



**2CP650 BATTERY
PRODUCT
SPECIFICATION**

Part Number 61350650

TECHNOLOGY

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

ELECTRICAL DATA


Type	2CP650		
Nominal Voltage	2 volts (1 cell)		
Rated Capacity	652 Ah - C ₁₀ to 1.80 Vpc at 20 °C 661 Ah - C ₁₀₀ to 1.80 Vpc at 20 °C		
Current / Power			
0.5 hr back-up time	1.65 Vpc	20 °C	764.9 A 1372 W
1.0 hr back-up time	1.67 Vpc	20 °C	458.3 A 845 W
2.0 hr back-up time	1.80 Vpc	20 °C	248.8 A 472 W
4.0 hr back-up time	1.80 Vpc	20 °C	140.3 A 274 W
8.0 hr back-up time	1.80 Vpc	20 °C	79.4 A 154 W
10.0 hr back-up time	1.80 Vpc	20 °C	65.2 A 126 W
20.0 hr back-up time	1.80 Vpc	20 °C	34.2 A 65.6 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	0.19 mΩ		
Short circuit current (± 10%) to IEC/EN 60896-21	10.5 kA		
Self discharge at 20° C IEC/EN 60896-21	max. 3%/month		
Heat loss during float service at 20 °C	≈ 0.65 W		

MECHANICAL DATA

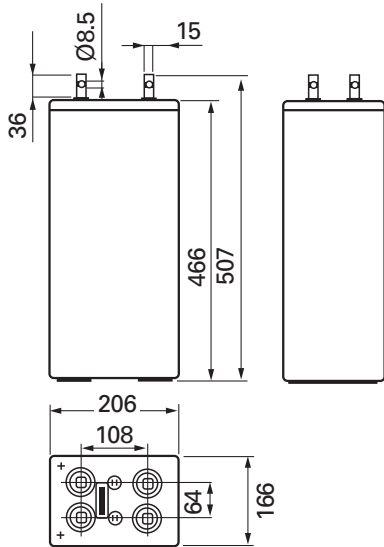
Weight ready for use	50.9 kg
Height of cell	507 mm
Height over terminal connector	512 mm
Width	206 mm
Depth	166 mm
Number of terminals	2⊕ / 2⊖
Terminals	ø 8.5 mm (through hole M8)
Suggested/maximum cable cross-section	4-185 mm ² *) up to 6-185 mm ² / up to 4-240 mm ² *)
Connection torque	25 Nm
Terminal 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	4-90 mm ²
Complete connector and terminal connection accessories	available

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

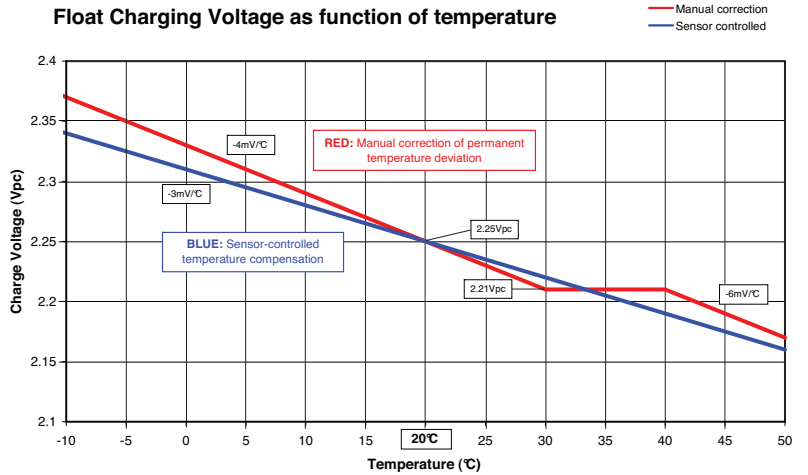
ENVIRONMENTAL DATA

Installation	Vertically / horizontally
Distance for cooling and ventilation (preset with the rigid connectors)	12 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: 0.7836 m ³ /hr = 27.67 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)

2CP650 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	755	743	720	694	657	600	551	510	474	417	372	337	264	219	159	129	109	96.4	76.1	63.0	53.7	33.6	28.1
	25 °C	778	765	742	715	677	618	568	525	488	430	383	347	272	226	163	132	112	99.3	78.4	64.9	55.3	34.6	28.9
1.87	20 °C	915	898	864	828	775	697	632	578	533	461	408	366	281	230	165.8	133.2	112.4	98.6	77.5	63.9	54.4	33.8	28.3
	25 °C	942.4	924.9	889.9	852.8	798.2	717.9	650.9	595.3	548.9	474.8	420.2	376.9	289.4	236.9	170.8	137.2	115.8	101.5	79.8	65.8	56.0	34.8	29.1
1.85	20 °C	1026	1005	963	917	853	759	683	620	569	488	428	382	291	237	169.7	135.7	114.1	99.8	78.2	64.4	54.8	34	28.4
	25 °C	1056.7	1035.1	991.8	944.5	878.5	781.7	703.4	638.6	586.0	502.6	440.8	393.4	299.7	244.1	174.8	139.8	117.6	102.7	80.5	66.3	56.4	35.0	29.2
1.84	20 °C	1082	1058	1011	962	891	789	707	640	585	500	438	390	295	240	171.5	136.9	115.0	100	78.5	64.6	54.9	34.0	28.4
	25 °C	1114.4	1089.7	1041.3	990.8	917.7	812.6	728.2	659.2	602.5	515	451.1	401.7	303.8	247.2	176.7	141.0	118.4	103	80.8	66.5	56.5	35.0	29.2
1.83	20 °C	1138	1111	1060	1005	928	818	730	659	601	512	447	397	299	242	172.9	137.8	115.5	101	78.8	64.8	55.1	34.1	28.4
	25 °C	1172.1	1144.3	1091.8	1035.1	955.8	842.5	751.9	678.7	619.0	527.3	460.4	408.9	307.9	249.2	178.1	141.9	119.0	104.0	81.1	66.7	56.7	35.1	29.3
1.82	20 °C	1192.2	1163.5	1107.1	1047.6	963.9	846.0	752.3	677.2	616.0	522.5	454.6	403.1	303.1	244.6	174.4	138.8	116.2	101.1	79.0	64.9	55.1	34.1	28.4
	25 °C	1228.0	1198.4	1140.3	1079.1	992.8	871.4	774.9	697.5	634.5	538.2	468.3	415.2	312.2	251.9	179.7	142.9	119.7	104.1	81.4	66.9	56.8	35.1	29.3
1.80	20 °C	1299.0	1265.0	1198.6	1129.2	1032.5	898.4	793.5	710.4	643.3	542.0	469.4	414.7	309.6	248.8	176.9	140.3	117.2	101.8	79.4	65.2	55.3	34.2	28.5
	25 °C	1338.0	1302.9	1234.5	1163.1	1063.5	925.3	817.3	731.7	662.6	558.3	483.4	427.1	318.8	256.2	182.2	144.5	120.8	104.8	81.8	67.2	57.0	35.2	29.3
1.77	20 °C	1449.6	1407.3	1325.6	1241.3	1125.5	967.9	847.2	753.2	678.2	566.6	487.7	428.9	317.4	253.8	183.3	144.6	119.9	102.6	79.9	65.6	55.6	34.3	28.6
	25 °C	1493.1	1449.5	1365.4	1278.5	1159.2	997.0	872.7	775.8	698.6	583.6	502.3	441.8	326.9	261.4	188.8	148.9	123.5	105.7	82.3	67.6	57.3	35.3	29.4
1.75	20 °C	1542.5	1494.7	1402.8	1308.7	1180.7	1008.5	878.1	777.5	697.9	580.3	497.8	436.7	321.7	256.5	184.7	145.4	120.5	103.1	80.2	65.8	55.7	34.3	28.6
	25 °C	1588.8	1539.5	1444.9	1348.0	1216.1	1038.7	904.5	800.8	718.8	597.7	512.7	449.8	331.3	264.2	190.2	149.8	124.1	106.1	82.6	67.7	57.4	35.3	29.4
1.72	20 °C	1670	1614	1508	1400	1254	1062	918	809	723	597	510	446	326.9	259.9	186.4	146.5	121.2	103.6	80.6	66	55.9	34.4	28.7
	25 °C	1720.1	1662.4	1553.2	1442	1291.6	1093.8	945.5	833.2	744.6	614.9	525.3	459.3	336.7	267.6	191.9	150.8	124.8	106.7	83.0	67.9	57.5	35.4	29.5
1.70	20 °C	1747.5	1686.4	1570.4	1453.4	1297.1	1092.3	941.0	826.4	737.0	607.1	517.3	451.7	329.7	261.6	187.3	147.1	121.6	103.9	80.7	66.1	56.0	34.4	28.7
	25 °C	1799.9	1737.0	1617.5	1497.0	1336.1	1125.0	969.2	851.2	759.1	625.3	532.9	465.2	339.6	269.5	192.9	151.5	125.2	107.0	83.1	68.1	57.6	35.4	29.5
1.67	20 °C	1851.8	1783.3	1654.1	1524.9	1353.7	1132.1	970.4	849.0	754.9	619.2	526.1	458.3	333.3	263.9	188.4	147.8	122.0	104.2	80.9	66.2	56.1	34.4	28.7
	25 °C	1907.4	1836.8	1703.7	1570.6	1394.4	1166.1	999.6	874.5	777.6	637.8	541.9	472.1	343.3	271.8	194.1	152.2	125.7	107.3	83.3	68.2	57.7	35.5	29.5
1.65	20 °C	1913.3	1840.2	1703.0	1566.3	1386.3	1154.8	987.1	861.7	764.9	625.9	531.0	462.0	335.2	265.1	189.1	148.1	122.3	104.4	81.0	66.3	56.1	34.4	28.7
	25 °C	1970.7	1895.5	1754.1	1613.3	1427.9	1189.4	1016.7	887.5	787.9	644.7	546.9	475.9	345.3	273.0	194.7	152.6	126.0	107.5	83.5	68.3	57.8	35.5	29.5
1.63	20 °C	1968.4	1891.2	1746.5	1603.0	1415.0	1174.6	1001.5	872.7	773.6	631.7	535.1	465.2	336.9	266.1	189.6	148.5	122.5	104.6	81.1	66.4	56.2	34.5	28.7
	25 °C	2027.4	1947.9	1798.9	1651.1	1457.4	1209.9	1031.6	898.9	796.8	650.6	551.2	479.1	347.0	274.1	195.3	152.9	126.2	107.7	83.6	68.4	57.8	35.5	29.6
1.60	20 °C	2041.7	1958.8	1804.0	1651.4	1452.5	1200.4	1020.2	886.8	784.7	639.1	540.4	469.1	338.9	267.4	190.2	148.9	122.8	104.8	81.3	66.5	56.2	34.5	28.7
	25 °C	2103.0	2017.6	1858.2	1700.9	1496.1	1236.4	1050.8	913.4	808.2	658.2	556.6	483.2	349.1	275.4	195.9	153.3	126.5	107.9	83.7	68.5	57.9	35.5	29.6

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	1449	1425	1378	1328	1254	1144	1050	971	903	794	710	643	505	419	316	255	215	187	148	122	104	65.0	54.0
	25 °C	1492	1468	1419	1368	1292	1178	1082	1000	930	818	731	662	520	432	325	263	221	193	152	126	107	67.0	55.6
1.87	20 °C	1729	1695	1630	1560	1459	1312	1190	1089	1005	871	771	693	535	440	327	263	221	191	150	124	105	65.2	54.2
	25 °C	1781	1746	1679	1607	1503	1351	1226	1122	1035	897	794	714	551	453	337	271	228	197	155	128	108	67.2	55.8
1.85	20 °C	1917	1876	1796	1711	1590	1417	1276	1161	1065	917	806	721	552	451	334	267	223	193	151	125	106	65.3	54.3
	25 °C	1975	1932	1850	1762	1638	1460	1314	1196	1097	945	830	743	569	465	344	275	230	199	156	129	109	67.3	55.9
1.84	20 °C	2010	1964	1877	1784	1653	1467	1316	1194	1093	937	822	734	560	456	336	269	225	193	152	125	106	65.5	54.4
	25 °C	2070	2023	1933	1838	1703	1511	1356	1230	1126	965	847	756	576	469	346	277	231	199	156	129	109	67.4	56.1
1.83	20 °C	2100	2051	1956	1856	1714	1515	1355	1225	1120	956	837	746	566	460	339	270	226	194	152	125	106	65.5	54.5
	25 °C	2163	2112	2014	1911	1766	1560	1395	1262	1153	985	862	768	583	474	349	278	233	200	157	129	110	67.5	56.1
1.82	20 °C	2189	2135	2032	1924	1773	1560	1391	1255	1144	974	851	757	573	464	341	272	227	195	153	126	107	65.6	54.6
	25 °C	2255	2199	2093	1982	1826	1607	1433	1293	1178	1003	877	780	590	478	351	280	234	201	158	130	110	67.6	56.2
1.80	20 °C	2358	2295	2177	2053	1882	1644	1457	1309	1189	1006	875	776	584	472	345	274	228	196	154	126	107	65.6	54.6
	25 °C	2429	2364	2242	2115	1938	1693	1501	1348	1225	1036	901	799	602	486	355	282	235	202	159	130	110	67.6	56.3
1.77	20 °C	2587	2512	2370	2225	2025	1752	1541	1376	1244	1046	905	799	597	480	349	277	230	198	154	126	107	65.7	54.7
	25 °C	2665	2587	2441	2292	2086	1805	1587	1417	1281	1077	932	823	615	494	359	285	237	204	159	130	111	67.7	56.3
1.75	20 °C	2723	2640	2484	2325	2107	1813	1589	1414	1275	1068	921	812	604	485	352	278	231	198	155	127	108	65.7	54.7
	25 °C	2805	2719	2559	2395	2170	1867	1637	1456	1313	1100	949	836	622	500	363	286	238	204	159	130	111	67.7	56.4
1.72	20 °C	2901	2807	2632	2454	2213	1891	1648	1461	1313	1094	940	827	612	490	355	280	233	199	155	127	108	65.8	54.8
	25 °C	2988																						