

GFX (OPzS) series acid-proof stationary battery



shoto[®]

power the future





Primary application

- DC power and standby power for operate equipment of power system and nuclear power station
- Standby power supply for various communication and signal systems
- Solar energy, wind energy, hydroelectric generation power storage and wind & solar hybrid project;
- Standby power supply for shipping;
- Standby power supply for petrochemical industry;
- Standby power supply for UPS, medical facilities and emergency lighting and so on;
- UPS.

Structure features of Shoto GFX series acid-proof stationary battery

- **Plate:**
Positive plate adopts tubular type plate which can effectively prevent active substance falling, positive plate frame is made of complex alloy, the alloy crystal particle is tiny and dense, the corrosion-resisting performance is good and service life is long. The negative plate adopts pasted plate, grid adopts radiated structure, which enhances utilization ratio of active substance and discharge capability of strong current; moreover, the charge reception capability is strong.
- **Battery case:**
Adopt AS transparent case with corrosion prevention, high strength and beautiful appearance, the internal structure and state of battery can be directly observed via transparent case.
- **Separator:**
The combined separator of multi-hole corrugated plastic plate and micro-bore rubber separator have bigger electrolyte storage space, which enhances dispersion speed of electrolyte, greatly reduces internal resistance of battery and prevents dendrite short circuit after deep discharge.

➤ **Terminal sealing:**

The built-in copper-core lead-based terminal post has strong current carrying capacity and corrosion resistance. The unique terminal post sealing structure can effectively eliminate the stress which is generated due to plate extension, leakage is avoided, sealing reliability of terminal post is ensured and service life of battery is greatly increased.

➤ **Acid resistant bolt:**

Adopt special funnel-shaped acid resistant bolt which can filter acid fume and prevent flame, the density and temperature of electrolyte can be measured directly, use is safe and maintenance is convenient.

Standard

IEC60896-11 DIN40736

BS EN 61427-2002

GB/T13337.1

Q/321284KCC 03-2006

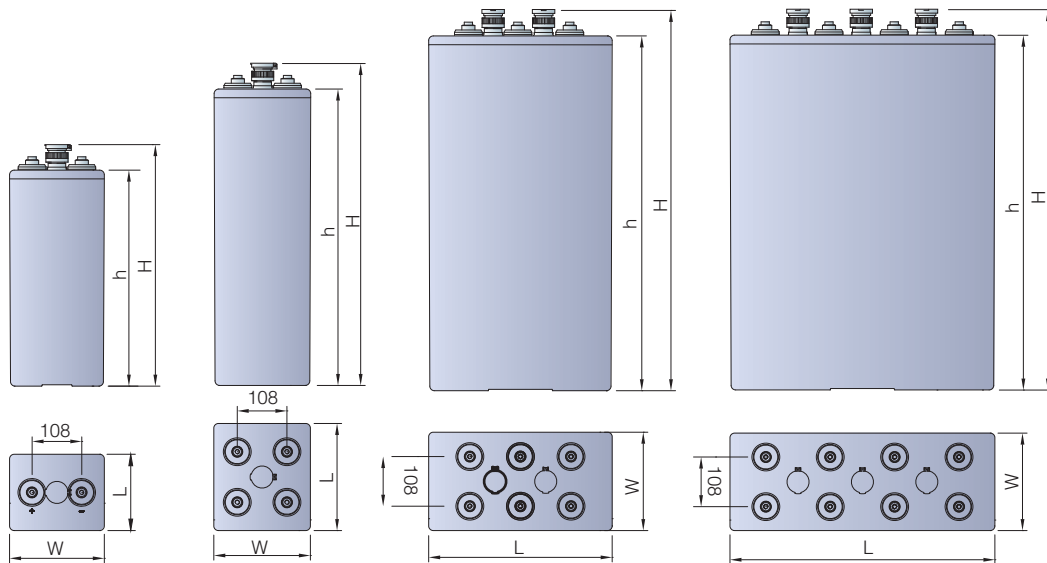
Features of application performance:

- **Designed service life of 22 years**
- **Water supplement cycle 0.25-1 year (normal)**
- **1-2 year (choose water content recombination valve)**
- **High cycle service life**
- **Better temperature resistance performance**
- **Excellent deep cycle performance**
- **Superior low current discharge performance**
- **Better charge reception capability**
- **Better safety performance and reliability**
- **Modular and personified installation design**
- **Performance price ratio is high and yearly operating cost is low**
- **Eco-friendly, cycle application**

Environmental requirement:

- Temperature: available for -20~50 (-4~122F), relative humidity 90%; the ambient temperature for batteries in the same pack shall be unified; ambient temperature is recommended for 20~25 (68~77F), storage temperature is 0~20 (32~68F); general storage period is 3~6 months, if it's exceeded, battery shall be charged. If the ex-works battery with acid addition charge exceeds 3~6 months, it shall be charged.
- Sea level height can't exceed 4000m (if 4000m is exceeded, it shall be specified in order);
- The operating environment shall be kept from ignition source, dry, clean and ventilated without radial ray, ultra-red radiation, organic solvent and corrosive gas, and it shall be kept out of the sun and ultraviolet ray level can't exceed level 2.
- Avoided being buried by sand, rained and watered; lightning stroke, small animal and electric shock shall be prevented, and insulation resistance 2 ;
- The acid density of GFX flooded battery shall be regulated when it's used, and the installation ground shall be provided with functions of acid etching protection, water prevention and water discharge.
- If battery is installed in high and cold area, anti-freezing measures shall be taken.

Model introduction:



GFX-200~GFX-600

GFX-800~GFX-1500

GFX-2000

GFX-2500~GFX-3000

Table of product specification and main parameters

Type	Rated Voltage (V)	Rated Capacity (Ah)	Number of terminal post with like polarity	Dimension (mm)				Weight (Kg)		
				Length L	Width W	Height h	Total height H	Without electrolyte	With electrolyte	Acid weight
GFX-200	2	200	1	103	206	354	409	13.5	18.0	4.5
GFX-250	2	250	1	124	206	354	409	16.0	21.0	5.0
GFX-300	2	300	1	145	206	354	409	19.0	25.0	6.0
GFX-350	2	350	1	124	206	470	525	21.5	28.0	6.5
GFX-420	2	420	1	145	206	470	525	25.5	33.5	8.0
GFX-490	2	500	1	166	206	470	525	29.0	39.0	10.0
GFX-600	2	600	1	145	206	645	700	34.0	46.0	12.0
GFX-800	2	800	2	191	210	645	700	48.0	64.0	16.0
GFX-1000	2	1000	2	233	210	645	700	57.0	77.0	20.0
GFX-1200	2	1200	2	275	210	645	700	68.0	92.0	24.0
GFX-1500	2	1500	2	275	210	795	850	82.0	112.0	30.0
GFX-2000	2	2000	3	399	214	772	827	110.0	150.0	40.0
GFX-2500	2	2500	4	487	212	772	827	140.0	190.0	50.0
GFX-3000	2	3000	4	576	212	772	827	163.0	225.0	62.0

Note: Output terminal is the M10 screw hole.

List of product internal resistance, short-circuit current, packing and transportation data

Model	Internal resistance (mΩ)	Short-circuit current (A)	Battery number Cell/case	Whole case weight(Kg)		20' Cabinet case number	20' Cabinet battery number
				Battery without electrolyte	Battery with electrolyte		
GFX-200	0.62	3129	12	194	248	54	648
GFX-250	0.58	3345	12	227	287	42	504
GFX-300	0.53	3661	12	265	337	42	504
GFX-350	0.51	3804	12	296	374	28	336
GFX-420	0.48	4042	12	347	443	28	336
GFX-490	0.45	4311	12	391	511	24	288
GFX-600	0.44	4409	12	453	597	28	336
GFX-800	0.41	4732	8	425	553	31	248
GFX-1000	0.37	5243	8	501	661	25	200
GFX-1200	0.34	5706	8	593	785	21	168
GFX-1500	0.32	6063	8	710	950	12	96
GFX-2000	0.28	6929	6	715	955	12	72
GFX-2500	0.26	7462	6	901	1201	11	66
GFX-3000	0.24	8083	3	535	721	15	45

Note: The packing and transportation data in the Table is only for reference, and specific requirements shall be specified in the contract.

Constant current discharge table

unit: A

Model and specification	Final voltage (V/unit)	Discharge time (min)					Discharge time (h)										
		5	10	15	30	45	1	1.5	2	3	4	5	8	10	20	100	120
GFX-200	1.90	121	110	100	91	76	75	56	52	42	33	29	21	18	10.41	2.69	2.24
	1.85	134	133	127	107	87	83	65	58	46	36	31	22	19	11.45	2.83	2.36
	1.80	165	161	158	128	98	93	67	62	49	41	35	25	20	12.01	2.94	2.45
	1.75	198	193	184	141	112	102	75	66	50	42	38	26	21	12.50	3.03	2.53
GFX-250	1.90	152	138	125	113	95	93	70	65	52	41	36	27	23	12.91	3.35	2.80
	1.85	167	165	160	133	109	104	81	72	57	45	39	28	24	14.20	3.53	2.95
	1.80	206	201	197	160	122	117	83	78	61	51	43	31	26	14.19	3.67	3.07
	1.75	247	241	230	177	140	127	93	82	63	52	44	33	28	15.50	3.78	3.16
GFX-300	1.90	183	165	150	136	114	112	84	79	58	49	43	32	28	15.62	4.00	3.36
	1.85	201	199	191	160	131	125	97	86	64	54	47	34	29	17.18	4.21	3.54
	1.80	247	241	236	192	147	140	100	93	73	61	52	37	31	18.04	4.38	3.68
	1.75	297	289	276	212	167	152	112	99	76	62	53	38	32	18.75	4.51	3.79
GFX-350	1.90	168	153	139	136	129	126	98	91	68	56	50	37	34	18.12	4.81	4.04
	1.85	185	184	191	179	148	143	113	103	75	61	55	40	35	19.93	5.06	4.25
	1.80	264	258	251	220	173	167	116	113	87	72	63	45	38	20.92	5.26	4.42
	1.75	317	310	299	246	197	183	130	122	91	74	65	46	39	21.75	5.42	4.55
GFX-420	1.90	202	184	167	164	154	151	118	109	81	67	59	45	40	21.87	5.76	4.83
	1.85	222	220	229	215	177	173	136	124	90	74	64	48	42	24.05	6.06	5.08
	1.80	317	310	301	262	208	200	140	135	105	86	76	54	45	25.25	6.27	5.26
	1.75	380	372	359	296	237	219	156	146	110	89	78	55	46	26.26	6.43	5.39

Constant current discharge table-continued

unit: A

Model and specification	Final voltage (V/unit)	Discharge time (min)					Discharge time (h)										
		5	10	15	30	45	1	1.5	2	3	4	5	8	10	20	100	120
GFX-490	1.90	235	214	194	191	180	176	137	127	95	78	69	52	47	25.41	6.75	5.65
	1.85	259	257	268	251	207	200	159	145	115	86	76	56	49	27.95	7.10	5.95
	1.80	370	361	351	305	242	233	163	158	124	100	89	63	53	29.34	7.35	6.24
	1.75	444	434	419	345	276	256	183	171	130	104	91	64	54	30.51	7.53	6.49
GFX-600	1.90	258	235	214	210	198	194	162	151	113	96	83	62	55	30.5	8.23	6.89
	1.85	279	270	268	261	228	220	187	167	126	105	92	66	57	33.55	8.66	7.25
	1.80	409	390	388	333	267	262	192	183	151	120	104	74	62	35.22	8.96	7.50
	1.75	490	468	463	382	304	288	215	198	153	125	107	76	64	36.62	9.19	7.69
GFX-800	1.90	345	313	285	280	264	259	216	202	151	128	111	82	73	40.62	10.98	9.18
	1.85	373	357	351	349	303	294	248	224	167	141	122	87	76	44.68	11.56	9.66
	1.80	551	528	517	444	355	349	256	244	201	160	139	99	82	46.91	11.96	10.00
	1.75	661	634	614	509	405	398	287	264	204	167	142	100	87	48.79	12.26	10.25
GFX-1000	1.90	399	363	330	323	305	299	250	234	189	159	139	103	91	50.41	13.76	11.48
	1.85	431	413	406	404	351	340	288	259	209	176	163	109	95	55.45	14.48	12.08
	1.80	688	660	646	556	444	437	320	305	256	200	173	123	103	58.22	14.99	12.50
	1.75	826	792	768	636	506	487	358	330	265	208	178	125	105	60.55	15.36	12.82
GFX-1200	1.90	517	470	428	419	395	388	324	280	227	191	167	124	109	60.83	16.45	13.78
	1.85	558	536	527	518	455	441	373	313	251	211	184	131	114	66.91	17.32	14.50
	1.80	826	792	776	667	561	524	391	386	301	240	208	148	124	70.25	17.93	15.01
	1.75	991	951	921	764	639	597	438	396	306	250	213	150	126	73.06	18.37	15.38
GFX-1500	1.90	525	477	433	426	403	394	373	323	263	231	202	148	131	75	20.12	16.86
	1.85	562	543	531	524	519	508	429	394	301	258	226	165	142	82.50	21.18	17.75
	1.80	844	817	788	751	640	633	471	463	360	289	261	185	155	86.62	21.92	18.37
	1.75	1013	981	945	885	730	719	528	506	387	317	274	189	157	90.09	22.47	18.83
GFX-2000	1.90	660	599	545	535	531	526	497	464	351	309	269	198	171	100	26.74	22.33
	1.85	713	707	704	698	686	642	571	539	400	344	302	220	189	110	28.15	23.50
	1.80	1071	1064	1034	1002	845	845	628	617	481	400	348	246	207	115.5	29.14	24.32
	1.75	1306	1298	1261	1180	963	958	704	674	516	424	366	251	209	120.1	29.86	24.93
GFX-2500	1.90	819	744	676	663	660	658	621	581	492	386	337	247	214	125	33.49	28.03
	1.85	883	878	875	873	852	789	714	673	560	430	377	275	237	137.5	35.25	29.50
	1.80	1329	1320	1293	1252	1059	1056	786	771	630	499	435	308	259	144.3	36.48	30.53
	1.75	1621	1610	1576	1475	1207	1198	880	843	646	528	457	314	261	150.1	37.40	31.30
GFX-3000	1.90	978	890	809	793	792	789	745	698	526	463	404	296	257	150	40.14	33.64
	1.85	1057	1050	1049	1048	1022	947	858	810	599	516	453	331	284	165	42.25	35.41
	1.80	1589	1578	1551	1503	1269	1267	943	926	760	599	521	370	311	173.2	43.73	36.65
	1.75	1938	1925	1891	1770	1447	1437	1056	1011	775	633	548	377	313	180.1	44.82	37.57

Constant power discharge table

unit: W

Model and specification	Final voltage (V/unit)	Discharge time (min)					Discharge time (h)										
		5	10	15	30	45	1	1.5	2	3	4	5	8	10	20	100	120
GFX-100	1.90	109	99	91	84	77	69	62	55	42	35	30	20	17	10.42	2.68	2.26
	1.85	120	119	112	100	90	79	70	61	47	38	33	23	19	11.35	2.79	2.36
	1.80	160	156	154	131	116	100	86	72	56	45	38	26	22	11.78	2.98	2.53
	1.75	192	187	178	148	129	110	94	77	58	46	39	27	23	12.06	3.11	2.62
GFX-200	1.90	218	198	178	165	150	135	121	107	83	68	58	40	33	20.82	5.38	4.48
	1.85	240	238	218	193	173	152	135	118	90	74	64	44	37	22.67	5.60	4.67
	1.80	320	312	293	249	220	190	164	137	106	85	72	49	42	23.54	5.76	4.80
	1.75	383	374	336	280	244	208	177	145	109	87	73	51	44	24.13	5.85	4.88
GFX-250	1.90	273	248	222	205	187	168	151	134	104	84	73	51	43	25.82	6.70	5.60
	1.85	300	298	273	240	215	189	168	147	113	93	79	56	47	28.12	6.99	5.84
	1.80	400	390	367	312	275	238	205	172	131	107	90	63	52	27.81	7.19	6.02
	1.75	480	468	421	350	305	260	221	181	135	110	91	63	52	29.92	7.30	6.10
GFX-300	1.90	327	297	266	248	225	201	181	160	125	102	87	62	53	31.24	8.00	6.72
	1.85	360	357	327	290	258	226	202	177	135	113	95	67	57	34.02	8.34	7.01
	1.80	479	468	441	375	331	286	246	205	157	128	108	75	63	35.36	8.58	7.21
	1.75	575	561	505	419	366	313	265	217	162	131	109	78	66	36.19	8.70	7.31
GFX-350	1.90	302	275	252	244	234	224	203	182	142	119	102	74	64	36.24	9.62	8.08
	1.85	333	330	313	303	277	251	227	202	158	131	112	80	69	39.46	10.02	8.42
	1.80	513	501	447	402	361	320	280	239	187	152	128	90	75	41.00	10.31	8.66
	1.75	615	601	514	450	405	360	309	257	196	158	132	96	77	41.98	10.46	8.78
GFX-420	1.90	363	330	303	292	279	266	242	217	171	142	122	89	77	43.74	11.52	9.66
	1.85	399	396	377	363	332	301	272	242	190	157	135	96	83	47.62	12.00	10.06
	1.80	615	601	535	481	432	383	335	286	223	183	154	108	90	49.49	12.29	10.31
	1.75	738	721	618	541	487	432	370	308	234	191	159	112	95	50.68	12.41	10.40
GFX-490	1.90	423	385	354	342	327	312	284	255	199	166	143	104	89	50.82	13.50	11.30
	1.85	466	462	439	425	389	352	317	282	221	184	158	112	97	55.34	14.06	11.78
	1.80	718	701	625	561	505	449	392	334	262	214	180	126	105	57.51	14.41	12.23
	1.75	861	841	645	630	567	504	431	358	274	222	185	128	109	58.88	14.53	12.53
GFX-600	1.90	464	422	379	367	356	345	323	300	247	208	180	130	113	61.00	16.46	13.78
	1.85	501	485	467	456	424	392	366	339	277	230	199	142	122	66.43	17.15	14.36
	1.80	793	756	659	610	562	514	463	411	328	269	227	161	136	69.03	17.56	14.70
	1.75	951	907	675	613	566	518	456	423	347	284	237	163	137	70.68	17.74	14.84
GFX-800	1.90	619	563	506	489	475	460	430	400	329	278	239	174	150	81.24	21.96	18.36
	1.85	669	642	623	608	566	523	487	451	368	308	265	190	164	88.47	22.89	19.13
	1.80	1068	1025	879	814	751	687	618	549	437	358	304	213	182	91.94	23.44	19.60
	1.75	1282	1230	901	818	755	692	608	524	464	380	317	217	184	94.16	23.66	19.78
GFX-1000	1.90	774	704	632	611	593	575	538	500	411	347	298	217	188	100.8	27.52	22.96
	1.85	836	802	779	759	707	654	610	565	430	386	331	237	204	109.8	28.67	23.92
	1.80	1335	1281	1098	1016	937	857	771	685	547	447	378	267	227	114.1	29.38	24.50
	1.75	1602	1537	1126	1023	944	864	760	712	579	473	395	271	229	116.9	29.64	24.74

Constant power discharge table--continued

unit: W

Model and specification	Final voltage (V/unit)	Discharge time (min)					Discharge time (h)										
		5	10	15	30	45	1	1.5	2	3	4	5	8	10	20	100	120
GFX-1200	1.90	929	844	757	733	712	690	645	600	493	417	359	261	225	121.7	32.90	27.56
	1.85	1003	962	934	911	848	784	731	677	553	463	397	284	245	132.5	34.29	28.71
	1.80	1602	1537	1318	1220	1125	1029	926	823	656	537	455	320	274	137.7	35.14	29.42
	1.75	1922	1844	1350	1228	1133	1037	912	881	694	568	475	326	276	141.0	35.45	29.68
GFX-1500	1.90	942	857	770	762	751	739	697	655	545	466	405	294	254	150.0	40.24	33.72
	1.85	1008	977	947	936	892	848	796	744	612	517	447	320	275	163.4	41.94	35.15
	1.80	1637	1586	1343	1295	1210	1124	1024	924	742	612	519	367	306	169.8	42.96	36.01
	1.75	1965	1903	1399	1313	1215	1116	979	946	803	645	537	378	309	173.9	43.37	36.34
GFX-2000	1.90	1185	1077	1028	1016	1000	984	929	873	725	621	540	392	338	200.0	53.48	44.66
	1.85	1280	1271	1263	1248	1189	1130	1061	992	816	688	595	426	367	217.8	55.74	46.53
	1.80	2077	2063	1792	1728	1613	1498	1365	1231	990	815	691	488	409	226.4	57.11	47.67
	1.75	2534	2517	1825	1795	1661	1526	1391	1256	1025	834	705	492	413	231.8	57.63	48.11
GFX-2500	1.90	1470	1336	1285	1270	1251	1232	1162	1091	907	775	675	490	423	250.0	66.98	56.06
	1.85	1588	1577	1579	1560	1487	1413	1327	1240	1020	861	744	533	459	272.3	69.80	58.41
	1.80	2578	2560	2240	2160	2017	1873	1706	1539	1237	1019	865	610	512	282.8	71.50	59.84
	1.75	3145	3124	2281	2243	2075	1906	1738	1569	1405	1130	939	613	518	289.7	72.18	60.41
GFX-3000	1.90	1758	1598	1543	1523	1501	1478	1394	1309	1087	933	811	588	509	300.0	80.28	67.28
	1.85	1899	1886	1895	1871	1784	1696	1592	1487	1223	1032	893	640	550	326.7	83.66	70.11
	1.80	3083	3062	2688	2592	2420	2248	2047	1846	1485	1224	1036	737	615	339.5	85.71	71.83
	1.75	3761	3735	2738	2693	2491	2288	2086	1883	1532	1235	1039	743	623	347.6	86.50	72.51

Model selection table for various power demands and standby power time of GFX series battery 48V system

Final voltage is 1.90V/cell.

Battery Capacity Power KW	Time	Time													
		5min	15min	30min	1h	2h	3h	5h	8h	10h	24h	48h	120h	240h	
0.05		100	100	100	100	100	100	100	100	100	200	200	250	500	
0.1		100	100	100	100	100	100	100	100	100	200	200	500	1000	
0.2		100	100	100	100	100	100	100	100	100	200	400	1000	2000	
0.5		100	100	100	100	100	100	100	100	150	500	1000	2500	5000	
1		100	100	100	100	100	100	200	250	300	1000	2000	5000	10000	
3		100	100	150	200	250	300	490	600	800	3000	6000	-	-	
5		200	250	300	350	420	600	800	1000	1200	5000	10000	-	-	
10		500	800	800	800	1000	1200	2000	2000	2500	10000	-	-	-	

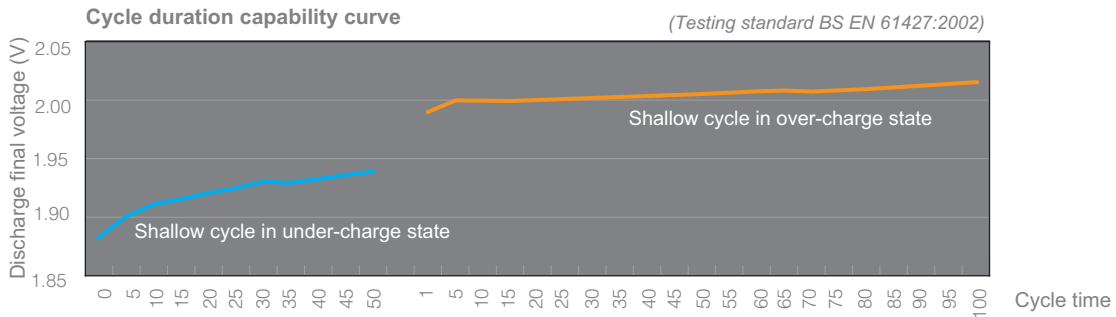
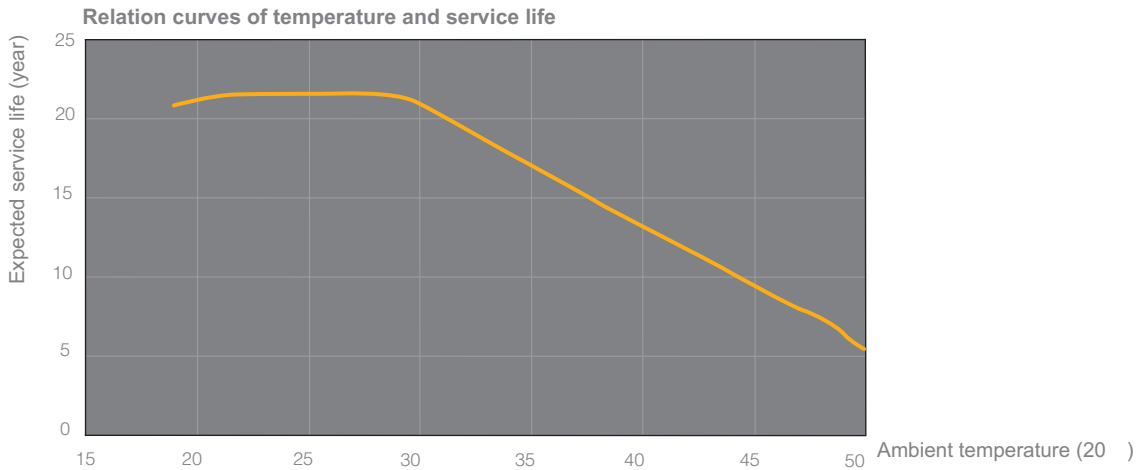
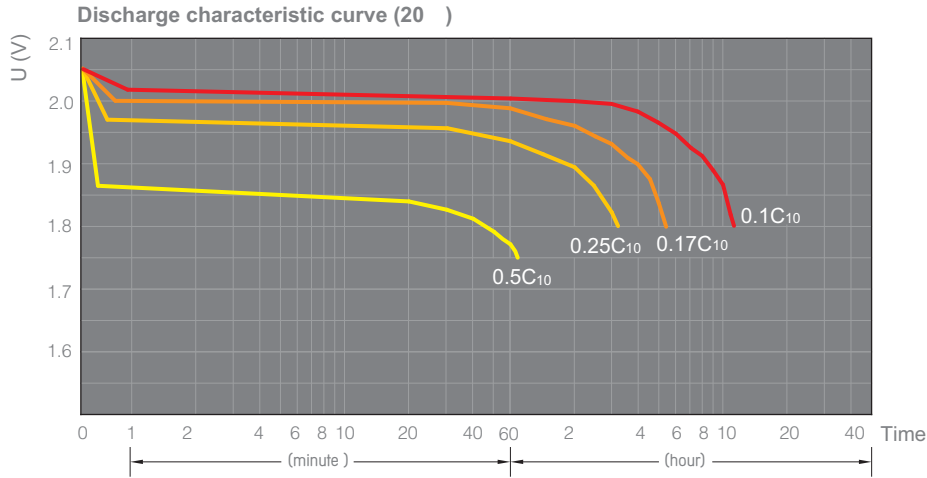
Final voltage is 1.80V/cell.

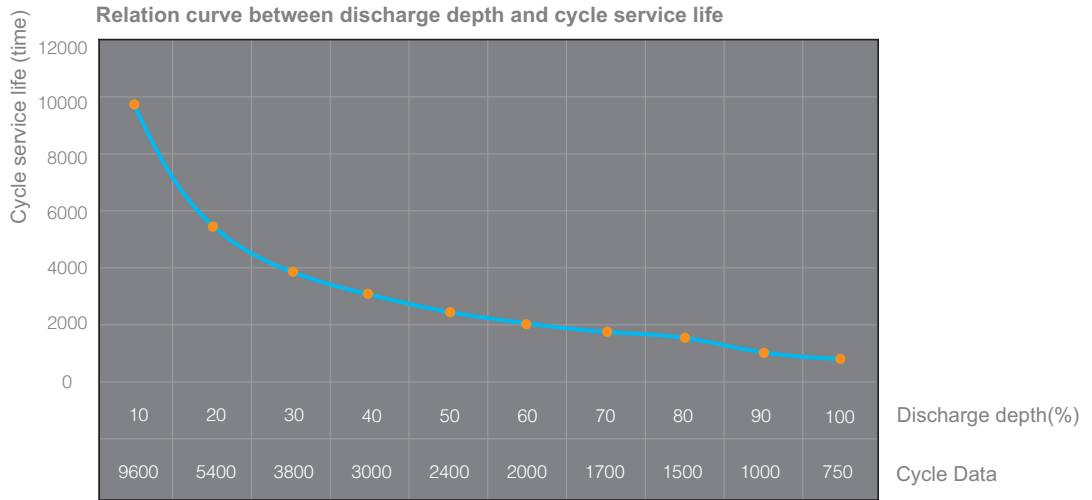
Battery Capacity Power kW	Time													
	5min	15min	30min	1h	2h	3h	5h	8h	10h	24h	48h	120h	240h	
0.05	100	100	100	100	100	100	100	100	100	200	200	200	420	
0.1	100	100	100	100	100	100	100	100	100	200	200	420	800	
0.2	100	100	100	100	100	100	100	100	100	200	320	800	1600	
0.5	100	100	100	100	100	100	100	100	100	420	800	2000	4000	
1	100	100	100	100	100	100	150	200	200	800	1600	4000	8000	
3	100	100	100	200	200	250	350	500	600	2500	4800	12000	-	
5	150	200	200	250	350	420	600	800	1000	4000	8000	-	-	
10	300	300	420	500	800	800	1200	2000	2500	8000	-	-	-	
30	1000	1200	1500	2000	2000	2500	4000	6000	7500	-	-	-	-	

Final voltage is 1.75V/cell.

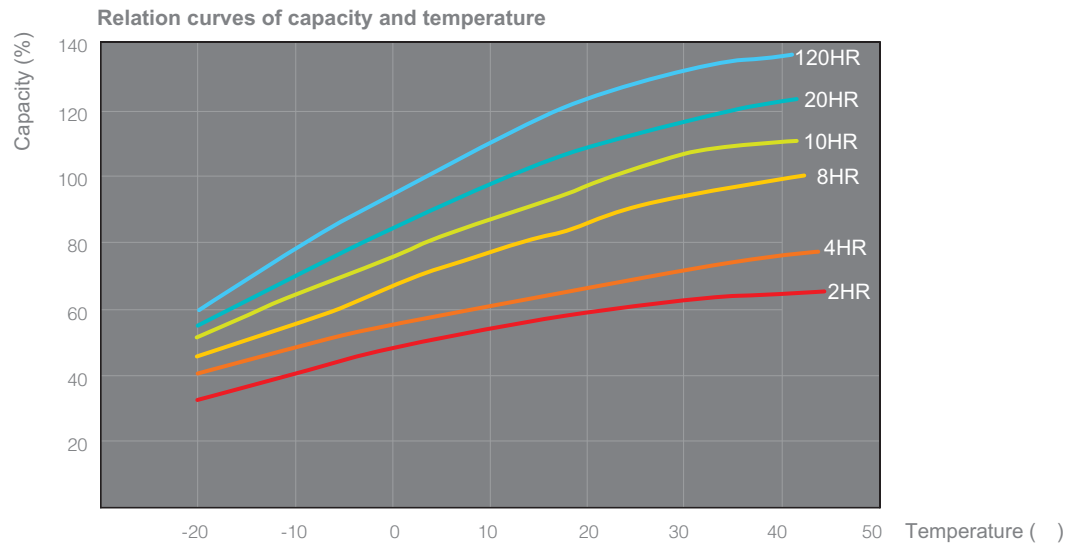
Battery Capacity Power kW	Time													
	5min	15min	30min	1h	2h	3h	5h	8h	10h	24h	48h	120h	240h	
0.05	100	100	100	100	100	100	100	100	100	200	200	200	350	
0.1	100	100	100	100	100	100	100	100	100	200	200	350	800	
0.2	100	100	100	100	100	100	100	100	100	200	300	700	1400	
0.5	100	100	100	100	100	100	100	100	100	350	800	2000	4000	
1	100	100	100	100	100	100	150	200	200	800	1500	4000	8000	
3	100	100	100	150	200	250	350	500	600	2500	5000	12000	-	
5	150	150	150	200	300	420	600	800	1000	4000	8000	-	-	
10	250	250	300	420	800	800	1200	2000	2000	8000	-	-	-	
30	800	1200	1500	2000	2000	2500	4000	5000	6000	-	-	-	-	

Performance curve of GFX series acid-proof stationary battery





Remark: a) test circumstances: 20-30 °C, relative humidity is 50~80percent;
 b) charge mode: charge quantity is equal to 105~115percent of discharge quantity
 c) residual capacity is 80 percent C₁₀



all data and specifications are subject to change without notice.

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