

Baterías estacionarias abiertas de bajo mantenimiento

Déjenos conducirlo al mundo de la energía sin fin y presentarle los bloques y elementos tipo OPzS que producimos según la tecnología convencional del plomo-ácido.

Nuestras baterías se distinguen por:

- su alta capacidad
- larga vida media
- mantenimiento reducido
- baja autodescarga
- control del nivel de ácido sencillo y rápido
- bajo nivel de consumo de agua
- dimensiones y pesos ajustados
- la más baja y constante corriente de flotación

Los elementos individuales (2 V) y los bloques (6 V y 12 V) están contenidos en recipientes fabricados en estirenoacrilnitrilo (SAN), un material que es extraordinariamente resistente a las influencias electroquímicas y a los daños mecánicos.

Las baterías estacionarias del tipo OPzS se fabrican de acuerdo a las normas DIN 40736, EN 60896 y IEC 896-1.

Aplicaciones

Las baterías estacionarias del tipo OPzS están destinadas a ser usadas para el suministro de energía en instalaciones de telecomunicaciones, ordenadores, luces de emergencia, alarmas, sistemas de control y vigilancia en plantas de energía y estaciones de distribución, en estaciones de ferrocarril, aeropuertos, etc...

Debido a su extremadamente bajo nivel de autodescarga, son las más adecuadas en las instalaciones de energía solar.

Estructura

La placa positiva es de tipo tubular, lo que quiere decir que la materia activa (PbCh) está contenida en unas bolsas especiales hechas de una fibra de poliéster y endurecida por medio de un compuesto del que se impregnan.

Esta estructura previene el escape de la materia activa durante el uso y asegura una larga duración.

Tanto las rejillas de las placas positivas como las de las negativas están fabricadas de una aleación especial con bajo contenido en antimonio (1,6%) con la adición de otros agentes para la mejora de la estructura cristalina.

Las placas negativas están empastadas con una aleación especial que mantiene un óptimo nivel de porosidad de la sustancia activa durante el funcionamiento de la batería.

Como electrolito se usa ácido sulfúrico con una densidad de 1,24 FO,01 Kg/1 a 20 °C, y con un nivel predeterminado y marcado en el contenedor.

Los separadores entre placas positivas y negativas están fabricados de un material plástico microporoso que ofrece una resistencia interna mínima.

Los contenedores se fabrican en un material llamado estiroacrilnitrilo (SAN), y es transparente salvo la tapa superior que es opaca.

A través de un proceso especial, las tapas se encajan y sellan perfectamente al contenedor. Asimismo, los terminales están herméticamente unidos a la tapa por medio de juntas de goma para evitar cualquier posibilidad de fuga de electrolito.

Debido al hecho de que los contenedores son perfectamente transparentes, los niveles tanto máximo como mínimo de electrolito, son claramente visibles. Estas marcas de nivel están fabricadas con un material resistente al ácido y autoadhesivo y colocadas en un lateral del contenedor.

Un tapón cerámico se encarga de sellar el orificio de llenado para prevenir cualquier filtración de vapores provenientes de las reacciones que se producen en el electrolito. Sin embargo, deja pasar el oxígeno y el hidrógeno que se desprenden en el proceso normal de carga.

Se fabrican 2 versiones de las baterías:

- Versión cargada en seco: las placas de la batería se cubren de electrolito y se cargan. Una vez hecho esto, las placas estarían formadas y después de un proceso de secado en una atmósfera libre de oxígeno para prevenir la oxidación, estarían listas para almacenar sin problemas de autodescarga. Para su posterior uso sólo habría que rellenar la batería con electrolito.
- Cargadas con electrolito: la batería estaría lista para su montaje y uso ya que la batería viene sumergida en electrolito y cargada. Cada elemento pasa una prueba de capacidad antes de ser calificada como apta para su uso.

Pedidos

Para que las baterías cumplan con todas las expectativas que se le demandan, les rogamos que en sus pedidos hagan constar los siguientes datos:

- Clase de dispositivo que hay que alimentar (centralita telefónica, convertidor DC-AC, luz de emergencia, etc...)
- Parámetros eléctricos del consumo (kW, kVA, factor de potencia,...)
- Tensiones máximas y mínimas en el elemento consumidor.
- Diagrama tiempo-consumo y autonomía requerida.
- Caída de tensión esperada en las líneas.
- Temperatura ambiente en la sala de baterías (media, mínima y máxima)
- Tipo de rectificador, sus características, punto de regulación I (A) o U (V), respectivamente.
- Dimensiones de la sala de baterías.
- Tipo de instalación (bornes soldados o enroscados, elementos en bancada metálica o de madera, o bancadas antisísmicas)
- Accesorios para el mantenimiento de baterías (densímetros, termómetros, jarra,...)
- Tipo de batería: cargada en seco o con electrolito.

En caso de problemas con el pedido, estamos a su disposición para aconsejarles y darles asistencia en la elección del tipo de batería.

Mantenimiento-Funcionamiento

Se recomienda que las baterías OPzS sean instaladas en sistemas donde estén conectadas continuamente a un rectificador o inversor.

La batería puede ser cargada en régimen de flotación a una tensión entre 2,23 y 2,25 V/elemento, o, en caso de una carga rápida después de una descarga, con tensiones comprendidas entre 2,35 y 2,40 V/elemento.

Una carga rápida normalmente dura otras 3 a 5 horas después de haber alcanzado de 2,35 a 2,40 voltios por elemento.

Después de ello, la tensión debe cambiar automáticamente al régimen de flotación. El mantenimiento de la batería se reduce a un mínimo cada cierto tiempo. En modo normal, sólo se debe añadir agua destilada una vez cada 2 o 3 años y, si es necesario, se debe limpiar la superficie de los elementos con un paño humedecido en agua. Todos los valores de tensión que se manejan en este manual están referidos a temperaturas entre 15 y 25 °C. Fuera de este rango, se deben aplicar las correcciones recomendadas por el fabricante.

OPzS - bloques / Datos técnicos

Tipo de elemento	12 V	12 V	12 V	6 V	6 V	6 V	
	1 OPzS	2 OPzS	3 OPzS	4 OPzS	5 OPzS	6 OPzS	
	50	100	150	200	250	300	
Tipo de placas	OPzS 50 (SPg250)						
Tensión	12	12	12	6	6	6	
Capacidad en Ah en regimen de descarga	1h	29	58	87	116	145	174
	3h	39	78	117	156	195	234
	5h	45	90	135	180	225	270
	10h	60	105	158	210	263	315
	100h	73	146	218	291	364	437
Intensidad de descarga en Amp.	1h	29	58	87	116	145	174
	3h	13	26	39	52	65	78
	5h	9	18	27	36	45	54
	10h	6,0	10,5	15,8	21,0	26,3	31,5
	100h	0,73	1,46	2,18	2,91	3,64	4,37
Tensión final - en V/E regimen de descarga	1h				1,71		
	3h				1,77		
	5h				1,78		
	10h				1,80		
	100h*				1,85		
Dimensiones en mm	L	272	272	380	272	380	380
	W	205	205	205	205	205	205
	h ₁	350	350	350	350	350	350
	h ₂	388	388	388	388	388	388
Peso en kg / Sin ácido / Con ácido		27,4	44,5	66,7	39,8	54,9	60,6
		36,6	53,3	76,2	48,5	65,3	72,8

* alrededor 25 °C

Baterías OPzS para aplicaciones solares

<i>Capacities in Ah</i>	C10	C20	C24	C48	C72	C96	C100	C120	C240
Type	Uf=1,8V at 20°C	Uf=1,85V at 25°C							
12V 1 OPzS 50	50	57	59	66	71	73	73	74	76
12V 2 OPzS 100	100	114	118	132	141	145	146	147	151
12V 3 OPzS 150	150	171	177	198	212	218	218	221	227
6V 4 OPzS 200	200	228	236	264	282	290	291	294	302
6V 5 OPzS 250	250	285	295	330	353	363	364	368	378
6V 6 OPzS 300	300	342	354	396	423	435	437	441	453
2 OPzS 100	100	117	121	135	145	150	151	152	158
3 OPzS 150	150	176	182	203	218	225	226	228	237
4 OPzS 200	200	234	242	270	290	300	301	304	316
5 OPzS 250	250	293	303	338	363	375	376	380	395
6 OPzS 300	300	351	363	405	435	450	452	456	474
5 OPzS 350	350	410	424	473	508	525	527	532	553
6 OPzS 420	420	491	508	567	609	630	632	638	664
7 OPzS 490	490	573	593	662	711	735	737	745	774
6 OPzS 600	600	702	726	810	870	900	903	912	948
8 OPzS 800	800	936	968	1080	1160	1200	1204	1216	1264
10 OPzS 1000	1000	1170	1210	1350	1450	1500	1510	1520	1580
12 OPzS 1200	1200	1400	1450	1620	1740	1800	1810	1830	1900
12 OPzS 1500	1500	1760	1820	2030	2180	2250	2260	2280	2370
16 OPzS 2000	2000	2340	2420	2700	2900	3000	3010	3040	3160
20 OPzS 2500	2500	2930	3030	3380	3630	3750	3760	3800	3950
24 OPzS 3000	3000	3510	3630	4050	4350	4500	4520	4560	4740

The acid density in an electrically charged cell is 1,24 ± 0,1 kg/l at 293°K (= +20°C)

When cycling only 80% of the rated capacity shall be used. Deep discharge may reduce the operation life time.

1,70V/cell disc.(A)											
1,24kg/l 20°C											
Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	109	86	58	36	28	22	20	16	12	11,0	6,1
3 OPzS 150	155	123	83	52	40	32	29	24	18	15,8	8,8
4 OPzS 200	216	165	111	70	54	43	38	32	24	21,4	11,9
5 OPzS 250	268	204	138	87	67	54	47	40	30	26,6	14,9
6 OPzS 300	319	244	165	105	80	64	56	48	36	31,9	17,9
5 OPzS 350	337	269	193	125	94	77	67	58	45	38,4	21,2
6 OPzS 420	400	320	234	150	114	92	81	70	54	46,2	25,6
7 OPzS 490	465	371	267	174	133	108	94	81	63	53,7	29,7
6 OPzS 600	513	427	322	215	162	132	114	97	73	65,9	36,1
8 OPzS 800	697	577	435	290	218	177	152	129	97	87,9	48,2
10 OPzS 1000	865	718	541	361	272	221	190	161	121	110,0	60,2
12 OPzS 1200	1028	857	645	432	325	264	230	193	145	131,7	72,3
12 OPzS 1500	1161	1008	770	541	415	338	292	250	185	167,2	93,9
16 OPzS 2000	1574	1364	1035	724	551	449	389	333	247	222,4	124,8
20 OPzS 2500	1965	1703	1293	904	689	561	485	416	308	277,8	156,1
24 OPzS 3000	2337	2025	1540	1079	826	672	582	500	370	332,9	186,9

1,75V/cell disc.(A)											
Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	100	77	54	36	27	22	19	15	13	10,9	6,1
3 OPzS 150	143	110	78	51	39	32	27	23	19	15,8	8,8
4 OPzS 200	196	149	104	69	53	43	37	31	25	21,2	11,9
5 OPzS 250	243	185	130	85	66	53	45	39	31	26,4	14,8
6 OPzS 300	289	221	155	103	78	64	54	46	38	31,7	17,7
5 OPzS 350	297	244	183	124	93	76	66	56	46	38,5	21,3
6 OPzS 420	353	291	218	148	112	92	79	67	55	46,5	25,7
7 OPzS 490	410	338	253	172	131	106	92	79	64	54,0	29,6
6 OPzS 600	449	381	300	206	159	130	110	93	77	65,4	35,9
8 OPzS 800	611	514	406	277	213	174	147	124	103	86,8	47,8
10 OPzS 1000	757	639	504	345	265	217	184	155	128	108,7	59,5
12 OPzS 1200	900	763	602	413	318	260	220	186	154	130,4	71,7
12 OPzS 1500	949	863	701	511	399	329	284	241	198	165,9	93,0
16 OPzS 2000	1288	1168	943	684	530	438	378	321	264	220,0	123,6
20 OPzS 2500	1608	1458	1178	854	663	547	471	401	330	275,1	154,6
24 OPzS 3000	1911	1733	1409	1018	794	656	565	481	398	329,8	185,2

1,70 power- W/cell disc.											
1,24kg/l 20°C											
Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	189	153	105	67	51	42	37	29	23	20,8	11,6
3 OPzS 150	270	219	150	96	74	59	54	45	34	30,0	16,8
4 OPzS 200	375	293	200	129	99	81	71	60	46	40,6	22,7
5 OPzS 250	465	364	249	160	123	100	88	76	57	50,6	28,3
6 OPzS 300	554	435	297	192	147	120	105	90	68	60,6	34,0
5 OPzS 350	585	479	348	230	174	143	127	109	85	72,8	40,4
6 OPzS 420	695	571	423	275	210	172	152	131	102	87,6	48,6
7 OPzS 490	806	661	482	320	245	201	177	153	119	101,9	56,5
6 OPzS 600	891	761	581	395	300	245	213	182	138	125,1	68,7
8 OPzS 800	1211	1028	785	533	403	329	285	243	184	166,8	91,6
10 OPzS 1000	1501	1279	975	664	502	412	356	304	229	208,8	114,5
12 OPzS 1200	1785	1526	1164	793	600	492	431	364	275	249,9	137,4
12 OPzS 1500	2016	1795	1389	995	765	630	549	471	351	317,2	178,6
16 OPzS 2000	2732	2429	1867	1329	1017	836	730	628	468	421,8	237,3
20 OPzS 2500	3411	3033	2332	1660	1271	1044	911	784	584	526,9	296,8
24 OPzS 3000	4058	3607	2778	1981	1523	1252	1092	942	702	631,5	355,4

1,75 power -W/cell disc.											
Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	179	139	99	66	51	42	36	28	25	20,7	11,9
3 OPzS 150	255	198	142	95	73	59	51	44	36	30,0	17,2
4 OPzS 200	349	269	189	127	98	81	69	58	48	40,4	23,2
5 OPzS 250	433	334	236	158	122	100	85	73	60	50,3	28,9
6 OPzS 300	516	398	282	190	145	120	102	87	72	60,3	34,6
5 OPzS 350	530	440	334	228	174	143	124	106	88	73,3	41,6
6 OPzS 420	629	525	397	272	209	172	148	126	106	88,5	50,2
7 OPzS 490	731	609	460	317	244	199	173	148	123	102,7	57,8
6 OPzS 600	800	687	547	380	296	244	208	175	147	124,4	70,1
8 OPzS 800	1088	927	739	511	396	326	277	234	196	165,3	93,4
10 OPzS 1000	1348	1153	919	637	494	407	347	292	245	206,9	116,2
12 OPzS 1200	1604	1376	1096	762	592	488	415	351	294	248,1	139,9
12 OPzS 1500	1691	1557	1276	944	742	617	534	454	379	315,7	181,6
16 OPzS 2000	2294	2106	1716	1261	988	820	711	606	504	418,7	241,3
20 OPzS 2500	2866	2630	2145	1575	1234	1025	888	756	629	523,6	301,7
24 OPzS 3000	3406	3127	2566	1878	1479	1228	1065	908	760	627,5	361,6

1,80V/cell disc.(A)											
1,24kg/l 20°C											
Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	86	69	50	36	26	22	19	15	13	10,7	6,0
3 OPzS 150	123	99	72	51	38	32	27	23	19	15,5	8,7
4 OPzS 200	166	133	96	65	51	42	36	31	25	20,8	11,7
5 OPzS 250	206	165	120	81	63	52	44	39	31	25,9	14,5
6 OPzS 300	246	197	143	97	75	62	53	46	37	31,0	17,4
5 OPzS 350	251	216	167	115	90	74	64	55	45	38,0	21,2
6 OPzS 420	298	257	198	138	108	89	77	67	54	45,4	25,0
7 OPzS 490	346	298	230	161	126	103	90	78	64	53,2	29,6
6 OPzS 600	378	329	265	191	151	125	107	93	77	64,0	35,3
8 OPzS 800	446	444	357	256	202	167	144	123	102	85,3	47,1
10 OPzS 1000	637	552	444	319	252	209	180	154	128	106,5	58,6
12 OPzS 1200	758	659	531	382	302	250	215	185	153	127,8	70,6
12 OPzS 1500	791	743	617	467	370	310	269	233	192	161,3	91,0
16 OPzS 2000	1061	994	830	624	493	412	358	310	256	214,3	120,9
20 OPzS 2500	1325	1241	1036	779	616	515	447	388	319	267,5	150,7
24 OPzS 3000	1573	1475	1235	930	738	618	536	466	383	320,8	180,9

1,83V/cell disc.(A)											
Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	76	63	47	32	25	21	18	15	12	10,7	4,8
3 OPzS 150	109	90	68	46	36	30	25	22	18	15,4	6,4
4 OPzS 200	146	120	89	61	48	40	34	29	24	20,5	9,9
5 OPzS 250	181	149	111	76	60	50	42	37	30	25,6	12,7
6 OPzS 300	215	177	132	92	71	59	51	44	36	30,7	15,5
5 OPzS 350	221	193	153	108	85	70	61	53	44	36,8	20,8
6 OPzS 420	262	230	182	129	102	84	73	63	52	44,0	24,8
7 OPzS 490	304	266	221	151	119	98	86	74	61	51,7	29,1
6 OPzS 600	317	290	238	178	142	119	102	88	74	62,2	34,5
8 OPzS 800	430	373	321	239	189	159	137	118	98	83,1	46,0
10 OPzS 1000	534	488	400	298	236	198	170	147	123	103,5	57,4
12 OPzS 1200	635	582	478	356	283	238	204	177	147	124,5	68,9
12 OPzS 1500	662	627	552	427	344	289	253	220	183	154,6	86,1
16 OPzS 2000	889	847	742	570	457	385	337	294	244	205,7	114,2
20 OPzS 2500	1110	1059	926	712	571	481	420	367	304	256,8	142,6
24 OPzS 3000	1319	1258	1104	851	684	576	504	441	365	307,7	171,1

1,80 power -W/cell disc.											
1,24kg/l 20°C											
Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	157	127	93	68	50	41	35	29	25	20,5	11,8
3 OPzS 150	224	181	133	95	72	60	51	44	36	29,6	17,0
4 OPzS 200	303	243	177	120	95	78	67	58	48	39,8	22,8
5 OPzS 250	376	302	220	151	118	98	84	74	60	49,6	28,5
6 OPzS 300	448	360	263	180	141	117	100	88	71	59,5	34,1
5 OPzS 350	458	394	307	215	169	140	121	105	87	72,9	41,6
6 OPzS 420	544	470	365	256	202	167	146	127	105	87,0	49,0
7 OPzS 490	631	544	424	299	237	195	170	148	122	101,9	58,1
6 OPzS 600	690	601	487	355	283	235	203	177	147	122,8	69,3
8 OPzS 800	814	812	657	477	379	316	272	234	196	163,5	92,3
10 OPzS 1000	1161	1009	818	594	472	393	339	293	245	204,3	114,8
12 OPzS 1200	1382	1203	977	711	567	472	406	352	294	245,0	138,3
12 OPzS 1500	1441	1357	1136	869	695	584	508	443	369	309,3	178,3
16 OPzS 2000	1935	1815	1527	1161	926	777	677	590	491	410,9	236,9
20 OPzS 2500	2416	2265	1907	1450	1156	971	845	738	613	513,1	295,3
24 OPzS 3000	2868	2694	2274	1732	1386	1164	1013	885	736	615,2	354,6

1,83 power -W/cell disc.											
Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	140	117	87	61	48	39	34	28	24	20,6	9,4
3 OPzS 150	201	167	125	87	68	57	48	43	36	29,8	12,5
4 OPzS 200	269	222	164	115	91	76	65	57	46	39,7	19,5
5 OPzS 250	333	276	205	143	113	94	81	70	58	49,5	24,9
6 OPzS 300	397	329	244	172	135	112	97	84	69	59,4	30,4
5 OPzS 350	406	358	283	203	162	133	117	102	85	71,1	40,8
6 OPzS 420	483	426	337	243	193	160	140	122	101	85,1	48,6
7 OPzS 490	561	494	408	283	225	187	163	142	118	100,0	57,1
6 OPzS 600	584	539	441	334	269	226	194	170	142	120,2	67,6
8 OPzS 800	793	691	595	448	359	302	261	227	190	160,7	90,1
10 OPzS 1000	984	905	740	559	448	377	325	282	237	200,1	112,6
12 OPzS 1200	1171	1080	884	669	536	452	390	339	284	240,8	135,0
12 OPzS 1500	1221	1163	1021	802	652	550	483	423	354	299,0	168,8
16 OPzS 2000	1638	1572	1372	1070	867	732	643	565	471	397,8	223,8
20 OPzS 2500	2047	1964	1713	1337	1083	915	802	705	587	496,7	279,6
24 OPzS 3000	2432	2333	2043	1597	1297	1096	962	847	705	595,1	335,4

1,87V/cell disc.(A)

1,24kg/l

20°C

Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	63	53	41	29	23	19	17	13	12	10,0	4,7
3 OPzS 150	90	75	59	42	33	28	24	21	17	14,3	6,2
4 OPzS 200	118	100	78	55	44	36	32	27	22	19,4	9,6
5 OPzS 250	147	123	96	69	54	45	39	34	28	24,3	12,4
6 OPzS 300	174	147	115	82	65	54	47	41	34	28,7	15,1
5 OPzS 350	177	161	131	96	77	64	56	49	41	34,4	19,6
6 OPzS 420	210	192	156	115	92	76	67	58	49	41,3	23,6
7 OPzS 490	244	223	180	134	107	88	78	68	56	48,3	27,4
6 OPzS 600	250	237	202	156	127	107	94	81	67	58,2	33,4
8 OPzS 800	339	321	273	209	170	144	125	108	90	77,9	44,4
10 OPzS 1000	420	399	339	262	212	179	157	135	113	96,9	55,5
12 OPzS 1200	501	475	404	313	254	215	187	162	135	116,6	66,5
12 OPzS 1500	513	494	462	365	299	258	226	200	167	142,3	81,8
16 OPzS 2000	696	668	621	488	398	342	302	267	222	190,0	108,5
20 OPzS 2500	869	819	775	609	497	428	377	333	277	236,9	135,7
24 OPzS 3000	1032	992	925	727	596	513	452	400	333	284,3	162,5

1,90V/cell disc.(A)

Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	46	41	34	24	19	16	14	12	10	8,9	4,1
3 OPzS 150	69	63	51	36	29	24	21	19	16	13,9	5,5
4 OPzS 200	91	82	67	48	38	32	28	25	21	18,1	8,8
5 OPzS 250	114	103	84	60	48	40	35	32	26	23,0	11,5
6 OPzS 300	127	124	100	72	57	49	42	38	31	27,1	14,3
5 OPzS 350	130	126	113	83	67	56	50	44	37	32,4	19,3
6 OPzS 420	156	151	136	100	81	67	59	53	44	39,4	23,4
7 OPzS 490	182	177	159	116	94	78	69	62	51	45,5	27,1
6 OPzS 600	194	188	174	137	112	95	83	74	61	53,8	32,2
8 OPzS 800	258	251	233	183	149	127	110	99	81	71,0	42,9
10 OPzS 1000	323	314	291	228	186	158	137	123	102	89,0	53,5
12 OPzS 1200	374	364	349	274	223	190	164	148	122	106,8	64,1
12 OPzS 1500	402	393	368	318	262	229	199	179	147	126,7	80,4
16 OPzS 2000	518	507	490	424	349	305	266	237	196	169,1	106,9
20 OPzS 2500	648	634	613	530	436	381	332	297	245	211,4	133,8
24 OPzS 3000	777	760	735	636	524	458	399	356	294	253,7	160,6

1,87 power -W/cell disc.

1,24kg/l

20°C

Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	118	100	78	55	44	37	32	26	23	19,6	9,2
3 OPzS 150	171	142	112	80	64	54	46	41	34	28,0	12,2
4 OPzS 200	223	188	147	106	84	70	62	53	44	37,9	18,8
5 OPzS 250	277	233	183	131	104	88	76	66	55	47,4	24,2
6 OPzS 300	329	278	218	157	124	105	91	80	66	56,1	29,5
5 OPzS 350	334	304	248	184	147	123	108	94	79	67,2	38,4
6 OPzS 420	397	362	295	220	176	148	129	112	95	80,8	46,4
7 OPzS 490	461	421	342	256	205	171	151	132	110	94,4	53,8
6 OPzS 600	471	448	383	298	243	208	182	157	131	113,8	65,4
8 OPzS 800	639	606	517	400	326	279	243	210	176	152,3	87,0
10 OPzS 1000	793	753	642	499	406	347	304	262	219	189,5	108,7
12 OPzS 1200	945	897	766	597	487	417	364	315	263	227,9	130,4
12 OPzS 1500	967	933	875	697	573	499	440	388	325	278,2	160,2
16 OPzS 2000	1313	1261	1176	930	763	663	586	517	433	371,4	212,6
20 OPzS 2500	1639	1545	1469	1162	952	828	732	647	540	463,1	266,1
24 OPzS 3000	1947	1872	1752	1388	1143	993	877	776	647	555,9	318,5

1,90 power -W/cell disc.

Cell Type	15 min	30 min	1 h	2h	3 h	4 h	5 h	6h	8 h	10 h	20h
2 OPzS 100	87	79	65	46	37	31	27	24	20	17,6	8,2
3 OPzS 150	131	119	97	69	56	46	41	37	31	27,4	11,0
4 OPzS 200	174	156	128	93	74	63	55	49	41	35,5	17,5
5 OPzS 250	217	196	160	116	94	79	69	63	51	45,2	23,0
6 OPzS 300	242	236	193	139	112	94	82	75	61	53,3	28,4
5 OPzS 350	247	240	217	161	131	109	96	87	72	63,7	38,4
6 OPzS 420	297	289	261	193	156	130	114	103	86	77,7	46,5
7 OPzS 490	346	337	304	224	182	152	134	120	100	89,6	53,9
6 OPzS 600	369	360	334	264	217	184	161	144	119	106,0	64,1
8 OPzS 800	491	480	446	352	289	247	213	193	159	139,9	85,3
10 OPzS 1000	615	600	557	441	361	308	267	240	198	175,2	106,4
12 OPzS 1200	712	694	669	529	433	370	319	289	237	210,3	127,5
12 OPzS 1500	765	751	705	614	508	445	387	349	286	249,6	160,1
16 OPzS 2000	986	967	940	819	678	594	517	463	383	332,9	212,8
20 OPzS 2500	1232	1209	1175	1024	847	742	646	579	478	416,3	266,2
24 OPzS 3000	1479	1450	1410	1228	1017	891	775	695	574	499,6	319,6

OPERATING INSTRUCTIONS

for stationary vented lead-acid OPzS, SPgBG, OGi, UPS and SOLAR (TOPzS) batteries

Nominal data:

Nominal voltage UN : 2.0 V x number of cells

Nominal capacity CN = C10: 10-hour discharge
(see plate type)

Nominal discharge current: IN = 1/10 = CN / 10

Final discharge voltage Us: 1,80V/cell

Nominal temperature TN: 20°C

"LA" antimony content: < 2% in the grids

Nominal S.G. of electrolyte: 1,24 +/- 0,01 kg/l

Bat. Type: _____
Assembled by: _____
Date: _____
Start-up by: _____
Date: _____



Observe operating instructions and affix close within sight of the battery! Work on batteries only under instructions of skilled personnel!



Smoking prohibited! Do not expose battery to open flame, glowing fire or sparks as explosion and fire hazard exists!



When working on batteries wear protective glasses and clothing!



Explosion and fire hazard! Avoid short circuits! Caution! Metal parts of the battery cells are always live, therefore do not place items or tools on the battery!



Electrolyte is strongly corrosive!



Monoblock batteries / cells are very heavy! Ensure secure installation! Only use suitable transport equipment!



Dangerous voltage!



Acid splashes in the eyes or on the skin must be washed out or off with plenty of water. Then see a doctor immediately. Acid on clothing should be washed out with water!

Safety requirements according to EN 50272-3.

Non-compliance with operating instructions, repairs made with other than original parts, use of additives for the electrolyte (alleged "enhancing agents") render the warranty null and void.

1. Commissioning

a) Filled and charged batteries

Before commissioning all blocks must be inspected for mechanical damage, cells must be connected with the correct polarity and connectors firmly seated. The following torque apply for M10 screw connectors is:

20 ± 1 Nm

If necessary the terminal covers must be put on. Check the electrolyte level in all cells. If necessary top up to maximum level with purified water as under DIN 43530 Part 4.

Before putting the battery in operation, plastic transport vent caps must be removed and replaced with ceramic cell plugs.

With charger off and loads isolated connect battery to the direct current power supplies maintaining correct polarity (positive terminal to positive post).

Switch on the charger and charge as under section 2.2.

b) Dry charged (DC) batteries

Instructions for the initial charging of a dry charged stationary OPzS and SOLAR (TOPzS) batteries:

- Unscrew the sealed vent plugs and fill the cells with pure dilute sulphuric acid, specific gravity 1,230 0,01kg/l read at 20 (68 F), up to about 25 mm below top of lid for SPgBG multi-block hard rubber containers and 50 mm below of lid for OPzS translucent containers or max level marked on the label. The temperature of the filling acid should be between 10°C and 25°C (50 - 77 F).
- Insert the original plastic vent plug with removed sealing foil on the top or place the special ceramic vent plug.
- Start charging for not less than 2 and not more than 12 hours elapsed after the last cell has been filled with the acid.
- Apply the 0,5 x 110(5A/100Ah) current.
- Charge for 8 hours and then keep the battery on open circuit for 1-2 hours.
- Continue the charging for a few hours, until the battery is fully charged, i.e. until constant voltage and constant specific gravity have been reached. The specific gravity of the acid in a fully charged cell is 1,240 0,01 kg/l read at 20°C (68 F). If during the charging the temperature of the acid exceeds 55°C (131 F) reduce the charging current by 50%.
- 0,5 h after charging discharge the battery at 10 hour rate of current until the cell voltage drops to average value 1.80 Volts. Allowable minimum voltage of a single cell is 1,70V.
- Recharge the battery according to the operating instructions 2.2.
- 24 hours after recharging adjust electrolyte level to the "max" mark on the label. Activation and test results must be kept as part of battery documentation. Non-compliance with this request renders the warranty null and void.

2. Operation

For the operation of stationary battery, installations EN 50272-2 apply

2.1 Discharging

Never allow the final discharge voltage of the battery to drop below that assigned for the discharge current. Charge immediately after discharge as well as partial discharge. Recommended DOD (Depth Of Discharge) for normal operating is up to 80% of CN.

2.2 Charging

All charging procedures with their limit values may be employed as stated below:

DIN 41773 (IU characteristic)

DIN 41774 (W characteristic)

DIN 41776 (I characteristic).

Depending on charger type and charging characteristic alternating currents flow through the battery superimposing onto the direct current. These alternating currents and the reaction of the loads lead to an additional warming of the battery and strain on the electrodes with possible resulting damage (see 2.5). Depending on the system at hand, charging may be carried out under the following modes:

a) Stand-by parallel operation and floating operation.

Here the load, direct current and battery are continuously connected in parallel. Thereby the charging voltage is at the same time the operating voltage of the system.

With stand-by-parallel operation the direct current is at any time capable of supplying the maximum load current and the battery charging current. The battery only supplies current when the direct current source fails.

The charge voltage should be set at 2,23 V +/- 1% x number of cells measured at the battery's terminals. To reduce the recharging time a charging stage can be applied in which the charging voltage is 2,35 to 2,4 V x number of cells (stand-by parallel operation with recharging stage).

Automatic changeover to the charging voltage of 2,23 V +/- 1% x number of cells follows after few hours on the voltage 2,35-2,4 V x number of cells. With the floating operation the direct current source is not able to supply the maximum load current at all times.

The load current intermittently supersedes the nominal current of the direct current source. During this period the battery supplies power. It is not fully charged at all times. Therefore, depending on the load the charge voltage must be set at 2.23 to 2.30 V x number of cells.

b) Switch mode operation

When charging the battery is separated from the load. Towards the end of the charging process the charge voltage of the battery is 2,6 - 2,75 V/cell. The charging process and parameters must be monitored (see Sections 2.4, 2.5 and 2.6). On reaching a fully charged state the charging process must be stopped or switched to float charge as under Section 2.3.

c) Battery operation (charge/discharge operation)

Only the battery supplies the load. Hereby the charge voltage of the battery towards the end of the charging process is 2,6-2,75 V/cell. The charging process and parameters must be monitored (see Sections 2.4, 2.5 and 2.6). When reaching a fully charged state the charging process must be switched off. The battery can be switched to the load as necessary.

2.3 Maintaining the full charge (float charging)

Devices complying with the stipulations under DIN 41773 (IU characteristic) must be used. They are to be set so that the average cell voltage is 2,23V +/- 1% (2,25 V +/- 1% for UPS) cell at 20°C and the electrolyte density does not decrease over a protracted period (otherwise see 2.8).

2.4 Equalizing charge

Equalizing charges are required after exhaustive discharges and after inadequate charges; they can be carried out as follows:

- Up to 72 hours at constant voltage of max. 2,4 V/ cell,
- With the I or W characteristic as under 2.6. If during equalizing charging permitted load voltages are exceeded, appropriate measures must be taken, e. g. disconnection of the load. If exceeding the maximum temperature of 55°C the charging must either be stopped, proceed with reduced current, or be switched to float charge to allow the temperature to drop. The equalizing charge is completed when the electrolyte densities no longer increases within a period of 2 hours.

2.5 Alternating currents with periodic deviations

On recharging up to 2,4 V/cell as under operation modes a) to c) the actual value of the alternating current is occasionally permitted to reach max. 20 A per 100 Ah nominal capacity. Above 2,4 V/cells 10 A per 100 Ah nominal capacity may not be exceeded. In a fully charged state with a charge voltage of 2,23 to 2,30 V/cell the actual value of the alternating current must not exceed 5 A per 100 Ah nominal capacity.

2.6 Charging currents

The charging currents are not limited up to 2,4 V/ cell. When exceeding the charging voltage of 2,4 V/cell, greater water decomposition occurs. The charging currents per 100 Ah nominal capacity shown in Table 1 must not be exceeded.

Charging procedure	Cell model	Cell voltage
I-charact.	5,0 A	2,6 - 2,75
W-charact.	7,0 A 3,5 A	at 2,4 V at 2,65 V



2.7 Temperature

The recommended operating temperature for Lead-acid batteries is 10°C to 30°C. The technical data apply for the nominal temperature 20°C. The ideal operating temperature is 20 +/- 5°C. Higher temperatures shorten the service life. Lower temperatures reduce the available capacity. The maximum temperature of 55°C must not be exceeded.

2.8 Temperature-related charge voltage

A temperature-related adjustment of the charge voltage within the operating temperature of 15°C to 25°C is not necessary. Should the temperature range be lower than 15°C and/or higher than 25°C a temperature related adjustment of the charge voltage should be made. The temperature correction factor is (-0.004 V/Cell per °K).

Should the temperature constantly rise above 40°C then the factor is (-0.003 V/Cell per °K).

2.9 Electrolyte

The electrolyte is diluted sulphuric acid. The nominal electrolyte density is based on 20°C and the nominal electrolyte level when fully charged with maximum deviation +/- 0.01 kg/l. Higher temperatures reduce the electrolyte density; lower temperatures increase the electrolyte density. The associated correction factor is 0.0007 kg/l per °K. Example: electrolyte density of 1.23 kg/l at 35°C corresponds to a density of 1.24 kg/l at 20°C or electrolyte density of 1.25 kg/l at 5°C corresponds to a density of 1.24 kg/l at 20°C.

3. Battery maintenance and control

The electrolyte level must be checked regularly. If it dropped to the lowest electrolyte level mark, purified water must be added as under DIN 43530 Part 4, maximum conductivity 30 µS/cm.

To avoid leakage currents keep the battery clean and dry (especially inter cell connections). Plastic battery components, in particular the vent caps, must only be cleaned with water that contains no additives. At least every 6 months the following must be measured and recorded:

- Battery voltage
- Voltage of a few selected cells/mono block batteries
- Electrolyte density of a few selected cells/mono block batteries
- Electrolyte temperature of a few selected cells/mono block batteries

The following must be measured and recorded annually:

- Voltage of all cells/mono block batteries
- Electrolyte density of all cells/mono block batteries
- Electrolyte temperature of a few selected cells/mono block batteries
- Should the float charge voltage in one cell deviate more than + 0.1 V or - 0.05 V from the average value (see 2.3), equalizing charging should be done (see 2.4.). Annual visual checks:
 - on bolted connectors (check that unsecured bolt connectors are firmly seated)

- on battery installation or arrangement
- on ventilation of battery room.

4. Tests

Tests must be performed on fully charged batteries according to EN 60896-1. In addition, special test instructions such as EN 50272-2 must be observed.

5. Faults

Should faults be detected in the battery or the charging device, customer services should be called in immediately.

Measurement records under Section 3 are necessary for fast fault detection and removal.

6. Storage and taking out of operation

Should cells/batteries be stored or taken out of operation for a longer period of time, they must be stored fully charged in a dry, frost-free room with max. temperature of 25°C.

Direct sunlight or other heat sources must be avoided. To avoid damage the following charging methods can be chosen:

- a. Equalizing charges on a quarterly basis as under Section 2.4. In average, ambient temperatures of more than 30°C monthly equalizing charges may be necessary.
- b. Float charging as under Section 2.3 above.

7. Transport

Batteries, wet, filled with acid require transport under demands of European Agreement concerning the international carriage of dangerous goods (ADR and RID). ADR special provision No. 598: New batteries are not subject to the requirements of ADR, when:

- they are secured in such a way that they can not slip, fall or be damaged;
- they are provided with carrying devices, unless they are suitably stacked, e.g. on pallets;
- there are no dangerous traces of alkalis or acids on the outside;
- they are protected against short circuits.

8. Technical data

The nominal voltage, the number of blocks, the nominal capacity (C10 = CN) and the battery type are obtained from the type plate.

8.1 Example

Date on type plate: 6 V 6 OPzS 300

Key:

- 6 V = Nominal voltage of the blocks battery (with individual cells the nominal voltage is 2 V)
- 6 = Number of positive plates
- OPzS = Type
- 300 = Nominal capacity C10 under EN 60896-1. Capacity with discharge period of 10 h (t10) to final discharge voltage 1,80 V/cell.

Other capacities at different discharge currents with the corresponding discharge times and final discharge voltage can be found in technical data list for OPzS stationary batteries.

Spent batteries must be collected separately and recycled.