

Guarantee

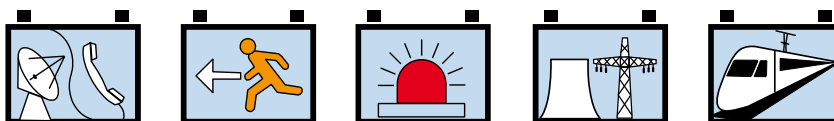
EverExceed®
power your applications

V4.0

**Sealed NiCd - Low Maintenance
SEBH Pocket plate Range
10-500Ah**



**»Premium quality for
uninterrupted communication«**



www.everexceed.com



Sealed NiCd - Low Maintenance SEBH Pocket plate Range 10-500Ah

The block battery - for dependability

The wide range of low, medium and high capacity types makes accurate selection easy, based on discharge time and end of discharge voltage. Robust construction and generous electrolyte reserve enable the battery to withstand wide temperature fluctuations in stationary cycling behaviour over its 20+ years' life.

Built with a future Nickel-cadmium plates are completely reliable, with no risk of thermal runaway or sudden death.

Generally operating between temperatures of -40°C to +60°C (-4°F to +140°F), they can tolerate extremes of -50°C to +70°C (-58°F to +158°F) for short periods.

With only periodic checks, the block battery will provide up to 20+ years' completely faithful service.

Trouble-free long cycle life

The EverExceed nickel-cadmium block battery's unique electrochemistry enables it to regularly withstand any depth of discharge.

Following a deep discharge the block battery is designed to recharge very quickly and economically, using standard single or two-level charging equipment.

Be sure of a low overall cost

The Ni-Cd block battery is the most highly cost-efficient solution to stored power requirements.

- | | |
|---------------------------|----------------------|
| No downtime | No replacement costs |
| Minimal maintenance | Ease of installation |
| 20+ years' operating life | |

Easy storage and installation

Nickel-cadmium block batteries are quick and easy to install as original equipment and may be stored for many years in a discharged state under correct conditions.

On installation a simple bolted connector enables the battery to be rapidly commissioned.

Assured reliability

Ni-Cd is equally dependable in controlled city environments or harsh, unpredictable conditions in the world's most remote and unpopulated areas.

The Ni-Cd battery's block construction makes it highly resistant to electrical abuse and transport over rough terrain, precluding risk of subsequent failure.

Optimized for performance:

An electrolyte solution of potassium hydroxide and a small amount of lithium hydroxide acts only as an ion transfer medium, delivering optimum performance without causing base material degradation.

Good reserves and circulation of the electrolyte are achieved by a wide inter-plate space.

Injection moulded plastic grids both separate plate and insulate plate edges. For extremely low temperatures a special high density electrolyte is available.

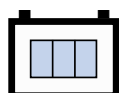
The block battery is fitted with a specially designed flame arresting flip top vent and does not produce corrosive vapours. The tough polypropylene casing ensures the battery's structural integrity throughout its long life.

Supports these Single Cell ranges with:

Quality approved manufacture to ISO 9001 and the TUV certification.

Single Cell batteries have been developed in line with the safety requirements of EN-50272-2 and components used (such as insulated cable connectors and end lug covers) are defined to ensure high protection against electric shocks (Ip2 level).

Full recycling service to protect the environment.



Protective cover

- To prevent external short-circuits
- In line with EN 50272-2 (safety) with ip2 level

Plate group bus

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

Plate

Horizontal pockets of double-perforated steel strips.

Cell container

Material: translucent/transparent polypropylene

Flame-arresting vents

Material: polypropylene.

Plate tab

Spot-welded both to the plate side-frames and to the upper edge of the pocket plate.

Separating grids

- These separate the plates and insulate the plate frames from each other.
- The grids allow free circulation of electrolyte between the plates.

Plate frame

Seals the plate pockets and serves as a current collector.

The EverExceed Single Cell ranges fully comply and exceed the IEC 60623 standard requirements.

Application

SEBH Series nickel cadmium batteries are designed for general industrial applications where absolute reliability is a necessity. Service-proven pocket-plate technology ensures long uninterrupted battery life without the risk of sudden loss of power.

SEBH Series batteries are suitable for high discharge rate applications (30 minutes and below) such as switchgear tripping, diesel engine starting, UPS, etc.

Performance Data

High tolerance to electrical abuses such as overcharge and over discharge.

High tolerance to rough handling and mechanical abuse due to strong components and robust construction.

Trouble-free long cycle life .

No risk of sudden death due to the chemistry and the cell structure.

Wide operating temperature: -40°C to 60°C.

Generous electrolyte reserve for long maintenance intervals.

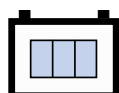
Clear (MBS) or translucent (PP) plastic cell case for easy electrolyte level inspection.

Plastic grid spacers eliminate separator deterioration problem.

Custom cell dimensions available.

20+ years service life in stationary applications.

Conforms to IEC60623.



Battery Charging

It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to C/5 or C/10. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Batteries can be charged in:

- ◆ **constant voltage mode with load connected**
- or
- ◆ **constant current or declining current mode when load is isolated.**

High rate or over charge will not damage the battery.

Minimum float charging current: 2 mA per Ah.

◆ Constant voltage mode:

For continuous parallel operation:

- Float voltage: 1.40 - 1.45 V/cell for SEBL, SEBM & SEBH
- Boost Voltage:
 - SEBL : 1.60 - 1.70 V/cell
 - SEBM : 1.60 - 1.65 V/cell
 - SEBH : 1.60 - 1.65 V/cell

A higher voltage will reduce the charge duration and increase the efficiency of recharging but may increase water consumption.

Single stage charging (without boost):

SEBL:	1.47 - 1.50 V/cell
SEBM:	1.46 - 1.49 V/cell
SEBH:	1.45 - 1.48 V/cell

For starting application:

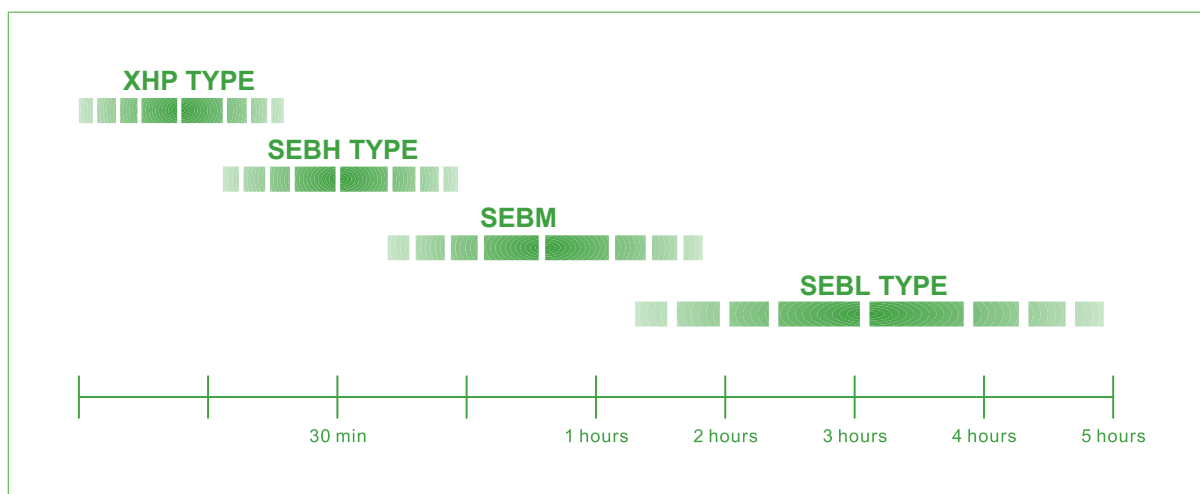
- Recommended charging voltage. 1.50 - 1.55 V/cell.

◆ Constant current mode:

- Normal charging: 0.2 C5 A for 8 hours
- Recommended for quick charging: 0.4 C5 A for 2.5 hours followed by 0.2 C5 A for 2.5 hours

Recommended Type Selection

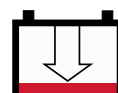
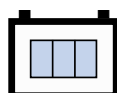
According to backup time required by application:



Initial Charging

The whole charge should preferably be carried out at constant current. The charging time is inversely proportional to the current which is set by the current limit of the charging equipment.

Recommended rates for the first charging: 0.2 C5A for 10 hours 0.1 C5A for 20 hours

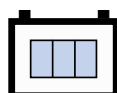


NiCd Pocket Plate SEBH Range Electrical Specifications & Dimensions

Cell Type	Nominal Voltage (V)	Capacity (C5 Ah)	Dimensions (mm/inch)						Weight (kg/lb.)				Terminal	Cell Case Material
			Length		Width		Height		Without Electrolyte		With Electrolyte			
SEBH10	1.2	10	55	2.2	134	5.3	270	10.6	1.2	2.6	2.2	4.8	M10	PP
SEBH20	1.2	20	55	2.2	134	5.3	270	10.6	1.7	3.7	2.6	5.7	M10	PP
SEBH30	1.2	30	70	2.8	140	5.5	295	11.6	2.8	6.2	4.3	9.5	M16	PP
SEBH40	1.2	40	80	3.1	140	5.5	365	14.4	4.2	9.3	6	13.2	M16	PP
SEBH50	1.2	50	80	3.1	140	5.5	365	14.4	4.5	9.9	6.2	13.7	M16	PP
SEBH60	1.2	60	80	3.1	140	5.5	365	14.4	4.8	10.6	6.5	14.3	M16	PP
SEBH70	1.2	70	105	4.1	165	6.5	345	13.6	6.8	15.0	9.2	20.3	M20	PP
SEBH80	1.2	80	105	4.1	165	6.5	345	13.6	7.2	15.9	9.6	21.2	M20	PP
SEBH90	1.2	90	105	4.1	165	6.5	345	13.6	7.8	17.2	10	22.0	M20	PP
SEBH100	1.2	100	165	6.5	167	6.6	345	13.6	9.2	20.3	13.5	29.8	M20	PP
SEBH120	1.2	120	165	6.5	167	6.6	345	13.6	9.8	21.6	14	30.9	M20	PP
SEBH150	1.2	150	165	6.5	167	6.6	345	13.6	11	24.2	16	35.3	M20	PP
SEBH200	1.2	200	170	6.7	285	11.2	350	13.8	18.5	40.8	26	57.3	2 x M20	ABS
SEBH250	1.2	250	170	6.7	285	11.2	350	13.8	20	44.1	27.5	60.6	2 x M20	ABS
SEBH300	1.2	300	175	6.9	290	11.4	500	19.7	25	55.1	36	79.3	2 x M20	ABS
SEBH350	1.2	350	175	6.9	290	11.4	500	19.7	26	57.3	37	81.5	2 x M20	ABS
SEBH400	1.2	400	186	7.3	398	15.7	565	22.2	41	90.4	55	121	3 x M20	ABS
SEBH500	1.2	500	186	7.3	398	15.7	565	22.2	43	94.8	57	126	3 x M20	ABS

EverExceed SEBH batteries fulfil all requirements specified by IEC publication 60623.

Transparent case optional.



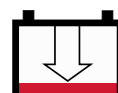
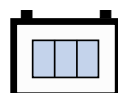
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

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

Final voltage: 1.14V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
SEBH10	10	1.00	1.18	1.87	3.05	4.45	5.83	8.16	9.14	12.0	14.7	16.8	19.7	25.2	39.6	46.2	57.3	68.8
SEBH20	20	2.01	2.36	3.74	6.12	8.95	11.7	16.5	18.5	24.7	30.2	34.4	37.0	51.1	80.3	93.0	118	124
SEBH30	30	3.01	3.54	5.61	9.18	13.4	17.5	24.8	27.8	37.0	45.3	51.6	56.5	76.6	120	140	177	187
SEBH40	40	4.02	4.72	7.48	12.2	17.9	23.3	33.1	37.0	49.4	60.4	68.8	76.0	102	161	186	237	249
SEBH50	50	5.02	5.91	9.35	15.3	22.4	29.2	41.3	46.3	61.7	75.5	86.0	95.5	128	201	232	296	311
SEBH60	60	6.02	7.09	11.2	18.4	26.8	35.1	49.6	55.5	74.1	90.6	103	115	153	241	279	355	373
SEBH70	70	7.03	8.27	13.1	21.4	31.4	40.9	57.8	64.8	86.4	106	120	135	179	281	325	414	435
SEBH80	80	8.03	9.45	14.9	24.4	35.8	46.8	66.1	74.0	98.7	121	138	154	204	321	372	473	498
SEBH90	90	9.04	10.6	16.8	27.6	40.3	52.6	74.4	83.3	112	136	155	172	230	361	418	533	559
SEBH100	100	10.1	11.9	18.7	30.6	44.7	58.5	82.6	92.6	124	151	172	191	255	401	465	591	621
SEBH120	120	12.0	14.2	22.4	36.8	53.7	70.1	99.2	111	148	182	206	230	307	482	558	710	745
SEBH150	150	15.1	17.8	28.0	45.9	67.2	87.7	124	139	185	226	258	306	383	603	698	888	932
SEBH200	200	20.1	23.6	37.4	61.2	89.5	117	165	185	247	302	344	382	511	804	930	1183	1243
SEBH250	250	25.1	29.5	46.7	76.5	111	146	207	232	309	377	430	517	638	1005	1162	1479	1553
SEBH300	300	30.1	35.5	56.1	91.8	134	175	248	277	371	453	516	573	766	1206	1395	1774	1864
SEBH350	350	35.2	41.4	65.4	107	156	204	289	324	432	529	602	688	894	1406	1628	2071	2175
SEBH400	400	40.2	47.3	74.7	122	179	234	330	370	494	604	688	766	1022	1607	1860	2366	2486
SEBH500	500	50.2	59.0	93.4	153	224	292	413	463	617	755	860	957	1278	2010	2325	2958	3107



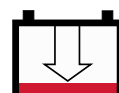
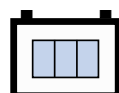
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

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

Final voltage: 1.10V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
SEBH10	10	1.01	1.22	1.93	3.18	4.67	6.11	8.69	10.4	14.2	17.4	19.8	23.5	29.7	46.0	53.6	69.1	72.7
SEBH20	20	2.04	2.45	3.88	6.37	9.36	12.2	17.5	21.1	29.2	35.8	40.8	48.2	60.7	93.8	108	136	151
SEBH30	30	3.06	3.67	5.82	9.55	14.0	18.4	26.3	31.6	43.9	53.7	61.2	72.3	91.0	141	163	203	228
SEBH40	40	4.07	4.89	7.76	12.7	18.7	24.4	35.1	42.1	58.5	71.6	81.6	96.4	121	188	217	271	304
SEBH50	50	5.09	6.11	9.70	15.9	23.4	30.6	43.9	52.7	73.2	89.5	102	121	152	234	271	339	379
SEBH60	60	6.11	7.33	11.6	19.1	28.0	36.8	52.7	63.2	87.8	107	122	144	182	282	326	407	456
SEBH70	70	7.13	8.56	13.5	22.2	32.7	42.8	61.5	73.8	102	125	142	169	212	328	379	474	532
SEBH80	80	8.15	9.78	15.5	25.5	37.4	49.0	70.3	84.3	117	143	164	192	243	375	434	542	607
SEBH90	90	9.12	10.9	17.5	28.6	42.0	55.1	79.1	94.9	132	161	184	217	273	422	488	610	683
SEBH100	100	10.2	12.3	19.4	31.8	46.8	61.2	87.9	105	146	179	204	240	303	469	542	677	760
SEBH120	120	12.2	14.7	23.3	38.2	56.1	73.4	106	127	176	215	245	289	364	562	650	813	911
SEBH150	150	15.3	18.3	29.0	47.8	70.2	91.7	132	159	220	268	306	362	455	704	813	1016	1139
SEBH200	200	20.4	24.4	38.8	63.6	93.5	123	176	211	293	358	408	482	606	938	1085	1354	1518
SEBH250	250	25.5	30.6	48.5	79.6	117	153	220	264	366	447	511	602	758	1173	1356	1693	1898
SEBH300	300	30.6	36.7	58.1	95.4	140	183	264	317	439	537	612	722	910	1407	1626	2031	2278
SEBH350	350	35.6	42.8	67.9	111	163	214	307	369	513	626	715	842	1061	1641	1897	2371	2657
SEBH400	400	40.8	48.9	77.6	127	187	245	352	422	586	715	816	963	1213	1875	2168	2709	3036
SEBH500	500	50.9	61.1	97.0	159	233	306	439	527	732	895	1021	1204	1515	2344	2710	3386	3796



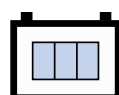
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

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

Final voltage: 1.05V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
SEBH10	10	1.03	1.25	2.00	3.27	4.83	6.4	9.3	11.0	16.5	20.8	23.6	27.9	35.3	54.4	63.9	78.8	85.9
SEBH20	20	2.08	2.51	3.98	6.55	9.67	12.8	18.6	22.1	33.3	43.1	48.7	57.7	72.5	112	127	145	171
SEBH30	30	3.12	3.76	5.97	9.82	14.5	19.2	27.9	33.2	49.9	64.6	73.1	86.5	109	167	191	221	257
SEBH40	40	4.16	5.01	7.96	13.1	19.4	25.6	37.1	44.3	66.5	86.1	97.5	115	145	223	255	297	344
SEBH50	50	5.19	6.27	9.95	16.4	24.2	32.1	46.4	55.3	83.2	107	122	145	181	279	317	373	430
SEBH60	60	6.23	7.52	11.9	19.6	29.1	38.4	56.0	66.4	99.6	129	146	173	218	334	381	450	515
SEBH70	70	7.27	8.77	13.9	23.0	33.9	44.5	65.2	77.5	117	151	171	202	254	391	445	526	601
SEBH80	80	8.31	10.0	16.0	26.2	38.7	51.6	74.4	88.6	133	172	195	230	290	446	509	602	687
SEBH90	90	9.31	11.3	17.9	29.4	43.6	57.4	83.5	100	150	194	219	260	327	501	572	671	772
SEBH100	100	10.4	12.6	19.9	32.8	48.3	64.5	92.6	111	167	215	244	288	362	558	636	747	858
SEBH120	120	12.5	15.0	23.8	39.2	58.0	76.8	111	133	199	258	293	346	435	669	763	899	1030
SEBH150	150	15.6	18.8	29.8	49.1	72.6	96.5	139	167	249	323	365	433	544	836	954	1196	1288
SEBH200	200	20.8	25.0	39.8	65.4	96.8	128	185	222	333	430	487	577	725	1115	1272	1494	1716
SEBH250	250	26.0	31.3	49.7	81.8	121	161	232	277	416	538	609	721	906	1394	1590	2020	2147
SEBH300	300	31.2	37.6	59.7	98.2	145	193	279	333	500	645	731	865	1088	1673	1908	2241	2576
SEBH350	350	36.3	43.9	69.6	114.2	169	225	325	387	583	753	853	1009	1269	1952	2225	2690	3005
SEBH400	400	41.6	50.1	79.6	130.6	193	256	372	443	665	861	975	1153	1450	2231	2543	2995	3434
SEBH500	500	51.9	62.6	99.5	163.5	242	321	464	554	832	1076	1218	1442	1813	2789	3179	3742	4292



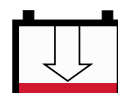
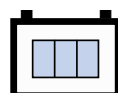
Discharge Data Table

Discharge performance data after fully charged by constant current according to IEC60623

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

Final voltage: 1.00V/cell

Cell Type	Capacity (C5 Ah)	Discharge Time in Hours							Discharge Time in minutes							Time in Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
SEBH10	10	1.05	1.27	2.02	3.32	5.0	6.55	9.59	11.2	17.3	23.3	27.2	32.1	41.1	64.2	72.4	91.7	98.4
SEBH20	20	2.11	2.53	4.04	6.64	10.0	13.1	19.2	22.5	35.1	47.8	56.1	66.6	84.8	128	146	184	203
SEBH30	30	3.17	3.79	6.06	10.0	15.0	19.6	28.8	33.8	52.7	71.7	84.1	99.7	127	192	218	275	305
SEBH40	40	4.22	5.06	8.08	13.3	19.9	26.3	38.4	45.0	70.2	95.6	112	133	170	255	291	367	406
SEBH50	50	5.27	6.32	10.1	16.6	24.9	32.8	48.0	56.3	87.7	120	140	166	212	319	364	458	508
SEBH60	60	6.33	7.58	12.1	19.9	29.9	39.3	57.6	67.9	106	144	168	200	255	383	437	550	610
SEBH70	70	7.38	8.84	14.1	23.3	34.9	45.9	67.1	79.0	123	167	196	233	297	446	510	641	712
SEBH80	80	8.44	10.1	16.2	26.6	39.9	52.5	76.6	90.1	140	191	224	266	339	511	582	734	813
SEBH90	90	9.48	11.4	18.2	30.0	44.8	59.0	86.3	101	158	215	252	299	381	574	655	825	915
SEBH100	100	10.6	12.7	20.2	33.2	49.8	65.6	95.9	112	176	239	281	332	424	638	728	917	1017
SEBH120	120	12.6	15.2	24.2	39.9	59.7	78.7	115	135	211	287	336	399	509	766	874	1101	1219
SEBH150	150	15.8	18.9	30.3	49.9	74.6	98.4	144	169	263	358	420	499	636	957	1092	1375	1525
SEBH200	200	21.1	25.3	40.4	66.5	99.5	131	192	225	351	478	560	665	848	1277	1457	1834	2033
SEBH250	250	26.4	31.5	50.5	83.1	124	164	240	281	439	598	701	832	1060	1595	1821	2293	2541
SEBH300	300	31.7	37.9	60.6	99.7	149	197	287	338	527	717	841	997	1272	1914	2185	2752	3049
SEBH350	350	36.9	44.2	70.7	116	174	230	336	393	615	836	980	1164	1484	2233	2549	3210	3557
SEBH400	400	42.1	50.5	80.8	133	199	263	383	450	702	956	1121	1330	1696	2553	2913	3669	4065
SEBH500	500	52.7	63.2	101	167	249	328	479	563	878	1195	1401	1662	2121	3191	3641	4586	5081



Calculation Methods

Information required for battery capacity calculation

The following information needed for a precise battery capacity calculation:

Nominal voltage of the system	Load current required	Backup time required
Maximum voltage (for charging)	Minimum voltage	Temperature range
Battery layout and available space	Physical condition	

Float Voltage Operation

In these conditions the float voltage, being the voltage at which the general load circuit will operate, then a decision will have to be reached on the cell float voltage needed to maintain the battery in the required condition.

$$\text{Number of cells required} = \frac{\text{Circuit voltage}}{\text{Cell Float voltage}}$$

$$\text{Minimum cell voltage} = \frac{\text{Minimum D.C. voltage}}{\text{Number of cells}}$$

The most commonly used float voltages are 1.40-1.48 voltage per cell, but the exact figure has to be related carefully to circumstances.

For Example

An EverExceed Nickel Cadmium battery is required to maintain an inverter load of 50KVA at 0.8 power factor for a backup time of 30 minutes, at 20~25°C temperature. The DC voltage to the inverter operates within the limit of 265 volts with the battery on float charge to a minimum of 202 volts at end of back up time. The inverter has an 85% efficiency rate.

-Number of Cells (at recommended float of 1.44VPC) = $265/1.44 \approx 184$ cells

-Minimum Cell Voltage = $202/184 \approx 1.10$ volts per cell

-Maximum Battery Current

$$= \frac{\text{Inverter load in KVA} \times \text{Power factor}}{\text{Min. cell voltage} \times \text{Number of cells} \times \text{Inverter efficiency}}$$

$$= \frac{50\text{KVA} \times 0.80}{1.10 \times 184 \times 0.85} = 232.5 \text{ Amps}$$

We shall choose the battery with capacity equal or just above 232.5Amps.

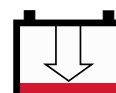
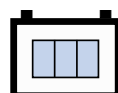
To meet the 30 minutes backup time requirement, we determine to choose the battery size from SEBH Range.

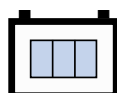
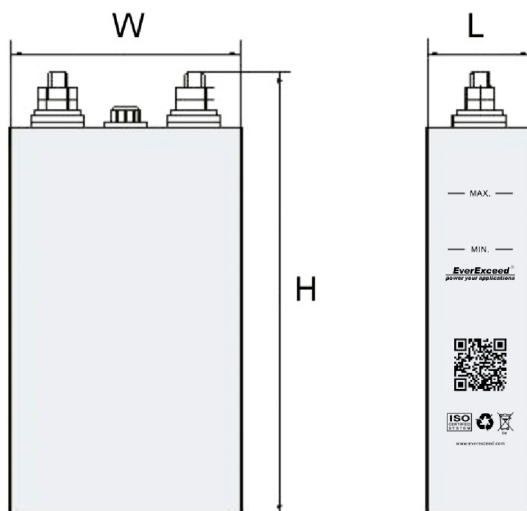
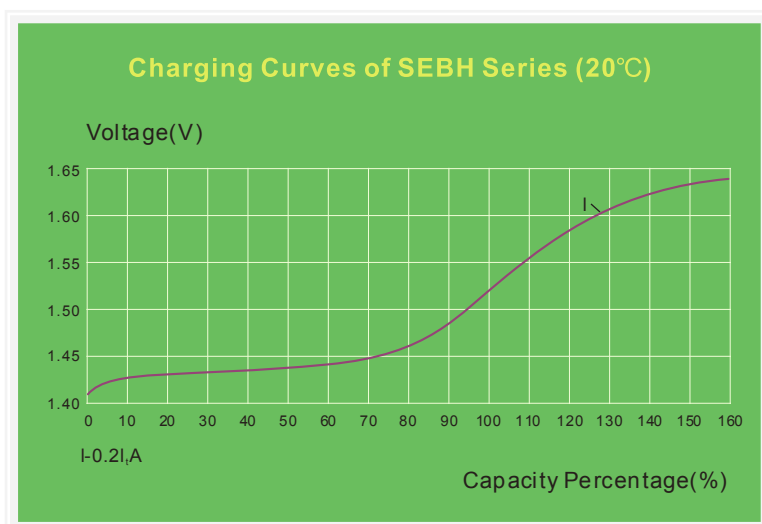
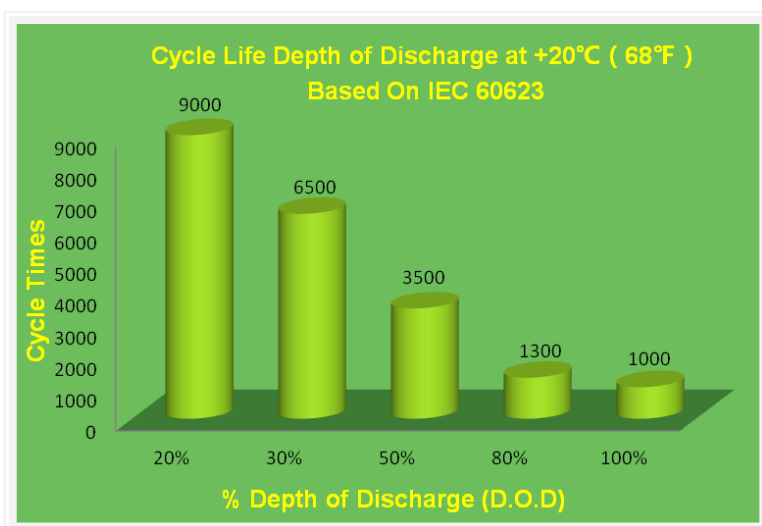
From our catalogue data, the cell type is SEBH300.

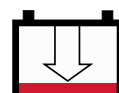
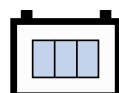
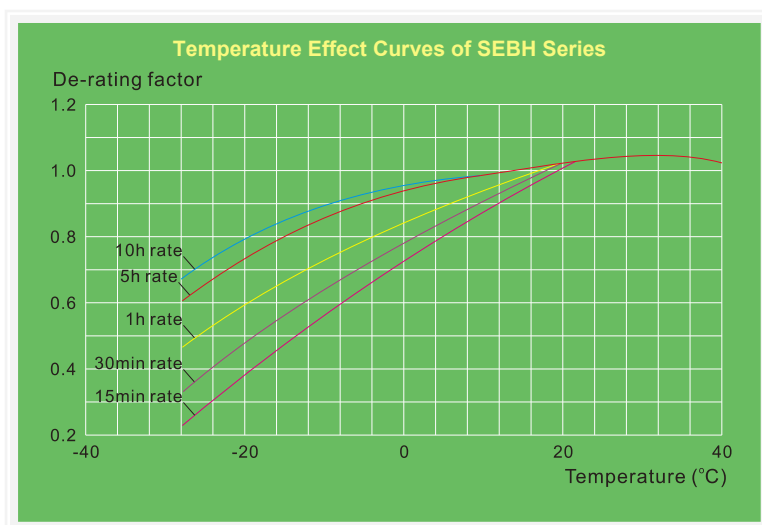
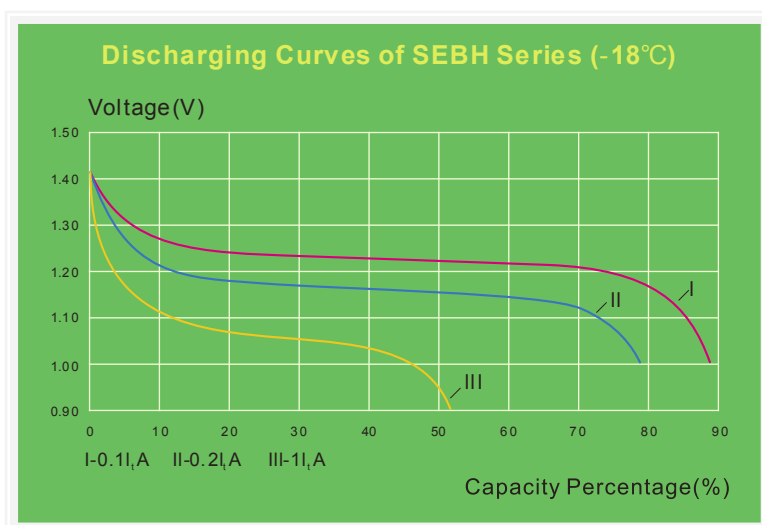
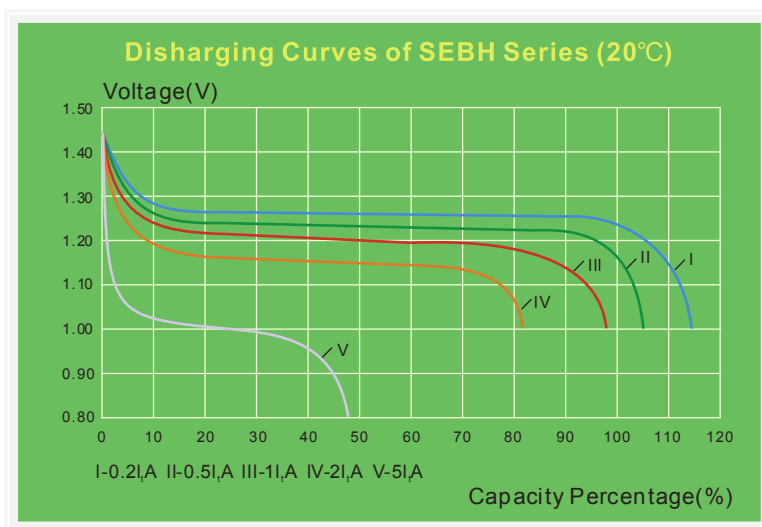
Battery shall comprise 184 cells of EverExceed Nickel Cadmium type SEBH300.

System Voltage	Number of Cells	Spread Range Number of Cells
24	20	18 ~ 21
36	30	27 ~ 31
48	40	36 ~ 41
110	92	88 ~ 93
220	184	180 ~ 186

The number of cells in a battery may be determined by simply dividing the nominal voltage of the system by the nominal voltage of a cell (1.2 Volts).







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