



The reliable power source.



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bizSAFE₃



APOLLON-Diamond
Nickel Cadmium Alkaline Batteries



APOLLON-Diamond

Nickel Cadmium Alkaline Battery

APOLLON-Diamond Nickel Cadmium batteries are one of the most trusted and reliable sources of DC power in wide-ranging and critical applications ranging from switch gear tripping, to UPS, to engine starting. All APOLLON-Diamond Nickel Cadmium batteries are manufactured to fulfill the requirements stipulated by IEC 60623 and EN60623.

Long Life

Up to 15 - 20 years of operating life and the ability to withstand deep discharges. This means durability and low life cycle costs to end users.

Wide Range of Operating Temperatures

APOLLON-Diamond Nickel Cadmium batteries are designed to withstand a wide range of operating temperatures, of between -40 degrees Celsius to 50 degrees Celsius.

Long Shelf Life

No worries if you store up APOLLON-Diamond Nickel Cadmium batteries for long periods before using. The batteries offer unparalleled shelf life of up to several years under correct conditions, including under discharged state.

Low Maintenance

Not just easy storage, but also relatively carefree usage. Topping up of electrolyte is only required between 3 to 6 months under tropical climate, and between 6 to 12 months in temperate climate. Visual checking is easy with the fully transparent container that comes with APOLLON-Diamond Nickel Cadmium batteries. Furthermore, no active monitoring of electrolyte level is required if they are used with APOLLON-Diamond Battery Chargers with Electrolyte Level Sensor alarm.

High Reliability

High reliability for assured backup in mission critical applications. APOLLON-Diamond Nickel Cadmium batteries offer excellent resistance to over-charging and over-discharging. In addition, there is no risk of sudden death or thermal runaway.

Manufactured to withstand Rugged Treatment

Both MBS** and PP** casings offer excellent resistance against rugged treatment. Standard casings are also fire retardant to UL94. Additional protection can be ordered according to specifications.

**MBS - Polymethacrylate Butadiene Styrene
PP - Polypropylene Homopolymer

APOLLON-Diamond Nickel Cadmium batteries are available in four series: Low Discharge Rate Series (HDS), Medium Discharge Rate Series (HDM), High Discharge Rate Series (HDH) and Very High Discharge Rate Series (HDV).

HDS Series

This series is specially designed for general purpose and stand-by applications, where discharge is not frequent and takes place over long periods. The typical operation condition is on float charge. Ideal applications include switchgear tripping, fire alarms, telecommunications and UPS.

HDM Series

This series is suitable for medium discharge periods of between 30 minutes and 5 hours, or for mixed loads which involve a mixture of high and low discharge rates. Ideal applications include stand-by and UPS.

HDH Series

These batteries come with very thin plates to achieve a higher performance through increased active material exposure. High capacity switchgear tripping, UPS, as well as engine starting are ideal applications. Best suited for very short discharge periods of 1 second to 60 minutes at very high discharge currents.

HDV Series

An improved high discharge rate range, which is ideally suited and designed for applications where the highest reliability and extremely high discharge currents in very short periods are required.

Where supplementary mechanical strength and additional shock or vibration resistance is required, such as in certain railway applications, APOLLON-Diamond Nickel Cadmium batteries can be installed into robust wooden or steel crates.



Cell Capacities and Dimensions

HDS (LOW RATE TYPE)						
CELL TYPE	NOMINAL CAPACITY	CELL DIMENSIONS (MM)			CELL WEIGHT	ELECTROLYTE VOLUME (ℓ)
		WIDTH	LENGTH	HEIGHT		
HDS22P	22	114	52	266	2.00	0.6
HDS30P	30	114	52	266	2.20	0.50
HDS40P	40	114	52	266	2.30	0.40
HDS50P	50	139	79	291	3.50	1.00
HDS60P	60	139	79	295	4.30	1.13
HDS70P	70	139	79	295	4.40	1.00
HDS80P	80	139	79	295	5.10	1.10
HDS100P	100	139	79	362	6.00	1.40
HDS120P	120	139	79	362	6.20	1.30
HDS125P	125	139	79	362	6.40	1.20
HDS150P	150	165	105	345	9.00	2.00
HDS200P	200	167	162	343	14.00	3.30
HDS250P	250	167	162	343	14.00	3.40
HDS300P	300	282	170	348	22.50	5.00
HDS350P	350	282	170	348	25.00	5.00
HDS400P	400	282	170	348	25.00	5.00
HDS500P	500	285	172	490	33.60	7.80
HDS600P	600	285	172	490	34.00	7.50
HDS700P	700	285	172	490	39.00	8.40
HDS800P	800	395	185	560	57.50	15.50
HDS900P	900	395	185	560	59.00	17.00
HDS1000P	1000	395	185	560	61.00	18.00

HDM (MEDIUM RATE TYPE)						
CELL TYPE	NOMINAL CAPACITY	CELL DIMENSIONS (MM)			CELL WEIGHT	ELECTROLYTE VOLUME (ℓ)
		WIDTH	LENGTH	HEIGHT		
HDM30P	30	114	52	266	2.40	0.60
HDM40P	40	114	52	266	3.60	1.00
HDM50P	50	139	79	291	5.00	1.20
HDM60P	60	139	79	291	5.30	1.20
HDM75P	75	139	79	295	6.50	1.10
HDM80P	80	139	79	295	6.50	1.15
HDM100P	100	139	79	362	9.30	1.80
HDM110P	110	139	79	362	9.30	1.80
HDM120P	120	165	105	345	9.50	2.00
HDM150P	150	167	162	345	12.50	2.70
HDM200P	200	167	162	345	13.50	2.70
HDM250P	250	282	170	348	22.00	4.80
HDM300P	300	282	170	348	26.00	6.00
HDM350P	350	285	172	490	28.00	6.00
HDM400P	400	285	172	490	32.00	7.00
HDM500P	500	285	172	490	36.50	8.50
HDM600P	600	395	185	560	39.00	10.00
HDM700P	700	395	185	560	66.00	15.00
HDM800P	800	395	185	560	66.00	15.00
HDM900P	900	395	185	560	66.00	15.00
HDM1100P	1100	395	185	560	68.00	12.50

Above cell dimensions are for batteries in MBS transparent containers. Other sizes and specifications available. Please enquire.



Cell Capacities and Dimensions

HDH (HIGH RATE TYPE)						
CELL TYPE	NOMINAL CAPACITY	CELL DIMENSIONS			CELL WEIGHT	ELECTROLYTE VOLUME (ℓ)
		WIDTH	LENGTH	HEIGHT		
HDH30P	30	139	79	295	4.50	1.40
HDH40P	40	139	79	362	4.50	1.30
HDH50P	50	139	79	362	6.00	1.60
HDH60P	60	139	89	362	6.50	1.70
HDH70P	70	165	105	345	9.00	1.80
HDH80P	80	165	105	345	9.60	2.00
HDH100P	100	165	162	345	13.30	3.60
HDH120P	120	167	162	345	13.50	3.50
HDH150P	150	282	170	348	21.80	6.20
HDH200P	200	282	170	348	25.60	6.10
HDH250P	250	282	170	348	27.00	6.00
HDH300P	300	291	174	505	33.00	6.50
HDH350P	350	291	174	505	34.50	7.00
HDH400P	400	291	174	505	36.00	7.50
HDH500P	500	398	185	562	53.00	15.00

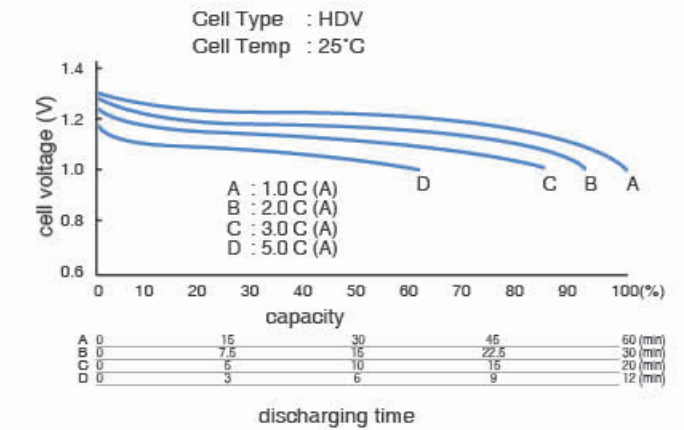
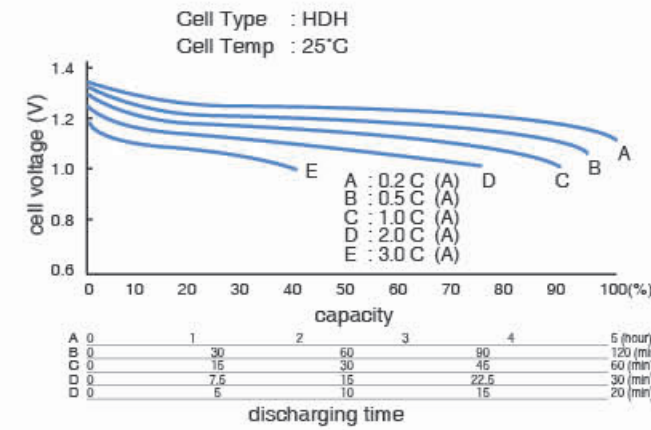
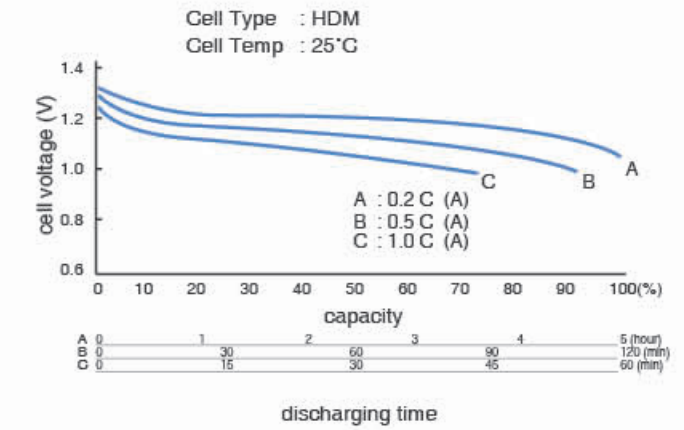
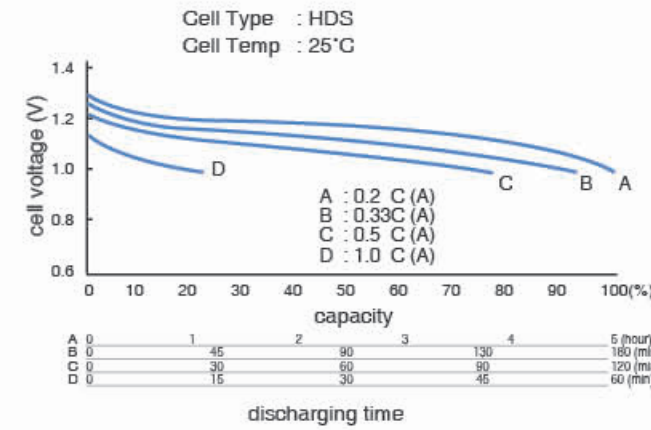
HDV (VERY HIGH RATE TYPE)						
CELL TYPE	NOMINAL CAPACITY	CELL DIMENSIONS (MM)			CELL WEIGHT	ELECTROLYTE VOLUME (ℓ)
		WIDTH	LENGTH	HEIGHT		
HDV5P	5	81	26	163	0.51	0.050
HDV10P	10	81	26	163	0.62	0.060
HDV20P	20	81	34	245	1.10	0.130
HDV30P	30	81	43	266	1.75	0.210
HDV40P	40	81	43	266	1.86	0.180
HDV50P	50	81	50	266	2.20	0.250
HDV60P	60	138	61	266	3.80	0.400
HDV70P	70	138	61	266	4.00	0.400
HDV80P	80	138	61	266	4.00	0.400
HDV90P	90	138	61	266	4.30	0.350
HDV100P	100	138	61	266	4.20	0.300
HDV120P	120	139	79	295	5.50	0.700
HDV140P	140	139	79	362	7.00	1.400
HDV170P	170	139	79	362	8.50	1.500
HDV190P	190	165	105	350	10.00	1.450
HDV210P	210	165	105	350	10.50	1.450
HDV230P	230	167	162	343	12.50	2.500
HDV250P	250	167	162	343	13.00	2.400

Above cell dimensions are for batteries in MBS transparent containers.
Other sizes and specifications available. Please enquire.

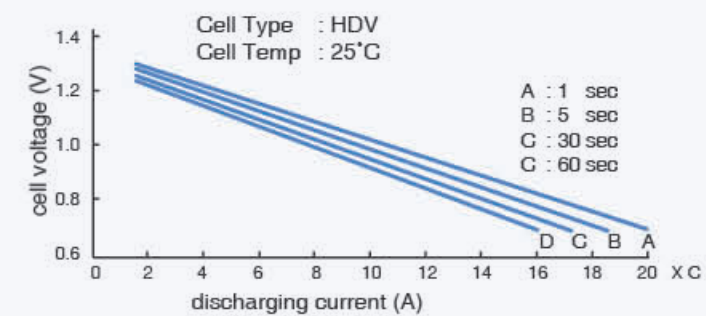
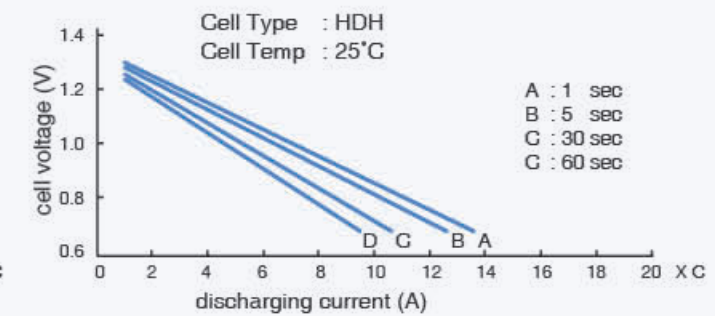
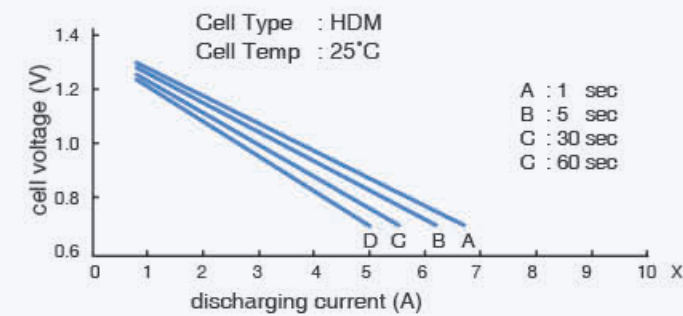


Discharge Graphs

Discharging



High Rate Discharging





Charging Information

The following per-cell charge voltage are recommended

CELL TYPE	FLOATING CHARGE	EQUALIZING CHARGE
HDS	1.48 ~ 1.50	1.55 ~ 1.60
HDM	1.42 ~ 1.45	1.55 ~ 1.60
HDH	1.42 ~ 1.45	1.55 ~ 1.60
HDV	1.40 ~ 1.42	1.52 ~ 1.57

Initial charging before putting into service:

To inject $2 \times C_5$ AH into the battery. The charging time should be adjusted according to the level of the charging current, as shown in the following example:

Example:

20 hours at current limit of $0.1 \times C_5$ (Amp)

10 hours at current limit of $0.2 \times C_5$ (Amp)

C_5 = The nominal capacity of the battery in ampere hours, 5 hour-rated

Battery Installation

Alkaline batteries are installed either by mounting on stands or installed in cubicles. Conditions of installation area are as follows:

- Avoid direct sunlight
- Avoid gases and dust
- No vibration and low humidity
- Keep temperature below 40° Celsius

We are ready to help you select the right type.

When you are selecting a battery or stand-by power system, you should carefully consider various performance requirements and the conditions under which it is expected to be used. Most important are the following three factors:

- 1 How much current is needed?
- 2 How long must the battery work?
- 3 What is the permissible end voltage?

Our Sales Engineers will help you select the right type of APOLLON-Diamond Nickel Cadmium Alkaline Battery for stand-by and other power supply system applications.



Battery Size Calculation

BASIC DATA REQUIRED FOR A PRECISE BATTERY SIZING CALCULATION:

- Maximum Voltage (For Charging)
- Minimum Voltage
- Standing Load Current (Amps)
- Intermittent Load Current
- Standby Period
- Nominal Voltage of the System
- Battery Layout and Available Space
- Physical Conditions



DETERMINATION OF THE NUMBER OF CELLS IN A BATTERY

The number of cells in a battery may be determined by simply dividing the minimum voltage of the system by the end voltage of a cell (1.1V), with following results:

SYSTEM VOLTAGE	NUMBER OF CELLS	SPREAD IN ACTUAL PRACTICE
24	20	18 - 21
30	23	23 - 25
48	40	32 - 42
110	86	84 - 93
220	172	180 - 186

Discharge currents and times of discharge when battery is fully charged at 20°C ± 5

Final discharge voltage 1.10V per cell

Cell Type	c Ah	Hours							Minutes							Seconds		
		10	8	5	3	2	1.5	1	45	30	20	15	10	5	1	30	5	1
HDV 5P	5			1.1			3.3	4.8		8.2	11.4	13.2	18.7	21.2	29.3	33.8	35.1	43.9
HDV 10P	10			2.1			6.6	9.5		17.3	23.7	27.5	39.0	44.3	61.3	70.5	73.3	91.7
HDV 20P	20			4.1			13.3	19.0		33.1	45.6	52.8	74.8	84.9	117.0	135	140	176
HDV 30P	30			6.2			19.8	28.5		51.7	71.2	82.5	117.0	132	183	211	219	275
HDV 40P	40			8.3			26.5	38.0		66.2	91.2	105.0	149	169	235	270	281	352
HDV 50P	50			10.3			33.1	47.5		86.2	118	137	195	221	306	352	366	458
HDV 60P	60			12.4			39.8	57.0		104	142	165	234	265	367	423	439	550
HDV 70P	70			14.4			46.3	66.5		120	166	192	273	309	428	493	518	642
HDV 80P	80			16.5			53.0	76.0		138	190	220	312	354	490	564	586	734
HDV 90P	90			18.6			59.5	85.5		155	213	247	351	398	551	634	669	825
HDV 100P	100			21.0			66.0	95.0		173	237	275	390	442	612	705	732	917
HDV 120P	120			24.8			80.0	114		207	285	330	468	531	735	846	879	1101
HDV 140P	140			28.9			93.0	133		242	332	385	546	619	857	987	1025	1284
HDV 170P	170			35.1			113	162		293	403	467	663	752	1041	1198	1245	1559
HDV 190P	190			39.9			125	180		327	451	522	741	840	1163	1339	1406	1743
HDV 210P	210			43.3			139	200		362	498	577	819	929	1250	1406	1538	1831
HDH 30P	30	3.03	3.79	6.06	9.57	13.7	17.4	24.3	29.3	35.3	44.3	51.8	69.1	85.3	115	140	168	185
HDH 50P	50	5.06	6.32	10.1	15.9	22.8	29.1	40.5	48.9	59	73.7	86.4	115	142	192	234	280	309
HDH 700P	70	7.08	8.84	14.1	22.3	32	40.8	56.7	68.5	82.1	101.2	120	161	199	269	327	393	433
HDH 100P	100	10.1	12.6	20.2	31.9	45.7	58.3	81	97.9	119	149	172	230	284	385	468	561	619
HDH 120P	120	12.1	15.1	24.2	38.3	54.3	69.9	97	117	142	178	207	276	341	462	561	673	743
HDH 150P	150	15.2	18.9	30.3	47.8	68.5	87.4	121	146	177	223	259	345	426	577	702	842	928
HDH 200P	200	20.2	25.2	40.4	63.8	91.4	116	162	195	236	296	345	460	568	770	936	1123	1238
HDH 300P	300	30.3	37.9	60.6	95.7	137	174	243	293	355	443	518	691	853	1155	1404	1684	1857
HDH 350P	350	35.4	44.2	70.8	111	160	204	283	342	413	517	604	806	995	1348	1638	1965	2167
HDH 400P	400	40.4	50.5	80.9	127	182	233	324	391	473	590	691	921	1137	1540	1872	2246	2476
HDH 500P	500	50.6	63.2	101	159	228	291	405	489	589	737	864	1152	1422	1926	2340	2808	3096
HDM 30P	30	3.1	3.83	6.13	9.84	13.5	16.5	20.3	22.3	25.5	30.7	32.4	36.4	41.2	54.0	57.1	71.8	84.3
HDM 40P	40	4.1	5.11	8.18	13.1	18.0	22.1	27.1	29.7	33.9	41.0	43.2	48.9	54.9	72.0	76.2	95.7	115
HDM 50P	50	5.1	6.39	10.2	16.4	22.6	27.6	33.9	37.2	42.6	51.3	54.0	60.7	68.7	90.0	95.2	119	140
HDM 60P	60	6.15	7.66	12.2	19.6	27.1	33.1	40.7	44.6	60.0	61.5	64.8	72.9	82.4	108	114	143	171
HDM 75P	75	7.69	9.58	15.3	24.6	33.9	41.4	50.9	55.8	65.8	76.9	81.0	91.1	103	135	142	179	207



Discharge currents and times of discharge when battery is fully charged at 20°C ± 5

Final discharge voltage 1.10V per cell

HDM 80P	80	8.2	10.2	16.3	26.2	36.2	44.2	54.3	59.5	70.1	82.1	86.4	97.1	109.5	144	151.5	191	221
HDM 85P	85	8.72	10.8	17.3	27.8	38.4	46.9	57.7	63.2	74.3	87.2	91.8	103	116	153	161	203	235
HDM 100P	100	10.2	12.7	20.4	32.8	45.2	55.2	67.9	74.4	84.9	102	108	121	137	180	190	239	282
HDM 120P	120	12.3	15.3	24.5	39.3	54.2	66.3	81.5	89.2	103	123	129	145	164	216	228	287	335
HDM 150P	150	15.3	19.1	30.6	49.2	57.8	82.8	101	111	128	153	162	182	206	270	285	359	421
HDM 200P	200	20.5	25.5	40.9	65.6	90.4	110	135	148	170	205	216	243	274	360	381	478	559
HDM 250P	250	25.5	31.8	51.0	82.0	113	138	169	186	212	255	270	303	343	450	475	598	705
HDM 300P	300	30.7	38.3	61.3	98.4	135	165	203	223	253	307	324	364	412	540	571	718	839
HDM 350P	350	35.9	44.7	71.6	114	158	193	237	260	299	359	378	425	480	630	666	837	978
HDM 400P	400	41.0	51.1	81.8	131	180	221	271	297	343	410	432	486	549	720	762	957	1115
HDM 500P	500	51.3	63.9	102	164	226	276	339	372	430	513	540	607	687	900	952	1197	1385
HDM 600P	600	61.5	76.6	122	196	271	331	407	446	511	615	648	729	824	1080	1143	1436	1669
HDM 700P	700	71.8	89.4	143	229	316	386	475	520	597	718	756	850	961	1260	1333	1675	1942
HDM 800P	800	82.1	102	163	262	361	442	543	595	679	820	864	972	1099	1440	1524	1915	2225
HDS 10P	10	1.05	1.31	2.03	2.98	3.73	4.67	5.53	6.00	6.84	7.56	8.10	8.46	9.31	10.8	11.5	13.7	14.3
HDS 22P	22	2.31	2.89	4.47	6.57	8.21	10.2	12.1	13.2	15.0	16.6	17.8	18.6	20.4	23.9	25.3	30.1	31.5
HDS 30P	30	3.15	3.94	6.10	8.96	11.2	14.0	16.6	18.0	20.5	22.6	24.3	25.3	27.9	32.6	35.9	41.1	43.0
HDS 40P	40	4.21	5.25	8.13	11.9	14.9	18.6	22.1	24.0	27.3	30.2	32.4	33.8	37.2	43.5	47.5	54.9	57.4
HDS 45P	45	4.74	5.93	9.15	13.4	16.8	21.0	24.9	27.0	30.7	34	36.4	38	41.9	49	51.8	61.7	64.5
HDS 50P	50	5.26	6.57	10.1	14.9	18.6	23.3	27.6	30.0	34.2	37.8	40.5	42.3	46.5	54.4	59	68.6	71.7
HDS 60P	60	6.32	7.88	12.2	17.9	22.4	28.0	33.2	36.0	41.0	45.3	48.6	50.7	55.8	65.3	71.5	82.3	86.1
HDS 80P	80	8.42	10.5	16.2	23.9	29.8	37.3	44.2	48.0	54.7	60.4	64.8	67.6	74.5	87.1	95.3	109	114
HDS 100P	100	10.5	13.1	20.3	29.8	37.3	46.6	55.3	60.0	68.4	75.6	81.0	84.6	93.1	108.0	120	137	143
HDS 125P	125	13.1	16.4	25.5	37.3	46.6	58.3	69.1	75.0	85.5	94.5	101	105	116	136	144	171	179
HDS 150P	150	15.8	19.7	30.5	44.8	56.0	70.0	83.0	90.0	102	113	121	126	139	163	179	205	215
HDS 200P	200	21.1	26.2	40.6	59.7	74.7	93.3	110	120	136	151	162	169	186	217	238	274	287
HDS 250P	250	26.3	32.8	50.8	74.7	93.3	116	138	150	171	189	202	211	232	272	288	343	358
HDS 300P	300	31.5	39.4	61.0	89.6	112	140	166	180	205	226	243	253	279	326	345	411	430
HDS 350P	350	36.8	45.9	71.1	104	130	163	193	210	239	264	283	296	326	381	403	480	502
HDS 400P	400	42.1	52.5	81.3	119	149	186	221	240	273	302	324	338	372	435	460	549	574
HDS 500P	500	52.6	65.7	101	149	186	233	276	300	342	378	405	423	465	544	576	686	717
HDS 600P	600	63.1	78.8	122	179	224	280	332	360	410	453	486	507	558	653	691	823	861
HDS 700P	700	73.5	91.7	142	208	261	326	387	420	479	529	567	592	652	756	805	959	1000
HDS 800P	800	84.2	105	162	239	298	373	442	480	547	604	648	676	745	872	921	1098	1148

Discharge currents and times of discharge when battery is fully charged at 20°C ± 5

Final discharge voltage 1.10V per cell

HDS 900P	900	94.7	118	183	268	336	420	498	540	615	680	729	761	838	980	1036	1235	1291
HDS 1000P	1000	105	131	203	298	373	466	553	600	684	756	810	846	931	1089	1152	1372	1435