

NiCd RANGE

NICKEL CADMIUM INDUSTRIAL BATTERY SOLUTIONS



Capacity: 10 Ah to 1000 Ah



NICKEL CADMIUM BATTERIES SINTERED / POCKET PLATES

10 Ah to 1000 Ah / 20 years long life

PMI Nickel Cadmium industrial cells using advanced sintered plate / pocket plate technology have been used successfully in industrial battery applications for long years. With a design life of 20 years, they have proved to be a very reliable DC power source in float service or cyclic applications in harsh conditions with temperatures up to 50° C.

KPH Series (High Discharge Rate Cells)

KHP Series High Discharge Rate nickel cadmium battery is made of pocket plate with the characteristics of thin plate, high porosity and low internal resistance. The battery is particularly suitable for short discharge periods such as switchgear tripping and closing, UPS, etc.

KPM Series (Medium Discharge Rate Cells)

KMP Series Medium Discharge Rate nickel cadmium battery is made of pocket plate. The battery is suitable for medium discharge periods between 30 minutes and 5 hours such as standby for UPS, gas turbine control, etc.

KPL Series (Low Discharge Rate Cells)

KLP Series Low Discharge Rate nickel cadmium battery is made of pocket plate. The battery is designed for general purpose and standby applications such as lighting on train and operation of circuit breaker, etc.



Battery Model	Discharge Performance	Plate Type	Applications
KPH Series	High Discharge Rate	Pocket Plate	Engine starting, UPS (up to 30 minutes), operation and control of DC motor, water treatment plants, etc.
KPM Series	Medium Discharge Rate	Pocket Plate	UPS (over 30 minutes), railway DC power sources, auxiliary power sources for power stations, chemical plants, oil refineries, iron works, etc.
KPL Series	Low Discharge Rate	Pocket Plate	Emergency lighting, telecommunications, operation of communication equipment on a ship lighting, air conditioner control on a train, etc.



Connector covers

Material : plastic.

Flame arresting vents

Material : polypropylene

Cell container

Material : translucent polypropylene

Plate tab

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

Plate group bus

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

Separating grids

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

Plate frame

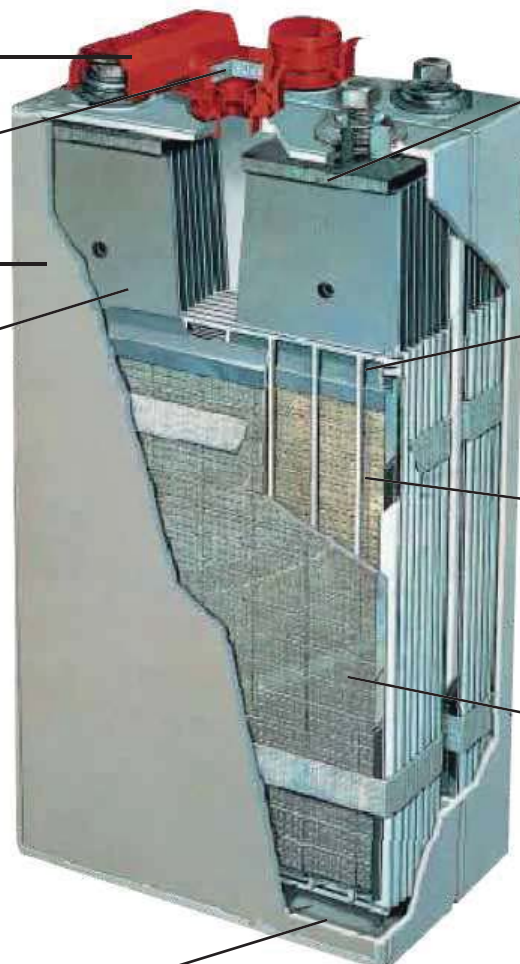
Seals the plate pockets and serves as a current collector.

Plate

Horizontal pockets of double-perforated steel strips.

Electrolyte

An alkaline solution of potassium hydroxide (KOH) which does not corrode steel.





Battery Charging:

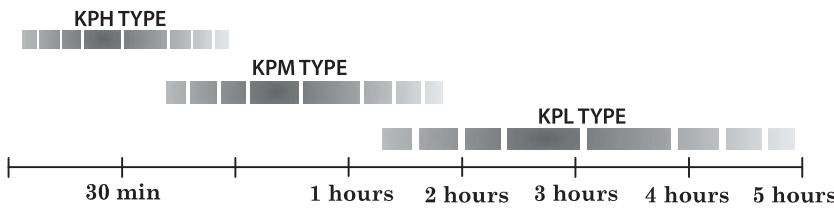
It is recommended to use Constant Voltage method of charging for Nickel Cadmium Batteries, usually with current limitation to $C/5$ or $C/10$. Charging voltages must be regularly checked. To optimize the battery performance, it is necessary to ensure that the voltage is kept within the following limits:

Recommended Charging Voltage Per Cell

IEC Type	Floating Charge	Equalizing Charge
KPH	1.41 ± 0.01	1.6
KPM	1.43 ± 0.01	1.63
KPL	1.45 ± 0.01	1.65

Recommended Type Selection

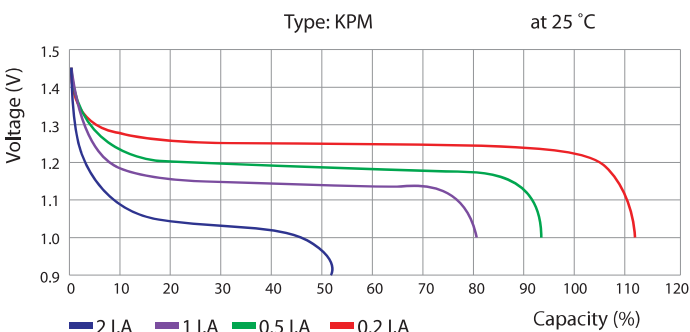
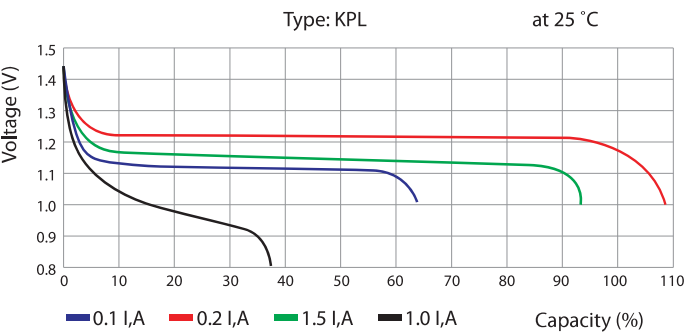
According to backup time required by application:

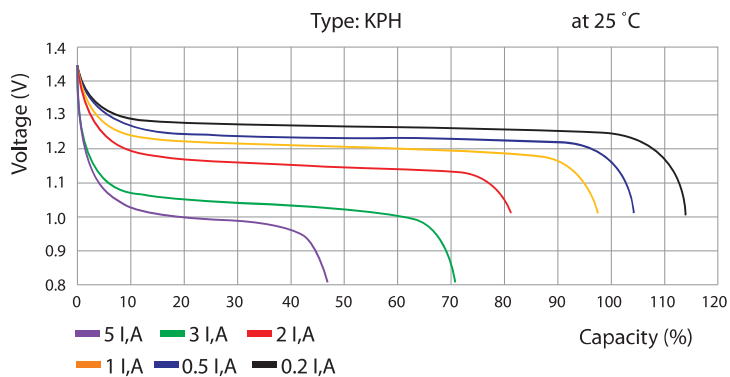


Initial Charging:

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:
 $0.2 C$ 5A for 10 hours
 $0.1 C$ 5A for 20 hours

Discharge Curves at 20C (68F)





These curves are only for demonstration purposes. They should not be used for detailed sizing

Discharge:

The low rate battery can be discharged at the current of $0.1 C_5 A \sim 0.5 C_5 A$ ($1 C_5 A$ is for the short time discharge). The medium rate battery can be discharged at $0.2 C_5 A \sim 3.5 C_5 A$. During discharge, the temperature of electrolyte should not exceed $45^\circ C$. If exceeded, the discharge current must be reduced or cooling measures be taken immediately. The battery discharge regime is shown as follow:

Constant discharge(A)	Discharge end-voltage(V)	Discharge duration	remarks
$0.1 C_5$	≥ 1.10	About 10h	
$0.2 C_5$	≥ 1.10	About 5h	
$0.33 C_5$	≥ 1.10	About 3h	Final discharge voltage is 0.9V/cell for low rate cell
$0.5 C_5$	≥ 0.9	About 2h	Final discharge voltage is 0.7V/cell for low rate cell
$1 C_5$	≥ 0.9	About 40min	Only for medium rate cell
$2 C_5$	≥ 0.8	About 10min	Only for starting application of the medium rate cell

Features:

- Long service life more than 20 years
- Excellent charging efficiency and smooth discharge voltage
- High resistance to mechanical and electrical abuse
- Reduced maintenance and replacement cost
- High cycling capability
- Exceptionally better life cycle cost
- Wide operating temperature range from $-20^\circ C$ to $50^\circ C$
- No electrolyte stratification
- No plate corrosion
- Low internal resistance
- Reduced loss of capacity at deep temperature
- No ice formation at temperatures below $0^\circ C$
- Exceptional lifetime at high temperatures
- 20 years in stationary cycling applications
- Suitable for deep discharge conditions
- Long shelf life, up to several years in a discharged state under correct conditions
- Recognized by CE/IEC60623/ISO9001



Capacity and Dimensions : TYPE KLP (IEC-EN 60623)

POCKET PLATE NI-CD BATTERY

LOW RATE OF DISCHARGE

MODEL	NOMINAL VOLTAGE (V)	RATED CAPACITY C ₅ Ah	MAX EXTERNAL DIMENSION (mm) LWH			MAXWEIGHT (KG)	ELECTROLYTE VOLUME (L)	SCREW THREAD OF TERMINAL POLES	CONTAINER MATERIAL
KPL10	1,2	10	38	84	138	0.8	0.2	M6	MBSorPP
KPL20	1,2	20	32	113	223	1.2	0.3	M6	PP
KPL30	1,2	30	68	134	245	2.7	0.9	M10x1	MBSorPP
KPL40	1,2	40	68	134	245	2.9	0.8	M10x1	MBSorPP
KPL50	1,2	50	68	134	245	3.2	0.7	M10x1	MBSorPP
KPL60	1,2	60	70	134	285	4.2	0.8	M16	MBSorPP
KPL70	1,2	70	70	134	285	4.2	0.7	M10x1	MBSorPP
KPL80	1,2	80	80	141	370	5.8	1.7	M10x1	MBSorPP
KPL100	1,2	100	80	141	370	6.0	1.5	M10x1	MBSorPP
KPL120	1,2	120	80	141	370	7.0	1.3	M10x1	MBSorPP
KPL150	1,2	150	107	165	348	9.0	2.0	M20	MBSorPP
KPL200	1,2	200	107	165	348	10.0	1.5	M20	MBSorPP
KPL250	1,2	250	164	167	348	13.5	2.5	M20	PP
KPL300	1,2	300	164	167	348	14.0	2.1	M20	PP
KPL350	1,2	350	152	170	385	15.9	2.6	M20	PP
KPL400	1,2	400	152	170	385	17.0	2.4	M20	PP
KPL500	1,2	500	162	200	450	24.0	4.2	2xM20	PP
KPL600	1,2	600	176	291	510	36.5	8.8	2xM20	MBS
KPL700	1,2	700	176	291	510	39.0	8.3	2xM20	MBS
KPL800	1,2	800	186	398	570	57.0	15.8	3xM20	MBS
KPL900	1,2	900	186	398	570	59.0	14.5	3xM20	MBS
KPL1000	1,2	1000	186	398	570	60.0	14.3	3xM20	MBS



Capacity and Dimensions : TYPE KPM (IEC-EN 60623)

POCKET PLATE NI-CD BATTERY

LOW RATE OF DISCHARGE

MODEL	NOMINAL VOLTAGE (V)	RATED CAPACITY C ₅ Ah	MAX EXTERNAL DIMENSION (mm) LWH			MAXWEIGHT (KG)	ELECTROLYTE VOLUME (L)	SCREW THREAD OF TERMINAL POLES	CONTAINER MATERIAL
KPM10	1,2	10	48	81	245	0.8	0.3	M10x1	MBS
KPM20	1,2	20	68	134	245	1.2	0.8	M10x1	PP
KPM30	1,2	30	68	134	245	2.7	0.7	M10x1	PP
KPM40	1,2	40	70	134	285	2.9	0.9	M16	MBSorPP
KPM50	1,2	50	70	134	285	3.2	0.8	M16	MBSorPP
KPM60	1,2	60	80	141	370	4.2	1.7	M16	MBSorPP
KPM70	1,2	70	80	141	370	4.2	1.6	M16	MBSorPP
KPM80	1,2	80	80	141	370	5.8	1.4	M16	MBSorPP
KPM100	1,2	100	107	165	348	6.0	1.9	M20	MBSorPP
KPM120	1,2	120	107	165	348	7.0	2.0	M20	MBSorPP
KPM150	1,2	150	164	167	348	9.0	3.4	M20	MBSorPP
KPM200	1,2	200	164	167	348	10.0	3.1	M20	MBSorPP
KPM250	1,2	250	152	170	450	13.5	3.0	M20	PP
KPM300	1,2	300	162	200	450	14.0	5.1	2xM16	PP
KPM350	1,2	350	162	200	510	15.9	4.9	2xM16	PP
KPM400	1,2	400	176	291	510	17.0	8.7	2xM16	MBS
KPM500	1,2	500	176	291	510	24.0	8.2	2xM16	PP
KPM600	1,2	600	176	291	510	36.5	7.5	2xM16	MBS
KPM700	1,2	700	186	398	570	39.0	15.0	3xM20	MBS
KPM800	1,2	800	186	398	570	57.0	13.0	3xM20	MBS
KPM900	1,2	900	186	398	570	59.0	12.0	3xM20	MBS
KPM1000	1,2	1000	186	398	570	60.0	11.0	3xM20	MBS



Capacity and Dimensions : TYPE KPH (IEC-EN 60623)

POCKET PLATE NI-CD BATTERY

MEDIUM RATE OF DISCHARGE

MODEL	NOMINAL VOLTAGE (V)	RATED CAPACITY C ₅ Ah	MAX EXTERNAL DIMENSION (mm) LWH			MAXWEIGHT (KG)	ELECTROLYTE VOLUME (L)	SCREV THREAD OF TERMINAL POLES	CONTAINER MATERIAL
KPH10	1,2	10	48	81	245	1.8	0.3	M10x1	MBS
KPH20	1,2	20	68	134	245	2.8	0.9	M10x1	PP
KPH30	1,2	30	70	134	285	4.3	0.9	M16	MBSorPP
KPH40	1,2	40	70	134	285	4.4	0.7	M16	MBSorPP
KPH50	1,2	50	80	141	370	6.2	1.7	M16	MBSorPP
KPH60	1,2	60	80	141	370	6.5	1.6	M16	MBSorPP
KPH70	1,2	70	107	165	348	8.5	2.2	M20	MBSorPP
KPH80	1,2	80	107	165	348	9.0	2.0	M20	MBSorPP
KPH100	1,2	100	164	167	348	12.8	3.2	M20	PP
KPH120	1,2	120	164	167	370	13.0	3.0	M20	PP
KPH150	1,2	150	164	167	370	14.0	2.8	M20	PP
KPH200	1,2	200	162	200	450	23.0	5.7	2xM20	PP
KPH250	1,2	250	162	200	450	24.0	5.5	2xM20	PP
KPH300	1,2	300	176	291	510	36.0	9.5	2xM20	MBS
KPH350	1,2	350	176	291	510	37.0	9.0	2xM20	MBS
KPH400	1,2	400	186	398	570	57.0	16.7	3xM20	MBS
KPH500	1,2	500	186	398	570	59.0	15.8	3xM20	MBS



Discharge Performance Data

1.1 KPL series battery (Final voltage 1.14V/cell)

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

Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPL10	10	0.98	1.15	1.65	2.35	2.80	3.09	3.75	4.67	5.19	5.57	5.88	6.73	9.53	11.0	14.4	16.5
KPL20	20	1.96	2.31	3.31	4.70	5.60	6.18	7.52	9.34	10.4	11.1	11.7	13.5	19.0	22.0	28.8	33.1
KPL30	30	2.94	3.46	4.97	7.05	8.40	9.27	11.3	14.0	15.6	16.7	17.6	20.2	28.5	33.0	43.3	49.6
KPL40	40	3.92	4.61	6.62	9.40	11.2	12.4	15.0	18.7	20.7	22.3	23.5	26.9	38.0	44.0	57.7	66.1
KPL50	50	4.86	5.71	8.24	11.6	13.8	15.3	18.1	22.4	25.0	26.1	28.5	31.8	44.3	50.4	65.5	74.6
KPL60	60	5.80	6.81	9.87	13.9	16.5	18.1	21.2	26.2	29.2	30.0	33.5	36.7	50.6	56.8	73.4	83.2
KPL70	70	6.74	7.91	11.5	16.1	19.1	21.0	24.3	29.9	33.5	33.8	38.5	41.6	56.9	63.2	81.2	91.7
KPL80	80	7.73	9.07	13.2	18.3	21.5	23.6	27.3	33.6	37.0	37.4	42.7	47.1	62.8	69.3	88.0	98.8
KPL100	100	9.74	11.4	16.5	22.7	26.4	29.0	33.6	41.4	44.8	45.9	52.0	58.8	76.7	84.3	106	118
KPL120	120	11.6	13.6	19.7	27.4	32.1	35.2	40.7	50.1	55.0	55.8	63.6	70.6	93.7	103	131	147
KPL150	150	14.7	17.3	24.8	33.9	39.0	42.5	49.5	61.3	64.8	67.2	75.6	88.2	112	123	152	169
KPL200	200	19.5	23.0	33.1	45.2	52.0	56.8	66.0	81.7	86.4	89.6	101	118	149	164	203	226
KPL250	250	24.5	28.8	41.4	56.5	65.0	70.9	82.5	102	108	112	126	147	187	204	254	282
KPL300	300	29.5	34.6	49.7	67.9	78.0	85.1	98.9	123	130	135	152	177	224	246	305	338
KPL350	350	34.4	40.3	58.0	79.2	91.0	99.1	116	143	151	157	177	206	262	287	356	395
KPL400	400	39.2	46.1	66.2	90.5	104	114	132	164	173	179	202	235	299	328	407	451
KPL500	500	49.0	57.6	82.8	113	130	142	165	204	216	224	252	294	374	410	508	564
KPL600	600	58.8	69.1	99.4	136	156	170	198	245	259	269	302	353	448	492	610	676
KPL700	700	68.6	80.6	116	158	182	199	231	286	302	314	353	412	523	574	711	789
KPL800	800	78.4	92.2	132	181	208	227	264	327	346	358	403	470	597	656	813	902
KPL900	900	88.2	104	149	203	234	255	297	368	389	403	453	529	672	737	914	1015
KPL1000	1000	98.0	116	166	226	260	283	330	409	432	448	504	588	747	820	1016	1127
KPL1100	1100	108	127	182	249	286	312	363	450	475	493	554	647	822	901	1118	1240
KPL1200	1200	118	138	199	271	312	340	396	491	518	538	605	706	897	983	1219	1353



Discharge Performance Data

1.2 KPL series battery (Final voltage 1.10V/cell)
 Discharge performance data after fully charged by constant current according to IEC60623.
 Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPL10	10	1.00	1.23	1.88	2.67	3.36	3.88	4.64	5.85	6.47	6.93	7.80	9.07	11.6	13.3	17.5	19.9
KPL20	20	2.00	2.45	3.76	5.34	6.73	7.75	9.27	11.7	13.0	13.8	15.6	18.1	23.2	26.7	34.9	39.7
KPL30	30	3.00	3.68	5.64	8.01	10.1	11.6	13.9	17.6	19.5	20.7	23.3	27.2	34.9	40.0	52.3	59.5
KPL40	40	4.00	4.90	7.53	10.7	13.4	15.5	18.6	23.4	26.0	27.6	31.1	36.3	46.5	53.4	69.8	79.3
KPL50	50	4.98	6.10	9.39	13.3	16.7	19.1	22.8	28.2	31.2	32.6	36.6	42.4	54.1	61.5	79.1	89.2
KPL60	60	5.98	7.32	11.3	15.9	19.8	22.6	26.9	32.8	36.0	37.9	42.4	47.9	61.5	69.1	87.6	98.1
KPL70	70	6.98	8.54	13.2	18.5	23.0	26.0	31.1	37.4	40.9	43.4	48.4	53.5	69.3	77.1	96.8	108
KPL80	80	7.95	9.73	15.0	21.2	26.4	29.8	35.5	42.4	46.4	48.0	53.3	60.2	76.8	85.3	106	118
KPL100	100	9.97	12.2	18.8	26.3	32.6	36.7	43.8	52.0	56.4	60.0	66.6	72.3	94.1	103	127	141
KPL120	120	11.9	14.6	22.4	31.8	39.4	44.5	53.0	63.2	69.0	72.0	79.9	89.3	115	127	157	175
KPL150	150	15.0	18.4	28.2	39.1	48.4	54.1	64.8	76.2	82.0	90.0	99.8	104	137	150	182	200
KPL200	200	20.0	24.5	37.6	52.2	64.6	72.1	86.4	102	109	120	133	138	184	200	243	267
KPL250	250	25.0	30.6	47.0	65.2	80.7	90.2	108	127	137	150	166	173	229	250	304	334
KPL300	300	30.0	36.8	56.4	78.2	96.9	108	130	153	164	180	200	207	275	300	365	400
KPL350	350	35.0	42.9	65.9	91.3	113	126	151	178	192	210	233	242	321	350	426	467
KPL400	400	40.0	49.0	75.3	104	129	144	173	204	219	240	266	276	367	399	487	534
KPL500	500	50.0	61.3	94.0	130	162	180	216	254	274	300	333	346	458	499	609	667
KPL600	600	60.0	73.5	113	157	194	216	259	305	328	360	400	415	550	599	731	800
KPL700	700	70.0	85.8	132	183	226	253	302	356	383	420	466	484	642	699	852	934
KPL800	800	80.0	98.1	150	209	258	289	346	407	437	480	533	553	733	799	974	1067
KPL900	900	90.0	110	169	235	291	325	389	457	492	540	599	622	825	899	1096	1201
KPL1000	1000	100	122	188	261	323	361	432	508	547	600	666	691	917	999	1218	1333
KPL1100	1100	110	135	207	287	355	397	475	559	602	660	733	760	1008	1099	1339	1467
KPL1200	1200	120	147	226	313	388	433	518	610	657	720	799	829	1100	1198	1461	1601



Discharge Performance Data

1.3 KPL series battery (Final voltage 1.05V/cell)

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

Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPL10	10	1.02	1.26	1.96	3.10	3.93	4.53	5.62	7.33	8.53	9.20	10.1	10.7	14.4	16.2	21.1	23.7
KPL20	20	2.04	2.52	3.92	6.20	7.87	9.06	11.3	14.7	17.1	18.4	20.3	21.3	28.8	32.4	42.2	47.5
KPL30	30	3.06	3.79	5.88	9.30	11.8	13.6	16.9	22.1	25.6	27.6	30.5	32.0	43.2	48.5	63.3	71.3
KPL40	40	4.08	5.05	7.84	12.4	15.7	18.1	22.5	29.4	34.1	36.8	40.7	42.6	57.6	64.7	84.4	95.0
KPL50	50	5.06	6.29	9.80	15.6	19.6	22.5	27.3	35.4	40.6	43.7	47.9	51.4	67.1	74.8	96.6	108
KPL60	60	6.03	7.52	11.8	18.7	23.5	26.9	32.2	41.4	47.1	50.5	55.0	60.1	76.5	84.9	109	121
KPL70	70	7.01	8.76	13.7	21.9	27.4	31.3	37.0	47.4	53.6	57.4	62.2	68.9	86.0	95.0	121	134
KPL80	80	8.05	10.1	15.7	25.0	31.2	35.5	41.8	53.4	59.8	63.4	69.1	78.2	94.8	104	130	143
KPL100	100	10.1	12.7	19.7	31.2	38.8	44.0	52.0	66.2	73.6	77.1	84.9	97.5	116	127	155	170
KPL120	120	12.1	15.1	23.6	37.5	46.7	53.1	62.6	79.9	89.3	94.5	103	117	141	155	193	211
KPL150	150	15.3	19.1	29.7	46.5	58.0	65.4	77.5	98.3	108	113	124	147	168	184	222	240
KPL200	200	20.4	25.4	39.6	62.0	77.3	87.1	103	131	145	150	166	196	225	246	295	321
KPL250	250	25.5	31.7	49.5	77.5	96.6	109	129	164	181	187	208	245	281	307	369	401
KPL300	300	30.6	38.1	59.4	93.1	116	131	155	196	217	225	250	293	337	369	443	481
KPL350	350	35.7	44.4	69.3	109	136	153	181	229	253	262	291	341	394	431	517	561
KPL400	400	40.8	50.8	79.2	124	155	174	207	262	289	300	333	390	450	492	591	641
KPL500	500	51.0	63.5	99.0	155	193	218	258	328	362	374	416	488	562	615	738	801
KPL600	600	61.2	76.1	119	186	232	261	310	394	434	449	499	586	675	738	886	962
KPL700	700	71.4	88.8	139	217	271	305	362	459	506	524	582	684	787	861	1033	1122
KPL800	800	81.6	101	158	248	309	349	413	525	578	600	665	782	900	984	1181	1282
KPL900	900	91.8	114	178	279	348	392	465	590	651	674	748	880	1012	1107	1329	1443
KPL1000	1000	102	126	198	310	386	435	517	656	723	749	831	977	1124	1230	1477	1603
KPL1100	1100	112	140	218	341	425	479	568	722	795	824	915	1074	1237	1353	1624	1763
KPL1200	1200	122	152	238	372	464	523	620	787	867	899	998	1172	1350	1476	1772	1923



Discharge Performance Data

1.4 KPL series battery (Final voltage 1.0V/cell)
 Discharge performance data after fully charged by constant current according to IEC60623.
 Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPL10	10	1.03	1.27	2.00	3.20	4.23	5.10	6.46	8.93	10.1	10.9	12.0	14.4	17.9	19.8	25.5	28.7
KPL20	20	2.05	2.55	4.00	6.40	8.47	10.2	12.9	17.9	20.2	21.7	24.0	28.8	35.7	39.6	51.1	57.5
KPL30	30	3.08	3.83	6.00	9.60	12.7	15.3	19.4	26.9	30.3	32.6	36.0	43.2	53.6	59.4	76.6	86.2
KPL40	40	4.10	5.10	8.00	12.8	16.9	20.4	25.8	35.9	40.3	43.5	48.0	57.6	71.4	79.3	102	115
KPL50	50	5.09	6.35	10.0	16.0	21.2	25.4	31.7	43.2	48.6	52.0	56.9	66.9	83.3	91.2	117	131
KPL60	60	6.09	7.60	12.0	19.2	25.6	30.3	37.6	50.6	56.9	60.5	65.8	76.1	95.2	103	132	147
KPL70	70	7.08	8.85	14.0	22.4	29.9	35.3	43.5	57.9	65.2	69.0	74.7	85.4	107	115	147	163
KPL80	80	8.13	10.1	16.0	25.6	34.0	40.1	49.2	65.3	73.3	77.7	84.4	94.8	118	127	158	174
KPL100	100	10.2	12.7	20.0	32.0	42.2	49.7	61.0	81.1	90.8	96.6	105	117	144	154	189	206
KPL120	120	12.2	15.2	24.0	38.4	50.9	60.0	73.7	97.9	110	116	127	142	176	188	235	258
KPL150	150	15.4	19.2	30.0	48.0	62.8	73.8	90.6	121	135	144	158	173	210	225	270	290
KPL200	200	20.6	25.5	40.0	64.0	83.7	98.4	121	161	180	192	211	230	280	300	360	387
KPL250	250	25.7	31.9	50.0	80.0	105	123	151	201	225	240	264	288	350	375	450	484
KPL300	300	30.9	38.3	60.0	96.0	126	148	181	242	270	288	317	346	420	451	540	581
KPL350	350	36.1	44.6	70.0	112	147	173	211	282	315	336	370	403	489	526	630	678
KPL400	400	41.2	51.0	80.0	128	168	197	241	322	360	384	422	461	559	601	720	775
KPL500	500	51.5	63.7	100	160	209	246	302	403	450	480	528	576	699	751	901	969
KPL600	600	61.8	76.5	120	192	251	295	362	483	539	576	634	691	839	901	1081	1162
KPL700	700	72.1	89.3	140	224	293	345	422	564	629	672	739	806	979	1051	1261	1355
KPL800	800	82.4	102	160	256	335	394	483	644	719	768	845	922	1119	1201	1441	1549
KPL900	900	92.7	115	180	288	376	444	543	725	809	864	950	1037	1259	1351	1621	1743
KPL1000	1000	103	127	200	320	419	492	604	805	899	960	1056	1152	1398	1501	1801	1937
KPL1100	1100	113	140	220	352	460	542	664	886	989	1056	1162	1267	1538	1651	1981	2130
KPL1200	1200	124	153	240	384	502	591	724	966	1079	1152	1267	1382	1678	1801	2161	2324



Discharge Performance Data

1.5 KPM series battery (Final voltage 1.14V/cell)

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

Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPM10	10	0.96	1.20	1.88	2.54	3.16	3.69	4.32	5.52	6.39	7.04	8.04	9.82	14.6	16.6	19.8	22.0
KPM20	20	1.93	2.40	3.76	5.07	6.35	7.43	8.65	11.1	12.8	14.0	16.0	19.4	28.2	31.8	37.6	40.3
KPM30	30	2.90	3.60	5.64	7.62	9.56	11.2	13.0	16.8	19.2	20.9	23.9	28.7	40.6	45.6	53.1	54.8
KPM40	40	3.87	4.80	7.51	10.2	12.9	15.2	17.7	22.9	26.2	28.7	32.8	39.4	56.1	62.9	73.4	76.0
KPM50	50	4.84	6.00	9.39	12.8	16.2	19.1	22.4	29.0	33.3	36.6	41.6	50.1	71.6	80.1	93.6	97.2
KPM60	60	5.81	7.20	11.3	15.3	19.5	23.1	27.1	35.1	40.3	44.4	50.5	60.8	87.1	97.4	114	118
KPM70	70	6.77	8.40	13.1	17.9	22.7	27.0	31.8	41.0	47.1	51.9	59.0	71.1	102	114	133	138
KPM80	80	7.74	9.60	15.0	20.4	25.9	30.9	36.3	46.8	53.8	59.1	67.2	80.9	115	129	150	156
KPM100	100	9.7	12.0	18.8	25.5	32.4	38.6	45.4	58.3	67.1	73.4	83.5	100	142	159	185	191
KPM120	120	11.6	14.4	22.5	30.6	38.9	46.4	54.4	69.9	80.4	87.8	99.9	120	170	189	219	227
KPM150	150	14.5	18.0	28.2	38.3	48.6	58.0	68.0	87.3	100	109	124	149	210	234	271	280
KPM200	200	19.3	24.0	37.6	51.0	64.7	77.3	90.7	116	134	145	165	198	278	309	358	369
KPM250	250	24.2	30.0	47.0	63.8	80.9	96.7	113	145	167	181	206	247	346	385	444	458
KPM300	300	29.0	36.0	56.4	76.5	97.0	116	136	174	200	217	247	296	414	460	531	547
KPM350	350	33.8	42.0	65.8	89.3	113	135	159	203	233	253	288	345	483	537	620	638
KPM400	400	38.7	48.0	75.2	102	129	154	181	232	266	289	330	394	551	614	708	730
KPM500	500	48.3	60.0	94.0	128	161	193	227	290	333	361	412	493	690	767	885	913
KPM600	600	58.0	72.0	113	153	194	231	272	348	400	434	495	591	828	920	1062	1095
KPM700	700	67.7	84.0	132	179	226	270	318	406	467	506	577	690	966	1073	1239	1277
KPM800	800	77.4	96.0	150	204	258	308	363	464	533	579	659	788	1104	1227	1416	1460
KPM900	900	87.1	108	169	230	291	347	408	521	600	652	742	886	1241	1380	1593	1643
KPM1000	1000	96.7	120	188	255	323	385	454	579	666	723	825	985	1379	1534	1770	1825
KPM1100	1100	106	132	206	280	356	424	499	637	733	796	907	1084	1517	1687	1947	2007



Discharge Performance Data

1.6 KPM series battery (Final voltage 1.10V/cell)

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

Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPM10	10	0.99	1.23	1.95	2.90	3.71	4.39	5.31	6.87	7.93	8.73	9.93	12.2	17.9	20.5	25.1	26.6
KPM20	20	1.98	2.46	3.90	5.80	7.44	8.82	10.7	13.8	16.0	17.4	19.7	24.1	34.8	39.4	47.5	50.4
KPM30	30	2.97	3.69	5.85	8.71	11.2	13.3	16.2	20.9	24.1	26.1	29.4	35.6	50.5	56.5	67.1	71.4
KPM40	40	3.96	4.92	7.81	11.6	15.0	17.9	22.0	28.5	33.1	35.9	40.4	48.9	69.2	78.1	92.5	102
KPM50	50	4.95	6.15	9.76	14.5	18.7	22.4	27.8	36.2	42.0	45.7	51.3	62.2	87.9	99.6	118	133
KPM60	60	5.94	7.38	11.7	17.4	22.5	27.0	33.6	43.8	51.0	55.5	62.3	75.5	107	121	143	164
KPM70	70	6.93	8.61	13.7	20.4	26.3	31.5	39.3	51.2	59.7	64.9	72.9	88.2	124	141	167	191
KPM80	80	7.92	9.84	15.6	23.3	30.1	36.0	45.0	58.5	68.0	73.9	83.1	100	141	160	189	214
KPM100	100	9.90	12.3	19.5	29.1	37.6	45.0	56.2	73.0	84.8	91.9	103	124	175	197	233	260
KPM120	120	11.9	14.8	23.4	34.9	45.1	54.0	67.5	87.5	101	110	124	149	208	235	277	305
KPM150	150	14.9	18.5	29.3	43.6	56.4	67.5	84.4	109	127	137	154	185	259	290	343	373
KPM200	200	19.8	24.6	39.0	58.2	75.3	90.0	113	145	168	182	205	245	343	384	453	487
KPM250	250	24.8	30.8	48.8	72.7	94.1	113	141	182	210	227	256	306	427	477	563	600
KPM300	300	29.7	36.9	58.5	87.3	113	135	169	218	252	272	307	366	511	570	673	714
KPM350	350	34.7	43.0	68.2	102	132	158	197	254	294	318	358	427	596	665	785	833
KPM400	400	39.6	49.2	78.0	117	150	180	225	290	335	363	409	489	681	760	896	952
KPM500	500	49.5	61.5	97.5	146	188	226	281	362	420	454	511	611	852	951	1121	1190
KPM600	600	59.4	73.8	117	175	225	271	337	435	504	545	613	733	1022	1141	1345	1428
KPM700	700	69.4	86.1	137	204	263	316	394	507	587	635	716	854	1192	1331	1569	1667
KPM800	800	79.2	98.3	156	233	301	361	450	580	672	726	818	977	1363	1521	1794	1905
KPM900	900	89.2	111	175	262	338	406	506	653	755	817	921	1099	1533	1711	2018	2142
KPM1000	1000	99.1	123	195	291	375	451	562	725	839	908	1023	1221	1704	1902	2242	2381
KPM1100	1100	109	136	214	320	413	496	618	798	923	999	1125	1343	1874	2092	2467	2619



Discharge Performance Data

1.5 KPM series battery (Final voltage 1.14V/cell)
 Discharge performance data after fully charged by constant current according to IEC60623.
 Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPM10	10	0.96	1.20	1.88	2.54	3.16	3.69	4.32	5.52	6.39	7.04	8.04	9.82	14.6	16.6	19.8	22.0
KPM20	20	1.93	2.40	3.76	5.07	6.35	7.43	8.65	11.1	12.8	14.0	16.0	19.4	28.2	31.8	37.6	40.3
KPM30	30	2.90	3.60	5.64	7.62	9.56	11.2	13.0	16.8	19.2	20.9	23.9	28.7	40.6	45.6	53.1	54.8
KPM40	40	3.87	4.80	7.51	10.2	12.9	15.2	17.7	22.9	26.2	28.7	32.8	39.4	56.1	62.9	73.4	76.0
KPM50	50	4.84	6.00	9.39	12.8	16.2	19.1	22.4	29.0	33.3	36.6	41.6	50.1	71.6	80.1	93.6	97.2
KPM60	60	5.81	7.20	11.3	15.3	19.5	23.1	27.1	35.1	40.3	44.4	50.5	60.8	87.1	97.4	114	118
KPM70	70	6.77	8.40	13.1	17.9	22.7	27.0	31.8	41.0	47.1	51.9	59.0	71.1	102	114	133	138
KPM80	80	7.74	9.60	15.0	20.4	25.9	30.9	36.3	46.8	53.8	59.1	67.2	80.9	115	129	150	156
KPM100	100	9.7	12.0	18.8	25.5	32.4	38.6	45.4	58.3	67.1	73.4	83.5	100	142	159	185	191
KPM120	120	11.6	14.4	22.5	30.6	38.9	46.4	54.4	69.9	80.4	87.8	99.9	120	170	189	219	227
KPM150	150	14.5	18.0	28.2	38.3	48.6	58.0	68.0	87.3	100	109	124	149	210	234	271	280
KPM200	200	19.3	24.0	37.6	51.0	64.7	77.3	90.7	116	134	145	165	198	278	309	358	369
KPM250	250	24.2	30.0	47.0	63.8	80.9	96.7	113	145	167	181	206	247	346	385	444	458
KPM300	300	29.0	36.0	56.4	76.5	97.0	116	136	174	200	217	247	296	414	460	531	547
KPM350	350	33.8	42.0	65.8	89.3	113	135	159	203	233	253	288	345	483	537	620	638
KPM400	400	38.7	48.0	75.2	102	129	154	181	232	266	289	330	394	551	614	708	730
KPM500	500	48.3	60.0	94.0	128	161	193	227	290	333	361	412	493	690	767	885	913
KPM600	600	58.0	72.0	113	153	194	231	272	348	400	434	495	591	828	920	1062	1095
KPM700	700	67.7	84.0	132	179	226	270	318	406	467	506	577	690	966	1073	1239	1277
KPM800	800	77.4	96.0	150	204	258	308	363	464	533	579	659	788	1104	1227	1416	1460
KPM900	900	87.1	108	169	230	291	347	408	521	600	652	742	886	1241	1380	1593	1643
KPM1000	1000	96.7	120	188	255	323	385	454	579	666	723	825	985	1379	1534	1770	1825
KPM1100	1100	106	132	206	280	356	424	499	637	733	796	907	1084	1517	1687	1947	2007



Discharge Performance Data

1.6 KPM series battery (Final voltage 1.10V/cell)
 Discharge performance data after fully charged by constant current according to IEC60623.
 Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPM10	10	0.99	1.23	1.95	2.90	3.71	4.39	5.31	6.87	7.93	8.73	9.93	12.2	17.9	20.5	25.1	26.6
KPM20	20	1.98	2.46	3.90	5.80	7.44	8.82	10.7	13.8	16.0	17.4	19.7	24.1	34.8	39.4	47.5	50.4
KPM30	30	2.97	3.69	5.85	8.71	11.2	13.3	16.2	20.9	24.1	26.1	29.4	35.6	50.5	56.5	67.1	71.4
KPM40	40	3.96	4.92	7.81	11.6	15.0	17.9	22.0	28.5	33.1	35.9	40.4	48.9	69.2	78.1	92.5	102
KPM50	50	4.95	6.15	9.76	14.5	18.7	22.4	27.8	36.2	42.0	45.7	51.3	62.2	87.9	99.6	118	133
KPM60	60	5.94	7.38	11.7	17.4	22.5	27.0	33.6	43.8	51.0	55.5	62.3	75.5	107	121	143	164
KPM70	70	6.93	8.61	13.7	20.4	26.3	31.5	39.3	51.2	59.7	64.9	72.9	88.2	124	141	167	191
KPM80	80	7.92	9.84	15.6	23.3	30.1	36.0	45.0	58.5	68.0	73.9	83.1	100	141	160	189	214
KPM100	100	9.90	12.3	19.5	29.1	37.6	45.0	56.2	73.0	84.8	91.9	103	124	175	197	233	260
KPM120	120	11.9	14.8	23.4	34.9	45.1	54.0	67.5	87.5	101	110	124	149	208	235	277	305
KPM150	150	14.9	18.5	29.3	43.6	56.4	67.5	84.4	109	127	137	154	185	259	290	343	373
KPM200	200	19.8	24.6	39.0	58.2	75.3	90.0	113	145	168	182	205	245	343	384	453	487
KPM250	250	24.8	30.8	48.8	72.7	94.1	113	141	182	210	227	256	306	427	477	563	600
KPM300	300	29.7	36.9	58.5	87.3	113	135	169	218	252	272	307	366	511	570	673	714
KPM350	350	34.7	43.0	68.2	102	132	158	197	254	294	318	358	427	596	665	785	833
KPM400	400	39.6	49.2	78.0	117	150	180	225	290	335	363	409	489	681	760	896	952
KPM500	500	49.5	61.5	97.5	146	188	226	281	362	420	454	511	611	852	951	1121	1190
KPM600	600	59.4	73.8	117	175	225	271	337	435	504	545	613	733	1022	1141	1345	1428
KPM700	700	69.4	86.1	137	204	263	316	394	507	587	635	716	854	1192	1331	1569	1667
KPM800	800	79.2	98.3	156	233	301	361	450	580	672	726	818	977	1363	1521	1794	1905
KPM900	900	89.2	111	175	262	338	406	506	653	755	817	921	1099	1533	1711	2018	2142
KPM1000	1000	99.1	123	195	291	375	451	562	725	839	908	1023	1221	1704	1902	2242	2381
KPM1100	1100	109	136	214	320	413	496	618	798	923	999	1125	1343	1874	2092	2467	2619



Discharge Performance Data

1.7 KPM series battery (Final voltage 1.05V/cell)

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

Available current under 20°C±5°C.

Models	C _e Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPM10	10	1.01	1.25	1.98	3.22	4.17	5.00	6.40	8.33	9.60	10.7	12.3	14.9	22.0	25.4	31.3	33.8
KPM20	20	2.01	2.50	3.96	6.44	8.37	10.0	12.9	16.8	19.3	21.4	24.5	29.6	42.6	48.8	59.0	63.7
KPM30	30	3.02	3.75	5.94	9.66	12.6	15.1	19.4	25.5	29.0	32.2	36.7	43.9	61.9	70.3	83.3	89.8
KPM40	40	4.03	5.00	7.93	12.9	16.8	20.2	26.4	35.0	39.8	44.0	50.5	60.5	85.4	96.8	116	124
KPM50	50	5.04	6.25	9.92	16.1	21.1	25.4	33.3	44.5	50.5	55.9	64.3	77.1	109	123	148	158
KPM60	60	6.05	7.50	11.9	19.4	25.3	30.5	40.3	54.0	61.3	67.7	78.1	93.7	132	150	180	193
KPM70	70	7.05	8.75	13.9	22.6	29.5	35.7	47.1	63.3	71.8	79.2	91.3	110	154	175	210	225
KPM80	80	8.06	10.0	15.9	25.8	33.7	40.8	53.8	72.2	81.9	90.4	104	125	175	198	237	254
KPM100	100	10.1	12.5	19.8	32.3	42.1	51.0	67.3	90.1	102	113	129	155	216	244	291	313
KPM120	120	12.1	15.0	23.8	38.8	50.5	61.2	80.8	108	122	135	155	185	258	291	346	372
KPM150	150	15.1	18.8	29.7	48.5	63.1	76.5	101	135	153	169	193	230	320	360	427	460
KPM200	200	20.1	25.0	39.6	64.6	84.0	102	135	180	204	225	256	305	423	477	564	607
KPM250	250	25.2	31.3	49.5	80.8	105	127	168	224	254	281	320	380	527	593	700	754
KPM300	300	30.2	37.5	59.4	96.9	126	153	202	269	305	337	383	455	630	709	836	901
KPM350	350	35.2	43.8	69.3	113	147	179	235	314	356	394	447	531	735	827	975	1051
KPM400	400	40.3	50.0	79.2	129	169	204	269	359	408	450	511	606	840	946	1114	1201
KPM500	500	50.4	62.5	99.0	161	211	255	337	449	509	562	639	757	1051	1182	1393	1502
KPM600	600	60.4	75.0	119	194	253	306	403	539	611	675	766	909	1261	1419	1671	1802
KPM700	700	70.5	87.5	139	226	295	357	471	628	713	787	894	1060	1471	1655	1950	2102
KPM800	800	80.6	100	158	258	337	408	538	717	815	900	1022	1212	1681	1891	2228	2402
KPM900	900	90.6	113	178	291	380	459	605	807	917	1013	1149	1364	1891	2128	2507	2703
KPM1000	1000	101	125	198	323	421	510	673	896	1019	1124	1277	1515	2101	2364	2785	3003
KPM1100	1100	111	138	218	356	463	561	740	986	1121	1237	1404	1667	2311	2600	3064	3303



Discharge Performance Data

1.8 KPM series battery (Final voltage 1.00V/cell)
 Discharge performance data after fully charged by constant current according to IEC60623.
 Available current under 20°C±5°C.

Models	C _s Ah	Hours							Minutes						Seconds		
		10	8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPM10	10	1.01	1.26	2.00	3.27	4.76	5.70	7.33	9.87	11.5	12.7	14.5	18.0	26.7	30.6	38.5	42.4
KPM20	20	2.03	2.52	4.00	6.54	9.53	11.4	14.7	19.9	23.3	25.5	28.9	35.7	51.9	59.0	72.8	78.7
KPM30	30	3.04	3.78	6.00	9.81	14.3	17.2	22.2	30.0	35.2	38.4	43.4	53.0	75.6	85.2	103	109
KPM40	40	4.06	5.04	8.00	13.1	19.1	23.0	29.7	41.2	48.3	52.8	59.9	73.0	104	117	142	151
KPM50	50	5.07	6.30	10.0	16.4	23.9	28.8	37.3	52.5	61.4	67.3	76.3	93.0	132	150	181	193
KPM60	60	6.09	7.56	12.0	19.7	28.7	34.6	44.8	63.7	74.5	81.7	92.8	113	160	182	220	235
KPM70	70	7.11	8.82	14.0	22.9	33.5	40.4	52.3	74.6	87.2	95.6	109	132	187	212	257	274
KPM80	80	8.12	10.1	16.0	26.2	38.2	46.1	59.8	85.1	99.5	109	124	151	212	241	290	309
KPM100	100	10.1	12.6	20.0	32.7	47.8	57.7	74.7	106	124	136	154	187	263	297	358	380
KPM120	120	12.2	15.1	24.0	39.3	57.3	69.2	89.7	127	149	163	185	224	314	354	425	451
KPM150	150	15.2	18.9	30.0	49.1	71.6	86.5	112	159	186	204	230	279	391	439	526	558
KPM200	200	20.3	25.2	40.0	65.4	95.4	115	149	212	248	271	307	371	518	581	694	736
KPM250	250	25.3	31.5	50.0	81.8	119	144	187	264	309	339	383	463	646	723	863	913
KPM300	300	30.4	37.8	60.0	98.1	143	173	224	317	371	406	459	555	773	865	1031	1091
KPM350	350	35.5	44.1	70.0	115	167	202	261	370	433	474	536	647	902	1009	1203	1273
KPM400	400	40.6	50.4	80.0	131	191	230	299	423	495	542	612	739	1031	1153	1374	1454
KPM500	500	50.8	63.0	100	163	239	288	374	529	619	676	764	924	1289	1441	1718	1818
KPM600	600	60.9	75.6	120	196	287	346	448	635	743	812	918	1109	1546	1729	2062	2182
KPM700	700	71.0	88.2	140	229	335	404	523	741	866	947	1070	1294	1804	2017	2405	2545
KPM800	800	81.2	101	160	261	383	462	598	846	990	1082	1223	1479	2062	2306	2749	2909
KPM900	900	91.4	114	180	294	430	519	673	953	1114	1218	1376	1664	2319	2593	3093	3272
KPM1000	1000	101	126	200	327	478	577	748	1058	1237	1353	1530	1849	2577	2882	3436	3636
KPM1100	1100	112	139	220	360	525	635	823	1164	1361	1489	1682	2034	2835	3170	3780	4000



Discharge Performance Data

1.9 KPH series battery (Final voltage 1.14V/cell)

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

Available current under 20°C±5°C.

Models	C _s Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPH10	10	1.17	1.86	3.02	4.41	5.71	7.52	10.0	11.7	12.9	14.3	17.6	27.3	31.8	38.8	46.5
KPH20	20	2.34	3.71	6.06	8.86	11.5	15.3	20.5	24.0	26.4	29.3	35.7	55.4	64.1	80.0	84.0
KPH30	30	3.51	5.56	9.09	13.2	17.2	22.9	30.8	36.0	39.6	43.9	53.6	83.1	96.1	120	126
KPH35	35	4.09	6.48	10.6	15.5	20.0	26.7	36.0	42.0	46.2	51.2	62.5	96.9	112	140	147
KPH40	40	4.68	7.41	12.1	17.7	22.9	30.5	41.1	48.0	52.8	58.5	71.4	111	128	160	168
KPH50	50	5.85	9.26	15.1	22.1	28.7	38.1	51.4	60.0	65.9	73.1	89.3	139	160	200	210
KPH60	60	7.02	11.1	18.2	26.5	34.4	45.7	61.7	71.9	79.1	87.8	107	166	192	240	252
KPH70	70	8.19	13.0	21.2	31.0	40.1	53.4	72.0	83.9	92.3	102	125	194	224	280	294
KPH80	80	9.36	14.8	24.2	35.4	45.9	61.0	82.3	95.9	105	116	143	222	256	320	336
KPH100	100	11.7	18.5	30.3	44.3	57.3	76.1	103	120	132	146	179	277	320	400	420
KPH120	120	14.0	22.2	36.4	53.2	68.7	91.4	123	143	159	176	215	333	384	480	504
KPH150	150	17.6	27.7	45.5	66.5	86.0	115	155	180	198	220	268	416	481	600	631
KPH180	180	21.1	33.3	54.5	79.7	103	137	185	216	238	263	321	498	577	720	757
KPH200	200	23.4	37.0	60.6	88.6	114	152	206	240	264	293	357	554	641	800	841
KPH250	250	29.2	46.3	75.7	111	143	191	257	300	329	365	446	693	801	1000	1051
KPH300	300	35.1	55.5	90.9	133	171	229	308	360	396	439	536	831	961	1200	1260
KPH350	350	40.9	64.7	106	155	200	267	360	419	462	512	625	970	1121	1400	1470
KPH400	400	46.8	74.0	121	177	229	304	411	479	527	585	715	1108	1282	1600	1680
KPH500	500	57.9	91.5	150	220	283	377	509	594	653	724	884	1371	1586	1980	2079



Discharge Performance Data

1.10 KPH series battery (Final voltage 1.10V/cell)
 Discharge performance data after fully charged by constant current according to IEC60623.
 Available current under 20°C±5°C.

Models	C _s Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPH10	10	1.20	1.92	3.14	4.63	6.05	8.51	13.0	14.9	16.6	18.7	22.4	34.0	39.5	50.0	52.7
KPH20	20	2.42	3.84	6.31	9.26	12.1	17.3	26.6	30.8	34.3	38.2	45.8	69.2	80.0	98.0	109
KPH30	30	3.63	5.76	9.46	13.9	18.2	25.9	40.0	46.2	51.5	57.3	68.7	103	120	147	164
KPH35	35	4.24	6.72	11.0	16.2	21.2	30.2	46.7	53.9	60.1	66.9	80.1	121	140	171	192
KPH40	40	4.84	7.68	12.6	18.6	24.2	34.5	53.3	61.6	68.7	76.5	91.5	138	160	196	219
KPH50	50	6.05	9.60	15.7	23.2	30.3	43.1	66.6	77.0	85.9	95.6	114	173	200	245	274
KPH60	60	7.26	11.5	18.9	27.8	36.4	51.7	80.0	92.4	103	115	137	207	240	294	329
KPH70	70	8.47	13.4	22.0	32.4	42.4	60.3	93.3	108	121	134	160	242	280	343	384
KPH80	80	9.68	15.4	25.2	37.1	48.5	68.9	106	124	138	153	183	276	320	392	439
KPH100	100	12.1	19.2	31.5	46.3	60.6	86.1	134	154	171	191	229	346	400	490	549
KPH120	120	14.5	23.1	37.8	55.5	72.7	104	160	185	206	230	275	415	480	588	659
KPH150	150	18.2	28.8	47.3	69.4	90.9	129	200	231	258	287	343	519	600	736	824
KPH180	180	21.8	34.6	56.7	83.4	109	155	240	278	309	344	412	622	720	883	989
KPH200	200	24.2	38.4	63.0	92.6	121	172	266	308	344	383	458	692	800	981	1099
KPH250	250	30.3	48.0	78.7	116	152	215	333	385	429	478	572	865	1000	1226	1374
KPH300	300	36.3	57.6	94.5	139	182	258	400	462	515	573	687	1038	1200	1470	1648
KPH350	350	42.3	67.2	110	162	212	301	467	539	602	669	801	1211	1400	1715	1924
KPH400	400	48.4	76.8	126	185	242	345	533	617	687	764	915	1384	1600	1960	2197
KPH500	500	60.5	96.0	158	231	303	431	667	771	859	956	1145	1730	2000	2451	2747



Discharge Performance Data

1.11 KPH series battery (Final voltage 1.05V/cell)

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

Available current under 20°C±5°C.

Models	C ₅ Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPH10	10	1.24	1.98	3.24	4.78	6.28	9.10	16.1	19.4	21.3	24.1	28.8	42.8	50.2	61.3	66.3
KPH20	20	2.48	3.94	6.48	9.58	12.5	18.2	32.6	40.1	44.0	49.8	58.9	87.7	100	123	133
KPH30	30	3.72	5.91	9.72	14.4	18.8	27.3	48.9	60.1	65.9	74.6	88.4	131	150	185	199
KPH35	35	4.34	6.89	11.3	16.8	22.0	31.9	57.1	70.2	76.9	87.0	103	153	175	216	232
KPH40	40	4.96	7.88	12.9	19.2	25.1	36.4	65.2	80.2	87.9	99.5	118	175	200	247	265
KPH50	50	6.20	9.85	16.2	24.0	31.4	45.5	81.5	100	110	124	148	219	250	308	332
KPH60	60	7.44	11.8	19.4	28.8	37.7	54.6	97.8	120	132	149	177	263	300	370	398
KPH70	70	8.68	13.8	22.7	33.6	44.0	63.7	115	140	154	174	207	307	350	432	464
KPH80	80	9.92	15.8	25.9	38.3	50.3	72.8	131	160	176	199	236	350	400	494	530
KPH100	100	12.4	19.7	32.4	47.9	62.9	91.0	163	200	219	249	295	439	500	617	662
KPH120	120	14.8	23.6	38.8	57.5	75.5	109	195	240	263	299	354	527	600	740	794
KPH150	150	18.6	29.5	48.6	71.8	94.3	137	244	301	330	373	442	658	750	926	993
KPH180	180	22.3	35.5	58.3	86.2	113	164	294	361	396	447	531	789	900	1112	1192
KPH200	200	24.8	39.4	64.8	95.8	126	182	327	401	440	498	590	878	1000	1235	1324
KPH250	250	31.0	49.3	81.0	120	157	228	408	501	550	622	737	1096	1250	1543	1656
KPH300	300	37.2	59.1	97.2	144	189	273	490	601	659	746	885	1315	1500	1852	1987
KPH350	350	43.4	68.9	113	168	220	318	571	701	769	871	1032	1535	1750	2160	2318
KPH400	400	49.6	78.8	129	191	251	364	652	802	879	995	1180	1755	2000	2469	2649
KPH500	500	62.0	98.5	162	239	315	455	816	1002	1099	1243	1475	2193	2500	3087	3312



Discharge Performance Data

1.12 KPH series battery (Final voltage 1.0V/cell)
 Discharge performance data after fully charged by constant current according to IEC60623.
 Available current under 20°C±5°C.

Models	C _e Ah	Hours						Minutes						Seconds		
		8	5	3	2	1.5	1	30	20	15	10	5	1	30	5	1
KPH10	10	1.25	2.00	3.29	4.88	6.42	9.40	17.0	22.7	25.5	29.0	35.1	51.8	58.4	74.1	78.8
KPH20	20	2.51	4.00	6.58	9.76	12.8	18.8	34.4	46.4	52.7	60.1	72.4	103	118	148	162
KPH30	30	3.76	6.00	9.87	14.7	19.2	28.2	51.6	69.6	79.1	90.1	109	154	177	222	244
KPH35	35	4.38	7.00	11.5	17.1	22.5	32.9	60.2	81.2	92.4	105	127	180	206	259	284
KPH40	40	5.01	8.00	13.1	19.5	25.7	37.6	68.8	92.8	106	120	145	206	235	296	325
KPH50	50	6.26	10.0	16.4	24.4	32.1	47.0	86.0	116	132	150	182	258	294	370	406
KPH60	60	7.51	12.0	19.7	29.3	38.5	56.4	104	139	159	180	218	309	353	444	488
KPH70	70	8.76	14.0	23.0	34.2	45.0	65.7	121	162	185	210	254	361	412	518	569
KPH80	80	10.0	16.0	26.3	39.1	51.4	75.1	138	185	211	240	290	412	471	592	650
KPH100	100	12.6	20.0	32.9	48.8	64.3	94.0	172	232	264	300	362	515	588	741	813
KPH120	120	15.1	24.0	39.5	58.6	77.2	113	206	279	316	360	435	618	706	889	975
KPH150	150	18.7	30.0	49.4	73.2	96.5	141	258	348	395	450	543	773	883	1111	1219
KPH180	180	22.5	36.0	59.2	87.9	116	169	310	418	475	541	652	927	1059	1333	1463
KPH200	200	25.0	40.0	65.8	97.6	129	188	344	464	528	601	724	1031	1177	1482	1626
KPH250	250	31.2	50.0	82.2	122	161	235	430	580	660	751	906	1288	1470	1852	2033
KPH300	300	37.5	60.0	98.7	146	193	282	516	696	792	901	1087	1546	1764	2222	2439
KPH350	350	43.7	70.0	115	171	225	329	603	812	923	1051	1268	1805	2058	2593	2846
KPH400	400	50.0	80.0	131	195	257	376	688	928	1055	1201	1449	2062	2353	2963	3252
KPH500	500	62.5	100	165	244	322	469	860	1160	1320	1501	1812	2577	2941	3704	4065



Calculation Methods

Information required for battery capacity calculation

The following information is 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.

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

$$\text{Minimum cell voltage} = \frac{\text{Minimum DC voltage}}{\text{Number of cells}}$$

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 PMI 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 KMP Range.

From our catalogue data, the cell type is KPM300.

Battery shall comprise 184 cells of PMI Nickel Cadmium type KPM300.

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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