

PRODUCT CATALOGUE

Vented Single Cell Ni-Cd Battery Range



GAZ ENERGY

140 years of excellence

Throughout our rich history, GAZ Geräte-und Akkumulatorenwerk Zwickau has always been at the forefront of technological development. Today we rank among the leading suppliers of industrial Ni-Cd batteries and energy storage solutions based on Li-ion batteries.

We develop and manufacture Ni-Cd cells of highest quality, pushing the boundaries of this proven chemistry with innovative design features. Delivering customized battery solutions to customers around the world, our battery systems serve as backup power sources for critical equipment in industries ranging from oil and gas, energy and communications to transportation and other infrastructure.

Applications

GAZ ENERGY Ni-Cd batteries are built to withstand mechanical and electrical stress as well as extreme temperatures. Their ruggedness makes them ideal for deployment in challenging conditions such as oil and gas, excavation, transmission and refineries, utility power generation and Transmission and distribution, substations, telecom installations, or transportation infrastructure.

With their design lifespan exceeding 20 years and minimal maintenance requirements, GAZ ENERGY Ni-Cd batteries offer unparalleled reliability whenever the risk of failure is unacceptable. They provide backup power for all kinds of critical installations even in the most extreme conditions and remote locations. Industrial facilities, large data centers, commercial buildings, hospitals, airport infrastructure, all rely on GAZ ENERGY Ni-Cd batteries.

Their durability and high discharge rate performance makes GAZ ENERGY Ni-Cd batteries particularly suitable for inrush applications such as cranking generators or switching on heaters, circulation pumps, and similar unpredictable, time-sensitive,

high-power demanding critical applications that should perform even at extreme temperatures. GAZ ENERGY batteries recover their voltage instantaneously unlike 'Coup de Fouét' phenomenon for other electro-chemistry, making them the ideal choice for such inrush applications.

- O&G on-shore, off-shore exploration and refineries
- Power Generation-Transmission-Distribution
- Utility Substations, Switch-Gear and Control-Gear operations
- Emergency lighting
- Communication systems – SCADA
- DC UPS systems
- Critical processes input power regulation
- Track-side applications, railway signaling
- Security-Alarm systems
- Gen-set / Engine-starting power



European quality without compromise

GAZ ENERGY Vented Range cells are built with uncompromised quality and workmanship in accordance to IEC 60623 standards and EU battery regulations. And not only to meet but exceed the performance requirements specified in the standard. Optimized anodic to cathodic capacity ratio and stack-cell designs specific to low, medium and high rate discharge applications guarantees the right price-performance ration without capacity oversizing and compromising on the energy or power or mixed-load performances. Special easy-to-fit and refill vent plugs consists of inert granules that help condensing of escaping gas and reduce water consumption. Vent plugs are fitted with flame arresting disk that prevents external sparks and any explosion.



Single cell construction



**Gas condensation type
Flame arresting vent plug**

Electrode edge
Connected to terminals
by bolting or welding

**Solid PP Grid type or Corrugated
Perforated Plastic Separators**
Insulates the plates and allows
free circulation of electrolyte.

Cell Case and Lid
Unique single cell case mold with only
top lid welding eliminate chance
of any electrolyte leakage.

Safety terminal

Redundant leak protection
minimizes carbonate formation

GAZ ENERGY single cell design

Weld above the electrolyte level
eliminates risk of faulty on the side
and on the bottom of the cell

Electrode frame

Consisting of electrode edge
and side bars. Seals the plates
and works as a current collector

Horizontal pockets

Formed by perforated steel
strips containing the active material.

Industrial Ni-Cd Vented Battery Ranges

KL... P

KM... P

KH... P

The robust and well-proven design of GAZ ENERGY Ni-Cd cells and batteries offers exceptional reliability for maximum service life and highly favorable Total Cost of Ownership.

Backed by 140 years of tradition in excellence, GAZ prides itself on the highest possible manufacturing quality. GAZ ENERGY Ni-Cd battery cells fulfill all requirements according to IEC 60623 and EN 60623.

Configuration forms

GAZ ENERGY Ni-Cd prismatic cells can be assembled into many different configurations, for example:

- In battery racks and cabinets
- Mounted as compact blocks
- In plastic, FRP, or stainless steel crates, or in battery troughs

Advantages of Pocket-Plate technology

- Robust all steel electrode construction. Insensitive against seismic vibration categories, minor mishandling during transit.
- Proven technology for over 100 years with exceptional reliability in uncertain back-up needs.

- Excellent high rate power discharge Performance. Can be sized for as low as 1 second discharge.
- Reliable stationary cycling capability of 20+ years.
- Large electrolyte reserve reduce top-up frequency and periodic maintenance costs in remote sites.
- Lower internal resistance., Higher charge acceptance.
- No risk of 'Sudden-death' or Thermal runaway.
- No electrode corrosion or passivation in cells.
- Better extreme temperature performances. Can also operate reliably between -40 °C to +70 °C with special GAZ ENERGY electrolyte.
- Tolerate faulty over-charge, over-discharge without any loss of capacity but just increased electrolysis.
- Long shelf life of several years in discharged state under GAZ recommended conditions below +30 °C.
- No electrolyte stratification required. Electrolyte density remain mostly unaltered throughout service life.
- Exceptional Total Cost-of-Ownership (TCO).
- Better retained capacity at sub-zero temperatures.
- Visible electrolyte level through translucent container.
- No memory effect unlike sealed cylindrical cells.

Efficient design and solution for every need

GAZ developed the KL, KM and KH ranges of Ni-Cd vented batteries to offer a both economically and technically flexible solution for every stationary application. The choice of Low,

Medium and High rate discharge type makes it easy to select the ideal battery, based on the required discharge time and end of discharge voltage.

	KL...P Range	KM...P Range	KH...P Range
Capacity Steps	94	110	30
Capacity Range	10-1800 Ah	110- 1430 Ah	10-800 Ah
Design and Performance	Thickest Plate Design for Low discharge rate > 3 h	Optimum Plate thickness for Medium or mixed discharge rate.	Thinnest Plate design for High Discharge rate < 45 min
Maintenance	DI/DM water top-up requirement 18-24 months. Preventive maintenance as per IEEE guidelines.		
Typical Market Segment	Utilities, O&G Offshore and Onshore Rigs, Refineries, Commercial & Industrial Buildings, Hospitals, Rail-Infra	Substations, Rapid Transport and O&G Infra, Chemical, Mining and Process Industries, Utility T&D Substations	Utility Generation, Industries, O&G, Commercial & Industrial Buildings, Hospitals, Rail and public Infrastructures
Typical Applications	Auxiliary Energy back-up in Alarm, Signalling Systems, Emergency Lighting, Communication, SCADA	Mix of Energy and Power Back-up applications for UPS Systems, Switchgear, Controlgear	High Power back-up for Genset, Engine Starting, UPS Systems, Substations, Process machineries

GAZ ENERGY Vented KL Battery Range

This GAZ ENERGY cell type has been especially designed for low rates of discharge over long periods, i.e. the current is relatively low in comparison with the total stored energy. The discharges can generally be infrequent and the recommended discharge time for the KL range is above 3 hours.

The nominal C_5 capacity (as per IEC 60623) of KL range batteries is based on the available ampere hours (Ah) at a discharge rate of 5 hours to a final discharge voltage of 1.00 V per cell at $20 \pm 5^\circ\text{C}$.

Nominal voltage per cell

1.20 V per cell

Discharging conditions

The discharge performances as well as the nominal capacities C_5 given in this brochure are only valid for fully charged cells in accordance with IEC 60623 und EN 60623, clause number 7.3.2.

Charging Recommendation – KL Range

A. Constant Voltage (FCBC Chargers)

Recommendation for Stand-by Application

Boost Mode

Boost Voltage: 1.48 –1.70 V/cell

Boost Current Limit: $0.2 I_t$ A dc

NOTE: Higher Boost voltage will reduce the charge duration and increase efficiency of recharging but may increase electrolysis and water consumption.

Float Mode

Float Voltage: 1.40 –1.42 V/cell

Float Current: 1 to 2 mA/Ah cell capacity

Delay for switch from Boost to Float:

Boost Current ramped $< 0.004 I_t$ A

Single level Charging

1.46–1.50 V/cell

B. Constant Current mode

Charging for IEC Capacity Test

Constant Current: $0.2 I_t$ A dc for 8 h

Alternatively, $0.1 I_t$ A dc CC for 16 h

Voltage Limit: No Voltage Limit

Charging Temperature: $20 \pm 5^\circ\text{C}$

Fast Charging at 25°C

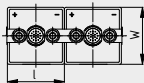
Boost charge: $0.3 I_t$ A for 2.5 h followed by $0.2 I_t$ A for 2.5 h

Trickle charge: 0.001–0.002 A/Ah

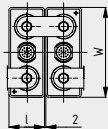
KL 10 P - KL 30 P



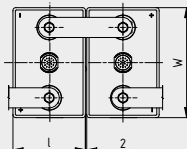
KL 35 P - KL 75 P



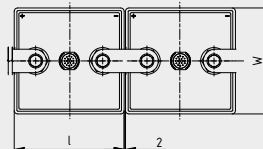
KL 80 P - KL 170 P



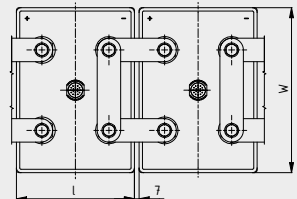
KL 180 P - KL 340 P



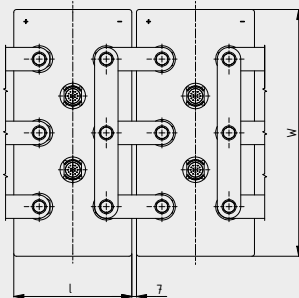
KL 350 P - KL 540 P



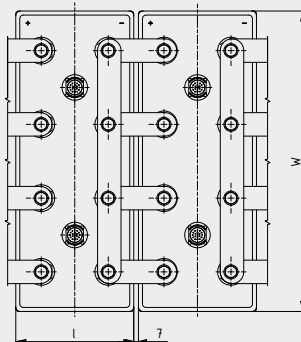
KL 550 P - KL 720 P



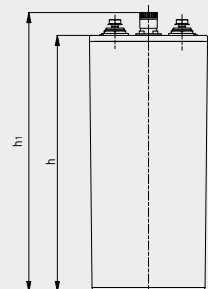
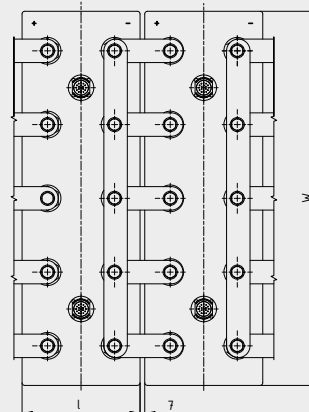
KL 750 P - KL 1080 P



KL 1100 P - KL 1450 P



KL 1500 P - KL 1800 P



KL... P Single Cell Range

Technical Specifications

KL Type Models	IEC-60623 Capacity	Cell Dimensions [Tolerance ±2 mm]				Connection Type	Nr. Of Terminals	Type of Terminals	Electrolyte Volume	Filled Cell Weight	Internal Resistance
In Plastic Containers	5 h rate [Cs]	l	w	h	hl	M = Nut	Poles/Cell	Connector	Approx. [± 5%]	Approx. [± 5%]	IR at 100% SoC
	[Ah]	mm	mm	mm	mm	S = Screw	[Nr.]	Type	[L]	[Kg]	[mΩ]
KL 10 P	10	46	85	237	261	M	2	M10	0,48	1,21	19,46
KL 17 P	17	46	85	237	261	M	2	M10	0,43	1,29	12,16
KL 21 P	21	46	85	237	261	M	2	M10	0,41	1,36	9,18
KL 26 P	26	46	85	237	261	M	2	M10	0,37	1,42	7,57
KL 30 P	30	46	85	237	261	M	2	M10	0,36	1,48	6,71
KL 35 P	35	85	85	237	261	M	2	M10	0,87	2,28	5,50
KL 40 P	40	85	85	237	261	M	2	M10	0,85	2,36	5,39
KL 45 P	45	85	85	237	261	M	2	M10	0,81	2,44	4,32
KL 50 P	50	85	85	237	261	M	2	M10	0,78	2,52	4,44
KL 55 P	55	85	85	237	261	M	2	M10	0,76	2,59	3,96
KL 60 P	60	85	85	237	261	M	2	M10	0,72	2,67	3,36
KL 65 P	65	85	85	237	261	M	2	M10	0,69	2,74	3,53
KL 70 P	70	85	85	237	261	M	2	M10	0,65	2,81	3,02
KL 75 P	75	85	85	237	261	M	2	M10	0,62	2,89	2,66
KL 80 P	80	53	134	364	394	S	2	M8	1,36	4,70	2,57
KL 85 P	85	53	134	364	394	S	2	M8	1,33	4,76	2,60
KL 95 P	95	53	134	364	394	S	2	M8	1,19	4,99	2,31
KL 100 P	100	53	134	364	394	S	2	M8	1,16	5,07	2,10
KL 110 P	110	53	134	364	394	S	2	M8	1,21	5,11	1,97
KL 115 P	115	53	134	364	394	S	2	M8	1,18	5,19	1,94
KL 120 P	120	69	134	364	394	S	2	M8	1,67	6,16	1,79
KL 125 P	125	69	134	364	394	S	2	M8	1,63	6,26	1,65
KL 135 P	135	69	134	364	394	S	2	M8	1,71	6,34	1,63
KL 145 P	145	69	134	364	394	S	2	M8	1,67	6,44	1,58
KL 150 P	150	69	134	364	394	S	2	M8	1,49	6,67	1,50
KL 160 P	160	69	134	364	394	S	2	M8	1,56	6,74	1,37
KL 170 P	170	69	134	364	394	S	2	M8	1,52	6,85	1,21
KL 180 P	180	108	164	364	394	S	2	M8	3,89	10,10	1,26
KL 190 P	190	108	164	364	394	S	2	M8	3,60	10,2	1,02
KL 200 P	200	108	164	364	394	S	2	M8	3,77	10,5	1,04
KL 210 P	210	108	164	364	394	S	2	M8	3,49	10,5	1,04
KL 215 P	215	108	164	364	394	S	2	M8	3,71	10,7	0,99
KL 225 P	225	108	164	364	394	S	2	M8	3,43	10,7	0,85
KL 240 P	240	108	164	364	394	S	2	M8	3,59	11,1	0,85
KL 250 P	250	108	164	364	394	S	2	M8	3,53	11,2	0,84
KL 255 P	255	108	164	364	394	S	2	M8	3,26	11,2	0,88
KL 265 P	265	108	164	364	394	S	2	M8	3,18	11,5	0,80
KL 270 P	270	108	164	364	394	S	2	M8	3,42	11,6	0,79
KL 290 P	290	108	164	364	394	S	2	M8	3,34	11,8	0,77
KL 300 P	300	108	164	364	394	S	2	M8	3,02	12,0	0,75
KL 305 P	305	108	164	364	394	S	2	M8	3,24	12,2	0,65
KL 320 P	320	108	164	364	394	S	2	M8	2,93	12,3	0,63
KL 340 P	340	108	164	364	394	S	2	M8	3,06	12,7	0,63
KL 350 P	350	164	158	364	394	S	2	M10	5,09	15,8	0,63
KL 360 P	360	164	158	364	394	S	2	M10	5,03	16,0	0,57
KL 370 P	370	164	158	364	394	S	2	M10	5,33	16,4	0,59
KL 385 P	385	164	158	364	394	S	2	M10	4,92	16,3	0,59

* All dimensions and weights stated are subject to usual manufacturing tolerances. The right is reserved to make any alterations without prior notice.

KL... P Single Cell Range

Technical Specifications

KL Type Models	IEC-60623 Capacity	Cell Dimensions [Tolerance ± 2 mm]				Connection Type	Nr. Of Terminals	Type of Terminals	Electrolyte Volume	Filled Cell Weight	Internal Resistance
In Plastic Containers	5 h rate [C ₅]	l	w	h	hl	M = Nut	Poles/Cell	Connector	Approx. [$\pm 5\%$]	Approx. [$\pm 5\%$]	IR at 100% SoC
	[Ah]	mm	mm	mm	mm	S = Screw	[Nr.]	Type	[L]	[Kg]	[m Ω]
KL 390 P	390	164	158	364	394	S	2	M10	4,88	16,5	0,55
KL 400 P	400	164	158	364	394	S	2	M10	5,23	16,9	0,51
KL 415 P	415	164	158	364	394	S	2	M10	4,76	16,8	0,53
KL 420 P	420	164	158	364	394	S	2	M10	4,72	17,3	0,52
KL 430 P	430	164	158	364	394	S	2	M10	5,04	17,2	0,47
KL 440 P	440	164	158	364	394	S	2	M10	4,98	17,7	0,50
KL 445 P	445	164	158	364	394	S	2	M10	4,59	17,3	0,45
KL 455 P	455	164	158	364	394	S	2	M10	4,56	17,8	0,46
KL 465 P	465	164	158	364	394	S	2	M10	4,86	18,0	0,43
KL 470 P	470	164	158	364	394	S	2	M10	4,80	18,2	0,45
KL 480 P	480	164	158	364	394	S	2	M10	4,42	17,7	0,46
KL 500 P	500	164	158	364	394	S	2	M10	4,67	18,6	0,42
KL 515 P	515	164	158	364	394	S	2	M10	4,63	18,8	0,40
KL 540 P	540	164	158	364	394	S	2	M10	4,49	19,2	0,41
KL 550 P	550	176	246	382	408	S	4	M10	9,07	27,0	0,40
KL 575 P	575	176	246	382	408	S	4	M10	8,93	27,6	0,36
KL 595 P	595	176	246	382	408	S	4	M10	8,77	28,0	0,38
KL 610 P	610	176	246	382	408	S	4	M10	8,74	28,1	0,33
KL 635 P	635	176	246	382	408	S	4	M10	8,59	28,5	0,32
KL 655 P	655	176	246	382	408	S	4	M10	8,57	28,8	0,32
KL 680 P	680	176	246	382	408	S	4	M10	8,41	29,1	0,33
KL 720 P	720	176	246	382	408	S	4	M10	8,22	30,1	0,30
KL 750 P	750	176	368	382	421	S	6	M10	14,2	40,1	0,30
KL 770 P	770	176	368	382	421	S	6	M10	14,1	40,5	0,29
KL 800 P	800	176	368	382	421	S	6	M10	13,9	41,4	0,28
KL 815 P	815	176	368	382	421	S	6	M10	13,9	40,9	0,27
KL 865 P	865	176	368	382	421	S	6	M10	13,7	41,8	0,23
KL 890 P	890	176	368	382	421	S	6	M10	13,4	42,4	0,26
KL 915 P	915	176	368	382	421	S	6	M10	13,4	42,4	0,24
KL 950 P	950	176	368	382	421	S	6	M10	13,2	43,1	0,20
KL 980 P	980	176	368	382	421	S	6	M10	13,1	43,5	0,20
KL 1030 P	1030	176	368	382	421	S	6	M10	12,9	44,0	0,19
KL 1080 P	1080	176	368	382	421	S	6	M10	12,6	45,5	0,18
KL 1100 P	1100	176	448	382	421	S	8	M10	16,5	52,1	0,18
KL 1150 P	1150	176	448	382	421	S	8	M10	16,2	53,4	0,17
KL 1190 P	1190	176	448	382	421	S	8	M10	16,0	54,1	0,18
KL 1220 P	1220	176	448	382	421	S	8	M10	15,9	54,2	0,19
KL 1270 P	1270	176	448	382	421	S	8	M10	15,6	55,1	0,16
KL 1300 P	1300	176	448	382	421	S	8	M10	15,6	55,7	0,17
KL 1350 P	1350	176	448	382	421	S	8	M10	15,2	56,3	0,16
KL 1450 P	1450	176	448	382	421	S	8	M10	14,9	58,3	0,15
KL 1500 P	1500	176	558	382	421	S	10	M10	19,9	66,9	0,15
KL 1540 P	1540	176	558	382	421	S	10	M10	19,8	67,0	0,14
KL 1600 P	1600	176	558	382	421	S	10	M10	19,4	68,2	0,14
KL 1630 P	1630	176	558	382	421	S	10	M10	19,4	68,9	0,13
KL 1700 P	1700	176	558	382	421	S	10	M10	19,0	69,6	0,13
KL 1800 P	1800	176	558	382	421	S	10	M10	18,5	72,1	0,11

* All dimensions and weights stated are subject to usual manufacturing tolerances. The right is reserved to make any alterations without prior notice.

GAZ ENERGY Vented KM Battery Range

This GAZ ENERGY Vented range KM cell type has been optimally designed for mixed load applications where these cells are capable of delivering variable high and also low rate discharges with economical battery capacity sizing. The discharges can generally be infrequent and the recommended discharge time for the KM range is between 30 minutes till 3 hours.

The nominal C_5 capacity of KM range batteries is based on the available ampere hours (Ah) at a discharge rate of 5 hours to a final End-of-Discharge (EOD) voltage of 1.00 V per cell (as per IEC 60623) and comply equivalent reference capacity performance till 1.15 V per cell EOD (as per DIN 40771) at $20 \pm 5^\circ\text{C}$.

Nominal voltage per cell

1.20 V per cell

Discharging conditions

The discharge performances as well as the nominal capacities C_5 given in this brochure are only valid for fully charged cells in accordance with IEC / EN 60623 clause 7.3.2 requirements.

Charging Recommendation - KM Range

A. Constant Voltage (FCBC Chargers)

Recommendation for Stand-by Application

Boost Mode

Boost Voltage: 1.46–1.70 V/cell

Boost Current Limit: $0.2 I_L$ A dc

NOTE: Higher Boost voltage will reduce the charge duration and increase efficiency of recharging but may increase electrolysis and water consumption.

Float Mode

Float Voltage: 1.40–1.42 V/cell

Float Current: 1 to 2 mA/Ah cell capacity

Delay for switch from Boost to Float:

Boost Current ramped $< 0.004 I_L$ A

Single level Charging

1.45–1.49 V/cell

B. Constant Current mode

Charging for IEC Capacity Test

Constant Current: $0.2 I_L$ A dc for 8 h

Alternatively, $0.1 I_L$ A dc for 16 h

Voltage Limit: No Voltage Limit

Charging Temperature: $20 \pm 5^\circ\text{C}$

Fast Charging at 25°C

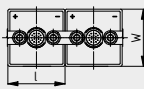
Boost charge: $0.3 I_L$ A for 2.5 h followed by $0.2 I_L$ A for 2.5 h

Trickle charge: 0.001–0.002 A/Ah

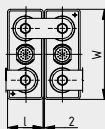
KM 10 P - KM 31 P



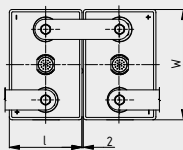
KM 38 P - KM 55 P



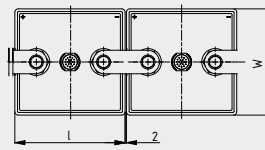
KM 60 P - KM 120 P



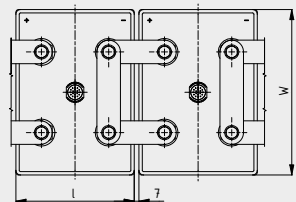
KM 116 P; KM 124 P - KM 260 P



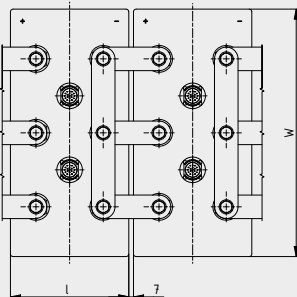
KM 270 P - KM 415 P



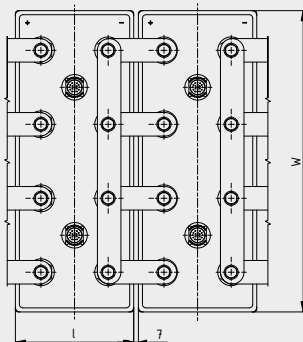
KM 430 P - KM 580 P; KM 610 P



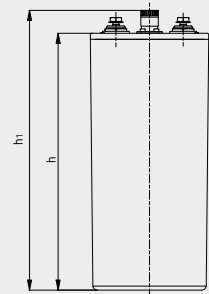
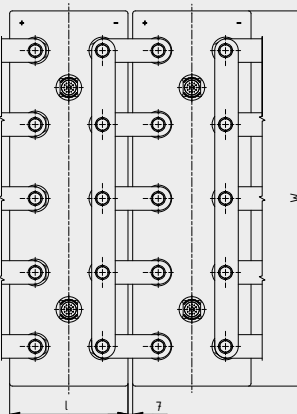
KM 585 P - KM 810 P; KM 850 P



KM 830 P - KM 1050 P; KM 1075 P; KM 1140 P



KM 1035 P; KM 1070 P - KM 1430 P



KM... P Single Cell Range

Technical Specifications

KM Type Models	IEC-60623 Capacity	DIN-40771 Capacity	Cell Dimensions [Tolerance ±2 mm]				Connection Type	Nr. Of Terminals	Type of Terminals	Electrolyte Volume	Filled Cell Weight	Internal Resistance
In Plastic Containers	5 h rate [C _s] EOD = 1.00 V	5 h rate [C _s] EOD = 1.15 V	l	w	h	hl	M = Nut	Poles/Cell	Connector	Approx. [± 5%]	Approx. [± 5%]	IR at 100% SoC
	[Ah]	[Ah]	mm	mm	mm	mm	S = Screw	[Nr.]	Type	[L]	[Kg]	[mΩ]
KM 10 P	10	9	46	85	237	261	M	2	M10	0,45	1,30	12,23
KM 15 P	15	14	46	85	237	261	M	2	M10	0,39	1,39	8,12
KM 20 P	20	18	46	85	237	261	M	2	M10	0,34	1,49	6,09
KM 25 P	25	23	46	85	237	261	M	2	M10	0,30	1,58	4,86
KM 31 P	31	29	46	85	237	261	M	2	M10	0,24	1,69	3,93
KM 38 P	38	35	85	85	237	261	M	2	M10	0,73	2,64	3,24
KM 44 P	44	41	85	85	237	261	M	2	M10	0,67	2,75	2,79
KM 50 P	50	46	85	85	237	261	M	2	M10	0,61	2,87	2,41
KM 55 P	55	51	85	85	237	261	M	2	M10	0,55	2,98	2,19
KM 60 P	60	55	53	134	364	394	S	2	M8	1,23	4,85	2,03
KM 65 P	65	60	53	134	364	394	S	2	M8	1,29	4,89	1,88
KM 70 P	70	65	53	134	364	394	S	2	M8	1,26	4,94	1,72
KM 75 P	75	69	53	134	364	394	S	2	M8	1,10	5,12	1,63
KM 80 P	80	74	53	134	364	394	S	2	M8	1,16	5,17	1,53
KM 85 P	85	79	53	134	364	394	S	2	M8	1,13	5,24	1,42
KM 90 P	90	83	69	134	364	394	S	2	M8	1,59	6,26	1,35
KM 95 P	95	88	69	134	364	394	S	2	M8	1,67	6,37	1,28
KM 100 P	100	92	69	134	364	394	S	2	M8	1,63	6,44	1,23
KM 105 P	105	97	69	134	364	394	S	2	M8	1,47	6,55	1,16
KM 110 P	110	102	69	134	364	394	S	2	M8	1,54	6,66	1,12
KM 116 P	116	107	70	164	364	394	S	2	M8	1,95	7,24	1,06
KM 120 P	120	111	69	134	364	394	S	2	M8	1,50	6,75	1,01
KM 124 P	124	115	70	164	364	394	S	2	M8	2,04	7,90	0,97
KM 130 P	130	120	70	164	364	394	S	2	M8	1,99	8,23	0,95
KM 135 P	135	125	70	164	364	394	S	2	M8	1,80	8,17	0,91
KM 145 P	145	134	70	164	364	394	S	2	M8	1,89	8,33	0,84
KM 150 P	150	139	70	164	364	394	S	2	M8	1,83	8,44	0,81
KM 155 P	155	143	108	164	364	394	S	2	M8	3,43	10,8	0,79
KM 160 P	160	148	108	164	364	394	S	2	M8	3,35	11,0	0,75
KM 165 P	165	153	108	164	364	394	S	2	M8	3,59	11,1	0,74
KM 175 P	175	162	108	164	364	394	S	2	M8	3,53	11,3	0,71
KM 180 P	180	166	108	164	364	394	S	2	M8	3,21	11,4	0,67
KM 185 P	185	171	108	164	364	394	S	2	M8	3,43	11,5	0,65
KM 190 P	190	176	108	164	364	394	S	2	M8	3,13	11,6	0,65
KM 195 P	195	180	108	164	364	394	S	2	M8	3,36	11,7	0,62
KM 200 P	200	185	108	164	364	394	S	2	M8	3,07	11,8	0,60
KM 205 P	205	190	108	164	364	394	S	2	M8	3,28	11,9	0,59
KM 210 P	210	194	108	164	364	394	S	2	M8	2,98	12,0	0,59
KM 215 P	215	199	108	164	364	394	S	2	M8	3,20	12,1	0,57
KM 225 P	225	208	108	164	364	394	S	2	M8	3,12	12,4	0,54
KM 230 P	230	213	108	164	364	394	S	2	M8	2,84	12,4	0,53
KM 240 P	240	222	108	164	364	394	S	2	M8	3,04	12,5	0,50
KM 250 P	250	231	108	164	364	394	S	2	M8	2,97	12,8	0,49
KM 260 P	260	240	108	164	364	394	S	2	M8	2,88	12,9	0,48
KM 270 P	270	250	164	158	364	394	S	2	M10	5,26	16,9	0,46

* All dimensions and weights stated are subject to usual manufacturing tolerances. The right is reserved to make any alterations without prior notice.

KM... P Single Cell Range

Technical Specifications

KM Type Models	IEC-60623 Capacity	DIN-40771 Capacity	Cell Dimensions [Tolerance ±2 mm]				Connection Type	Nr. Of Terminals	Type of Terminals	Electrolyte Volume	Filled Cell Weight	Internal Resistance
In Plastic Containers	5 h rate [C ₅] EOD = 1.00 V	5 h rate [C ₅] EOD = 1.15 V	l	w	h	hl	M = Nut	Poles/Cell	Connector	Approx. [± 5%]	Approx. [± 5%]	IR at 100% SoC
	[Ah]	[Ah]	mm	mm	mm	mm	S = Screw	[Nr.]	Type	[L]	[Kg]	[mΩ]
KM 275 P	275	254	164	158	364	394	S	2	M10	4,84	16,9	0,44
KM 285 P	285	264	164	158	364	394	S	2	M10	5,15	17,1	0,43
KM 290 P	290	268	164	158	364	394	S	2	M10	4,72	17,2	0,42
KM 305 P	305	282	164	158	364	394	S	2	M10	4,99	17,5	0,40
KM 310 P	310	287	164	158	364	394	S	2	M10	4,58	17,3	0,39
KM 325 P	325	301	164	158	364	394	S	2	M10	4,83	18,0	0,38
KM 345 P	345	319	164	158	364	394	S	2	M10	4,28	18,5	0,35
KM 350 P	350	324	164	158	364	394	S	2	M10	4,64	18,5	0,35
KM 365 P	365	337	164	158	364	394	S	2	M10	4,14	18,8	0,34
KM 375 P	375	347	164	158	364	394	S	2	M10	4,50	18,8	0,32
KM 395 P	395	365	164	158	364	394	S	2	M10	4,34	19,2	0,31
KM 415 P	415	384	164	158	364	394	S	2	M10	4,18	19,6	0,30
KM 430 P	430	398	176	246	382	408	S	4	M10	8,58	28,3	0,28
KM 440 P	440	407	176	246	382	408	S	4	M10	8,54	28,2	0,28
KM 455 P	455	421	176	246	382	408	S	4	M10	8,40	28,7	0,27
KM 465 P	465	430	176	246	382	408	S	4	M10	8,30	29,1	0,26
KM 475 P	475	439	176	246	382	408	S	4	M10	8,23	29,7	0,26
KM 480 P	480	444	176	246	382	408	S	4	M10	8,23	29,0	0,25
KM 495 P	495	458	176	246	382	408	S	4	M10	8,11	29,5	0,25
KM 505 P	505	467	176	246	382	408	S	4	M10	8,02	30,1	0,24
KM 515 P	515	476	176	246	382	408	S	4	M10	7,96	30,4	0,24
KM 525 P	525	485	176	246	382	408	S	4	M10	7,92	29,9	0,23
KM 535 P	535	495	176	246	382	408	S	4	M10	7,82	30,6	0,23
KM 545 P	545	504	176	246	382	408	S	4	M10	7,74	30,7	0,23
KM 570 P	570	527	176	246	382	408	S	4	M10	7,61	31,0	0,21
KM 580 P	580	536	176	246	382	408	S	4	M10	7,52	31,4	0,21
KM 585 P	585	541	176	368	382	421	S	6	M10	13,64	42,1	0,21
KM 600 P	600	555	176	368	382	421	S	6	M10	13,49	42,8	0,20
KM 610 P	610	564	176	246	382	408	S	4	M10	7,30	31,8	0,20
KM 620 P	620	573	176	368	382	421	S	6	M10	13,40	42,7	0,20
KM 640 P	640	592	176	368	382	421	S	6	M10	13,23	43,3	0,19
KM 660 P	660	610	176	368	382	421	S	6	M10	13,16	43,1	0,18
KM 680 P	680	629	176	368	382	421	S	6	M10	12,97	44,0	0,18
KM 700 P	700	647	176	368	382	421	S	6	M10	12,82	44,4	0,18
KM 710 P	710	656	176	368	382	421	S	6	M10	12,72	45,0	0,17
KM 725 P	725	670	176	368	382	421	S	6	M10	12,71	44,5	0,17
KM 745 P	745	689	176	368	382	421	S	6	M10	12,54	45,1	0,16
KM 760 P	760	703	176	368	382	421	S	6	M10	12,42	45,6	0,16
KM 790 P	790	730	176	368	382	421	S	6	M10	12,26	45,6	0,16
KM 810 P	810	749	176	368	382	421	S	6	M10	12,11	46,3	0,15
KM 830 P	830	767	176	448	382	421	S	8	M10	15,96	54,0	0,15
KM 850 P	850	786	176	368	382	421	S	6	M10	11,80	46,9	0,14
KM 855 P	855	791	176	448	382	421	S	8	M10	15,74	54,9	0,14
KM 875 P	875	809	176	448	382	421	S	8	M10	15,64	54,7	0,14
KM 910 P	910	841	176	448	382	421	S	8	M10	15,39	55,8	0,13
KM 930 P	930	860	176	448	382	421	S	8	M10	15,20	56,3	0,13

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KM... P Single Cell Range

Technical Specifications

KM Type Models	IEC-60623 Capacity	DIN-40771 Capacity	Cell Dimensions [Tolerance ± 2 mm]				Connection Type	Nr. Of Terminals	Type of Terminals	Electrolyte Volume	Filled Cell Weight	Internal Resistance
In Plastic Containers	5 h rate [C ₅] EOD = 1.00 V	5 h rate [C ₅] EOD = 1.15 V	l	w	h	hl	M = Nut	Poles/Cell	Connector	Approx. [± 5%]	Approx. [± 5%]	IR at 100% SoC
	[Ah]	[Ah]	mm	mm	mm	mm	S = Screw	[Nr.]	Type	[L]	[Kg]	[mΩ]
KM 950 P	950	878	176	448	382	421	S	8	M10	15,07	57,2	0,13
KM 965 P	965	892	176	448	382	421	S	8	M10	15,04	56,4	0,13
KM 990 P	990	915	176	448	382	421	S	8	M10	14,82	57,2	0,12
KM 1010 P	1010	934	176	448	382	421	S	8	M10	14,66	58,0	0,12
KM 1035 P	1035	957	176	558	382	421	S	10	M10	20,05	67,7	0,12
KM 1050 P	1050	971	176	448	382	421	S	8	M10	14,44	58,0	0,11
KM 1070 P	1070	989	176	558	382	421	S	10	M10	19,78	68,8	0,11
KM 1075 P	1075	994	176	448	382	421	S	8	M10	14,25	58,9	0,11
KM 1095 P	1095	1012	176	558	382	421	S	10	M10	19,66	68,5	0,11
KM 1135 P	1135	1049	176	558	382	421	S	10	M10	19,35	69,9	0,11
KM 1140 P	1140	1054	176	448	382	421	S	8	M10	13,85	59,7	0,11
KM 1165 P	1165	1077	176	558	382	421	S	10	M10	19,11	70,6	0,11
KM 1185 P	1185	1096	176	558	382	421	S	10	M10	18,96	71,6	0,10
KM 1200 P	1200	1110	176	558	382	421	S	10	M10	18,91	70,6	0,10
KM 1240 P	1240	1147	176	558	382	421	S	10	M10	18,64	71,7	0,10
KM 1270 P	1270	1174	176	558	382	421	S	10	M10	18,45	72,6	0,10
KM 1315 P	1315	1216	176	558	382	421	S	10	M10	18,17	72,6	0,09
KM 1350 P	1350	1248	176	558	382	421	S	10	M10	17,93	73,8	0,09
KM 1430 P	1430	1322	176	558	382	421	S	10	M10	17,42	74,8	0,09

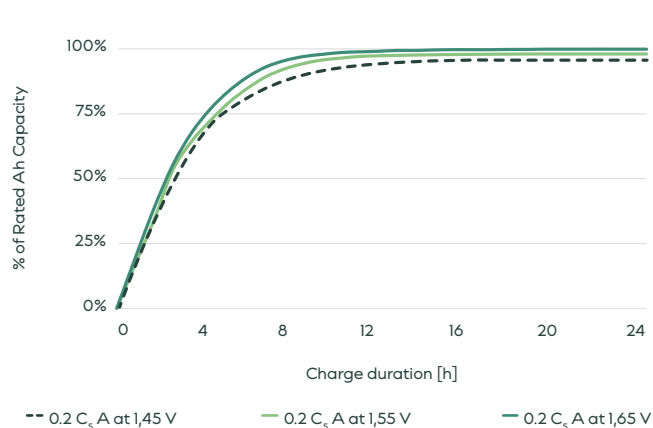
* All dimensions and weights stated are subject to usual manufacturing tolerances. The right is reserved to make any alterations without prior notice.

Superb chargeability

Thanks to their optimal active mass ratio, GAZ ENERGY Vented Range cells can accept more capacity input within a shorter recharge period even with constant voltage charging.

Typically, GAZ KM cells for their higher constant-current charge ratio, can be recharged to >80% SOC with appropriate boost-charge voltage within 5 - 7 hours, depending on the site operating conditions.

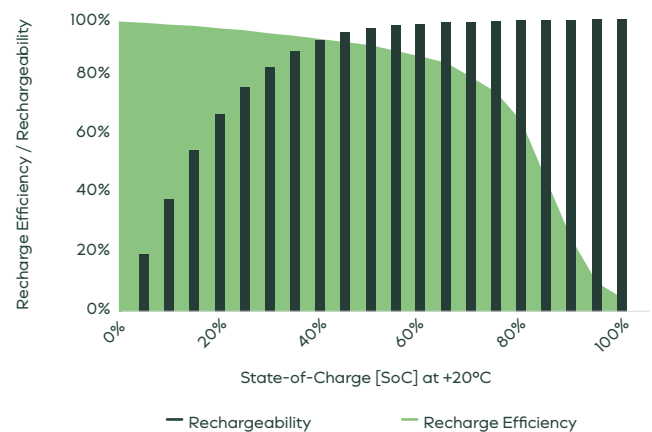
Typical Chargeability of KM Cells



Recharge Efficiency

GAZ Nickel-Cadmium battery has excellent recharge efficiency till the cell reaches around 80 - 90% SOC, based on L, M and H cell types. Recharge efficiency in this period can reach to an average >95% when recharged with right parameters at 20 ± 5 °C. An appropriately sized battery can achieve a round-trip efficiency (RTE) up to 90% in standard operating conditions.

Typical Recharge Efficiency Vs Rechargeability



GAZ ENERGY Vented KH Battery Range

This GAZ ENERGY Vented range KH cell type has been optimized for power demanding applications where these cells are capable to deliver high rate discharge current with economical battery capacity sizing. Typically for short-period inrush power applications. The discharges can generally be unpredictable and infrequent. The recommended discharge period for the KH range is typically between 1 second up to 45 minutes.

The nominal C_5 capacity (as per IEC 60623) of KH range batteries is based on the available ampere hours (Ah) at a discharge rate of 5 hours to a final discharge voltage of 1.00 V per cell at $20 \pm 5^\circ\text{C}$.

Nominal voltage per cell

1.20 V per cell

Discharging conditions

The discharge performances as well as the nominal capacities C_5 given in this brochure are only valid for fully charged cells in accordance with IEC / EN 60623 clause 7.3.2 requirements.

Charging Recommendations – KH Range

A. Constant Voltage (FCBC Chargers)

Recommendation for Stand-by Application

Boost Mode

Boost Voltage: 1.45–1.70 V/cell

Boost Current Limit: $0.2 I_t$ A dc

NOTE: Higher Boost voltage will reduce the charge duration and increase efficiency of recharging but may increase electrolysis and water consumption.

Float Mode

Float Voltage: 1.40–1.42 V/cell

Float Current: 1 to 2 mA/Ah cell capacity

Delay for switch from Boost to Float:

Boost Current ramped $< 0.004 I_t$ A

Single level Charging

1.44–1.48 V/cell

Engine Starting Applications

1.50–1.55 V/cell

B. Constant Current mode

Charging for IEC Capacity Test

Constant Current: $0.2 I_t$ A dc for 8 h

Alternatively, $0.1 I_t$ A dc for 16 h

Voltage Limit: No Voltage Limit

Charging Temperature: $20 \pm 5^\circ\text{C}$

Fast Charging at 25°C

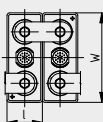
Boost charge: $0.3 I_t$ A for 2.5 h followed by $0.2 I_t$ A for 2.5 h

Trickle charge: 0.001–0.002 A/Ah

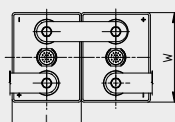
KH 10 P - KH 20 P



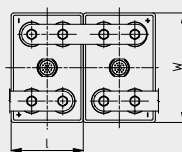
KH 30 P - KH 80 P



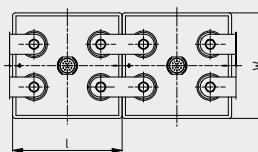
KH 100 P - KH 125 P



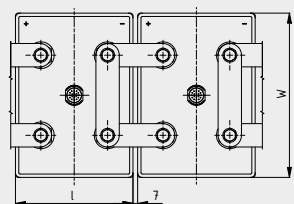
KH 150 P



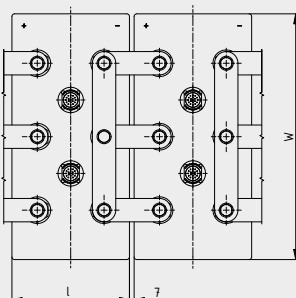
KH 185 P - KH 250 P



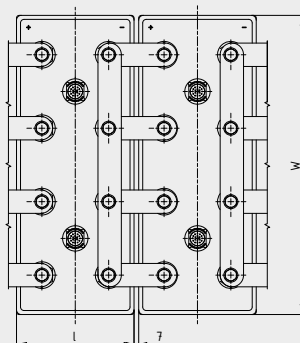
KH 280 P - KH 320 P



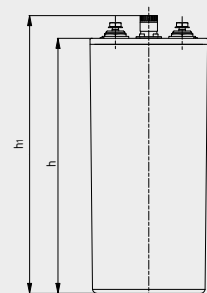
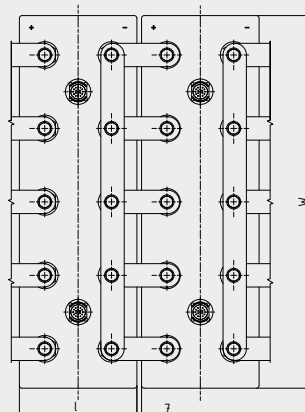
KH 360 P - KH 480 P



KH 520 P - KH 640 P



KH 700 P - KH 800 P

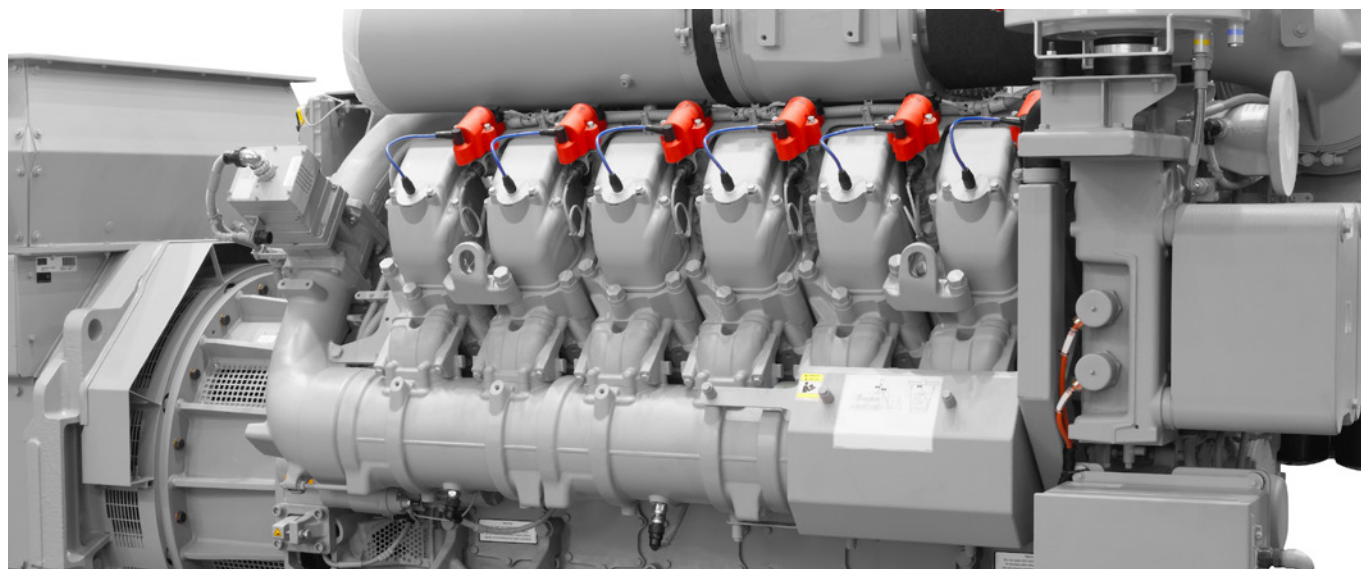


KH... P Single Cell Range

Technical Specifications

KH Type Models	IEC-60623 Capacity	Cell Dimensions [Tolerance ± 2 mm]				Connection Type	Nr. Of Terminals	Type of Terminals	Electrolyte Volume	Filled Cell Weight	Internal Resistance
In Plastic Containers	5 h rate [Cs]	l	w	h	hl	M = Nut	Poles/Cell	Connector	Approx. [$\pm 5\%$]	Approx. [$\pm 5\%$]	IR at 100% SoC
	[Ah]	mm	mm	mm	mm	S = Screw	[Nr.]	Type	[L]	[Kg]	[m Ω]
KH 10 P	10	46	85	237	261	M	2	M10	0,7	1,6	10,72
KH 20 P	20	46	85	237	261	M	2	M10	0,6	1,9	5,46
KH 30 P	30	53	134	330	360	S	2	M8	1,9	4,0	3,74
KH 40 P	40	53	134	330	360	S	2	M8	1,9	4,2	2,74
KH 50 P	50	53	134	330	360	S	2	M8	1,8	4,5	2,07
KH 65 P	65	69	134	330	360	S	2	M8	2,4	5,8	1,82
KH 80 P	80	69	134	330	360	S	2	M8	2,3	6,1	1,32
KH 100 P	100	104	134	330	360	S	2	M8	3,6	8,8	1,10
KH 125 P	125	104	134	330	360	S	2	M8	3,7	9,7	0,92
KH 150 P	150	108	164	330	360	S	4	M8	4,4	11,9	0,72
KH 185 P	185	164	158	330	360	S	4	M8	6,1	15,2	0,58
KH 200 P	200	164	158	330	360	S	4	M8	6,2	15,6	0,53
KH 235 P	235	164	158	330	360	S	4	M8	6,4	16,6	0,46
KH 250 P	250	164	158	330	360	S	4	M8	6,4	17,0	0,47
KH 280 P	280	176	246	330	360	S	4	M10	9,5	23,7	0,37
KH 300 P	300	176	246	330	360	S	4	M10	9,5	24,2	0,35
KH 320 P	320	176	246	330	360	S	4	M10	9,2	24,6	0,34
KH 360 P	360	176	368	330	360	S	6	M10	15,0	33,9	0,30
KH 390 P	390	176	368	330	360	S	6	M10	14,9	34,7	0,31
KH 420 P	420	176	368	330	360	S	6	M10	14,7	35,4	0,28
KH 450 P	450	176	368	330	360	S	6	M10	14,6	36,3	0,27
KH 480 P	480	176	368	330	360	S	6	M10	14,4	37,0	0,23
KH 520 P	520	176	448	330	360	S	8	M10	18,5	44,7	0,20
KH 560 P	560	176	448	330	360	S	8	M10	18,4	45,9	0,19
KH 600 P	600	176	448	330	360	S	8	M10	18,3	47,0	0,17
KH 640 P	640	176	448	330	360	S	8	M10	18,1	48,1	0,16
KH 700 P	700	176	558	330	360	S	10	M10	23,0	57,2	0,15
KH 750 P	750	176	558	330	360	S	10	M10	22,8	58,6	0,14
KH 800 P	800	176	558	330	360	S	10	M10	22,6	60,0	0,13

* All dimensions and weights stated are subject to usual manufacturing tolerances. The right is reserved to make any alterations without prior notice.



Superbly reliable and cost-effective

Nickel-cadmium cells are immune to thermal runaway and do not suffer sudden death. The unique electrochemistry of GAZ ENERGY Ni-Cd batteries also enables them to withstand any depth of discharge. At the same time, their low self-discharge rate makes them ideal for applications where the battery may not be used for extended periods.

Thanks to their exceptional ruggedness and minimal maintenance requirements, Ni-Cd batteries are the first choice for even the most challenging industrial, commercial, governmental and military applications.



Unique Features of GAZ ENERGY Ni-Cd cells

Setting some benchmark for industrial Ni-Cd batteries

- Single cell design for all rated capacities are housed in unique mono-block plastic containers that has seamless, non-welded surface on all side walls and bottom of cell container.
- All GAZ ENERGY cell containers are produced as one unit from a single injection moulding. This ensures that liquid electrolyte inside the cell can never be stagnant in contact with any plastic welded area.
- This ability prevent any chance of leakage of electrolyte and corresponding fire hazard in entire service life of GAZ ENERGY cells and minimizing handling and environmental hazards.
- More available capacity steps – More flexibility, in selection of sized battery for applications.
- The extended range of GAZ ENERGY Ni-Cd Pocket plate cells reaches a new height of standard in the industry. Single 1.2V GAZ ENERGY Vented KL..P cell can now have 1800 Ah capacity,
- Harmonized active mass distribution ratio among electrodes ensures the standardized Quality in production, minimizing Quality deviations.
- Increased rechargeability, Faster recharge ensures maximum availability and system reliability.

Reliable performance in extreme temperatures

Generally operating in temperatures from -20 °C to +50 °C, GAZ ENERGY Ni-Cd batteries can tolerate extremes up to +70 °C for short periods of time and can also operate up to -50 °C with special GAZ ENERGY electrolytes.

Easy storage and installation

GAZ ENERGY Ni-Cd batteries are quick and easy to install as original equipment and may be stored for a longer period in unfilled and discharged state under recommended conditions.

On installation a simple bolted connector enables the cells to be rapidly connected and commissioned in suitable battery racks or cabinets.

Low Total Cost of Ownership

GAZ ENERGY Ni-Cd batteries are designed to operate hassle-free for over 20+ years of designed lifetime with minimal comparable maintenance efforts, as per Annex – G of IEEE 1184-2006. Their superb quality further contributes to the particularly low TCO of GAZ ENERGY Ni-Cd battery systems against other conventional electrochemistry for a typical service life of 20+ years.



Design your battery solution

Visit the GAZ ENERGY website for our easy-to-use Ni-Cd battery Calculator, a tool that allows you to quickly estimate or determine which battery configuration, type and size is best suited for your application. It will give you an idea of the battery

storage system you need even before you inquire with the GAZ ENERGY sales department. The on-line battery calculator estimate the sizing in accordance to IEEE-1115, Recommended Practice for Sizing Nickel-Cadmium Batteries for Stationary Applications.

Ni-Cd Calculator

Current calculator

1. Period	Time	00:00:00	hh:mm:ss
	Current	0	amper

+

	Time	00:00:00	hh:mm:ss
	Current	0	amper

1. Load profile

Through a guided User-Interface, fill in the basic parameters of the required or expected load the batteries will be handling for a specific application.

The load input can be either with load in terms of current [A] or Apparent Power [KVA] or Real Power [KW] for load duration in hh:mm:ss. For instances of multiple loads in an application profile, select '+' to add these loads in their appropriate sequence.

Nominal Battery Voltage

48 V

110 V

220 V

Other

2. Cell Quantity

Select or specify the DC system voltage for the application and the number of cells your battery set should contain with regards to their nominal voltage and end-of-discharge or DC system cut-off voltage.

Ambient temperature °C / °F

20

30

Aging factor

1.00

Design margin factor

1.00

3. Design Data

Input the operating environment for the battery in the application. Other key requirements can be factored and filtered into the evaluation as well.

Once the battery is calculated, you are one click away to generate and download a complete report in PDF format that consist of battery sizing as per IEEE-1115 and ventilation requirements as per IEC 62485-2 or EN 50272-2.

In case you require an battery sizing assistance or want to check possibility of further optimization of the sizing to increase the competitiveness, contact our global sales team or partners to create or optimize your sizing needs with our professional complex battery software.



The output will be a recommendation that is not only technologically, but also economically the most favorable.

Our Commitment to the Environment

At GAZ, as one of the leading manufacturer of Ni-Cd batteries for over 140 years, we pay rightful attention to the environmental footprint of our batteries. Proper recycling prevents pollution but also enables the recovery of materials that can be reused. Starting from the optimized design, GAZ ENERGY Ni-Cd batteries are composed of harmonized production elements that make their recycling more efficient and cost-effective without compromising the product performance and design lifetime.

The recycling efficiency reaches nearly 80% of the cell weight, which is higher than the prescribed recycling efficiency of 75% by regulations applicable to Ni-Cd batteries.

All GAZ ENERGY batteries are disposed of with certified long-term partners in compliance to regional regulations. GAZ also provides a recycling testimonial with unique recycling case number for complete traceability.

Regulatory compliance

- **EU Declaration of Conformity** – GAZ confirms and bear the responsibility of self-declaration of conformity of produced Ni-Cd cells according to recently adopted EU Battery Regulation.
- **RoHS** – Even though accumulators are not within the scope of EU's Restriction of Hazardous Substances (RoHS) regulation, GAZ voluntarily declares that the substances restricted by RoHS are not present in our batteries except for their electrochemical core.
- **REACH** – About EU's Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), GAZ voluntarily declares that our Ni-Cd accumulators contain more than 0.1% w/w of Cadmium (Cd) substances depending on delivery status.



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