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.

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.

MADE IN GERMANY
GAZ ENERGY
SINCE 1884

Applications

GAZ ENERGY Ni-Cd batteries are built to with stand 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

Single cell construction

Safety terminal
Redundant leak protection minimizes carbonate formation

Gas condensation type
Flame arresting vent plug

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 edge
Connected to terminals by bolting or welding

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

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

Horizontal pockets
Formed by perforated steel strips containing the active material.

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

Industrial Ni-Cd Vented Battery Ranges

KL... P | **KM... P** | **KM... 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	46	30
Capacity Range	10–1800 Ah	11–1390 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 ± 5 °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: 1.55 –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

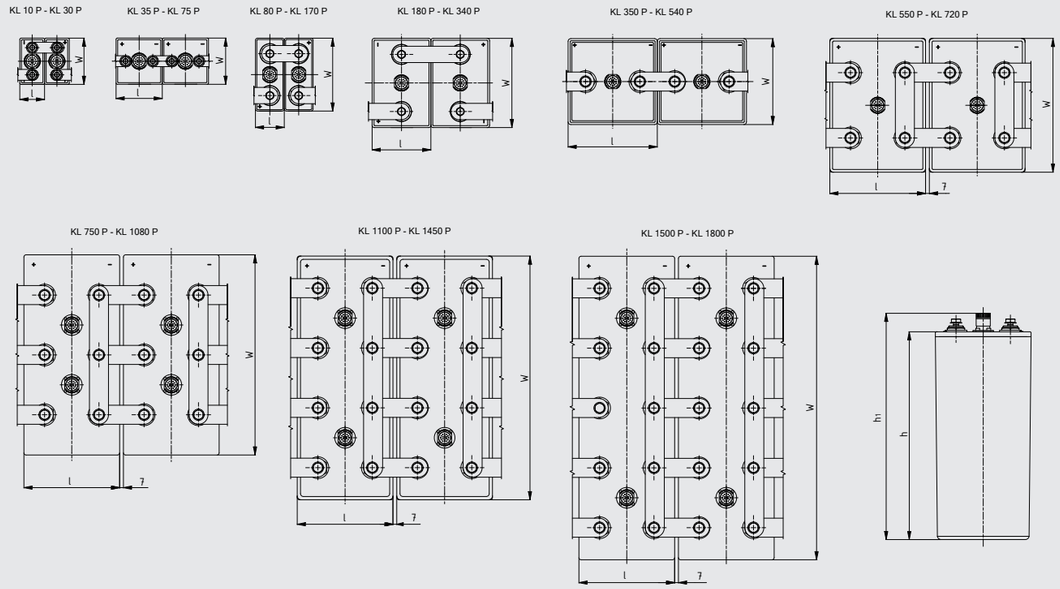
Delay for switch from Boost to Float:
Boost Current ramped < 0.004 I_t A

Single level Charging
1.47–1.50 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 ± 5 °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... 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	h1	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	262	M	2	M10	0,48	1,21	19,46
KL 17 P	17					M	2	M10	0,43	1,29	12,16
KL 21 P	21					M	2	M10	0,41	1,36	9,18
KL 26 P	26					M	2	M10	0,37	1,42	7,57
KL 30 P	30					M	2	M10	0,36	1,48	6,71
KL 35 P	35	85	85	237	262	M	2	M10	0,87	2,28	5,50
KL 40 P	40					M	2	M10	0,85	2,36	5,39
KL 45 P	45					M	2	M10	0,81	2,44	4,32
KL 50 P	50					M	2	M10	0,78	2,52	4,44
KL 55 P	55					M	2	M10	0,76	2,59	3,96
KL 60 P	60					M	2	M10	0,72	2,67	3,36
KL 65 P	65					M	2	M10	0,69	2,74	3,53
KL 70 P	70					M	2	M10	0,65	2,81	3,02
KL 75 P	75					M	2	M10	0,62	2,89	2,66
KL 80 P	80	53	134	364	392	S	2	M8	1,36	4,70	2,57
KL 85 P	85					S	2	M8	1,33	4,76	2,60
KL 95 P	95					S	2	M8	1,19	4,99	2,31
KL 100 P	100					S	2	M8	1,16	5,07	2,10
KL 110 P	110					S	2	M8	1,21	5,11	1,97
KL 115 P	115					S	2	M8	1,18	5,19	1,94
KL 120 P	120	69	134	364	392	M/S	2	M16/M8	1,67	6,16	1,79
KL 125 P	125					M/S	2	M16/M8	1,63	6,26	1,65
KL 135 P	135					M/S	2	M16/M8	1,71	6,34	1,63
KL 145 P	145					M/S	2	M16/M8	1,67	6,44	1,58
KL 150 P	150					M/S	2	M16/M8	1,49	6,67	1,50
KL 160 P	160					M/S	2	M16/M8	1,56	6,74	1,37
KL 170 P	170					M/S	2	M16/M8	1,52	6,85	1,21
KL 180 P	180	108	164	364	392	M/S	2	M16/M8	3,89	10,10	1,26
KL 190 P	190					M/S	2	M16/M8	3,60	10,2	1,02
KL 200 P	200					M/S	2	M16/M8	3,77	10,5	1,04
KL 210 P	210					M/S	2	M16/M8	3,49	10,5	1,04
KL 215 P	215					M/S	2	M16/M8	3,71	10,7	0,99
KL 225 P	225					M/S	2	M16/M8	3,43	10,7	0,85
KL 240 P	240					M/S	2	M16/M8	3,59	11,1	0,85
KL 250 P	250					M/S	2	M16/M8	3,53	11,2	0,84
KL 255 P	255					M/S	2	M16/M8	3,26	11,2	0,88
KL 265 P	265					M/S	2	M16/M8	3,18	11,5	0,80
KL 270 P	270					M/S	2	M16/M8	3,42	11,6	0,79
KL 290 P	290					M/S	2	M16/M8	3,34	11,8	0,77
KL 300 P	300					M/S	2	M16/M8	3,02	12,0	0,75
KL 305 P	305					M/S	2	M16/M8	3,24	12,2	0,65
KL 320 P	320					M/S	2	M16/M8	2,93	12,3	0,63
KL 340 P	340					M/S	2	M16/M8	3,06	12,7	0,63
KL 350 P	350	164	158	364	392	S	2	M10	5,09	15,8	0,63
KL 360 P	360					S	2	M10	5,03	16,0	0,57
KL 370 P	370					S	2	M10	5,33	16,4	0,59
KL 385 P	385					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	h1	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 390 P	390	164	158	364	392	S	2	M10	4,88	16,5	0,55
KL 400 P	400					S	2	M10	5,23	16,9	0,51
KL 415 P	415					S	2	M10	4,76	16,8	0,53
KL 420 P	420					S	2	M10	4,72	17,3	0,52
KL 430 P	430					S	2	M10	5,04	17,2	0,47
KL 440 P	440					S	2	M10	4,98	17,7	0,50
KL 445 P	445					S	2	M10	4,59	17,3	0,45
KL 455 P	455					S	2	M10	4,56	17,8	0,46
KL 465 P	465					S	2	M10	4,86	18,0	0,43
KL 470 P	470					S	2	M10	4,80	18,2	0,45
KL 480 P	480					S	2	M10	4,42	17,7	0,46
KL 500 P	500					S	2	M10	4,67	18,6	0,42
KL 515 P	515					S	2	M10	4,63	18,8	0,40
KL 540 P	540					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					S	4	M10	8,93	27,6	0,36
KL 595 P	595					S	4	M10	8,77	28,0	0,38
KL 610 P	610					S	4	M10	8,74	28,1	0,33
KL 635 P	635					S	4	M10	8,59	28,5	0,32
KL 655 P	655					S	4	M10	8,57	28,8	0,32
KL 680 P	680					S	4	M10	8,41	29,1	0,33
KL 720 P	720					S	4	M10	8,22	30,1	0,30
KL 750 P	750	176	368	382	418	S	6	M10	14,2	40,1	0,30
KL 770 P	770					S	6	M10	14,1	40,5	0,29
KL 800 P	800					S	6	M10	13,9	41,4	0,28
KL 815 P	815					S	6	M10	13,9	40,9	0,27
KL 865 P	865					S	6	M10	13,7	41,8	0,23
KL 890 P	890					S	6	M10	13,4	42,4	0,26
KL 915 P	915					S	6	M10	13,4	42,4	0,24
KL 950 P	950					S	6	M10	13,2	43,1	0,20
KL 980 P	980					S	6	M10	13,1	43,5	0,20
KL 1030 P	1030					S	6	M10	12,9	44,0	0,19
KL 1080 P	1080					S	6	M10	12,6	45,5	0,18
KL 1100 P	1100	176	448	382	418	S	8	M10	16,5	52,1	0,18
KL 1150 P	1150					S	8	M10	16,2	53,4	0,17
KL 1190 P	1190					S	8	M10	16,0	54,1	0,18
KL 1220 P	1220					S	8	M10	15,9	54,2	0,19
KL 1270 P	1270					S	8	M10	15,6	55,1	0,16
KL 1300 P	1300					S	8	M10	15,6	55,7	0,17
KL 1350 P	1350					S	8	M10	15,2	56,3	0,16
KL 1450 P	1450					S	8	M10	14,9	58,3	0,15
KL 1500 P	1500	176	558	382	418	S	10	M10	19,9	66,9	0,15
KL 1540 P	1540					S	10	M10	19,8	67,0	0,14
KL 1600 P	1600					S	10	M10	19,4	68,2	0,14
KL 1630 P	1630					S	10	M10	19,4	68,9	0,13
KL 1700 P	1700					S	10	M10	19,0	69,6	0,13
KL 1800 P	1800					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 discharge voltage of 1.15 V per cell (as per DIN 40771) and 1.00 V per cell (as per IEC 60623) at 20 ± 5 °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 - KM Range

A. Constant Voltage (FCBC Chargers)
Recommendation for Stand-by Application

Boost Mode
Boost Voltage: 1.55–1.70 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
1.46–1.49 V/cell

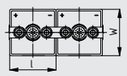
B. Constant Current mode

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 ± 5 °C

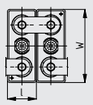
Fast Charging at 25 °C
Boost charge: 0.3 I_t A for 2.5 h followed by 0.2 I_t A for 2.5 h
Trickle charge: 0.001–0.002 A/Ah

KM 11 P - KM 30 P

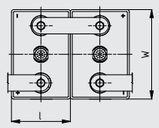
KM 40 P - KM 55 P



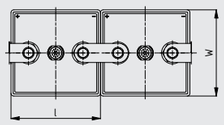
KM 65 P - KM 110 P



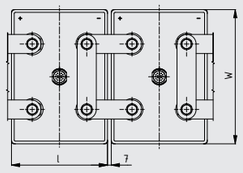
KM 125 P - KM 250 P



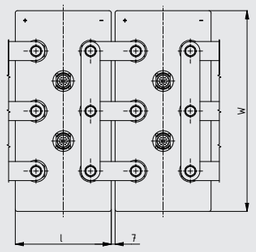
KM 270 P - KM 400 P



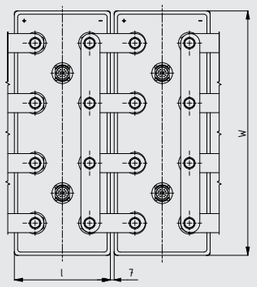
KM 420 P - KM 570 P



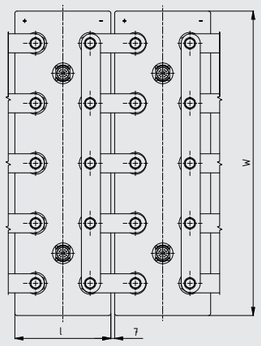
KM 600 P - KM 750 P

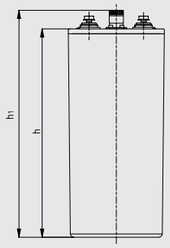


KM 850 P - KM 1050 P



KM 1150 P - KM 1390 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_5 till 1.0 V EOD]	5 h rate [C_5 till 1.15 V EOD]	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 11 P	12	11	46	85	167	191	M	2	M10	0,31	1,0	14,53
KM 18 P	19	18					M	2	M10	0,44	1,5	8,47
KM 24 P	26	24	46	85	237	262	M	2	M10	0,38	1,5	7,04
KM 30 P	33	30					M	2	M10	0,31	1,6	5,21
KM 40 P	44	40					M	2	M10	0,84	2,7	4,01
KM 48 P	52	48	85	85	237	262	M	2	M10	0,74	2,8	3,38
KM 55 P	61	55					M	2	M10	0,64	2,9	2,99
KM 65 P	71	65	53	134	364	392	S	2	M8	1,30	4,7	2,58
KM 75 P	82	75					S	2	M8	1,17	4,9	2,18
KM 90 P	99	90	69	134	364	392	S	2	M8	1,74	6,0	1,72
KM 110 P	121	110					S	2	M8	1,50	6,5	1,41
KM 125 P	137	125	70	164	364	392	S	2	M8	2,20	7,4	1,25
KM 140 P	154	140					S	2	M8	1,73	7,7	1,10
KM 160 P	176	160					S	2	M8	3,54	10,7	1,05
KM 185 P	203	185					S	2	M8	3,27	11,0	0,90
KM 205 P	225	205	108	164	364	392	S	2	M8	2,98	11,3	0,79
KM 225 P	247	225					S	2	M8	2,83	11,8	0,74
KM 250 P	275	250					S	2	M8	2,68	12,1	0,64
KM 270 P	297	270					S	2	M10	5,22	16,3	0,59
KM 300 P	330	300					S	2	M10	4,98	16,0	0,55
KM 320 P	352	320					S	2	M10	4,79	16,5	0,53
KM 340 P	374	340	164	158	364	392	S	2	M10	4,60	17,0	0,47
KM 355 P	390	355					S	2	M10	4,31	18,0	0,44
KM 380 P	418	380					S	2	M10	4,12	18,6	0,41
KM 400 P	440	400					S	2	M10	3,93	18,9	0,39
KM 420 P	460	420					S	4	M10	7,19	25,4	0,37
KM 450 P	499	450					S	4	M10	7,0	27,3	0,37
KM 470 P	520	470					S	4	M10	7,0	28,5	0,34
KM 500 P	555	500	176	246	382	408	S	4	M10	6,8	28,3	0,31
KM 520 P	575	520					S	4	M10	6,8	29,1	0,32
KM 550 P	610	550					S	4	M10	6,6	28,2	0,27
KM 570 P	630	570					S	4	M10	6,6	30,4	0,27
KM 600 P	665	600					S	6	M10	13,1	39,8	0,27
KM 630 P	700	630					S	6	M10	13,1	40,3	0,25
KM 675 P	750	675	176	368	382	418	S	6	M10	12,3	41,8	0,25
KM 705 P	785	705					S	6	M10	12,3	42,9	0,23
KM 750 P	835	750					S	6	M10	10,6	42,9	0,21
KM 850 P	945	850					S	8	M10	15,3	48,8	0,18
KM 950 P	1060	950	176	448	382	418	S	8	M10	14,2	53,2	0,17
KM 1000 P	1110	1000					S	8	M10	12,7	56,0	0,17
KM 1050 P	1165	1050					S	8	M10	12,7	58,8	0,16
KM 1150 P	1275	1150					S	10	M10	19,4	63,4	0,14
KM 1250 P	1390	1250	176	558	382	418	S	10	M10	17,3	68,9	0,12
KM 1390 P	1545	1390					S	10	M10	17,7	77,0	0,12

* 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 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 unpredicted 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 ± 5 °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, point 4.1.

Charging Recommendations – KH Range

A. Constant Voltage (FCBC Chargers)
Recommendation for Stand-by Application

Boost Mode
Boost Voltage: 1.55–1.70 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

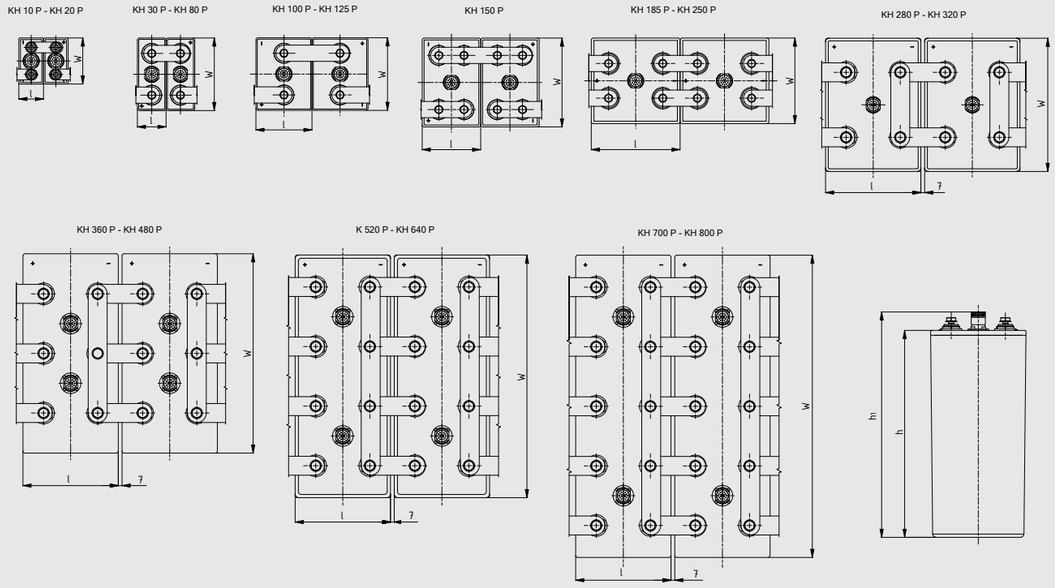
Single level Charging
1.44–1.48 V/cell

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 ± 5 °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

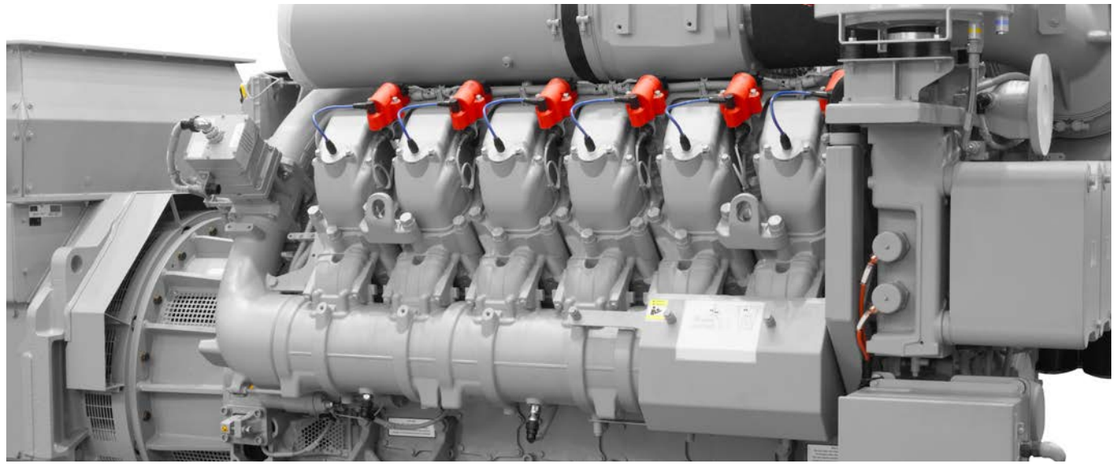


KH... P Single Cell Range

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 [C_5]	l	w	h	h1	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]
KH 10 P	10	46	85	237	262	M	2	M10	0,7	1,6	10,72
KH 20 P	20					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					S	2	M8	1,9	4,2	2,74
KH 50 P	50					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					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					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					S	4	M8	6,2	15,6	0,53
KH 235 P	235					S	4	M8	6,4	16,6	0,46
KH 250 P	250					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					S	4	M10	9,5	24,2	0,35
KH 320 P	320					S	4	M10	9,2	24,6	0,34
KH 360 P	360					S	6	M10	15,0	33,9	0,30
KH 390 P	390					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					S	6	M10	14,6	36,3	0,27
KH 480 P	480					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					S	8	M10	18,4	45,9	0,19
KH 600 P	600					S	8	M10	18,3	47,0	0,17
KH 640 P	640					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					S	10	M10	22,8	58,6	0,14
KH 800 P	800					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 stagnantly 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 1.2 V 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.

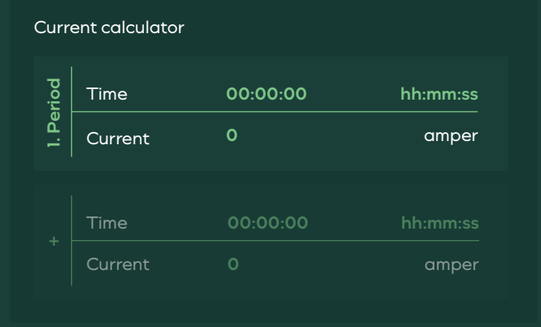
Low Total Cost of Ownership

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.

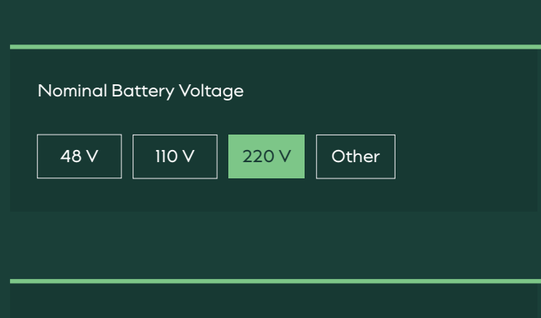
Ni-Cd Calculator



1. Load profile

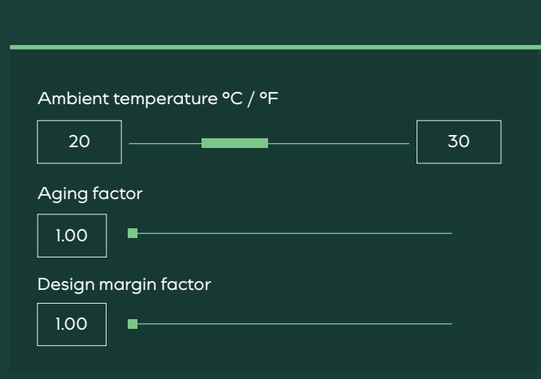
Through a guided User-Interface, fill in the basic parameters of the required or expected load the batteries will be handling for a specific application.

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.



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.



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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