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TOTAL ENERGY STORAGE SOLUTION PROVIDER



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FULLY INTEGRATED COMPETENCE FOR ENERGY STORAGE SOLUTIONS

Kokam develops and provides all the major components of energy storage system, which are used to create the most innovative and environment friendly solutions for a sustainable and clean future. The wide range of energy storage solutions offered by Kokam can be integrated with all areas of the power grid (generation, transmission, and distribution).

SYSTEM INTEGRATION



Kokam manufacturers Lithium-Ion/Polymer Batteries, Battery Management Systems, and Energy Storage Systems. Kokam's solutions are being utilized in over 50 different countries for various applications.

WORLD'S FIRST, WORLD'S BEST

In 1989 Kokam manufactured the world's first high capacity Lithium-Ion/Polymer batteries. Since then, Kokam has become a global battery industry leader within 150 worldwide patents related to battery technology and battery manufacturing equipment. In addition to offering customers a wide range of standard battery solutions, Kokam also works with customers to create customized solutions to address their unique needs.

AN EXPERIENCED BATTERY SOLUTION PROVIDER

Kokam manufactures over 30 different types of Lithium-Ion/Polymer batteries for Energy Storage System, Defense, Marine, Aerospace, Telecom, Electric Vehicle, and Medical applications. With 28 years of field experience, Kokam has installed over 667MWh of batteries around the world. Kokam's innovation solutions deliver high performance, and are reliable, durable, and exceptionally safe. Total 205MW ESS installed all around the world
 Developed 260Wh/kg cell which is the highest energy density in the world
 Launched new generation EV pack

Installed 36MW FR ESS in Nongong, Korea
Installed 30MW Spinning Reserve ESS in Australia
Delivered 10MWh Behind The Meter ESS

Installed 24MW FR ESS in Shin Gimje, Korea
Installed 16MW FR ESS in Shin Chungju, Korea
Developed of the Ultra High Power Cell

Installed 16MW FR ESS in West Ansung, Korea
Completion with 3rd Factory in Nonsan, Korea
Developed speicalized battery for high quality ESS

- Invested in Sunverge located in U.S

- Completion of Battery Plant in U.S for 700MWh Capacity
- Set up the 2nd Factory in Nonsan, Korea
 Establishment of limited battery manufacturing license in the U.S

- Installed Mutiple MWh ESS in U.S

Development of Nano cell
 Founded joint venture in U.S

Strated manufacturing the LTO Battery
Development of the high capacity cell(>200Ah)
Establishment of Kokam Electronics for Total Battery Solutions

Developed extreme high discharge performance 20C-rate & 30C-rate cell
Started with machinery sales
Exported turnkey technology of SLPB
Developed large capacity of SLPB

Establishment of KOKAM
Beginning of the battery business
Development SLPB (Superior Lithium Polymer Battery) 2017 ~2018

2016

2015

2013

2011

~2012

2009

~2010

2006

2002

~2005

~2008

~2014

















TOTAL ESS SOLUTION (Battery + PCS+ Transformer + Switchgear+EMS)

Integrated Cooling and Humidity control



Transformer + 6MW PCS (40ft) + 5MWh Battery (40ft)



- Racks are directly cooled by the HVAC system (1/6 of entire container volume) so cool air reaches the heat source directly.
 - Cooling is fast and very efficient.
 - Ambient conditions do not affect operation.
- Compared to general system, Kokam system saves 70% of power consumption



Transformer + 6MW PCS (Outdoor) + 2MWh Battery (20ft)





EMS (Energy Management System)

250kW/500kWh Outdoor ESS (Battery + PCS + EMS)





250kW PCS + EMS Control Room (One Side)



500kW Battery + Transformer (The Other Side)

Renewable Integration Demand Response Ancillary Grid Support Microgrid Application

3 phase 3 wire system / 3 phase 4 wire system Communication protocol - EMS: DNP3.0, IEC61850 IP44 Rated Battery Enclosure 4,400 x 2,000 x 2,800 (L x W x H / mm)

	Item	Specification
	Installed Energy	500kWh
Dotton	Operating Voltage Range	670 ~ 830V
Battery	Operating Temperature	-20 ~ 50 ℃
	Round Trip Efficiency	>0% (@ 25±3℃)
	Power	250kW
PCS	Cooling System	Forced Air-cooling
	Communication Protocol	EMS: DNP3.0, IEC61850
System	Dimension (L x W x H / mm)	4,400 x 2,000 x 2,800

1MW / 100kWh UPS Battery System



UPS Renewable Integration Ancillary Grid Services



PCS + UPS → Hybrid Bidirectional Inverter UPS Function (4ms response time) High Efficiency → Rated efficiency: 98% Modular Inverter Structure

2MW / 500kWh Indoor ESS





Renewable Integration Ancillary Grid Services

Module type inverter stack & Containerized outdoor design Secure and redundant control power and communication Compatible with a wide range of communication protocols and third-party software Convenient large screen HMI

ALL IN ONE E-HOUSE TYPE (OUTDOOR SYSTEM)

There are two models of AGTO 400-1500, AGTO 800-4000 which are scalable from 1.2MWh to 4MWh. E-House type ALL in ONE Outdoor series are available for diverse purposes such as efficient operation of renewable energy, stable power supply, and improving load factor via peak load reduction in places with high capacity: power plants, industrial complex, public facilities, and self-sufficient energy islands.



Battery: 1.2MWh ~ 1.5MWh

PCS: 800kWBattery: 1.6MWh ~ 4MWh

Model Comparison	AGTO 800-4000	AGTO 100-200
AC Battery Capacity (MWh)	1.2~1.5 (Scalable)	1.6~4 (Scalable)
AC Rated Output (kW)	400	800
Availability (%)	Above 97	Above 97
Round Trip Efficiency (%)	92	92
IP Protection (LiB Enclosure)	IP44	IP44
AC Grid Connection	3Phase 4wire 380V	3Phase 4wire 22,900V
		12,190 x 2,882 x 3,406
Dimensions (W/D/H, mm)	7,736 x 2,882 x 3,406	2,600 x 2,240 x 2,350
		7,000 x 950 x 2,505
Weight (tons)	16	31
Option	EMS Server System, Renewable	Energy connected Distribution Panel

ALL IN ONE SERIES (INDOOR & OUTDOOR)

ALL in ONE Series are a Grid-Tied Model which operates in grid connected state, and various applications are available such as Peak Cut, Frequency Regulation, and Renewable Energy Connection depending on customer's usage purpose.



Indoor	AGTI 50-100	AGTI 75-200	AGTO 100-200
AC Battery Capacity (kWh)	100	200	200
AC Rated Output (kW)	50	75	100
Availability (%)	Above 97	Above 97	Above 97
Round Trip Efficiency (%)	92	92	92
IP Protection (LiB Enclosure)	IP54	IP54	IP54
IP Protection (PCS)	IP44	IP44	IP44
AC Grid Connection	3phase 4wire 380V	3phase 4wire 380V	3phase 4wire 380V
Dimensions (W/D/H, mm)	1,430 x 800 x 2,450	1,950 x 800 x 2,450	1,950 x 800 x 2,450
Weight (kg)	2,400	3,250	3,250
Option		EMS Server System	

Outdoor	AGTO 75-200	AGTO 75-300	AGTO 100-200	AGTO 100-300		
AC Battery Capacity (kWh)	200	300	200	300		
AC Rated Output (kW)	75	75	100	100		
Availability (%)	Above 97	Above 97	Above 97	Above 97		
Round Trip Efficiency (%)	92	92	92	92		
IP Protection (LiB Enclosure)	IP54	IP54	IP54	IP54		
IP Protection	IP44	IP44	IP44	IP44		
(PCS & Distribution Panel)						
AC Grid Connection	3phase 4wire 380V	3phase 4wire 380V	3phase 4wire 380V	3phase 4wire 380V		
Dimensions (W/D/H, mm)	3,000 x 2,000 x 2,883 (Renewables Connection)					
Dimensions (W/D/H, mm)	4,000 x 2,000 x 2,883 (PV Integrated)					
Weight (Renewables Connection)	5,000kg	5,900kg	5,000kg	5,900kg		
Weight (PV Integrated)	6,200kg	7,300kg	6,200kg	7,300kg		

KEPCO Substation, KOREA (36MW/13MWh)



INSTALLED 205MW ENERGY STORAGE SYSTEM

REFERENCE

Alinta Newman Power Station Project KEPCO Frequency Regulation Project

Data Center UPS Project in U.S Data Center UPS Project in Texas Data Center UPS Project in Singapore Telecommunication Center UPS in Australia Distributed ESS Project PowerCor Utility in Australia Garden Island Micro Grid Project Gasado Island Micro Grid Project (KEPCO) Korea Industrial Building Project Distributed ESS Project San Diego Gas & Electric Daegu Demand Response Project Kansas City Power & Light Green Impact Zone Smart Grid Eumseong Hyundai Heavy Industry Factory KORAIL Station (x 2units) Duke Energy Seoul National Park Peak Shaving Project

30MW / 11MWh 36MW / 13MWh 24MW / 9MWh 16MW / 6MWh 16MW / 5MWh 15MW / 2.4MWh 9MW / 1.7MWh 8MW / 1.5MWh 3MW / 472kWh 2MW/4MWh 2MW / 2.2MWh 2MW / 555Wh 1.5MW / 3.2MWh 1MW / 6.6MWh 1MW / 2.6MWh 1MW / 2.3MWh 1MW / 1.5MWh 1MW/1MWh 1MW /1MWh 1MW / 530kWh 250kW / 800kWh 250kW / 310kWh



TO THE PARTY AND

16MW/6MWh KOREA

30MW / 11MWh AUSTRALIA

16MW / 5MWh KOREA





1MW/1MWh U.S

1MW/1MWh KOREA

1MW/2.3MWh U.S



COMPLETELY INTEGRATED BATTERY SOLUTION

- Cell
- Module
- Rack
- BMS (Module, Rack, System)
- Battery Protection Unit
- Container
- DC Panel
- HVAC System
- Fire Suppression System





"SPECIFICATION" HIGH-PERFORMANCE CONTAINERIZED STORAGE SOLUTION





			High Pov	High En	ergy Type			
Model		KCE-3774	KCE-2664	KCE-1351	KCE-675	KCE-5860	KCE-2730	
Installed Energy (MWh)		3.77	2.66	1.35	0.67	5.47	2.73	
Max Power	Discharge(MW)	15.10	10.66	5.41	2.70	10.94	5.46	
(Continuous)	Charge(MW)	15.10	10.66	5.41	2.70	5.47	2.73	
DC E	ifficiency	>95% [C/2 rate]						
DC	Voltage	640 ~ 1,100V						
Approx. Dimensions (ft)		53'	40'	40'	20'	40'	20'	
Ambient Operating Temperature Range		-30 ~ 50 °C						
Enclosi	ure details		Designed to satisfy IP54 per IEC 60529 standard					

ENERGY STORAGE SYSTEM INTEGRATED RENEWABLE ENERGY

Kokam Systems make no warranty explicit or implied with these specifications. Contents subject to change without notice.



- Extremely compact design (Max. 133kWh per Rack)
- Parallel connection up to 1MWh ~ 10MWh Accommodates user-specific energy and
- voltage requirements
- Equipped with multiple layers of safety mechanisms
- Increased system availability via redundancy function Convenient structural design for maintenance



of the system to the user



Optimized thermal management capability achieved by air vent holes and heat sink plates

- Achieves modularity through standardized structures Enables easy and guick customization via various serial and parallel connections
- Accommodates both high energy density or

Protection Door

 Acts as a barricade during emergency situations Comes with a user convenient door handle



- Maintains SOC balancing among the cells between the cells via equalization function
- CAN communication to Master BMS

emergency situations

- Monitoring data and event log saved up to 3 years
- Remote Management feature available over Ethernet

Rack Isolation

Allows a safe activation of the battery system via the precharge function

KRI/KRO STANDARD RACK

COMPACT SIZE WITH COST EFFECTIVE SYSTEM

Kokam's Indoor and Outdoor Type Rack (KRI/KRO) are composed of Kokam's standard battery modules which are able to be built into 60 -130kWh capacity systems upon a customer's request. The KRI/KRO racks can be installed in various locations such as offices, hospitals, utilities, telecom towers, data centers and military bases.

- Energy capacity of hundreds of kWh
- Outdoor type rack follows the NEMA3R
- Weatherproof capability
- Extreme environments





KOKAM RACK VS COMPETITOR'S RACK

x 3~5

Charge Power

x 3~5 Disharge Power x 1.5

Energy Density

Description		Kokam	Competitor
	Energy (kWh)	133	40~58
Power	Charge (kW)	532	100~174
FOwer	Discharge (kW)	532	100~220
Density	Energy Density (Wh/L)	70	45~57



	High Power Type						
Model	Indoor	KRI-H-2R5C-111	KRI-H-3R4C-133				
Model	Outdoor	KRO-H-2R5C-111	KRO-H-3R4C-133				
Installed Energy (k)	Wh)	111	133				
Rated Energy (kWh	ו)	105	126				
Configuration		2P20S Modules x 10	2P20S Modules x 12				
Nominal Power (kV	V)	111	133				
Max Charge/Disch	arge Power (kW)	444	532				
DC Efficiency*		>95% [C/2 rate]					
DC Voltage (V)		650 ~ 830	720 ~ 1100				
Ambient Operating		-10℃~ 50℃					
Approx. Weight (kg	1)	1200	1270				
Approx. Dimension	ıs (mm)	1150 x 743 x 2116	1150 x 743 x 2116				
Certifications		UL 1973					

High Energy Type						
Model	Indoor	KRI-2R5C-111	KRI-2R6C-133			
	Outdoor	KRO-2R5C-111	KRO-2R6C-133			
Installed Energy (kV	Vh)	111	133			
Rated Energy (kWh)	105	126			
Configuration		2P20S Modules x 10	2P20S Modules x 12			
Nominal Power (kW	/)	111	133			
Max Charge/Discha	arge Power (kW)	111	133			
DC Efficiency*		>95% [C/2 rate]				
DC Voltage (V)		640 ~ 832	768 ~ 1100			
Ambient Operating		-10℃~ 50℃				
Approx. Weight (kg)	1090	1260			
Approx. Dimension	s (mm)	1150 x 743 x 2116 1150 x 743 x 2116				
Certifications		UL 1	973			

*Inclusive of battery management systems and electronic components

*Kokam makes no warranty explicit or implied with these specifications. The contents are subjected to change without prior notice.

*Installed Energy: The total amount of stored capacity without considering the operational conditions.

*Rated Energy: The total amount of usable capacity, taking into consideration the operation conditions. (discharge condition @ 0.5P, 23±3°C, BOL)



KOKAM RACK SYSTEM (KRS) CUSTOMER-CENTERED SOLUTION



SPECIFICATION 🔮 🚇

	NMC High Power Type							
Model Name		Indoor	KRIS-H-2-222	KRIS-H-3-333	KRIS-H-4-444	KRIS-H-5-555	KRIS-H-6-666	
		Outdoor	KROS-H-2-222	KROS-H-3-333	KROS-H-4-444	KROS-H-5-555	KROS-H-6-666	
Installed Capad	city (k	Wh)	222	333	444	555	666	
Rated Capacity	y (kWł	ר)	211	316	422	527	633	
Rated Power Charge /Discharge(kW)		Charge charge(kW)	888	1332	1776	2220	2664	
Configuration		2 Racks connected in parallel	ed 3 Racks connected 4 Racks connected in parallel in parallel		5 Racks connected in parallel	6 Racks connected in parallel		
DC Efficiency*					>97% [C/2 rate]			
DC Voltage					600V ~ 850V			
Ambiant Opara	oting	Indoor	0 ~ 45 °C					
Ampient Opera	aung	Outdoor	-20 ~ 50 ℃					
Enclosure deta	aile	Indoor	IP20					
Enclosuro dota		Outdoor			IP54			
Certifications					UL 1973			

	NMC High Energy Type						
Model Name	Indoor	KRIS-H-2-266	KRIS-H-2-266 KRIS-H-3-399 KRIS-4-53		KRIS-5-665	KRIS-H-6-798	
Would Name	Outdoor	KROS-H-2-266	KROS-H-3-399	KROS-H-4-532	KROS-H-5-665	KROS-H-6-798	
Installed Capacity (k	Wh)	266	399	532	665	798	
Rated Capacity (kWI	h)	253	379	505	632	758	
Rated Power Charge /Discharge(kW)		266	400	532	665	798	
Configuration		2 Racks connected in parallel	ted 3 Racks connected 4 Racks connected in parallel in parallel		5 Racks connected in parallel	6 Racks connected in parallel	
DC Efficiency*				>97% [C/2 rate]			
DC Voltage				600V ~ 998V			
Ambient Operating	Indoor	0 ~ 45 °C					
Ambient Operating	Outdoor	-20 ~ 50 ℃					
Englagura dataila	Indoor			IP20			
	Outdoor			IP54			
Certifications				UL 1973			

	LTO High Power Type							
	Indoor	KRIS-H-2-228	KRIS-H-2-228 KRIS-H-3-342 KRIS-H-4-456 KF		KRIS-H-5-570	KRIS-H-6-684		
Model Name	Outdoor	KROS-H-2-228	KROS-H-3-342	KROS-H-4-456	KROS-H-5-570	KROS-H-6-684		
Installed Capacity (k)	Nh)	228	342	456	570	684		
Rated Capacity (kWh	1)	217	325	433	542	650		
Rated Power Charge /Discharge(kW)		866	866 1300 1733 2166		2166	2600		
Configuration		2 Racks connected 3 Racks connected 4 Racks connected in parallel in parallel in parallel		5 Racks connected in parallel	6 Racks connected in parallel			
DC Efficiency*				>97% [C/2 rate]				
DC Voltage				750V ~ 1100V				
Ambient Operating	Indoor	20 55°C						
Ambient Operating	Outdoor	-50 ~ 55 C						
Englacura dataila Indoor		IP20						
	Outdoor		IP54					
Certifications				KBIA				

The table above provides the technical specifications for a Battery System composed of 2EA Racks. A Battery System maybe composed of up to 30 Racks.
 Kokam recommends the use of a System BMS and a DC Distributional Panel with the Battery System.

KOKAM UPS

PIONEER OF PREMIUM BATTERY

Kokam UPS (KUPS) provides perfect protection in a number of applications including medical, telecom, and data centers. During an outage, KUPS immediately provides battery back-up power to protect mission-critical information and systems.

VRLA VS. Kokam Li-Ion



- Higher energy density and lighter weight allow integration of batteries and UPS within a factory-tested single container, providing faster and more reliable field installation and start-up
- Provides 4 to 8 times longer cycle life and high power density than lead-acid battery
- No degradation with shallow cycles
- No open-circuit failure mode
- No hydrogen generation
- Integrated monitoring of individual cell's voltages and temperatures





Customization of parallel cabinet & rack connections

Kokam UPS series provides a modular, easily scalable solution

Model	100S	110S	120S	132S	140S	154S
Installed Capacity (kWh)	27.7	30.5	33.3	36.6	38.8	42.7
Module Configuration	20S1P x 5	22S1P x 5	20S1P x 6	22S1P x 6	20S1P x 7	22S1P x 7
Voltage Range (Vdc)	410~320	451~352	492~384	541~422	574~448	631~492
Float Voltage (Vdc)	409~400	450~440	491~480	540~528	573~4560	630~616
Continuous Discharge Power (kW, 5min)	222	244	266	293	310	342
Peak Discharge Power (kW, 1min)	277	305	333	366	388	427
Battery Capacity (Ah)	75 Ah					
Peak Discharge Current (A)	870 A					
UL Certification			UL1973, UL16	642, UN38.3		

- For larger battery capacity, each rack is scalable as connected in parallel

- 3-wire connection is available on request

40% Less Footprint & 5 times Lighter

Small Footprint allows for more flexibility in installation and transportation. Kokam UPS takes up 40% less footprint than VRLA.



Kokam High Power UPS 🕨

BMS

PIONEER OF PREMIUM BATTERY



MOBILITY ESS

CONSTANT SUPPLY OF HIGH QUALITY ELECTRIC POWER



SYSTEM COMPONENTS

- Battery Rack
- PCS
- Fire Suppression System
- HVAC

SYSTEM BMS

- Processes and displays real-time status of the battery system from the rack level down to the cell level (up to 30 racks)
- Provides data on energy, voltage, current, SOH/SOC status and more
- Easy access to data through user friendly GUI
- Anomalies identifiable at the cell and module level for quick diagnosis
- Activates various protection mechanisms during emergency situations
- Monitoring data and event log saved up to 3 years
- Remote Management feature available over Ethernet

Mobile ESS for emergency power supply Units

	Vehicle + ESS Container	 Heat dissipation structure provides efficient cooling of the battery Constructed with insulation and HVAC to control battery system ambient temperature Rugged vehicle designed to meet the requirements of the Mobile standard 	
- E	Battery Rack	 Rugged design for long-term use Provides maximum safety with automatic fire suppression system and full enclosure Provides User Interface to monitor battery SOC & Condition 	
		- 30kW ~ 1MW Power Range	

PCS



DC PANEL

- Fuse and Breaker designed to protect the battery system against short circuit
- Fuse and Breaker status available through HMI



- 30kW ~ 1MW Power Range- Optimized design to meet the requirement of the mobile standard

- TR less design applied

BATTERY MODULE

HIGH-PERFORMANCE STORAGE SOLUTIONS

MEET VARIOUS NEEDS OF CUSTOMER'S TECHNICAL REQUIREMENT

Kokam Battery Module (KBM) provides 2 kWh - 12kWh systems composed of Lithium-ion Polymer Batteries connected in series/parallel. With its flexible and modular design, Kokam's Battery Module (KBM) can be customized to meet various technical needs of customers.

AIR COOLED BATTERY PACK

(h) (c)

- Standardized module can be connected in series/parallel to create a system of 2.4 kWh to MWh-scale
- Each module is built in an independent tray which secures clearance between individual cells for ventilation
- The module provides cooling for electronic components and lowers thermal resistance
- Maintenance and replacement costs of components are minimal
- Application: ESS, Telecom, Military, Electric Vehicle, Industrial, Aerospace, Marine





KBM 216 - 2.7kWh

KBM 255 - 3.8kWh



KBM 216 2P - 5.5kWh







LIQUID COOLED BATTERY PACK NEW

Advanced liquid cooling system

efficiency

All-New BMS

strings in parallel)

Kokam BMS permits very large

(up to 750V per string, and up to 24

strings and pack combinations

Direct cooling to cell face; 50-75% less mass than competing technology; maximizes volumetric

All external connections at front panel

Designed for ease of installation and service

Variable Bulkhead Design

Allows upgrades to connectors, fuses, VTBs without tooling entire pack

IEC ISO CA UN38.3

Populated with Kokam CCS Cells (Ceramic Coated Separator)

Enhanced cell separator eliminates the need for thermal barriers



Cost Effective / Safety / Long Life / Flexible Design

	71P 7.1kWh	114E 11.4kWh
NMC Cell	40 NMC - 2p24s	60 NMC - 2p24s
Specific Energy (Wh/kg)	≥92	≥152
Energy Density (Wh/L)	≥116	≥186
Capacity (Ah; Rated at C/2)	80	130
Voltage (Nominal; V)	88.8	87.8
Mass (kg)	77	75
Dimension (mm)	(L) 753 (W) 303 (H) 282
Test	Conditioins	Reference
Ingress Protection	Mated: IP67, IPXXD, Unmated	ISO 20653
Isolation & Drop Test	1.2m onto cement on corner	IEC 62133 / IEC 62281
Shock	50G, 6mS, 3 axis, 10 each	ISO 12405
Vibration	Random, 3 Axis, 21 hr/axis	ISO 12405
Composite Heat & Humidity	RH 93%, 25°- 65°C, 28 day	ISO 16750
Thermal Shock	85°C to-40°C within 30 min	ISO 12405
UNDOT	UN T1, T2, T3, T4, T5	UN 38.3
Housing Load	Knee 150kN/m ² ; Foot 356kN/m ²	GMW16390
Corrosion	Salt mist cyclic, test Kb	IEC 60068-2-52 DNV-GL SFC 2.4 sec 3.10
External Fuel Fire	130 sec over fuel fire	ECE R100 8E



BATTERY & UHOME ESS

PROVIDING USERS THE BEST POSSIBLE SOLUTION



Kokam Battery Module (KBM) are 2kWh – 50kWh systems composed of Lithium-ion Polymer Batteries connected in series or parallel with its flexible and modular design.

Maintenance :

Air Ventilation :

Each module is built as an independent tray which allows effective and sufficient handling when maintenance is required.

Cells within the modules are maintained at optimal temperatures to enable a longer life cycle. Optional heat sink plate can be provided to cool electronic components and increase thermal capability.

BATTERY SPECIFICATION

BATTERY SPECIFICATION	UL Japan (E		
ltem	Value		Remark
Energy	3.88 kWh		@ C/5 discharge 23± 3℃
Cell type	75 Ah		
Minimum Voltage	42.0 V		
Nominal Voltage	51.8 V		
Maximum Voltage	58.8 V		
Max. Continuous Charge C-rate	1C		@ 23± 3℃
Max. Continuous Discharge C-rate	1C		@ 23± 3°C
Peak Discharge C-rate	3C		< 10sec, > SOC 50%
Weight	Approx.	26.00 kg	
	Width	305 mm	
Module Dimension	Height	327.7 mm	
	Depth	235.4 mm	
	Charge	0 ~ 10 °C	< 0.3C
Available Operating		10 ~ 30 °C	≤ 2.0C
Temperature		30 ~ 40 °C	< 1.0C
	Discharge	-10 ~ 55 °C	
	1 year	-20 ~ 25 °C	
Available Storage	3 months 25 ~ 40 °C		@ 60±25% K.H. SOC 50±5%
CONDITION	<1 week	40 ~ 55 ℃	500 50± 5%



KOKAM BATTERY MODULE FOR HOME ESS CAN BE CUSTOMIZED TO MEET VARIOUS TECHNICAL NEEDS OF CUSTOMERS





LITHIUM POLYMER BATTERY

THE RIGHT CHOICE FOR YOUR BUSINESS

Kokam sets about to solve the limitations associated with conventional Lithium Ion Battery technology, including cycle and calendar life, safety, recharge time, power delivery, and ability to operate in extreme temperatures. The performance and features of this technology surpass other existing battery capabilities in the market space today.







HIGH ENERGY NMC (Nickel Manganese Cobalt)

Advantages

- High energy density (~ 203Wh/kg): Up to 5MWh of batteries can be stored in a 40ft container
- More than 96% of high efficiency at 0.5C
- Competitive Price: The NMC cells have a comparative advantage in terms of price, considering it's superior performance, reliability and safety features.



Energy

Performance

Life span

ULTRA HIGH POWER NMC

Advantages

- High C-rate up to 12C-rate discharging performance
- High C-rate up to 4C-rate charging performance
- Improved high power cycle life
- Up to 3MWh of batteries can be stored in a 40ft container
- Special coating applied to cathode to improve high power performance
- High C-rate discharge performance for uses in frequency regulation, UPS, etc.
- Improved performance without safety or cycle life trade off

LITHIUM TITANATE (LTO)

Advantages

- Operating temperature: -30~60 degC
- High specific power: 5C-rate continuous and 8C-rate peak charge & discharge operation
- High round trip efficiency (RTE): >95%
- Long cycle life: 20,000 cycles @ 90% DoD, 1C charge & discharge operating conditions
- Extremely Safe: A thermal runaway event is significantly less likely to occur in LTO cells. LTO cells can also be re-operated after an event of an over-discharge, unlike conventional graphite based Li-lon cells. This feature enables the user to operate the battery cells under extreme environmental and usage conditions.
- Advantages of the LTO cells: Anode side of ordinary Li-lon cells are made up of graphite, the anode side of the LTO cell is composed of Lithium Titanate, which has stronger chemical structure than graphite.



Great Power for Everyone

Kokam's high-performance lithium polymer battery technology delivers high power and energy density combined with excellent safety performance and cycle life.



Higher usable energy means greater battery utilization and lower cost



POWER:

ENERGY:

Superior power by weight or volume in a cost effective solution



CYCLE:

Excellent calendar and cycle life with consistent performance over extended use



Contact: battery@kokam.com