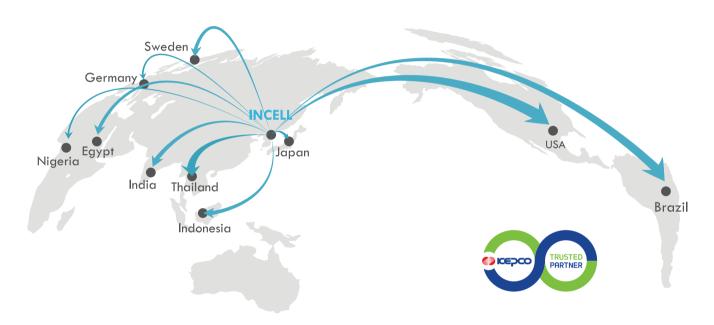


2020
Energy Storage System
Solution & Product Guide

INCELL

INCELL develops and produces ESS (Energy Storage System) based on excellent energy & battery solution technology to solve the energy and environmental problems of the earth. As a member of KEPCO Trust Partnership (KTP), KEPCO is doing its best to develop into a global enterprise in the ESS field from the energy valley led by KEPCO.

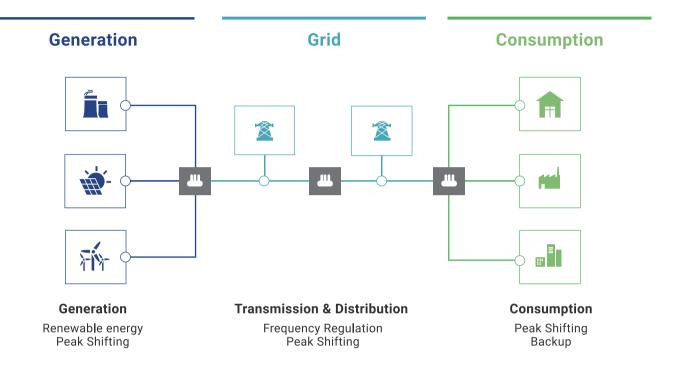


History —	2019	.01	Youth-friendly company selection (3 sections)	2014	.06	Supplied ESS in Samma Energy independent Island (1.2MWh)
ilistory		.04	Philippines Power Agency Supplier Selection		00	,
		.05	Italy Enel Group Supplier Registration		.06	Supplied Lithium Batteries for UPS Power failure Compensation to East–West Power Co., Ltd.
		0.4	WEDGG G		.08	Exported industrial lithium battery to Germany, USA
	2018	.04	KEPCO Gwangju Star company selection		40	
		.12	Minister prize awarded by Ministry of Science and ICT as a commercialization		.12	Smart Grid Support Project 3Mwh Installation
		.12	Minister prize awarded by Ministry of SMEs and Startups as a local specialization project	2013	.04	Installed lithium battery in KEPCO Seoul headquarters
			Startups as a local specialization project		.04	Exporting ESS monitoring and control equipment
	2017	.10	Supply LIB for Doosan Forklift			for Mozambique solar PV
		.12	Installation of solar connection ESS 50MWh	2012	.07	Exported 2MWh solar street ramp to Nigeria
		.12	Investment by POSCO Capital Co., LTD		.08	Exported lithium battery system for communication to India
	2016	.04	Signed export contract with ESS of KRW 270 billion and MOU with KEPCO		.12	Installed the first SG Project in Korea
		.11	Shinsung solar energy solar connection ESS 1MWh installation	2011	.02	Certified CE, ISO 9001/14001
		.11	Mass production of lithium battery for Samsung Electronics medical equipment	2010	.01	Installed the first ESS with solar power plant of KEPCO in Korea
		.11	Certified as KEPCO Trusted Partner of KEPCO		.03	Installed ESS of KHNP
			Credit Guarantee Fund selected as Star	2009	.07	Exported ESS to Japan
		.12	Enterprise			
	2015	.06	Telecom ESS export to Egypt	2008	.06	Joint development of KPX
		.07	Received order for 3 KEPCO SG stations	2007	.07	Development BMS
		.12	Install 3MWh of smart grid distribution business	2006	.07	Established R&D Center
		.12	Installation of ESS (24MW) for Korean power	2004	.01	Established company

frequency adjustment

Energy Storage System

Apllication





Lithium Battery System

for Utility / Industrial

INCELL's lithium batteries are manufactured in the same way as Tesla, the world's leading electric vehicle and ESS leader, by applying Samsung SDI's high performance cell, ensuring high efficiency and long life.

Features

- Using ESS-only cells
- · Low charging rate ensures safety and longevity
- Off-gas and humidity sensor built into the module to prevent fire
- · Module and rack design to prevent fire spread
- IEC 62619 Certification

Battery Module



Model	SP44-33-195	SP44-41-235	SP44-30T-60
Voltage	43.68Vdc	43.8Vdc	43.2Vdc
Energy	8.5kWh	10.3kWh	2.5kWh
Capacity	195Ah	235Ah	60Ah
Size(WHD)mm	459x83x895	472×90×915	472×90×375
Weight	About 65kg	About 68kg	About 25kg

Battery Rack



Model	LIB-R-06	LIB-R-07	LIB-R-09	
Voltage	873Vdc	876Vdc	864Vdc	
Energy (100% / 95%)	170kWh / 161kWh	205kWh / 195kWh	51.8kWh / 49.2kWh	
Capacity	195Ah	235Ah	60Ah	
Voltage Range	7	756 ~ 996Vdc (For ESS 768~	972Vdc)	
Size(WHD)mm	575x2290x977	575×2290×977	575×2290×440	
Weight	About 1500kg	About 1600kg	About 750kg	
Model	LIB-R-06-1	LIB-R-07-1	LIB-R-09-01	
Nominal Voltage	742.5Vdc	744.6Vdc	734.4Vdc	
Energy (100% / 95%)	144kWh / 137kWh	175kWh / 166kWh	44kWh / 41.8kWh	
Capacity	195Ah	235Ah	60Ah	
Voltage Range	642 ~ 846Vdc (For ESS 652~826Vdc)			
Size(WHD)mm	575×1994×977	575×1994×977	575×1994×440	
Weight	About 1300kg	About 1400kg	About 650kg	

^{*} Certification and operational capacity is 95% of the installed capacity.

Fire Prevention Safety Technology

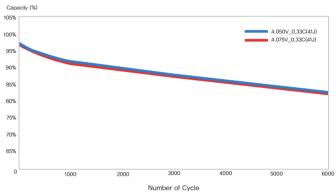
New Safety Algorithm

ESS is operated in a harsh operating environment due to charging/discharging cycles on a daily basis and is exposed to fire hazard. Thus, it has to meet higher requirements for safety technologies and operating software to prevent fire. **INCELL** offers **new fire safety technologies** from cell level to system level through safe features and operating algorithms.

Cell

- · SAMSUNG SDI's Cell for ESS application
- · Enhanced safety feature by adopting CID
- Various lineup: High Capacity, high power (6C), ultra high power (30C)
- · Over 80% of SOC maintained after 15 years (41J)

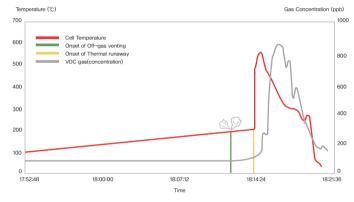
ESS Cycle Life Estimation(INR21700-41J)



Module & Rack

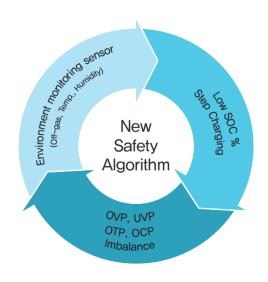
- Early detection of Off-Gas using gas sensor per module
- Detection of insulation with Environment monitoring sensor per module
- · Cascading thermal runaway prevention module design
- · Fire spread prevention with fully enclosed Rack design

Off-gas early detection using gas sensor

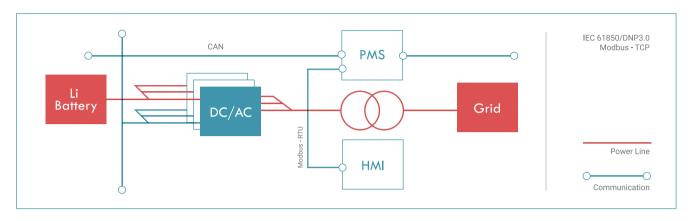


BMS & Safety Algorithm

- Full charge rate at relatively low SOC for a higher safety and longer life (87.5% compared to competitors)
- Overcharge protection with low charge voltage (4.075V) and step charging scheme.
- Environment monitoring systems and algorithms to enhance the safety and longevity in addition to existing battery safety features



PCS Power Conditioning System

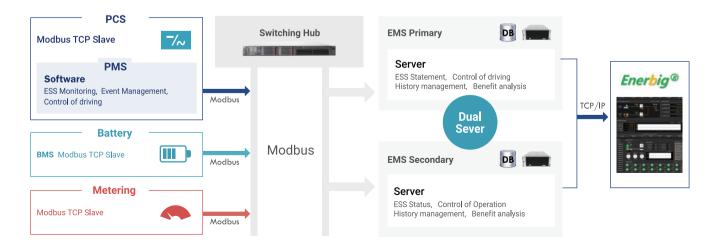


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Item	Specification
Power	50/80/100/200/250/500/750/1000kW 0.4/0.8/1.2/1.6/2.0/2.5MW
Voltage Range	L : DC 550V ~ 830V, H:DC 740 ~ 1.100V
Rated efficiency	98%~99%
Rated AC Voltage	350,380,400,440V / ±10%(Operating Range)
Grid Frequency	50 / 60Hz

EMS / PMS | Energy Management System Power Management System

Enerbig® is designed based on optimal operation algorithm through big data analysis which is core of power IoT, maximize operating efficiency.



Energy Storage System

Total Solution

Incell manufactures all components, including Lithium battery, which is the core of ESS, and can offer than 15years of economic and stability required for ESS by carrying out from feasibility analysis, design, construction and after-management.







Provide Total Solution Including Battery - PCS - PMS /EMS

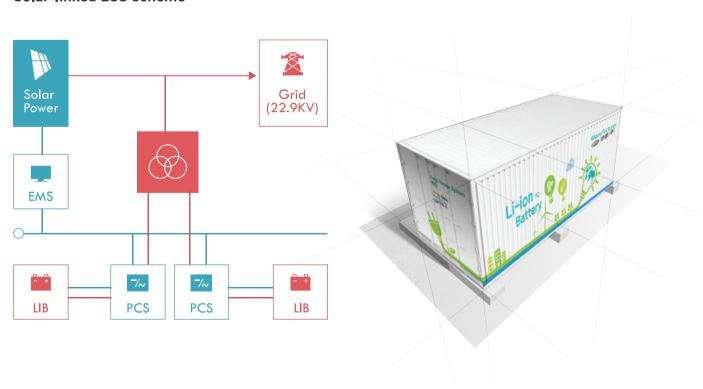
- Solar Power Plant
- Wind Power Plant
- Frequency Regulation
- Emergency Generator
- Building and Factory Power Demand Control







Solar-linked ESS scheme







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