INZI e-SOLUTION

AI and ICT Based High Safety & Long life
Lithium pack integrated solution company

INZI e-Solution

AI Lithium is the Answer !

INZI e-SOLUTION
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CONTENTS

INZI e-Solution
Lithium Battery Map | 4

Company Information | 6

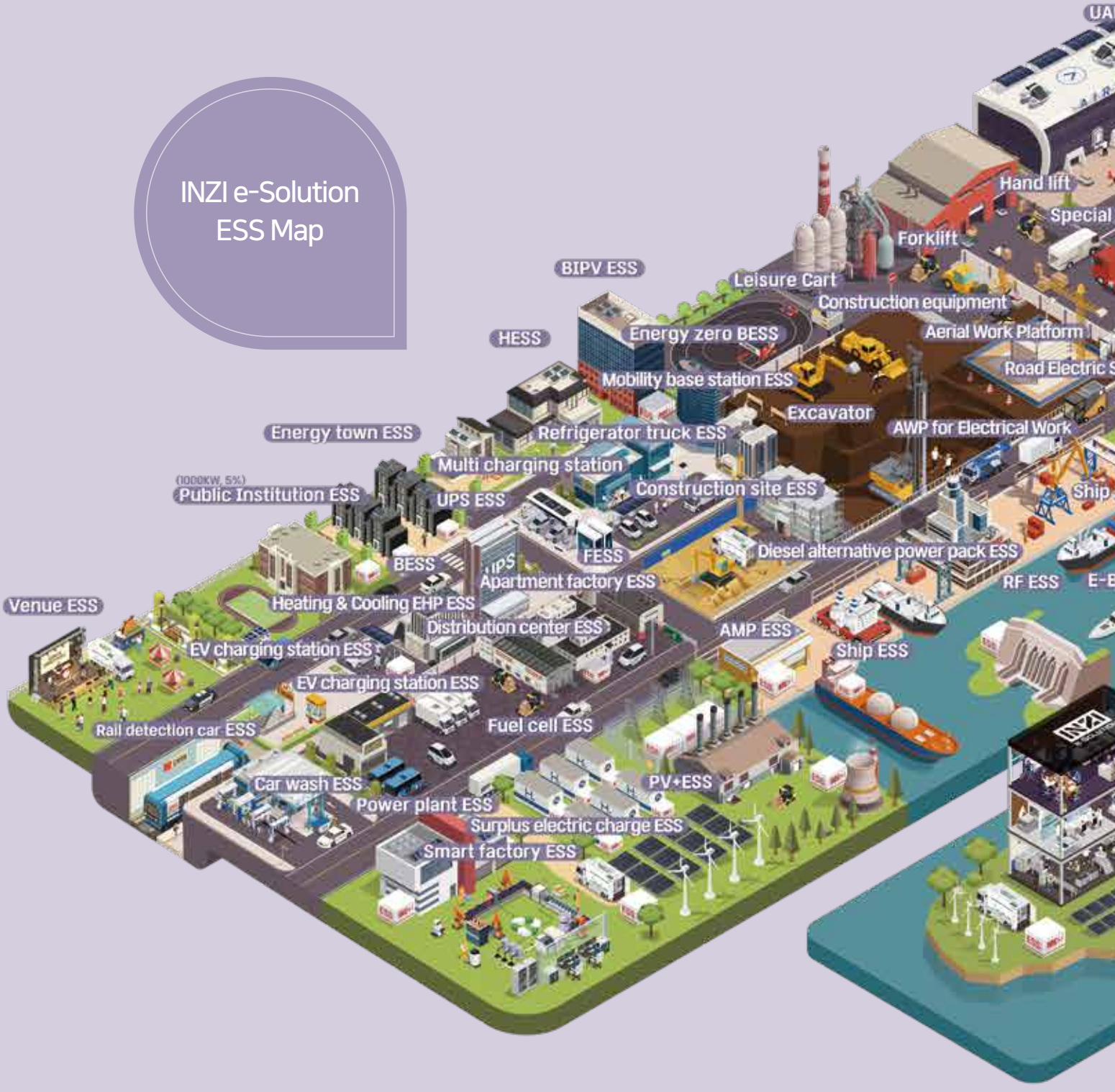
Reference | 8

Technology | 10

Product Line-up | 16

STARTING
MOTIVE POWER
INDUSTRIAL
ESS

INZI e-Solution
ESS Map



AI Lithium is the Answer !

Lithium is not an option, it is a must.

INZI e-Solution Mobility Map

INZI e-Solution Industrial Map

INZI e-Solution Introduction

INZI e-Solution

INZI e-Solution is high-safety lithium battery company based on AI and ICT. We are leading in the industry by developing and selling lithium battery of various industries such as Mobility, Industrial, ESS, etc. Based on advanced technology, we provide international standard-level quality and safety, including KC62619, BMS “functional safety” certification and NFT(P)C607, “Fire Safety” certification.

1st No.1 Domestic SMEs for Lithium Battery

The company achieved the No. 1 (LFP standard) in the industry by producing and selling lithium-ion battery needed for various industries such as golf carts, sweepers, FRTU, AGV, KTX, electric vehicles, forklift vehicles, and UPS and is recognized as a leading company in the industry with.

230MWh High cumulative Sales

Based on our differentiated technology, we have sold our products to many industries including starting, motive power, industrial and ESS. As a result, the company achieved 230MWh cumulative sales, making it the lead in the SME lithium battery industry.

13 years Rich experience in battery development

Through 13 years of research and development, manufacture and sales of battery system, we have rich experience and vast operational data that other companies do not possess.
This provides our customers with the most reliable, safe and optimized battery.

30 + Owns 30 + industry- leading BMS

We concentrate our energy on developing high performance BMS with the best engineers in BMS field. With 13 years of experience and extensive operational data, we have dozens of top- performing BMS that can be used immediately in various industries.

10% R&D investment of more than 10% of sales

We develop a differentiated lithium battery based on ICT & AI with the characteristic of high safety & lifespan by investing R&D cost of over 10% based on the annual sales. We participate in government R&D projects such as Ministry of SMEs and Startups, Ministry of Science and Technology, Ministry of Commerce, Industry and Energy. We also execute lithium battery development for major companies.

1st Introduction of the first defect prediction system based on ICT and AI in Korea

NZI e-Solution, which has been leading the development of "high safety lithium battery" with abundant experience and technology, introduced ICT remote monitoring system and AI analysis system for the first time in the domestic SME lithium battery industry.

INZI e-Solution History

2008 ~ 2014

· Establishment of "R", telecommunications company of Korea Power Cell Co., Ltd.
· Development of basic technology of lithium battery pack
· Development of lithium battery for electric motorcycle & electric controller
· Development of medium & large sized modularized lithium battery

2015 ~ 2018

· Establishment of new corporation of Korea Power Cell Co., Ltd.
· Relocation of factory (Scale of 3,305㎡ in Daejeon)
· ISO9001 Certification
· Establishment of corporate affiliate lab
· Certification of venture company
· Development of lithium battery for golf carts, advanced distribution management, cleaning machine, and AGV
· Lithium battery(LFP) for golf carts reached no.1 of market share
· Lithium battery certification for KTX

2019

· Received "New Growing Leading Company" Award of Daejeon
· Participation of R&D project of Ministry of Trade, Industry, and Energy (HESS development)
· Participation of R&D project of Ministry of SMEs and Startups (High safety lithium)
· Establishment of the 2nd Research Institute (Daejeon)
· Export of lithium battery ($200k)
· Construction of lithium battery remotely integrated control system
· Establishment of lithium battery defects projecting AI relative (wt KAIST)
· Development of multi BMS technology applying medium & large sized-lithium
· Participation in development of lithium battery for forklifts and excavators of Hyundai Engineering & Construction

2020

· "INNOBIZ" corporate certification
· "MAINBIZ" corporate certification
· "Star Corporation" 2020 of Daejeon
· Development of 1st solution of AI projecting defects of lithium battery
· Supply of OE of Hitachi golf cars(domestic)
· Development of Hitachi golf cars(Japan) for exports
· Development of lithium battery for monorail
· Development of lithium battery for road electric cleaning cars
· Lithium for road electric cleaning cars certified by "Korean Traffic Management Regulation"
· Development of ESS lithium battery for boring machine
· Development of Lithium battery for cable cars in Sacheon-si
· Commercialization of lithium battery for tower wagon rentals

2021

· Certification of lithium battery supplier for forklifts of Hyundai Engineering & Construction and mass production
· Certified performance of ISO16750 & ICE 6100 for forklifts
· Expansion of laboratory and production building
· Certification of "Promising Small Enterprise"
· Certification of "HR Developing Small Enterprise"
· Construction of 2nd improvements of lithium battery remotely integrated control system
· Participation in R&D project in the main region (Lithium battery for UPS)
· Participation in R&D of Ministry Science and Technology ICT (Advancement of remote-control system)
· Participation in lease-purchasing R&D of Ministry of SMEs and Startups (Lithium battery for KTX)
· Development of ESS lithium battery of H Heavy Industries Co., Ltd.
· Development of lithium battery for KIOSK at Incheon Airport
· Development of lithium battery for refrigerator trucks

2022

· 2026 Declaration of KPC Vision (No.1 in the industry · Revenue of $100m · Listed on the KOSDAQ)
· Obtained certification of industrial secondary battery safety KC62619
· Development of 50kWh of lithium battery for UPS
· Development of movable ESS lithium battery
· Development of household ESS lithium battery
· Ongoing 3rd improvement of lithium battery remotely integrated control system
· Participation in the Net Zero project (ESS development after usage)
· Development of lithium battery for smart pole
· Development of lithium battery for water sprinkler
· ISO14001 certification
· Establishment of Jeju branch
· Establishment of employee stock

2023

· Changed corporate name from Korea Power Cell Co., Ltd. → INZI e-Solution Co., Ltd.
· Raised $7.5m of investment
· Construction of new laboratory (496㎡)
· Certification of fire safety NFT(P)C 607
· Export company of Daejeon Award
· Top company of Daejeon Award
· 4IR Innovative Company Award
· Export of lithium battery for golf cars (to Japan)

INZI e-Solution Performance

“Record massive cumulative Sales - 230MWh”

Golf cart lithium battery

- Supplied 18,000 sets to 160 golf courses
- No. 1 market share
- Supplied for Yamaha Golf cart in OE ('15~'18)
- Supplied for KIOTI Golf cart in OE ('16~'17)
- Supplied for Hitachi Golf cart in OE ('20~)

AGV lithium battery

- Supplied 1,000 sets to a number of large companies including Hyundai Motor Company, Samsung Electronics, Samsung Semiconductor, SK Hynix, Hyundai Mipo Shipbuilding, GM Daewoo, CJ, Canon Korea, and Donghee Auto

Sweeper lithium battery

- No. 1 market share
- Exclusive supply contract with Cleantech Inc (No. 1 in the industry)
- Supplied 3,000 sets to major Sweeper companies

Forklift lithium battery

- Joint development with Korea Pallet Pool ('17)
- Participated in the development of lithium battery for Clark's forklift ('18)
- Participated in the development of Hyundai Construction Machinery’s forklift ('19~)
- Verified Supplier Confirmed for lithium battery of hyundai construction Machinery’s forklift ('20) & Started Mass Production ('21)

UPS lithium battery

- Supplied 1,000 sets to the Ministry of Defense
- Supplied to KEPCO substation delivery
- Supplied to general companies

BMS

- Supplied to KEPCO KDN
- Supplied to Seungil Electronics
- Supplied FRTU BMS to KEPCO
- Supplied DAS BMS to KEPCO
- Supplied BMS to HKT
- Supplied BMS 20,000 sets

"We are doing business with large, medium, and public companies such as Samsung Electronics, Hyundai Motor, Samsung Semiconductor, Hyundai Construction Machinery, KEPCO, Incheon International Airport, etc. and companies based on demand for technology."

ESS

- Supplied ESS for PV supply (11.2MWh)
- Supplied to the National Pension Service (BESS 24KWh)
- Supplied to KD Power delivery (240KWh)
- Supplied to Seoraksan National Park (45KWh)
- Development and supply of HESS

KTX lithium battery

- Exclusive development of lithium battery for KTX
- Supplied to Hyundai Rotem (Motrex)

KEPCO DAS lithium battery

- Exclusive development with KEPCO KDN
- Supplied 30,000 sets to KEPCO KDN
- No. 1 market share

Electric vehicle lithium battery

- Acquired safety certificate from the Road Traffic Safety Authority for electric vehicle's lithium battery ('20)
- Passed fall safety, submerged input, overcharge, over- discharge, short circuit, heat exposure, and combustion test
- Supplied batteries to Cleantech's road electric Sweeper

FRTU lithium battery

- First developer of FRTU lithium battery
- No. 1 market share
- Supplied to KEPCO HQ
- Supplied to KEPCO's 130 branches
- Supplied 20,000 sets

Other machinery's lithium battery

- Emergency rescue vehicles
- Incheon Airport ticketing device
- Sacheon Cable Vehicle
- Monorail
- Tunnel lighting
- Drilling machine
- Transpoter
- Smart Pole
- Mobile EV charger
- Sprinkler Truck
- E-Bicycle
- E-Kickboard
- E-Scooter
- etc

01 Technology – Li-ion Battery

Li-ion Battery

Battery with strengths of high energy density high efficiency charging/discharging, long battery life, light weight, small volume, and eco-friendly compared to NiCd, NiMH battery, which is the existing lead storage battery

Li-ion Battery Cell Type

[Prismatic Type]

[Can Type]

[Pouch Type]

Features of INZI e-Solution Cell

- Using long-life lithium-ion battery (LFP, Lithium iron phosphate battery)
- Lithium-ion battery with 1.5-2 times of life span of "NCM"
- Minimized possibility of fire with chemical safety of olivine structure
- LFP lithium-ion battery that works perfectly at wide range of temperature with its excellent thermal stability
- Contains end cell at the range of 1Ah-200Ah
- Applied for global Top 10 cell
- Possible to construct optimized capacity on various application

Manufacturer		Company A												Company B					Company C						
Model (Capacity)		20Ah	30Ah	40Ah	70Ah	50Ah	60Ah	80Ah	100Ah	113Ah	125Ah	150Ah	202Ah	50Ah	60Ah	80Ah	100Ah	113Ah	100Ah	125Ah	140Ah	150Ah	202Ah	240Ah	271Ah
Nominal Voltage [V]		3.2												3.2					3.2						
Dimensions	Length [mm]	72	126	126	126	126	126	142	365	365	365	365	365	130	135	135	135	135	160	200.33	200	200.33	173.6	173.9	173.6
	Width [mm]	42	46	46	46	65	65	57	63	73	73	73	73	36	27	27	34	34	49.91	33.4	46	33.4	53.7	71.5	57
	Height [mm]	152	190	190	204	190	243	493	312	312	312	312	312	162	206	206	214	214	119	172.2	173	207.2	207.3	207.3	207.3
Internal Resistance [mΩ]		≤1.6	≤0.8	≤0.8	≤0.8	≤0.7	≤0.6	≤0.6	≤0.5	≤0.5	≤0.5	≤0.5	≤0.5	≤0.7	≤2	0.7≤	≤0.7	≤2	≤0.28	≤0.36	≤0.6	≤0.34	≤0.16	≤0.45	≤0.14
Weight [kg]		0.7	1.4	1.4	1.8	2.0	2.8	5.7	10.6	13.2	13.2	13.2	13.2	1.31	1.42	1.64	2.04	2.14	1.95	2.43	3.05	2.95	4.12	5.2	5.47
Discharge	Discharge Current [A]	10	15	20	25	35	50	100	150	200	200	200	200	50	30	80	100	113	50	62.5	70	75	101	120	135.5
	Final Discharge Voltage [V]	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Charge	Charge Current [A]	5	7.5	10	12.5	17.5	25	50	75	100	100	100	100	25	30	40	50	57	20	25	28	30	40.4	48	54.2
	Final Charge Voltage [V]	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65
High-Speed Charge	Charge Current [A]	20	30	40	50	70	100	200	300	400	400	400	400	50	60	80	100	113	50	62.5	70	75	101	120	135.5
	Final Charge Voltage [V]	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65	3.65
Max. Continuous Discharge Current [A]		60	90	120	150	210	300	400	600	800	800	800	800	50	60	80	100	113	100	125	140	150	202	240	271
Max. Pulse Discharge Current (A for 10sec)		200	300	400	500	700	1,000	2,000	3,000	4,000	4,000	4,000	4,000	100	120	160	200	226	200	250	280	300	606	720	813
Self-Discharge		≤ 1% / month												≤ 1% / month					≤3.0% /month	≤3.5% /month	≤3.5% /month	≤3.5% /month	≤3.5% /month	≤3.5% /month	≤3.5% /month
Cycle Life (0.5C/DOD80%)		2,000 ~ 4,000 Cycles												2,000 ~ 4,000 Cycles					2,000 ~ 4,000 Cycles						
Usage Temperature		Charging : 0 ~ 65℃ Discharging : -20 ~ 65℃ Storage : -20 ~ 65℃												Charging : 0 ~ 45℃ Discharging : -20 ~ 55℃ Storage -20 ~ 45℃					Charging : 0 ~ 60℃ Discharging : -20 ~ 65℃ Storage -30 ~ 60℃						

*Contains various Lithium Cell other than the table above

INZI e-SOLUTION

Lithium-ion battery's features (compared to lead acid battery)

Lifespan
3~5 times longer lifespan than lead acid battery

Lead acid battery	Lithium battery
700Cycles (@DOD75%)	3,500Cycles (@DOD80%)

Volume
30% volume of lead acid battery

Lead acid battery	Lithium battery
100Wh/l	250Wh/l

Weight
30% weight of lead acid battery

Lead acid battery	Lithium battery
25~40Wh/kg	100~250Wh/kg

Output
3 times higher output than lead acid battery

Lead acid battery	Lithium battery
Firm 1C output Max 5C output	Firm 3C output Max 15C output

Chargespeed
Charges 5 times faster than lead acid battery (chargeable within 1 hour)

Lead acid battery	Lithium battery
Max charge 0.5C	Max charge 3C

Efficiency
40% reduction in electricity bills through high- efficiency charge and discharge

Lead acid battery	Lithium battery
80% charge efficiency	99% charge efficiency

Stability
High safety battery equivalent to lead acid battery

Lead acid battery	Lithium battery
High safety battery	High safety battery (limited to LFP lithium battery)

Four seasons use
Resistant to cold in winter and heat in summer

Lead acid battery	Lithium battery
-18°C ~ 50°C	-30°C ~ 60°C

Battery Management System(BMS)
Optimize battery performance and lifespan

Lead acid battery	Lithium battery
Manual	BMS

Self-discharge
Excellent long- term storage and capacity retention due to low self- discharge

Lead acid battery	Lithium battery
Less than 4% monthly average	Less than 1% monthly average

Low temperature performance
85% or more high capacity performance even in extreme winter

Lead acid battery	Lithium battery
- 18°C 50%~60% reduction in capacity	- 18°C 10%~15% reduction in capacity

Leakage
No leakage of electrolyte when battery is damaged during handling

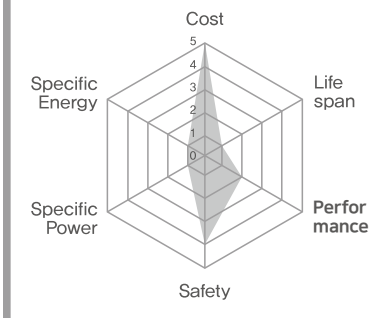
Lead acid battery	Lithium battery
Sulfuric acid leakage occurs when the battery is damaged (Flooded Type)	No leakage of electrolyte when battery is damaged (Sealed Type)

Comparison main performance by battery

LI-ION BATTERY

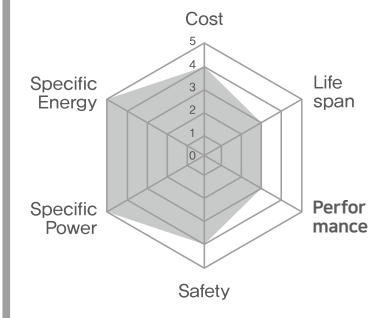
Battery with advantages such as high energy density, high efficiency charge and discharge, high stability, ultra- long lifespan, light weight, compact, and eco-friendliness compared to lead acid battery, NiCd battery, and NiMH battery

Lead acid battery



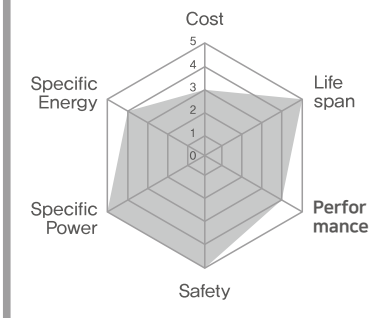
Cheap · Stability
Starter · Industry · Spare power

Lithium-ion battery (NCM)



High power · Compact
Light weight · Electric vehicle
Tool · Home appliances · Industry

Lithium-ion battery (LFP)

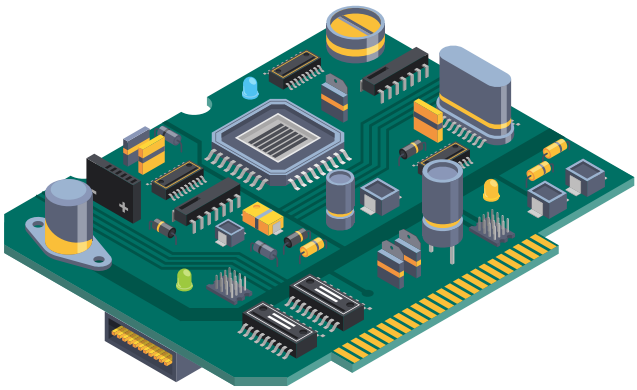


Long lifespan · Safety
Excellent low temperature performance
Drive · Industry · Energy storage

02
Technology
–
BMS
(Battery Management System)

BMS
(Battery Management System)

Completed the development of BMS applicable to various applications such as motive power, industry, communication, and ESS. Optimized product and the highest reliability with the vast application of operational data collected through 230MWh sales.



INZI e-Solution BMS's features

- Low heat generation
- Remote monitoring
- Diagnosis and remote control
- Cell balancing
- GUI Interface
- Data logging
- Tracking cause of defect and managing other history
- SOC, SOH, voltage, current, balancing, etc.
- Attached wired/wireless communication module (option)
- Battery protection (overcurrent cutoff, over discharge protection)
- Battery information black box attachment (SD storage device)
- Defect cause tracking and other history management

BMS type		V.105 rev5.0	V.106 rev5.0	V.105 rev7.0	V.108 rev8.0	V.108 rev10.0	V.131 rev1.3	V.131 rev1.6	V.131 rev2.2	V.131 rev3.0	V.132 rev1.0
Main function	Voltage	48~72V	12~36V	48~72V	12~36V	12~36V	12~36V	24V	24V	24V	24~36V
	Cell balancing	●	●	●	●	●	●	●	●	●	●
	Block charge	●	●	●	●	●	●	●	●	●	●
	Cut off discharge	●	●	●	●	●	●	●	●	●	(Alarm)
	Indicator – gauge			●	●	●			●	●	●
	Indicator – Volt meter								●	●	
	Current measurement			●	●	●	●	●	●	●	●
	TCP/IP – RS-232						●	●	●	●	●
	TCP/IP – RS-485							●			
	TCP/IP – CAN2.0A/B										
	Remote monitoring			●	●	●	●	●	●	●	●
	Wireless network										
Application Model		Golf cart	Samsung Hyundai AGV	Golf cart	Hyundai AGV	KEPCO FRTU	Samsung Hyundai AGV	KTX	KTX	KTX	Sweeper

INZI e-Solution BMS Development History

01 ~ V.100

2008
BMS Development
2010
Development completed

- Analog-based BMS
- 1st BMS applied model of golf carts for mass production
- Applied to various application including AGV, agricultural machines, etc

02 V.120 ~ V.151

2012
Start of development
2013
Development completed

- 8bit MCU-based BMS
- Applied model of golf carts for mass production that enable various communication
- Applied to various application including KEPCO FRTU, DAS terminal of Samsung AGV, cleaning cars, etc

03 V.300

2013
Start of development
2014
Development completed

- Optimized structure for constructing high voltage & modular pack with 8bit MCU-based modular BMS
- UPS applied

04 V.400

2014
Start of development
2016
Development completed

- Improved response rate and performance with MCU advancement of 32bit MCU-based BMS
- Optimized structure forconstructing high voltage & modular pack with modular BMS
- UPS, ESS applied

05 V.500

2020
Start of development
2021
Development completed

- 32bit MCU-based BMS
- Advancement of independent BMS
- Wire/wireless communicating module
- SD Memory storage
- AI Solution integration
- Electromagnetic wave shield
- Improved SOC storage feature (NVRAM, SRAM, EEPROM)
- Expanding CAN BUS, RS232, RS485, USB communication
- Prevention of BMS malfunction with the construction of HW WatchDog
- Expanding 2ch of current sensor and 3ch of relay control
- Improved data credibility insulated telecommunications (ISO Spi) of battery monitoring IC and MCU

06 V.600 (ESS Slave)

2021
Start of development
2022
Development completed

- 32bit MCU-based BMS
- Electromagnetic wave shield
- Improved SOC storage feature (SRAM, EEPROM
- Expanding CAN BUS, RS232, RS485, USB communication
- Prevention of BMS malfunction with the construction of HW WatchDog
- Expansion of 12ch of temperature sensor, 1ch of current sensor, FAN control 1ch
- Improved data credibility insulated telecommunications (ISO Spi) of battery monitoring IC and MCU
- Certification of KC62619 safet

07 V.031 (ESS Master)

2021
Start of development
2022
Development completed

- 32bit MCU-based BMS
- Wire/wireless communicating module
- SD Memory storage
- AI Solution integration
- Electromagnetic wave shield
- SOC 저장 기능 강화 (NVRAM, SRAM, EEPROM)
- Expanding CAN BUS, RS232, RS485, USB communication
- Prevention of BMS malfunction with the construction of HW WatchDog
- Expanding 2ch of current sensor and 4ch of relay control
- Measuring insulation resistance between +/- of battery
- Applied single-point failure preventing structure of safety function input and output

V.140 rev2.0	V.151 rev1.0	V.151 rev2.0	V.150 rev1.7	V.120 rev2.0	V.122 rev2.0	V.123 rev1.1	V.124 rev1.0	131 rev1.3	131 rev3.1	V.302			V520	V.530	V.630	
24V	24V	24V	24V	48 ~ 72V	48~72V	48~72V	48V	24~36V	24V	Master B	Slave B	Comm B	48~72V	24~36V	Master B	Slave B
●	●	●	●	●	●	●	●	●	●		●		●	●		●
●	●	●	●	●	●	●	●	●	●		●		●	●	●	
●	●	●	●	(Alarm)	●(Option)	●(Option)	●(Option)	●(Option)	●(Option)		●		●(Option)	●(Option)	●	
●	●	●	●								●		●	●		
				●	●	●	●	●	●				●	●		
●	●	●	●	●(Option)	●	●	●	●	●		●		●	●	●	
●	●	●	●	●	●	●	●	●	●		●		●	●	●	●
				●			●	●	●				●	●	●	●
					●	●							●	●	●	●
●	●	●	●	●	●	●	●	●	●		●		●	●	●	●
													●	●	●	
FRTU	For protection of KEPCO associated device	For protection of KEPCO associated device 2	Compact power equipment of KEPCO	Golf cart Forklift	Leisure cart (Monolith)	Hyundai Engineering & Construction Forklift Monorail	Samsung AGV	Sweeper Tower wagon	Samsung AGV	ESS/UPS			Golf cart Forklift AGV	AGV	ESS UPS Boring machine Transporter	

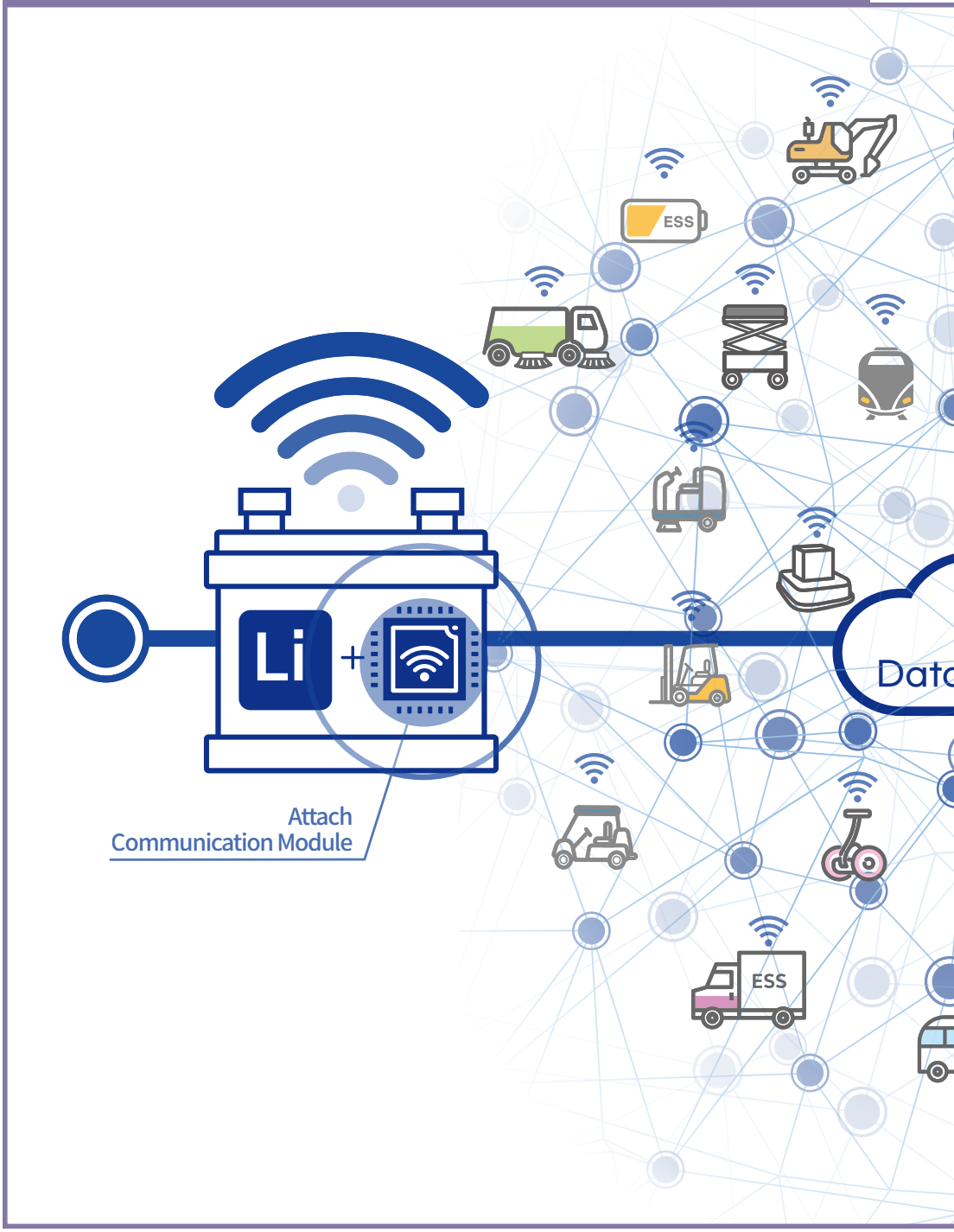
03 Technology

– Technology differentiation

First Mover

1. 1st company to launch a lithium-ion battery (LFP) in Korea ('10)
2. The company preparing an ICT- based lithium battery remote monitoring system
3. The company obtaining lithium battery real- time big data (Cloud System)
4. The company preparing lifespan and defect prediction systems through AI analysis

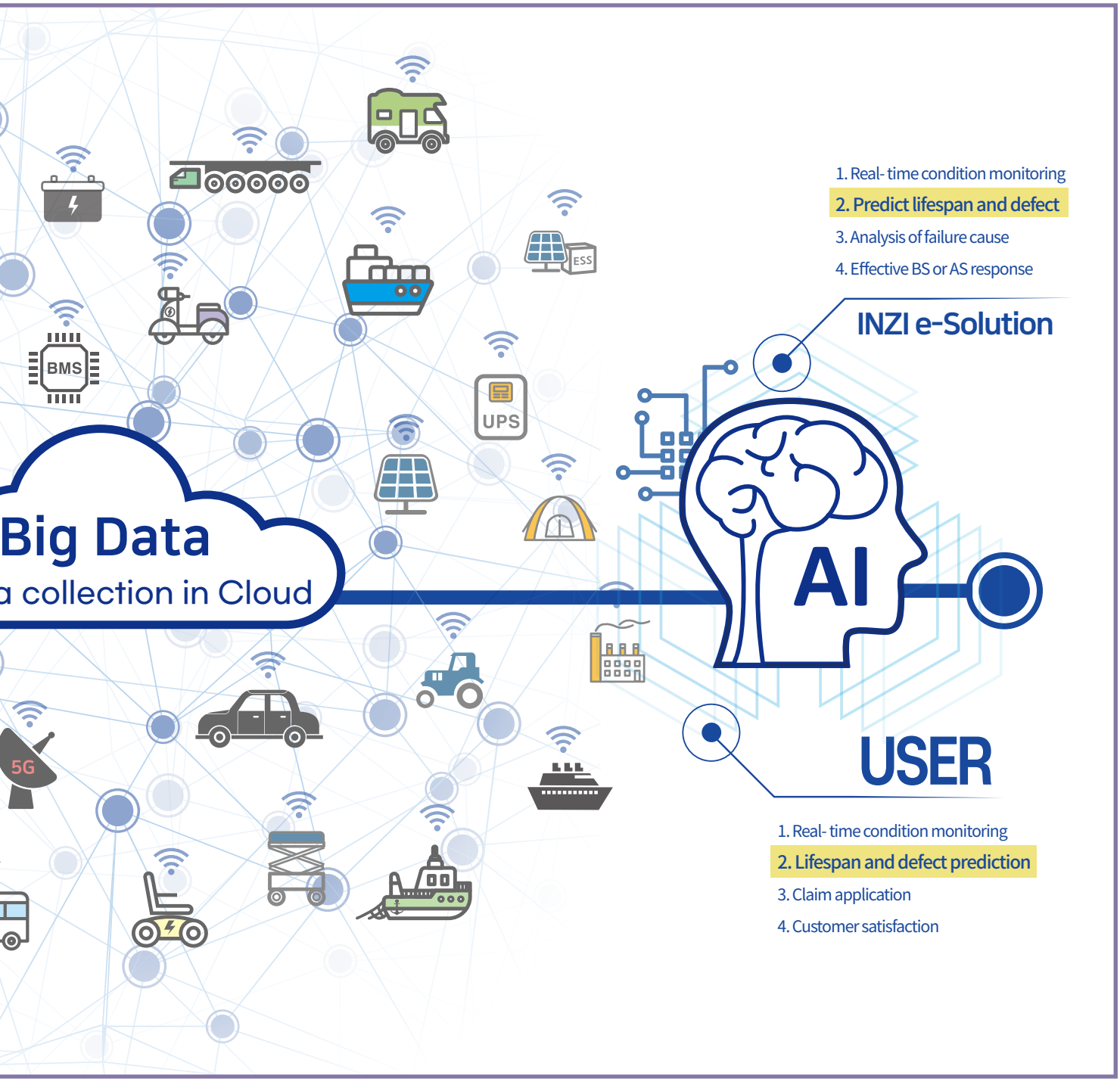
Remote monitoring control system + AI failure prediction



INZI e-SOLUTION

INZI e-Solution's technology differentiation

Existing battery	High safety lithium	Ultra-long lifespan Lithium	High Safety BMS	ICT&Big Data	AI analysis failure prediction
	Safest lithium-ion battery (LFP) structure (Olivine Structure) Explosion Hazard "Zero"	Long lifespan lithium-ion battery (LFP) that is more than twice as long as the existing lithium-ion battery (NCM)	Real- time active safety monitoring and BMS control	Real- time ICT remote monitoring and big data collection system using LoRa and WiFi wireless communication	Defect and accident prediction system through AI analysis (an affiliate with KAIST)



Starting Battery

Usage

- Vehicle
- Taxi
- Truck
- Bus
- Ship
- Motorcycle
- Camper
- Tractor
- Cultivator
- Other starter

INZI e-Solution Specialty

- Small size battery
- High stability
- High holding capacity
- Low self- discharge (≤1%/month)
- Ultra-long lifespan battery (3~4 times lead acid battery)
- Ultra-light battery (30% of lead acid battery)
- Excellent high rate discharge features(instant 5C, continuous 3C discharge possible)
- Battery for four seasons (low temperature resistance)
- Leak-proof battery (can be used in horizontal position)
- Excellent heat resistance properties
- Eco-friendly battery (non- toxic, no sulfuric acid, no heavy metals)
- No corrosion

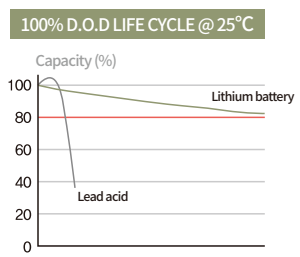
Specification

* Can produce in various specifications

Product Name		INZI-ST 1210	INZI-ST 1218	INZI-ST 1240	INZI-ST 1250	INZI-ST 1280	INZI-ST 12100	INZI-ST 12150	INZI-ST 12200
Nominal Voltage [V]		12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8
Nominal Capacity [Ah]		10	18	40	50	80	100	150	200
Nominal Energy [Wh]		132	238	528	660	1056	1320	1980	3640
Charging Voltage [V]		14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
Final Discharge Voltage [V]		9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Charging Current [A]		10	18	40	50	80	100	150	200
Peak Discharge Current [A]		10	18	40	50	80	100	150	200
Product Size [mm]	Width	181	166	256	197	260	323	532	532
	Length	76	175	173	165	170	175	205	269
	Height	167	125	220	169	220	235	220	220
Weight(kg)		2.2	3.2	7.8	6	12	15	19	25
Temperature Condition	Discharging	-20°C ~ 60°C							
	Charging	0°C ~ 55°C							
	Long-term storage	0°C ~ 35°C							
BMS		built-in							

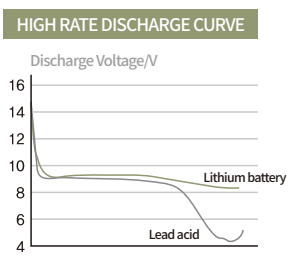
Extensive Cycle Life

More than 4X longer life than lead acid battery.



High-Rate Discharge

Maximum continuous discharge current up to 1 ~ 2C.



Motive Power Battery

Usage

- Golf cart
- Sweeper
- Road electric sweeper
- AGV
- E-Scooter
- E-Bike
- E-Wheelchair
- E-Boat
- Electric farm machinery
- Camper
- 2 wheel vehicle
- Forklift
- Aerial workbench
- Small tool
- Excavator

Features

- Ultra-long lifespan (3~4 times the lead acid battery)
- High safety (no explosion)
- Ultra-light battery (30% of lead acid battery)
- Ultra-small battery (40~60% of the volume of lead acid battery)
- Low self- discharge (≤1%/month)
- High charge/discharge efficiency (40% reduction in electricity bill)
- Excellent low temperature capacity performance
- Excellent high rate discharge (instant 5C, continuous 3C discharge possible)
- Leak-proof battery (can be used in horizontal position)
- Rapid charge battery (30- 50% of lead acid battery charge time)
- Eco-friendly battery (non- toxic, no sulfuric acid, no heavy metals)
- No need to refill distilled water
- No corrosion

INZI e-Solution Specialty

- Developed and supplied driving lithium battery(LFP) for the first time in Korea
- 13-year experience as of 2023
- Possession of massive operational big data accumulated over many years
- No. 1 in sales and market share in the same industry
- Companies with the largest number of models
- Excellent performance (compared to lead acid battery)

Golf cart

Features

- Long lifespan (3~4 times the lead acid battery)
- High safety (no explosion)
- High charge/discharge efficiency (40% reduction in electricity bill)
- Excellent low temperature feature (2nd round in winter)
- Quick charge possible
- Eco-friendly battery
- No need to refill distilled water (no corrosion)

INZI e-Solution Specialty

01 Developed and commercialized LFP Battery for golf cart for the first time in Korea ('10)
- 3 to 4 times the lifespan of a lead acid battery
- Reduce operating costs by about 40% compared to lead acid battery

02 Secured operating technology data of all golf carts with 13 years of experience
03 Possess the largest number of lithium batteries for golf carts (12 models)
04 Supply to Hitachi, a domestic golf cart handling company, in OE
05 Supplied 18,000 sets and No. 1 market share (as of 2023)

Specification

Model	Nominal Voltage	Capacity	Dimension [mm]			Wt
	[V]	[AH]	L	W	H	[kg]
INZI-GV4840	51.2	40	224	560	193	25
INZI-GV4870		70	289.6	580	197	37
INZI-GV48100		100	289.6	580	248	50
INZI-GV48113		113	720	200	250	45
INZI-GV48120		120	289	1080	193	65
INZI-GV48124		124	830	240	270	55
INZI-GV48160		160	640	290	280	69
INZI-GV7240	76.8	40	224	821	193	40
INZI-GV7270		70	224	1079	193	55
INZI-GV7280		80	730	225	200	48
INZI-GV72100		100	224	1079	248	60
INZI-GV72105		105	830	240	282	65
INZI-GV72113		113	750	240	280	72

*Can produce in various specifications

Aerial work platform

- Long lifespan
  (3~4 times the lead acid battery)
- Increased operating time
  (1~1.5 times the lead acid battery)
- High charge/discharge efficiency
  (40% reduction in electricity bill)
- No need to refill distilled water
  (no corrosion)
- Excellent low temperature features
  (good winter capacity)
- Eco-friendly battery
- High safety (no explosion)
- Cost reduction
  (reduced distilled water cost
  and corrosion prevention cost)

Features

INZI e-Solution Specialty

01 Developed lithium battery for aerial work platform ('15)
- Jointly developed with companies with the largest number of aerial work platforms in Korea ('15)
- Secured operating data and developed optimized BMS for aerial work platform

02 Powerful lifting ability
03 Enhanced communication function
04 Battery monitoring function
05 Sleep & Wakeup function

Specification

Model	Nominal Voltage	Capacity	Dimension [mm]			Wt
	[V]	[AH]	L	W	H	[kg]
INZI-AW24100-1	24	100	520	180	270.9	57.7
INZI-AW24120-2	24	120	360	260	277	50
INZI-AW48210	48	210	592	352	410	180

* Can produce in various specifications [Includes weight balance]

AGV

- Long lifespan
  (3~4 times the lead acid battery)
- Increased operating time
  (more than twice the lead acid battery)
- Lightweight & low volume battery
  (easy exchange)
- High charge/discharge efficiency
  (40% reduction in electricity bill)
- No need to refill distilled water
  (no corrosion)
- Eco-friendly battery
- High safety (no explosion)
- Quick charge (1C)
- Cost reduction
  (40% reduction compared to lead acid battery)

Features

INZI e-Solution Specialty

01 Developed various product lines and dedicated BMS
in cooperation with a number of large customer companies
- Provide customized design and technical support service
according to AGV specification

02 Important supply details
(recognized as a company with excellent technology)
- Hyundai Motor Company (Brazil factory, Turkey factory,
Beijing factory), Hyundai Heavy Industries, Hyundai Mipo
Shipbuilding, POSCO, GM Daewoo (Gunsan), Maru (Japan),
Donghee Auto, Samsung Electronics (Onyang, Pyeongtaek), etc.

Specification

Model		INZI-AGV24	INZI-AGV36	INZI-AGV48
Capacity		50 ~ 100AH	50 ~ 100AH	50 ~ 100AH
Nominal Voltage		25.6V (3.2VX8)	38.4V (3.2VX12)	51.2V (3.2VX16)
Charge current [A]		Max. 1C	Max. 1C	Max. 1C
Charge voltage [V]		28.4V (3.55VX8)	42.6V (3.55VX12)	56.8V (3.55VX16)
Charging method		CC→CV	CC→CV	CC→CV
Maximum discharge current		3C	3C	3C
Discharge end voltage [V]		22.4V (2.8VX8)	33.6V (2.8VX12)	44.8V (2.8VX16)
Communication		RS-232, RS-485	RS-232, RS-485	RS-232, RS-485
Temperature condition	At discharge	-25 ~ 65°C	-25 ~ 65°C	-25 ~ 65°C
	At charge	0 ~ 45°C	0 ~ 45°C	0 ~ 45°C
	During long- term storage	0 ~ 45°C	0 ~ 45°C	0 ~ 45°C

* Can produce in various specifications

E-Mobility

Features

- E-Scooter
- E-Quick board
- E-Motorcycle
- E-Boat
- E-Bicycle
- E-Surfboard

INZI e-Solution Specialty

01 Excellent Safety & Long Life
02 Protection through Battery Management System (BMS)
- Limited to Hard Packaing Products
- In case of Soft Packaging Products, PCM is applied
03 Wide Range of Voltage (24~72V)
04 Possesses a Wide Range of Products with Different Capacities (by Voltage Range)
05 Eco-friendly battery
06 Excellent Low Temperature characteristics (Good Winter Capacity)
07 High safety(Explosion“zero”)
08 E-Scooter Lithium Battery pack :
KSR 6100 standard-based lithium battery pack (‘2024)

Specification

Model	INZI-BIC4816	INZI-BIC4820	INZI-BIC4824	INZI-BIC4828	INZI-MOT7220	INZI-MOT7230	E-Scooter KSR 6100 standard-based lithium battery pack	
Nominal Voltage	48V				72V		48V	72V
Voltage Range	38.0V ~ 56.2V				57.0V ~ 84.4V		39.2 ~ 58.1V	56 ~ 83V
Nominal Capacity	16Ah	20Ah	24Ah	28Ah	20Ah	30Ah	30Ah	20Ah
Dimension (mm)	183*156*159	250*180*125	250*180*125	184*156*265	200*170*280	200*360*170	170*135*310	170*135*310
Weight	5.6kg	7.6kg	7.6kg	8.6kg	14kg	20kg	12kg	12kg

*Can produce in various specifications

Sweeper

Features

- Long lifespan
  (3~4 times the lead acid battery)
- Increased operating time
  (more than twice the lead acid battery)
- Lightweight & low volume battery
  (easy exchange)
- High charge/discharge efficiency
  (40% reduction in electricity bill)
- No need to refill distilled water
  (no corrosion)

INZI e-Solution Specialty

01 Developed and commercialized lithium battery (LFP) for electric sweeper ('16)
- Applied proven lithium iron phosphate battery technology for golf cart
- Developed lithium battery (LFP) for sweeper with various specification (24V, 36V, 48V, etc.)

02 Business alliance with Cleantech, Korea's No. 1 Electric sweeper manufacturer
- OE supply in progress
- Distributor contract for electric sweeper

Specification

Model	Nominal Voltage	Capacity	Dimension [mm]			Wt
	[V]	[AH]	L	W	H	[kg]
INZI-FM24100	25.6V	100	265	323	248	26
INZI-FM24113		113	290	212	252	20
INZI-FM24120		120	265	694.2	197.5	37
INZI-FM24140		140	265	694.2	197.5	37
INZI-FM24200		200	265	694.2	248	52
INZI-FM36100	38.4V	100	224	566.6	248	39
INZI-FM36113		113	293	240	279	30
INZI-FM36120		120	448	566.6	193.3	55
INZI-FM36140		140	448	566.6	193.3	55
INZI-FM36200		200	448	566.6	248	72

*Can produce in various specifications

Road electric sweeper

Features

- Long lifespan
  (3~4 times the lead acid battery)
- Increased operating time
  (1~1.5 times the lead acid battery)
- High charge/discharge efficiency
  (40% reduction in electricity bill)
- No need to refill distilled water
  (no corrosion)
- Excellent low temperature features
  (good winter capacity)
- Eco-friendly battery
- High safety (no explosion)
- Reduction of carbon and noise

INZI e-Solution Specialty

01 Developed lithium battery for electric road sweeper ('19)
- Developed and applied BMS exclusively for electric road sweeper

02 Passed the safety evaluation of lithium battery for road driving
- Performance and Standards of Vehicle Parts under Regulation Article 18.3 and Safety Test No. 48 of the Enforcement Rules [Appendix 1]

Item	Test result
Drop Safety Test	Pass
Submerged Safety Test	Pass
Overcharge Safety Test	Pass
Over discharge Safety Test	Pass
Short Circuit Safety Test	Pass
Heat Exposure Safety Test	Pass
Combustion Safety Test	Pass

Specification

Model	INZI- FM481000
Battery Type	LiFePo4
Nominal voltage	48V
Battery capacity	1,000 Ah
Operating voltage	39.8V ~ 54.8V
Charge current	250A
Maximum continuous discharge current	250A
Maximum discharge current	500A
Charge current	250A
Service lifespan	≤3,000 Cycles @ 80%DoD
Operating temperature	-20°C ~ 65°C
Battery size	951 mm x 827 mm x 627 mm
Battery weight	430 kg
Battery output (continuous)	12 kw
Battery output (maximum)	24 kw

* Can produce in various specifications

Forklift

Features

01 Cost Reduction
- Decreased fuel fee by 80-90% compared to diesel electrical forklift
- Decreased electric rates by 40-50% compared to lead battery electrical forklift
- Decreased fuel fee by 80-90% compared to diesel electrical excavator

02 Increased Usage Time
- Increased up to 1.5 times with high energy density

03 Long lifespan (3-4 times of lead battery)
04 Distilled water not required (No corrosion)
05 Eco-friendly battery
06 Excellent low temperature features (Moderate capacity in winter)
07 High safety (No explosion)

INZI e-Solution Specialty

01 Development of lithium battery for forklifts ('16)
02 Supplied lithium battery for forklifts and excavators of Hyundai Engineering & Construction Co., Ltd. ('21)
03 Development of Smart BMS System for forklifts and excavators
04 Passed assessment of performance and safety for forklifts
05 Differentiation
- Improved stabilization of output with double-parallel structure
- Master-Slave auto-transferable Smart BMS
- Improved battery stabilization with HCE-T200 structure
- Battery data monitoring & storage feature
- CAN2.0 communication
- Secured 10G of vibration & shock resistant feature

06 Development background
- Regulations of greenhouse gas, energy efficiency, harmful material and etc.
- Growth in e-commerce, increase in hub support warehouses and fulfilments
- Increased eco-friendly work environment with a strict restriction of exhaust and noise
- Increased demand in remodeling of small interior
- Increased remote-control excavator considering safety of drivers
- Increased demand in excavators for small tool carrier

Specification

Model	Nominal Voltage	Capacity	Dimensions [mm]			Weight
	[V]	[AH]	L	W	H	[kg]
INZI-FL48300	51.2	300	994	378	582	560
INZI-FL48500	51.2	500	984	446	750	1000
INZI-FL48600	51.2	600	984	536	750	1150
INZI-FL48900	51.2	900	1066	990	537	1320

*Can produce in various specifications

Excavator

Features

01 Cost Reduction
- Decreased fuel fee by 80-90% compared to diesel electrical forklift
- Decreased electric rates by 40-50% compared to lead battery electrical forklift
- Decreased fuel fee by 80-90% compared to diesel electrical excavator

02 Increased Usage Time
- Increased up to 1.5 times with high energy density

03 Long lifespan (3-4 times of lead battery)
04 Distilled water not required (No corrosion)
05 Eco-friendly battery
06 Excellent low temperature features (Moderate capacity in winter)
07 High safety (No explosion)

INZI e-Solution Specialty

01 Supplied lithium battery for Excavators of Hyundai Engineering & Construction Co., Ltd. ('21)
02 Development of Smart BMS System for forklifts and excavators
03 Passed assessment of performance and safety for forklifts
04 Differentiation
- Improved stabilization of output with double-parallel structure
- Master-Slave auto-transferable Smart BMS
- Improved battery stabilization with HCE-T200 structure
- Battery data monitoring & storage feature
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- Increased eco-friendly work environment with a strict restriction of exhaust and noise
- Increased demand in remodeling of small interior
- Increased remote-control excavator considering safety of drivers
- Increased demand in excavators for small tool carrier

Specification

Model	Nominal Voltage	Capacity	Dimensions [mm]			Weight
	[V]	[AH]	L	W	H	[kg]
INZI-EX72200	76.8	200	575	380	456	120

*Can produce in various specifications

Eco-Friendly Vessel

- Long lifespan battery
- High safety (No explosion)
- Eco-friendly battery(carbon reducing)
- Self-generating power
- Excellent electricity stability
- Excellent low temperature feature (Moderate capacity in winter)

Features

INZI e-Solution Specialty

01 Supply power when snowplow car is operating
02 Excellent carbon reduction effects through diesel to electricity
03 Protection feature by BMS
04 Vibration-resistant design structure of international standard-based
05 KR classification of ships design applied

Specification

Model		INZI-VS358210D-6-001
Capacity		210 Ah
Nominal Voltage		358.4 V (3.2 V x 112)
Charge current [A]		Max 1C
Charge voltage [V]		387.5 V
Charging Temp		20℃ ~ 30℃
Charging time		0.2C / 6~7 hour
Charging method		CC / CV
Maximum discharge current		210 A
		420 A
Discharge end voltage [V]		336 V
Internal resistance		≤ 100 mΩ
Temperaturecondition	At discharge	-20℃ ~ 55℃
	At charge	0℃ ~ 55℃
	During long- term storage	one month : 0℃ ~ 50℃ / six month : 0℃ ~ 45℃
Humidity		< 70%
Weight		Approx 815 ± 20 (kg)
IPGRADE		IP55
Dimensions		1170 mm x 1432 mm x 516 mm

*Can produce in various specifications

Special vehicel

Features

- Carbon-free lithium battery for automation of internal combustion engine
- Lithium Battery for the Motorization of Diesel Engines
- Eco-Friendly Product that can Replace Diesel Fuel
- Reduction of Greenhouse (Carbon) Gas, Fine Particles, and Noise
- 80~90% Reduction in Fuel Cost (After Electrification)
- Extended Life (2,000~3,000 Cycles)
- High safety (No explosion)
- Excellent low temperature features (Moderate capacity in winter)

INZI e-Solution Specialty

01 Development of a Lithium Battery for Electrification Motorization of Transporters ('21)
02 Development of a Lithium Battery for Electrification Motorization of 5t Trucks ('21)
03 Development of a Multi BMS System for Carbon-Reduction Lithium Batteries
04 Differentation & Strengths
- Diesel Engine → Lithium Battery + Motor + Inverter
- Enhanced the Stability of the Output with a 4-Parallel Structure
- Secured a High Level of Safety by Applying a 3-Phase Safety Device
- IP67 Grade Applied
- Battery Data Monitoring & Storage Function
- CAN2.0 Communication Applied

Specification

Model	INZI-TP576400	INZI-TP576226
Battery Type	LiFePO4	LiFePO4
Voltage	576V	576V
Battery Capacity	400Ah	226Ah
Specification (Module)	570 mm x 358 mm x 270 mm	570 mm x 358 mm x 270 mm
Weight (Module)	65kg	65kg
Module quantity	32ea	16ea

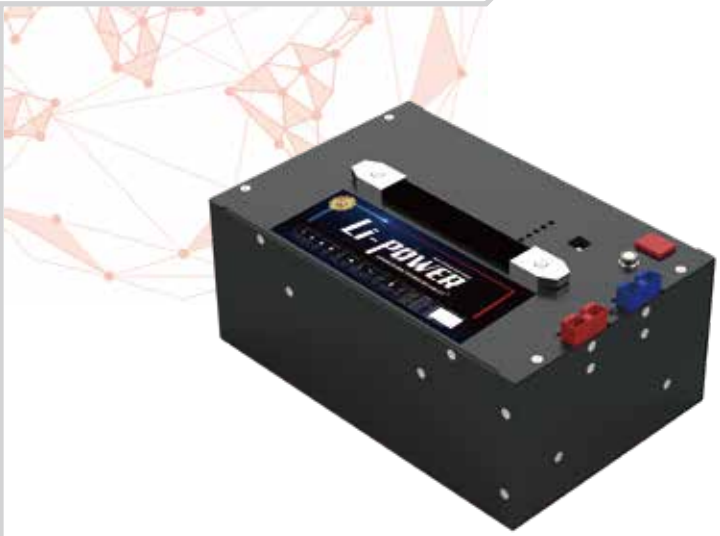
*Can produce in various specifications

Industrial Battery

Usage

- Power plants
- UPS
- Telecommunication
- Railroad
- Data center
- Medical devices
- Electrical panel
- Generator
- Fire extinguishing and disaster prevention system
- FRTU
- Security & fire alarm systems
- Various mechanical equipment and spare power

Smart Pole



Features

- Long lifespan battery
  (3~4 times of lead-acid battery)
- Excellent low temperature feature
- High safety (No explosion)
- Eco-friendly battery(carbon reducing)
- Energy reducing

INZI e-Solution Specialty

01 Stand-alone type
- Used as a CCTV and light in national park.
  It is using electricity stored through renewable energy,
  such as wind power, solar power and etc.

02 System-linked type
- For supplying electricity in case of an emergency such as a power outage

03 Low Temperature Performance Enhancement
- Ensure reliable performance by applying the heating system,
  even in extreme environments (mountain terrain, winter, etc.)

04 Verified BMS for smart pole

Specification

Model	INZI-SP2440
Battery Content	8S 7P
Rated Power	40 Ah
Rated Voltage	25.6 V
Voltage Range	24 ~ 28 V
Rated Power Amount	1 kWh
Max. Charging Current	10 A
Max. Discharge Current	20 A
PEAK Current	30 A
Discharge Temp	-20℃ ~ 65℃
Charging Temp	0℃ ~ 45℃
Module Dimensions	320 mm x 211 mm x 145 mm
Module Weight	13 kg

*Can produce in various specifications

Refrigerator Truck

- Long lifespan battery
- High safety (No explosion)
- Eco-friendly battery(carbon reducing)
- Energy reducing
- Excellent electricity stability
- Low noise, vibration-free

Features

INZI e-Solution Specialty

01 Excellent carbon reduction effects through diesel to electricity
-Decreased fuel by 90% compared to diesel
02 Independently operable(even when the motor is off)
by supplying electricity to the refrigerator
03 Protection feature by BMS
04 Battery monitoring available
05 Chargeable at charging station
06 Maintains static freezing temperature regardless of output

Specification

Model	INZI-SV33648
Battery Content	112S 2P
Rated Power	48 Ah
Rated Voltage	358.4 V
Voltage Range	336 V ~ 392 V
Rated Power Amount	17.2 kWh
Max. Charging Current	20 A
Max. Discharge Current	10 A
PEAK Current	20 A
Discharge Temp	-20℃ ~ 65℃
Charging Temp	0℃ ~ 45℃
Module Dimensions	1320 mm x 210 mm x 678 mm
Module Weight	130 kg

*Can produce in various specifications

Dust Removal Truck

Features

- Long lifespan battery
- High safety (No explosion)
- Eco-friendly battery(carbon reducing)
- Self-generating power
- Excellent electricity stability
- Excellent low temperature feature (Moderate capacity in winter)

INZI e-Solution Specialty

01 Supply power when Dust Removal truck is operating
02 Excellent carbon reduction effects through diesel to electricity
03 Protection feature by BMS
04 Vibration-resistant design structure of international standard-based

Specification

Model	INZI-SV207
Battery Content	108S 1P
Rated Power	60 Ah
Rated Voltage	345.6 V
Voltage Range	303.48 V ~ 372.6 V
Rated Power Amount	20.7 kWh
Max. Charging Current	60 A
Max. Discharge Current	60 A
PEAK Current	60 A
Discharge Temp	-20℃ ~ 65℃
Charging Temp	0℃ ~ 55℃
Dimensions	534 mm x 815.7 mm x 532 mm
Weight	270 kg

* Can produce in various specifications

Sprinkler Truck

Features

- Long lifespan battery
- High safety (No explosion)
- Eco-friendly battery(carbon reducing)
- Self-generating power
- Excellent electricity stability
- Excellent low temperature feature (Moderate capacity in winter)

INZI e-Solution Specialty

01 Supply power when snowplow car is operating
02 Excellent carbon reduction effects through diesel to electricity
03 Protection feature by BMS
04 Vibration-resistant design structure of international standard-based

Specification

Model	INZI-SV415
Battery Content	108S 2P
Rated Power	60 Ah
Rated Voltage	345.6 V
Voltage Range	303.48 V ~ 372.6 V
Rated Power Amount	41.5 kWh
Max. Charging Current	60 A
Max. Discharge Current	120 A
PEAK Current	120 A
Discharge Temp	-20℃ ~ 65℃
Charging Temp	0℃ ~ 55℃
Dimensions	1149 mm x 815.7 mm x 532 mm
Weight	540 kg

* Can produce in various specifications

AWP for Electrical Work

- Long lifespan battery
- High safety (No explosion)
- Eco-friendly battery(carbon reducing)
- Self-generating power
- Low noise, vibration-free
- Excellent low temperature feature (Moderate capacity in winter)

Features

INZI e-Solution Specialty

01 Supply power when AWP for Electrical Work is operating
02 Excellent carbon reduction effects through diesel to electricity
03 Protection feature by BMS
04 Vibration-resistant design structure of international standard-based

Specification

Model	INZI-SV48500
Battery Content	16S 5P
Rated Power	500 Ah
Rated Voltage	51.2 V
Voltage Range	48 V ~ 56 V
Rated Power Amount	25.6 kWh
Max. Charging Current	200 A
Max. Discharge Current	200 A
PEAK Current	900 A (10sec)
Discharge Temp	-20℃ ~ 50℃
Charging Temp	0℃ ~ 50℃
Dimensions	984 mm x 466 mm x 750 mm
Weight	1005 kg

*Can produce in various specifications

Snowplow Car

Features

- Long lifespan battery
- High safety (No explosion)
- Eco-friendly battery(carbon reducing)
- Excellent electricity stability
- Excellent low temperature feature (Moderate capacity in winter)

INZI e-Solution Specialty

01 Supply power when snowplow car is operating
02 Excellent carbon reduction effects through diesel to electricity
03 Protection feature by BMS
04 Vibration-resistant design structure of international standard-based

Specification

Model	INZI-SV48300
Battery Content	16S 3P
Rated Power	300 Ah
Rated Voltage	51.2 V
Voltage Range	48 V ~ 56 V
Rated Power Amount	15.3 kWh
Max. Charging Current	100 A
Max. Charging Current	200 A
PEAK Current	200 A
IPGRADE	IP67
Discharge Temp	-20℃ ~ 65℃
Charging Temp	0℃ ~ 45℃
Dimensions	927 mm x 378 mm x 560 mm
Weight	488 kg

*Can produce in various specifications

UPS & Stand by

INZI e-Solution Specialty

01 High power
- Excellent response to instant power output with 3 times higher output than lead acid battery

02 Long lifespan
- 3~5 times (15 years or more) compared to lead acid battery lifespan (3~7 years)

03 Ultra-light weight / low volume
- Installation space is 20% of lead acid battery
- Reduction of building cost, load reinforcement cost, construction cost, space management service cost, heating and cooling cost, rental cost (when renting)

04 Remote meter reading management possible through ICT Cloud

Features

- Ultra-long lifespan (3~5 times the lead acid battery)
- Ultra-light/low volume
- Low self-discharge (≤1%/month)
- High power (more than 3 times of lead acid battery)
- Wide operating temperature
- Leak-proof battery (can be used in horizontal position)
- Eco-friendly battery (non- toxic, no sulfuric acid, no heavy metals)
- No corrosion
- High safety (no explosion)

Output		Lifespan		Installation space		Management	
Lead acid battery	Li-ion battery	Lead acid battery	Li-ion battery	Lead acid battery	Li-ion battery	Lead acid battery	Li-ion battery
							

UPS & Stand by

UPS RACK System

[Li Module for UPS]

[Li Rack System for UPS]

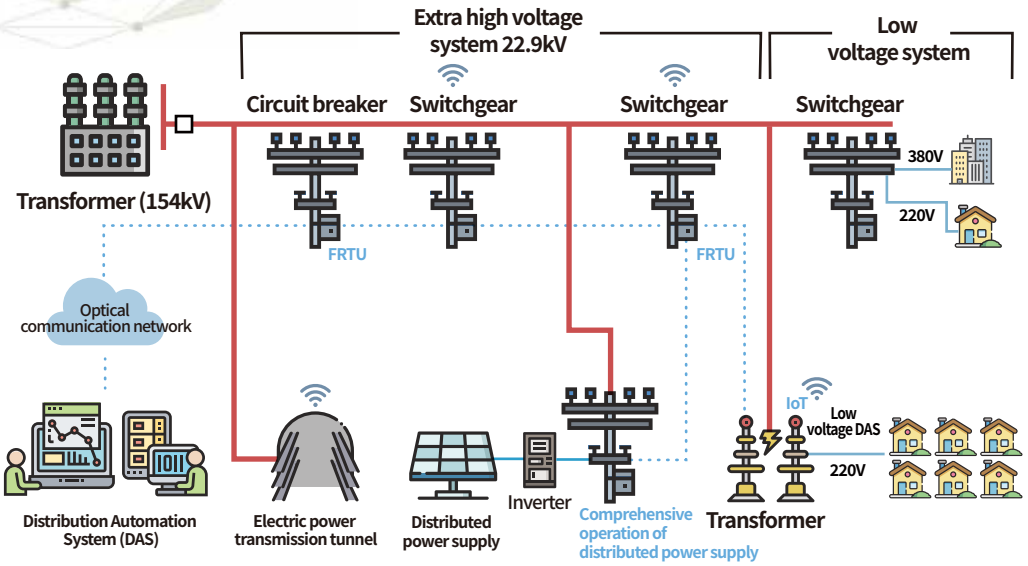
Specification

BPU			Module	UPS		
Appearance		Appearance				
Model	B605A	Model	M605A	ESS484A	ESS058D	ESS215E
		Nominal Voltage [V]	57.6	460.8	115.2	358.4
Size (W*D*H) [mm]	741.4*570*330	Operating Voltage [V]	50.6~62.3	404.6 ~ 498.2	108~127	336~392
		Total Energy [kWh]	6.05	48.4	5.76	21.5
Weight [kg]	About 32	Usable Energy [kWh]	5.44	43.5	5.18	19.35
		Capacity [Ah]	105	105	50	60
Configuration	OV / OC / OT / Short circuit Protection circuit breaker, power switch, status display LED, CAN 2.0A, TCP/IP	Size (W*D*H) [mm]	366.8*570*231.6	852.4*650*1546.1	800*450*1000	1000*600*2000
		Weight [kg]	About 50	About 555	About 220	About 530

* Can produce in various specifications

FRTU battery

KEPCO FRTU system configuration diagram



Installing lithium-ion batteries for terminals for obtaining and controlling information such as current, voltage, and fault detection for all sections from high voltage to low voltage during the power distribution process of generated electricity

FRTU for high voltage


Underground type


Door type


Processing type


Integrated type

FRTU for low voltage


Low voltage FRTU


Compact type

FRTU battery

Product features

01

Developed "first" lithium-ion battery for FRTU
- Participated in the demonstration project of lithium-ion battery for FRTU
- Participated in the purchase standard of KEPCO for FRTU
- Battery safety test certified company for FRTU
- Conduct lithium-ion battery tests with a number of switchgear companies

02

Specialized lithium-ion battery for FRTU
- FRTU Peak Current response 6C
- Over 70 open/close operation possible
- Abnormality detection (current, voltage, temperature, BMS power, converter, etc.)
- EMC Pass (IEC 61000- 4- 5)
- Remote monitoring technology applied

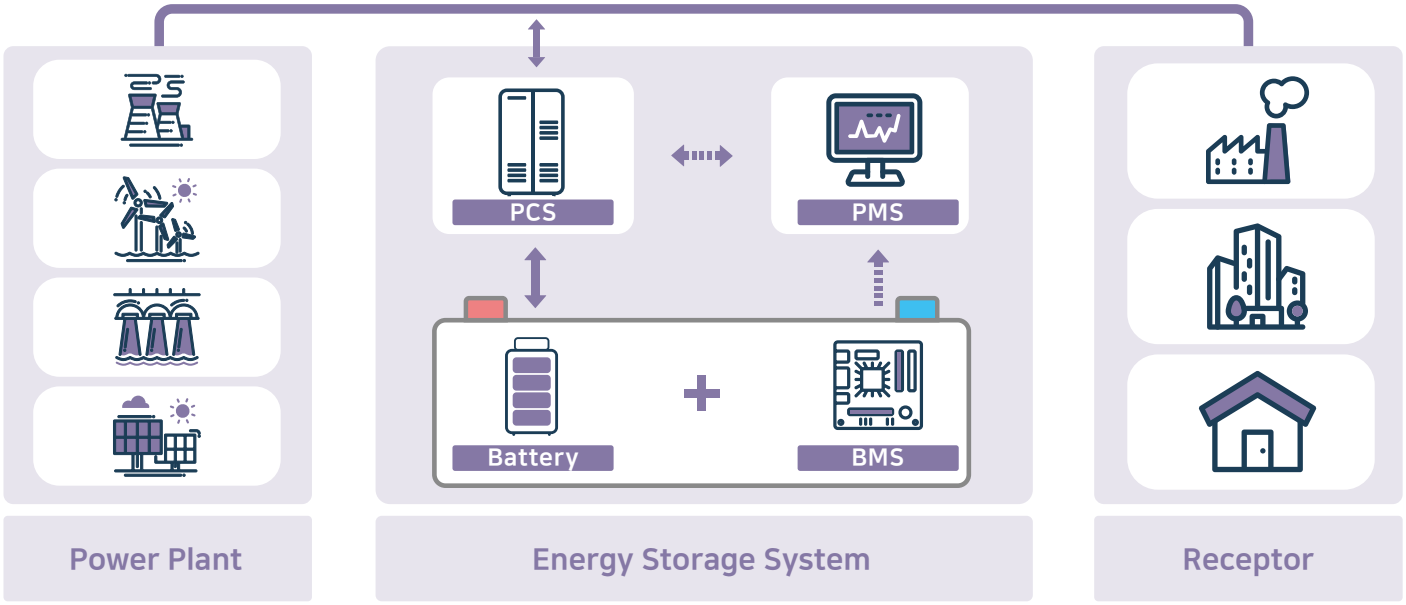
Model	FRTU		Low Voltage DAS	
	INZI-FRTU2410	INZI-FRTU2420	INZI-FRTU2405	INZI-FRTU-405C
Use	High Voltage FRTU		Low Voltage FRTU	Low Voltage FRTU - Compact
Voltage	3.2 X 8ea	3.2 X 8ea	3.2 X 8ea	3.2 X 8ea
Capacity	10Ah	20Ah	5Ah	5Ah
Charging Current	Max. 5A	Max. 10A	Max. 5A	Max. 3A
Peak Discharge Current	6C (more than 1 sec)	6C (more than 1 sec)	6C (more than 1 sec)	6C (more than 1 sec)
Weight	2.84kg	6.50kg	1.5kg	1.5kg
Size [mm]	180x77x166.5	180x154x166.5	150x140x45	150x140x35
Delivery Place	KEPCO	KEPCO	KEPCO KDN	KEPCO KDN
Image				

ESS
Energy Storage System

What is ESS [Energy Storage System]?

ESS(Energy Storage System) is a system that supplies electrical energy effectively to various fields after storing general output. ESS is normally used to provide
①safety of electrical grid
②utilization of power through the integration of new renewable energy
③cost reduction through electric power demand management(DR) and peak management and
④emergency power source service.

Concept of ESS



Composition of ESS

Battery

- Lithium battery for power storage (NCM, LFP, etc)
- Lithium battery for power storage (NCM, LFP, etc)
  - Battery storage after converting AC→DC
  - Power supply to system and demand device after converting DC→AC

BMS (Battery Management System)

- Stabilization through cell balancing
- Condition inspection of cell & module unit
- Share of PMS of inspection data
- Safety management by BPU control at emergency

PMS (Power Management System)

- Integrated monitoring/control system for stable operation and function of ESS system

PCS (Power Conditioning System)

- Device that converts power from AC ↔ DC when in/output of power between the batteries with different system of battery structure
- Control of power quality

ESS

Advantages of INZI e-Solution ESS

"Long lifespan, fire-free, vibration resistant, shock resistant, corrosion resistant, forced air cooling, electric shock prevention, short circuit prevention, real-time AI diagnosis"

ESS has been used in various environments that require high depth of charging/discharging, low power, and high power. The usage has been expanded recently to harsh environments such as vibration, shock, seawater, sea breeze, etc. INZI e-Solution ESS applies Lithium-Iron Phosphate battery cell for safe and stable usage and provides superior ESS technology that is incomparable by enhancing vibration resistant, shock resistant, corrosion resistant features when structuring Cell·Module·Rack.

Fire-Free

· Applied LFP Cell with excellent fire safety

Long Lifespan

· Long lifespan of 1.2-2 times compared to NCM with excellent chemical safety of LFP battery with olivine structure

Improved safety sensor (Temperature sensor)

· Sensing Cell temperature
· Improved safety by blocking ESS system if receives overheating signal

Auto Air Cooling System

· Improved performance by controlling cell temperature
· Improved safety with auto forced air cooling system

Safety with electric shock prevention & external short circuit

· Real-Time Monitoring
· Double-blocking structure

Real-time AI analysis of condition

· Analyzing real-time condition of battery
· Projecting remaining lifetime & defects by AI analysis of collected data (Option)

High-powered Li-Cell based

· Improved safety and output performance by applying high cost & high-powered (1-2C) LFP Cell

Wide Application

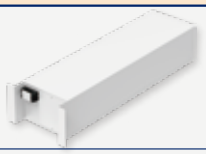
· Applicable to various fields that require low-high output with monomodular structure

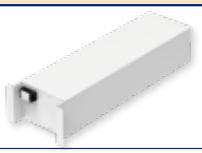
Supports multi-channel network & GUI SW

· CAN, TCP/IP, RS232/RS485
· Real-time monitoring & SW diagnosis of battery

ESS

ESS specification

	Model	M768A	M605A	M311A
Module	Appearance			
	Nominal Voltage [V]	51.2	57.6	57.6
	Total Energy [kWh]	7.68	6.05	3.46
	Usable Energy [kWh]	6.91	5.44	3.11
	Capacity [Ah]	150	105	60
	Size (W*D*H) [mm]	459*589*230	366.8*570*231.6	355*900*162
	Weight [kg]	About 72	About 50	About 40

	Model	B768A	B605A	B311A
BPU	Appearance			
	Size (W*D*H) [mm]	459*589*230	366.8*570*231.6	284*800*162
	Weight [kg]	About 25	About 32	About 20
	Configuration	OV / OC / OT / Short circuit Protection circuit breaker, power switch, status display LED, CAN 2.0A, TCP/IP		

	Model	ESS1152A	ESS998A	ESS484A
ESS	Appearance			
	Nominal Voltage [V]	768	665.6	460.8
	Operating Voltage [V]	674.4 ~ 830.4	584.5 ~ 719.7	404.6 ~ 498.2
	Total Energy [kWh]	115.2	99.8	48.4
	Usable Energy [kWh]	103.7	89.9	43.5
	Capacity [Ah]	150	150	105
	Size (W*D*H) [mm]	950*698.3*2047.4	950*698.3*2047.4	852.4*650*1546.1
	Weight [kg]	About 1,255	About 1,110	About 555
	System configuration	M768A 15S + B768A	M768A 13S + B768A	M605A 8S + B605A

	Model	ESS363A	ESS518A	ESS484B	ESS449A
ESS	Appearance				
	Nominal Voltage [V]	345.6	864.0	806.4	748.8
	Operating Voltage [V]	303.5 ~ 373.7	758.7 ~ 934.2	708.1 ~ 871.9	657.5 ~ 809.6
	Total Energy [kWh]	36.3	51.8	48.4	44.9
	Usable Energy [kWh]	32.7	46.7	43.5	40.4
	Capacity [Ah]	105	60	60	60
	Size (W*D*H) [mm]	650*950*2012.4	738*950*1512	738*950*1512	738*950*1512
	Weight [kg]	About 455	About 750	About 710	About 670
	System configuration	M605A 6S + B605A	M311A 15S + B311A	M311A 14S + B311A	M311A 14S + B311A

Mobile ESS

purpose

01 Mobile ESS (Response to the Carbon Emission Regulation)
- Emergency & Temporary Use of Ships in Coastal Sulfur Oxide ECAs (Emission Control Areas)

02 Mobile ESS for Various Construction Equipment
- Replacing Diesel Engines for Drilling Machines, etc.

03 Disaster Sites
- Power Supply within Disaster Areas where Power Grids are not Installed, etc.

04 Event Halls/Venues
- Power Supply within Event Halls/Venues located in Areas where Power Grids are not established
- Replacement of Various Generators in Event Halls/ Venues, etc.

05 Emergency Dispatch of Electric Vehicles
- Emergency Charging for Electric Vehicles, etc.

06 Power Peak Reduction
- Used in Buildings Subject to Power Peak Reduction Regulations/Laws
- Used for Reducing Electricity Costs via Power Peak Reduction, etc.

07 ESS for Micro Grids
- Used when Establishing an Independent Power Grid/System via a Connection with Renewable Energy

INZI e-Solution Specialty

01 Development of a Mobile ESS-based Technology ('21)
02 Differentiation & Strengths
- Diesel Engine → Lithium Battery + Motor + Inverter
- Enhanced the Stability of the Output with a 4-Parallel Structure
- Secured a High Level of Safety by Applying a 3-Phase Safety Device
- IP67 Grade Applied
- Battery Data Monitoring & Storage Function
- Eco-friendly Product (Greenhouse Gas Reduction)
- CAN2.0 Communication Applied

03 Extended Life (2,000~3,000 Cycles)
04 Excellent Fire Safety by Applying Lithium-ion Battery (LFP)
05 Excellent Low-Temperature Characteristics (Ensures Good Capacity during the Winter)

Specification

Model		ESS1152M/ESS1306M	ESS2304M/ESS2612M
ESS	Appearance		
	Nominal Voltage [V]	768	729.6
	Operating Voltage [V]	674.4 ~ 830.4	674.4 ~ 830.4
	Total Energy [kWh]	115.2	230.4
	Usable Energy [kWh]	103.7	207.4
	Capacity [Ah]	150	300
	Size (W*D*H) [mm]	1390*606.4*1668.4	2780*606.4*1668.4
	Weight [kg]	About 1,255	About 2,510
	System configuration	M768M 15S + B768M	ESS1152M 2P

* Can produce in various specifications

HESS

Features

01 System that stores eco-friendly energy by connecting solar energy system at home
02 Increased self-consumption rate & reduced electricity cost at home
03 Implementable self-powered power supply network by utilizing HESS at islands and mountainous areas
04 Utilizing as UPS when blackout

INZI e-Solution Specialty

01 Commercialization of household ESS ('22)
02 Development of Li-Battery + EMS + PV integrated system ('22)
03 Differentiation
- Improved output stabilization with double-parallel structure of battery
- High safety certified with 3rd level of safety equipment
- Battery data monitoring & storage feature
- Eco-friendly product (Reduced green-house gas)

04 Long Lifespan (2000~3000cycle)
05 Excellent fire safety with lithium-ion phosphate battery (LFP)
06 Excellent low temperature features (Can be used in various environments)
07 Real-time information with HMI application

Specification

Model		HESS051A	HESS102A	HESS154A
HESS	Nominal Voltage [V]	51.2	51.2	51.2
	Operating Voltage [V]	48~56	44.96 ~ 55.36	44.96 ~ 55.36
	Total Energy [kWh]	5.12	10.24	15.36
	Usable Energy [kWh]	4.61	9.21	13.82
	Capacity [Ah]	100	200	300
	Size (W*D*H) [mm]	274*560*372	650*380*1526	650*380*1526
	Weight [kg]	About 55	About 135	About 165
	Configuration	0V / OC / OT / Short circuit Protection circuit breaker, power switch, status display LED, CAN 2.0A, TCP/IP GUI LCD		

* Can produce in various specifications

INZI e-SOLUTION

INZI e-Solution, a company specialized in lithium battery

INZI e-Solution lithium battery will reward you with quality.

Venture business certificate

ISO 9001 Quality management system

ISO 14001 Quality management system

Affiliated research institute certificate

Inno - biz certificate

Main - Biz certificate

Certificate of Material/Parts/Equipment Specialized Corporation

NFT(P)C 607 Fire Safety Certificate

KC62619

Regional economic vitalization Award

Daejeon City's Star Enterprise certificate

Certificate of Promising Small Enterprise of Daejeon


AI Lithium is the Answer !