

CLIANTECH SOLUTIONS

YOUR PATH TO TECHNOLOGY

Turnkey Solutions for
Lithium Battery Assembly
Cell to BESS Manufacturing

In Collaboration with  **encore**
SYSTEMS



www.cliantechsolutions.com

KEEP YOUR ENERGY CENTERS OPERATING

SYSTEM ENGINEERING CAPABILITIES



Concept to Commissioning

- Business feasibility
- Consultative Approach
- Market Forecast



Project Management

- End-to-end execution – from concept to market-ready solutions



Technology Transfer Support

- 5kWh ~ 5MWh EV & ESS applications from Global OEMs



Process & Plant Design

- Layout Design in 2D
- Configuration Design
- Site Readiness - Utility & Facility



Prototype Development

- Prototype Development along with complete BOM details



Manpower Selection & Training

- Onsite & Offsite programs to upskill teams for smooth operations



Installation & Ramp-up Support

- Professional assistance from setup to full-scale production readiness



Certification / Compliances Support

- EV & ESS Applications
- India & Global



Automation & MES Integration

- MES Integration with ERP
- Smart automation systems



Preventive Maintenance

- Regular service schedules
- Lifetime Software Upgrades
- Hardware Enhancements



Spare Parts Support

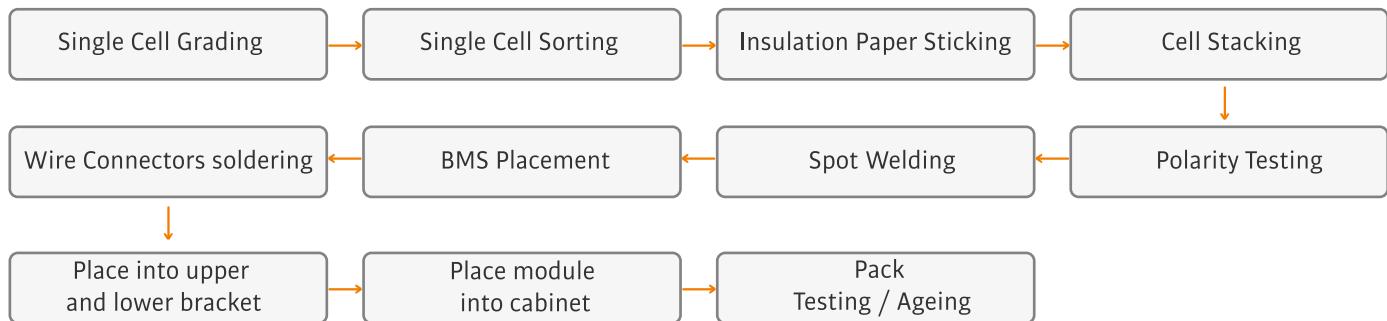
- OEM-certified spares with warranty and quick in-house repairs



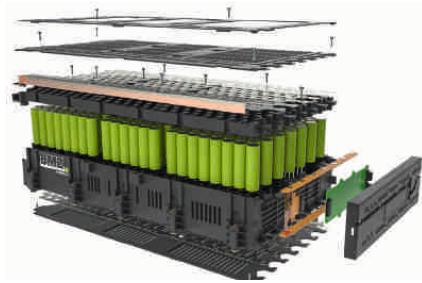
24 x 7 Service & AMC

- Round-the-clock technical support and annual maintenance contracts

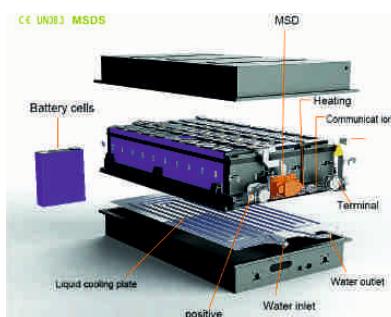
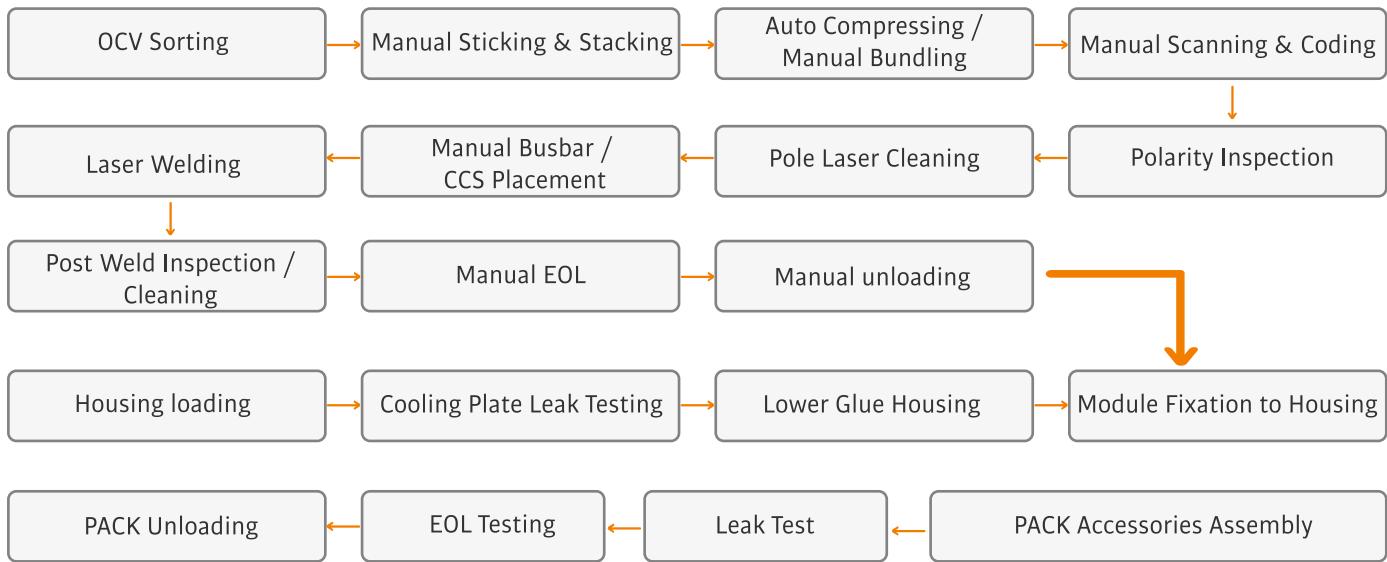
Cylindrical Cell to Module Assembly Line Flow



*for reference purposes only, actual process may vary



Prismatic Cell to Module Assembly Line Flow



CYLINDRICAL CELL GRADING / CYCLER / CAPACITY TESTING



5V 3A — 5V 6A
512 channels
(Cylindrical/Pouch)

5V 10A — 5V 20A
256 channels
512 channels



Jig Form

Fast Clamp Cylinder
/Manual Pouch



Clamp Typ

Cross fixture/probe fixture/65
Blue and white clasp/



Fixture
Spacing

35MM/40MM
/85MM/85MM



Supports Cells

Cylindrical:
18650/21700/26650/32700/32
135/33140/34189"/40140*
Pouch: Multiple sizes
(customised)

Compatible for:



Main Test Functions:
Current, Voltage, Time

AUTOMATIC CELL SORTING



18650/21700/26650/32700
10CH/6CH



32135/33140/34189/40140
10CH/6CH

IR Tester*:
HK 3561/HIOKI BT3561, BT3561A

Test Functions:
Internal Resistance, Open Circuit Voltage

Sorting efficiency: \geq 70PPM

Interface: PLC + Touch Screen

Compatible For :



Keyence / Chinese

AUTO INSULATION PAPER STICKING



18650/21700/26650/32700

Any one size (can be customised)

Can be integrated with Automatic Cell sorting
machine optional

Barley Paper Roll Width: \sim 100mm

Throughput: \geq 70PPM (18650 size)

Interface: PLC + Touch Screen

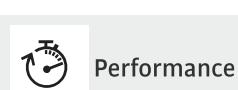
CCD / POLARITY INSPECTION (Before Welding)



Offline



Inline with I/O Conveyor



PC Controlled
Gigabit network card
data transmission



Ultra High Definition
20M Pixel Camera



400mm x 300mm
(can be customised)



Cylindrical:
18650/21700/26650/32700/
32135*/33140*/34189*/40140*

AUTOMATIC/MANUAL SPOT WELDING



5000A / 8000A / 10000A

Manual

- ⦿ Max Cylindrical Stroke: 20mm, 100 mm by default
- ⦿ Mode of welding: Double point balance welding
- ⦿ Welding Time: 0 - 9.99ms, adjustable, prec. 0.01ms
- ⦿ Max welding thickness: 0.25mm, 0.15mm & for above grooving or bumping is required.



8000A / 10000A

Double Sided Automatic

- ⦿ Stroke Size: 500mm x 380mm (customizable)
- ⦿ Welding Mode: Single Point / double point/three point option.
- ⦿ Japanese DK welding needle, diameter 2.5mm, continuous use.
- ⦿ Welding Head Rotation Range: +/- 90 Deg.

Gantry Transistor Power Supply

Welding Pulse width is adjustable, solder spot does not change color.

Control mode constant current / constant voltage / current and voltage combination mode.

Real-time welding current monitoring, virtual welding, false welding alarm function.

Electric / Pneumatic Type

Supports Cells

Cylindrical:
18650/21700/26650/32700/
32135*/33140*/34189*/40140*

COMPREHENSIVE FINISH PACK / EOL TESTING



50V 60A ⇢ 100V 120A

100V 200A

Main test items:

- 1) Open circuit voltage
- 2) Load voltage
- 3) charging & discharging current
- 5) AC/DC internal resistance (ACR/DCR)
- 7) Charging overcurrent protection test
- 8) Discharge overcurrent protection test
- 9) Discharge voltage difference (ΔV)
- 10) Short circuit protection function
- 11) Charging activation
- 12) Short circuit activation
- 13) Single-string static differential voltage (optional)
- 14) Multiple-string static differential voltage (optional)

	50V60A	100V120A	100V200A
Discharge Tests (customizable)			
Initial Voltage	0-50V	0-100V	0-100V
End Voltage	0-50V	0-100V	0-100V
Discharge Current	0.2-30A	0-60A	0.2-100A
Discharge Time	0.60S	0-60S	0-60S
Charge Tests (customizable)			
Initial Voltage	0-50V	0-100V	10-100V
End Voltage	0-50V	0-100V	10-100V
Charge Current	0.2-5A	0-60A	0.2-20A
Charge Time	0.60S	0-60S	0-60S

PRISMATIC CELL GRADING / CYCLER / CAPACITY TESTING

with Auto Clamping System



5V 60A — 5V 100A
16~64 channels



5V 30A — 5V 500A
16~196 Channels



Jig Form

Electric upper pressure
type square aluminum shell
/ Manual OTT



Clamp Typ

Crocodile clamp/enhanced
flat head clamp/OTT (optional
add alligator clip)



Supports Cells

Prismatic: A length of 65-220 mm;
40MM/81MM /162MM
The thickness of 20-70mm;
Height 90-220mm; Center
distance of polar ear: 45-160mm



Fixture
Spacing

40MM/81MM
/162MM

Test Functions:
Current, Voltage, Time, DCIR*, Temperature, Pulse Test*, Work Conditions Test*

Compatible for:



AUTOMATIC / MANUAL CELL SORTING



20V-1000V

HIOKI BT3561, BT3561A
BT3562A, BT3563A
BT3564A

6/10 channels

comes with
HIOKI BT3562A &
HIOKI Dm7275

Sorting Parameters:
Open circuit voltage, AC internal resistance, DC
internal resistance

Supports Cells:

50*160*118,36*130*200,30*130*200mm

Sorting efficiency: ~600 cells per hour

Inbuilt Industrial Computer and HMI

Margin voltage deviation \pm 0.1mV, Internal resistance
deviation \pm 0.05mΩ

Compatible For :



Keyence (Japan)

AUTO/SEMI-AUTO LASER CLEANING & LASER WELDING



Laser Cleaning for Cell
Terminals and Busbars



High speed galvanometer
laser welding

Laser Type: Pure Fibre Laser (IPG/Raycus/Maxx)

Maximum output power (pulse mode)
150W/300W/450W/600W

Maximum output power (continuous mode)
150W/300W/450W/600W

Maximum peak power 1500W/3000W/4500W/6000W

Cooling mode:
Water cooling

Laser wavelength:
1070nm

Working mode:
pulse/continuous

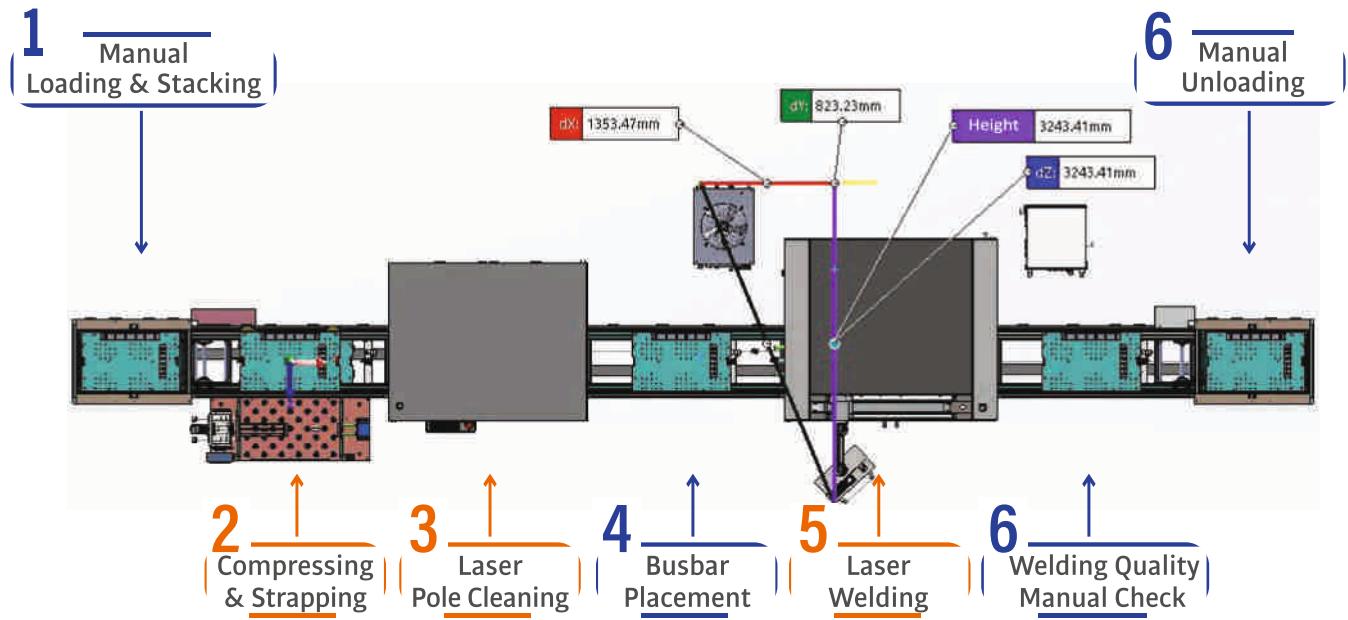
XYZ axis control:
manual/servo motor

Laser Source & Wattage: 100W Fibre
Loading/Unloading: Manual/Auto
Cleaning Width: can be customised
Cooling: Air Cooled
Life of Laser Source: >100000 Hours

SEMI-AUTO ASSEMBLY SOLUTION

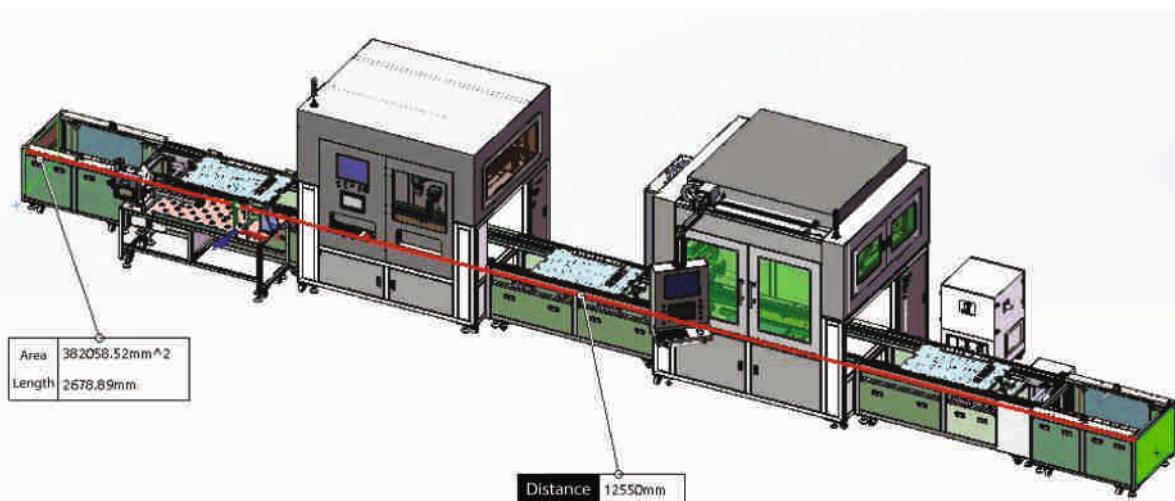
CELL TO MODULE TYPE I

Auto Station  Manual Station 



Inbuilt Features

Inline Automatic Compression	*Traceability from Cell to Module	Laser Source Options RAYCUS / IPG with AMB mode optional
Polarity Detection & Laser Cleaning in single station	Compatible with 13 series Module Assembly Compatible with 100Ah ~ 314Ah Cells	
Laser Welding	Throughput upto 6 cpm (cells per minute)	*Optional
*MES Control	Area Required: 10,000 sqft (excluding testing set-up and Pack Line)	

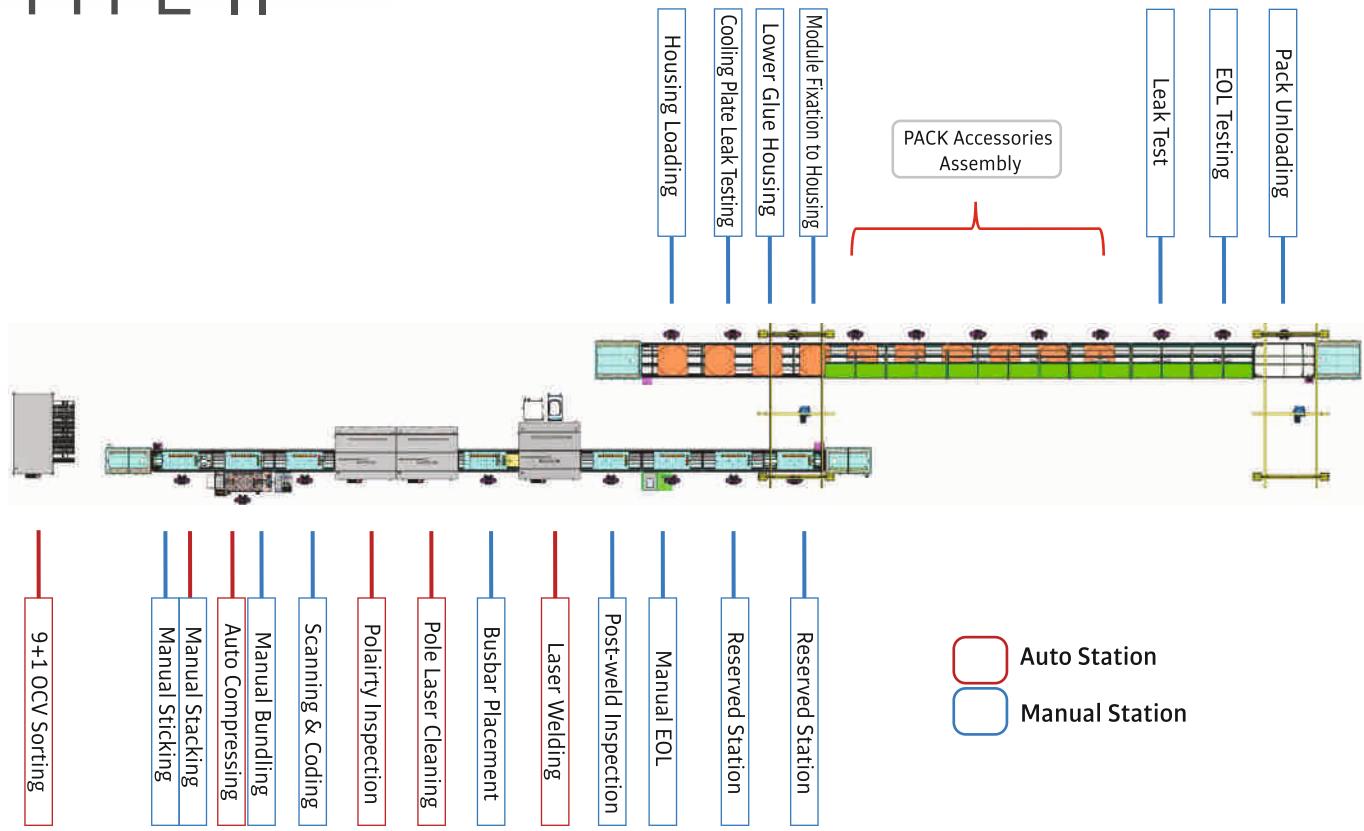


Line dimension: L12550 * W1900 * H2500 (mm)

SEMI-AUTO ASSEMBLY SOLUTION

CELL TO MODULE TO PACK

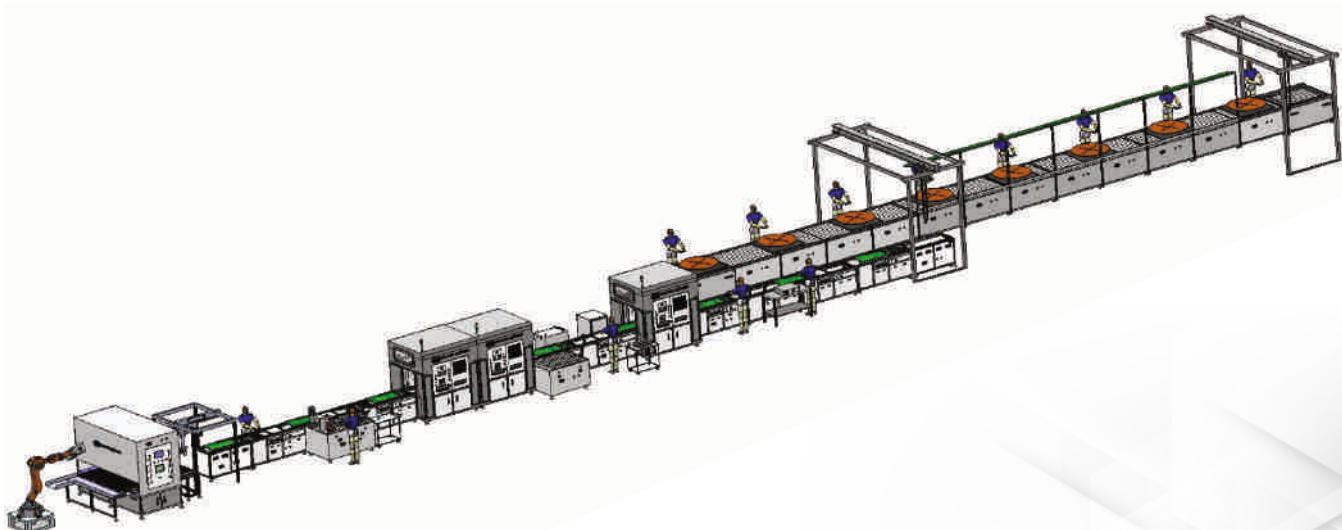
TYPE II



Inbuilt Features

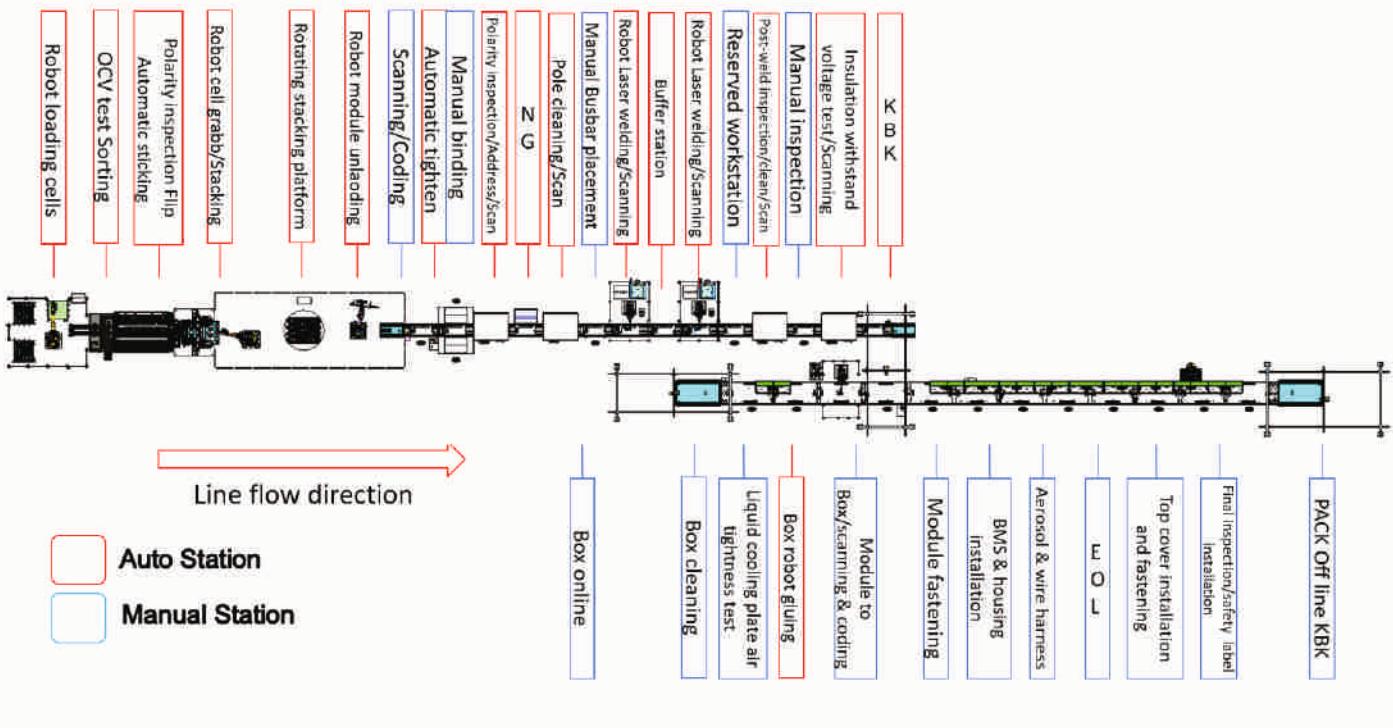
Inline Automatic Compression	Traceability from Cell to Module and Module to Pack	Laser Source Options RAYCUS / IPG with AMB mode optional
Polarity Detection	Air Cooling & Liquid Cooling Capability in Pack Line	
Laser Cleaning	Compatible with 52 series & 104 series Pack Assembly	
Laser Welding	Compatible with 100Ah ~ 625Ah Cells	
Complete Line MES controlled	Throughput upto 8 ~ 15 cpm (cells per minute)	

Area Required: 20,000 sqft (excluding testing set-up)



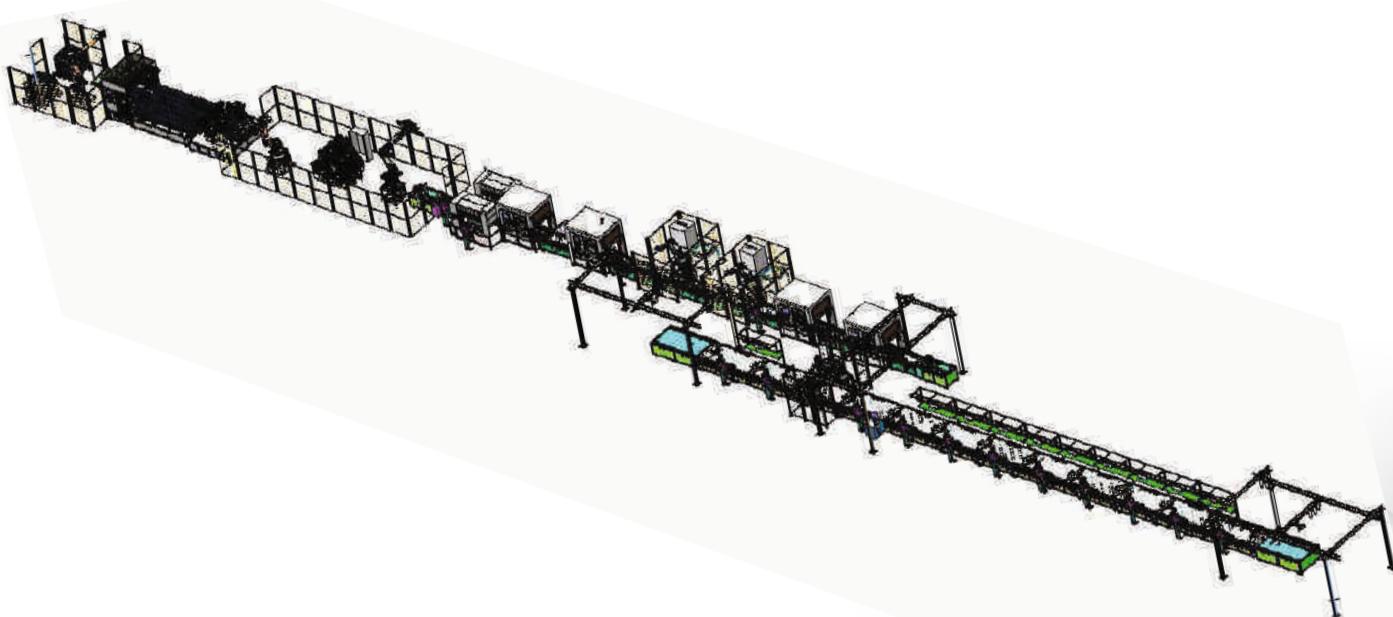
FULLY-AUTO ASSEMBLY SOLUTION

CELL TO MODULE TO PACK



Inbuilt Features

Automatic Cell Loading	Automatic Gluing on bottom plate in Pack Line	Laser Source Options RAYCUS / IPG with AMB mode optional
Automatic Cell Surface Cleaning	Traceability from Cell to Module and Module to Pack	
Automatic Insulation Pasting	Air Cooling & Liquid Cooling Capability in Pack Line	
Inline Automatic Compression	Compatible with 52 series & 104 series Pack Assembly	Area Required: 25,000 sqft (excluding testing set-up)
Automatic Cell Stacking	Compatible with 100Ah ~ 625Ah Cells	
Polarity Detection	Throughput upto 8 ~ 15 cpm (cells per minute)	
Laser Cleaning (Cell Terminals)	Complete Line MES controlled	
Automatic Laser Welding		



PCBA / BMS TESTING



Supports
Hardware & Software
(Smart) BMS

Testable for 4S ~ 48S for BMS (PCBA, modular design, support scalable and extensible)

With Short-Circuit Protection Test and Protect Time Test*

Temperature Protection Test

Supports CAN 2.0A, CAN 2.0B, RS485 Communication, as per customer requirements

Support Automatic Start by Scanning Barcodes or Manual Start

Test BMS (PCBA) including LFP, NMC, LCO, LMnO, LTO, Etc

Supports + & - protection board

BATTERY MODULE & PACKAGEING / TESTER



Voltage Range: 60V ~ 1000V

Current Range: 60A ~ 500A



No. of channels customizable

It can be used in automotive battery, energy storage systems (ESS) and other high-power battery large variety of tests.

Each channel can be arbitrarily set as constant current charge and discharge mode, constant voltage charge and discharge mode, constant power and resistance discharge mode, the DCIR mode, rest mode etc.

Each channel can test batteries in different modes, also it can carry out completely independent work in different modes without interaction.

It has improved software and hardware multi-level protection, and emergency stop switch.

It is dual AC/DC designed to improve energy efficiency.

END OF LINE TESTER



Voltage Range: upto 1500V

A comprehensive and intelligent testing platform developed to integrate automatic testing, data recording integration analysis, production efficiency, and other aspects of lithium battery offline, providing a complete static testing solution for power battery modules or PACK

Insulation Withstand Voltage Tester

- 1) AC Withstand Voltage (ACW): 5kV/100mA
- 2) DC Withstand Voltage (DCW): 6kV/20mA
- 3) Insulation Resistance (IR): 6kV/50GΩ
- 4) Ground Impedance: 40A/600mΩ

Multimeter

- 1) Resolution: 6½
- 2) Voltage Range: 2000VDC

AC Internal Resistance Tester

- 1) Voltage Range: 2100VDC
- 2) Resistance Range: 3600Ω

Programmable Resistor Unit

- 1) Insulation simulation switching
- 2) Switching Resistance: 5KΩ×10MΩ; Accuracy: ±3%
- 3) Resolution: 5KΩ

ENERGY STORAGE TESTING

BESS APPLICATION

Cluster / Cabinet Testing Equipment

1600V/250A - 2



Capacity Range:	500kW
Voltage Range:	50~1600V
Current Range:	-250A~250A
Feedback Efficiency:	95%

High-frequency topology design; dual-channel per rack unit with multi-rack parallel operation capability

Voltage/current accuracy up to $\pm 0.05\%$ FS

Current conversion time $\leq 5\text{ms}$

High regenerative power quality with harmonic content $\leq 3\%$ and power factor ≥ 0.99

Compact footprint and industry-leading power density

Large Capacity Battery Container Testing Equipment

1600V/4.5MW



Advanced Design

High precision test results, high integration. IP54 protection. Indoor & Outdoor & Movable. Supports modular installation, significantly saving space.

Super Cost-Saving

Entire battery containers and flexible multi-channel testing of clusters/packs. Saving millions in testing investment costs, facility construction, and electricity expenses

Super Flexible

2.5MW can be upgraded to 5MW/6MW to meet higher demands. Don't need a full-power replacement and significantly reducing equipment cost.

Super Energy-Saving

Paired charge-discharge testing between two battery compartments (one charging and the other discharging) effectively conserves energy and enhances overall efficiency

PRODUCTION LINE MES

Cell to BESS Manufacturing

ENcore Systems' customised MES management system is responsible for receiving data on all workstations' information and can also connect to the company's ERP system.

Overview of the MES management system

System Dashboard	Count the production progress of each key position
Production Management	1. Order Management: set up production work orders as per the production plan. 2. Product Management: set-up, adding, modifying, deleting product information. 3. Materials Management: manages material information used in the production process. Currently, the only materials we use are battery cells.
Production data query	1. Data query for each workstation - information uploaded by each inspection station 2. Data traceability - through any information such as PACK code, module code, cell code, operator, etc. to obtain all the test data information of the PACK from the cell to the PACK;
Report Statistics	include production achievement rate, hourly and daily production efficiency, product yield rate
System Settings	1. Menu permission management 2. Workstation detection software

Cell segment detection		PACK segment detection	
OCV detection	Module code generation	1. Air-cooled PACK segment detection	
Module pole polarity detection	Module insulation withstand voltage test	Series installation torque collection	EOL Testing
Pole photography	Pole laser cleaning results	Insulation withstand voltage test	
Welding section inspection		2. Liquid Cooling PACK Segment Detection	
Laser welding	Post-weld inspection	Liquid cooling plate air tightness detection	PACK code generation
Insulation withstand voltage test		Module fixed torque data collection	EOL test
		Series installation torque data collection	PACK air tightness test
		BMU , module, PACK data binding	Generate label
Local data disk configuration, supports lossless upload to MES		External box cover installation torque data collection	

Electronic Display Screen

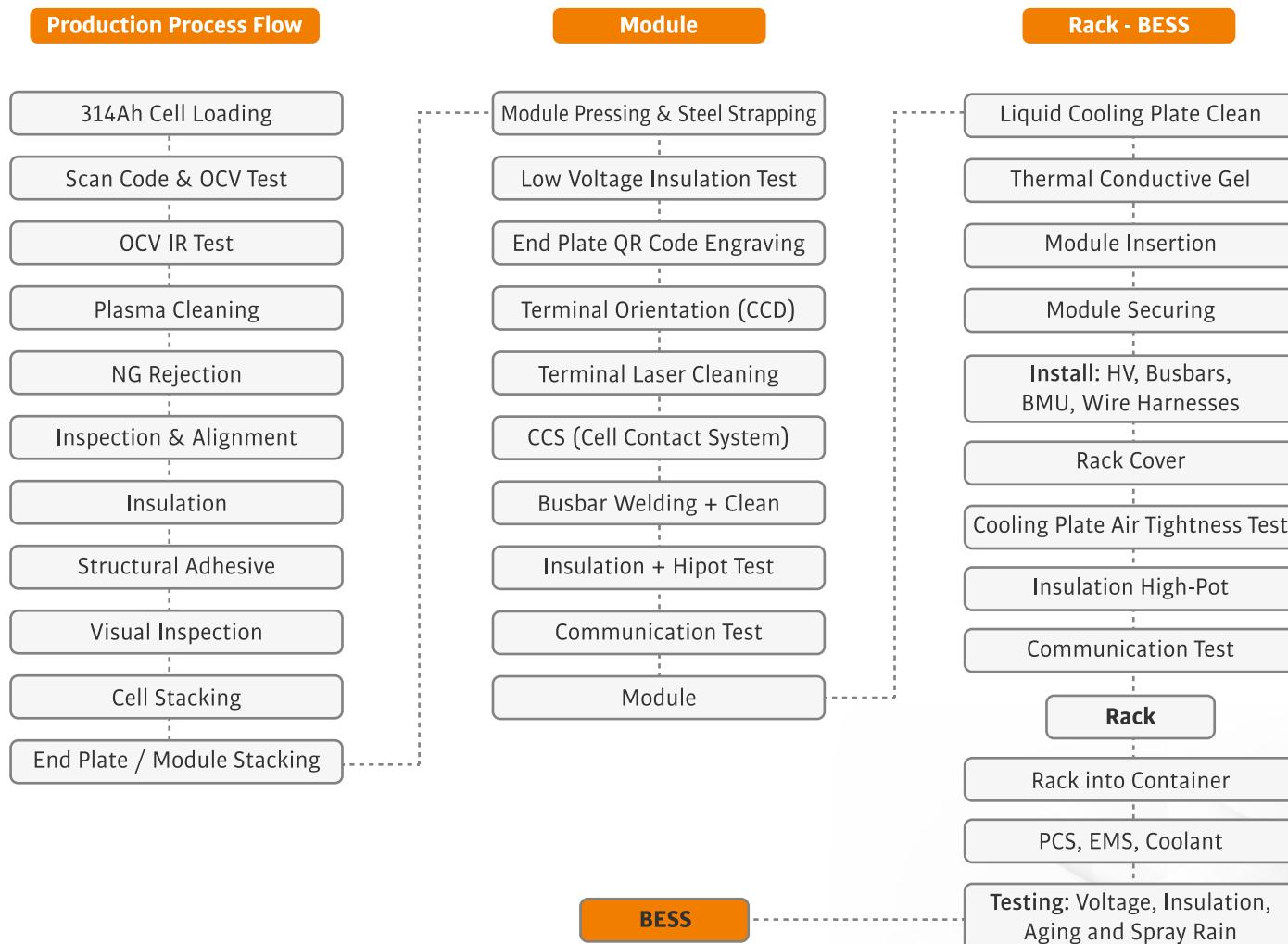


BESS MANUFACTURING

PROCESS FLOW (CELL TO BESS)



BESS Manufacturing



MAJOR TECHNOLOGY PARTNERS



*Exclusive Partnership
for India Market*

TRUSTED BY THE LEADERS OF TOMORROW

OUR CUSTOMERS, OUR PRIDE (2024-25)

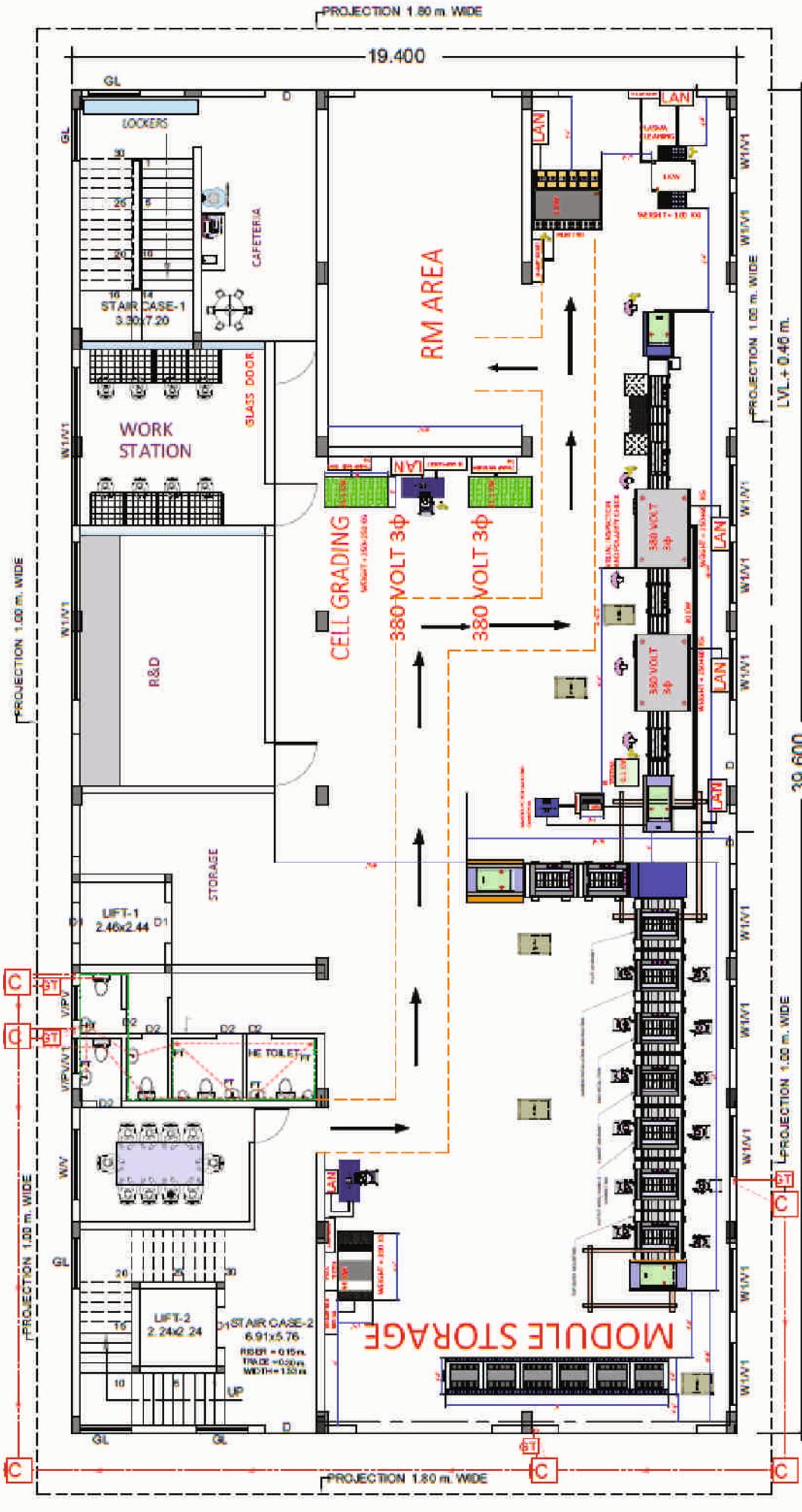
Flagship Projects

Customer	Annual Capacity	Project Type	Location
RCRS Innovations Limited	1 Gwh	Automatic Cylindrical & Prismatic EV and ESS	Uttar Pradesh, India
Su-Kam Power Systems Ltd	3 Gwh	Automatic-Cylindrical & Prismatic EV and ESS	Himachal Pradesh, India
Fujiyama Power Systems Ltd	2 Gwh	Automatic-Prismatic ESS	Uttar Pradesh, India
Voltra Energy Pvt Ltd	2 Gwh	Automatic - Prismatic ESS	Haryana, India
Bessium Energy & Solutions	2 Gwh	Automatic - Prismatic ESS	Uttar Pradesh, India
Pastiche Energy Pvt Ltd	2 Gwh	Automatic-Prismatic ESS	Punjab, India
Lithina Energy Pvt Ltd	2 Gwh	Automatic-Prismatic ESS	Rajasthan, India
Microtek International Pvt Ltd	2 Gwh	Automatic Prismatic ESS	Himachal Pradesh, India

Brands that believe in Us!

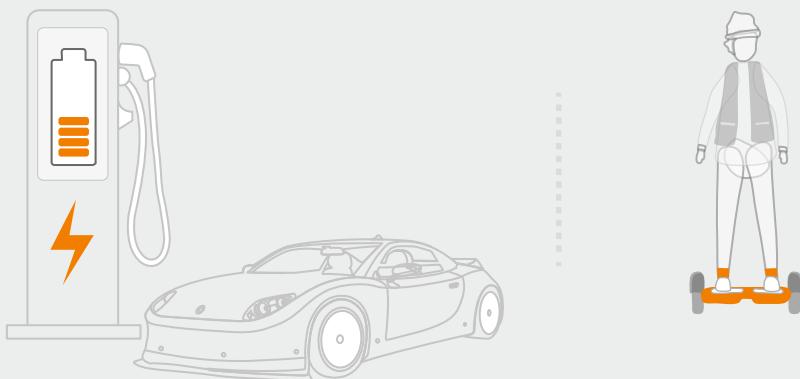
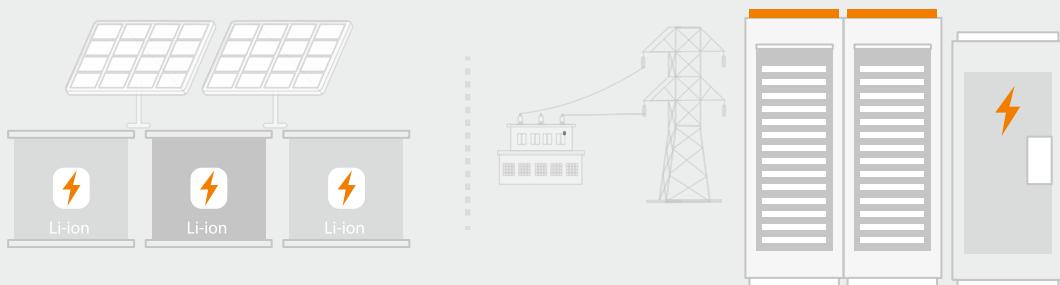
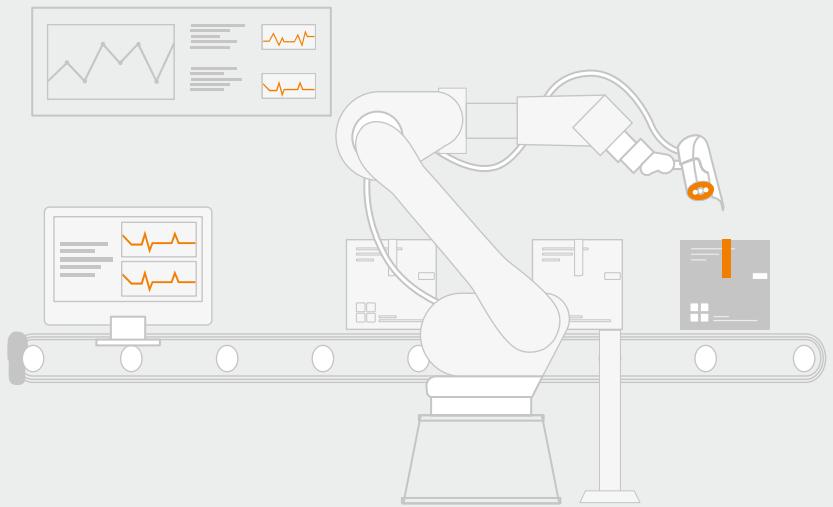


DETAILED 2D FACTORY LAYOUTS



FIRST FLOOR PLAN

CLIA NTECH



All the solutions required for end-to-end Lithium Technology Ecosystem,
NICELY ARRANGED IN ONE PLACE

Lithium Battery Pack Assembly Solutions

BESS: Engineering & Consulting

Technology Transfer

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