Rexroth

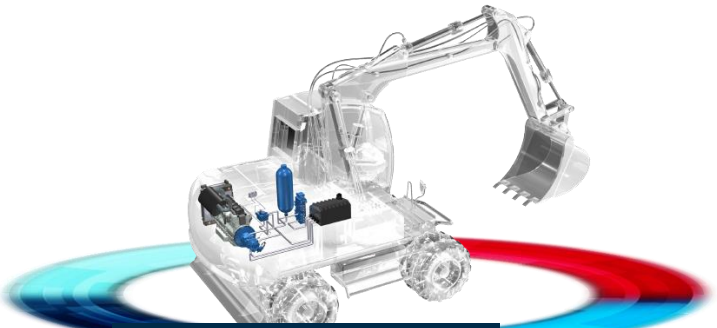
BOSCH

WE MOVE. YOU WIN.
Innovation on the move

We develop solutions and technologies that set-in **motion** the **innovation** and **competitiveness** of our customers

Motion

Industrial Machines



Motion

Hardware
Mobile Operators

Motion

Production Lines
and Process

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Technologies
Fit for the present, future-proof

Industrial Hydraulics

- Cylinders
- Engines
- CU
- Pumps
- Valves
- Software

Assembly, Intralogistics, transport

- Workbenches
- Guided Conduct
- Tightening systems
- Transport lines
- AGV / AMR
- Robot / Cobot

IoT, automation and electrification

- ctrlX AUTOMATION
- Drives
- PLC
- Industrial PCs / HMIs
- Motors and gearboxes
- IoT Platform
- Security systems

Mechatronics

- Guides and linear axes
- Cartesian systems
- Screw drives
- Integrated measuring systems
- Smart MechatroniX / Cartesian Robots

Hydraulics and mobile electronics

- Pumps
- Engines
- Cylinders
- Valves
- Batteries
- Sensors
- Electronics and controls
- HMI
- Motors and electrical systems
- IoT / Software
- Units

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BDXS

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Bosch Digital Xcellence Services

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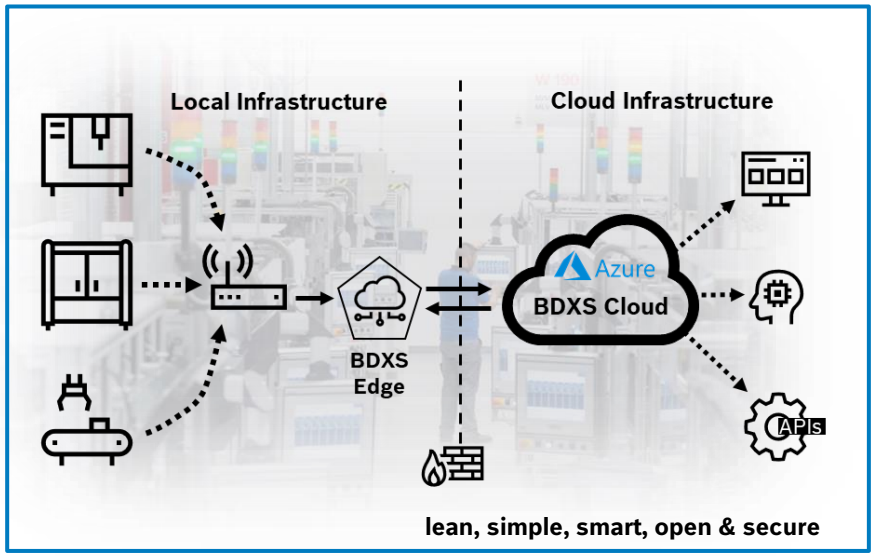
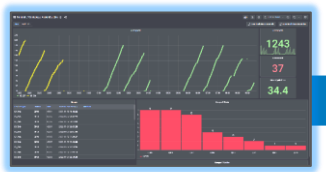
Christoffer Laessig, +49(711)811-48569
BDXS.contact@de.bosch.com

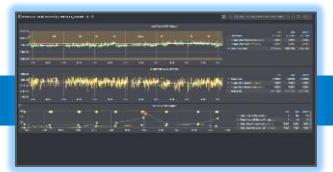
Digital solutions for Manufacturing Excellence

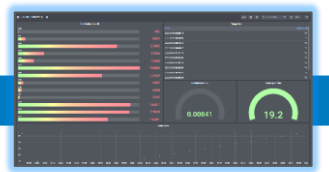
Cloud
Dashboards
Applied AI
Real Use Cases.
Real Benefits.
Software
IT Consulting

We develop solutions engineers love.




Production KPIs


Predictive Maintenance


Tool Monitoring


Bottleneck Detection

Curve Classification

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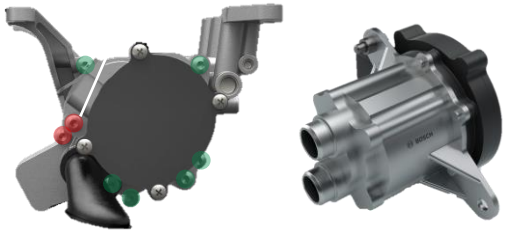
Digital Solutions for Manufacturing Excellence

Case Study: Screwing Process Verification with ML

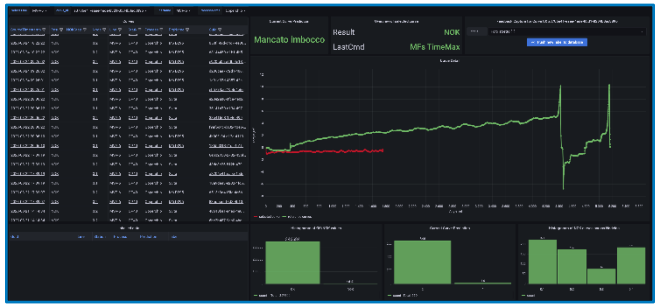
Customer Challenges

- Labor-intensive efforts for determination of root causes for NOK screwing processes
- Time-consuming, error-prone and manually approach for data preparation & analysis of torque over angle charts for various products
- Lack of time / resources for machine learning and for IT orchestration for automation of the overall use case
- PoC from customer done, but difficulty in scaling and operating the solution



Solution

- Automated and secure data extraction from OT (machine) level and transfer to cloud
- Fully-automated data processing of screwing curves and meta-data extraction
- Machine learning (AI) based classification of screwing curves and automated determination of root causes in classes
- Dashboard with results and most important KPIs for screwing process verification
- Screwing Equipment / Manufacturer agnostic



Benefits

- Minimization of labor efforts and hence cost savings in production
- Automated quality assurance in production as firewall without effecting cycle-time
- High customer satisfaction with fast implementation and go-live in production

~80% **6 Weeks** **100%**

Customer(s)

- Automotive Supplier(s) in Germany & Italy

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BCI

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Bosch Connected Industry
Product Portfolio overview

AUTOMATION RE-THOUGHT

Nexeed Automation

Efficiency in **machine engineering and operation**

- Reduction of software engineering effort up to 30%
- Information services increase performance and machine lifetime
- Remote device and asset management with the Device Portal

THE FACTORY AT A GLANCE

Nexeed Industrial Application System

Steering of **manufacturing and intralogistics**

- Increase in productivity up to 25%
- Open interfaces ensure maximum connectivity flexibility
- Interoperable modules fit optimally to your changing individual needs

PRODUCT-CENTRIC DIGITAL TRANSFORMATION

Bosch Semantic Stack

Leverage your data across the entire **product life cycle**

- Cost savings through early failure containment
- Early warning of a field failure risk and faster warranty decisions
- Data-Driven Intelligence Solution for the automotive industry

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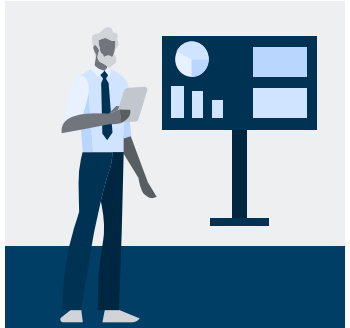
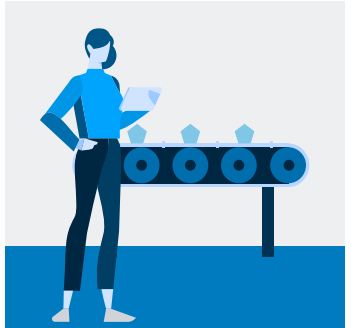
Nexeed IAS
Modules overview



Shopfloor Management

Make decisions efficiently



Product & Quality

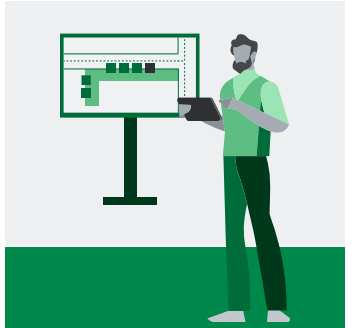
Avoid mistakes systematically

Machine & Equipment

Minimize downtimes

Intralogistics

Optimize material flows



Execution

Manage production orders

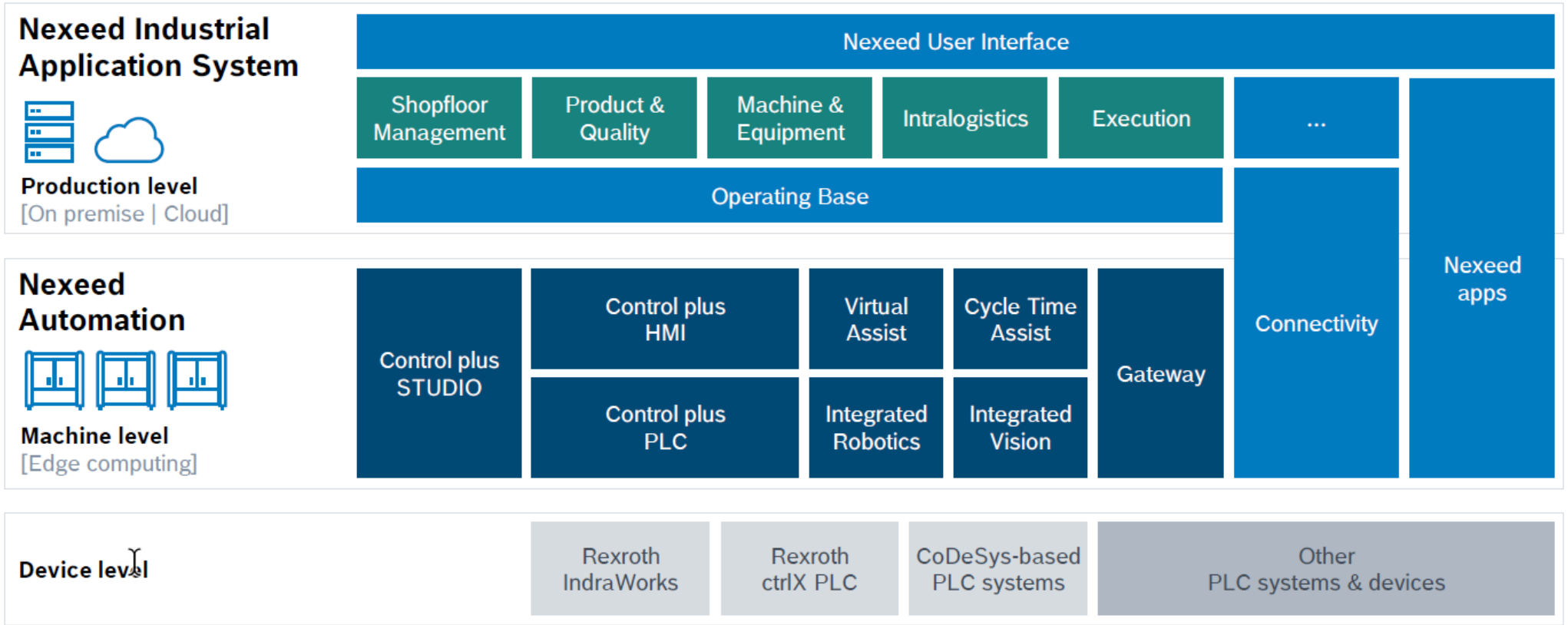
Module Integration

Add customer specific modules

Operating Base	Orchestrate modules easily
Valuable Extensions	Increase efficiency across modules

Bosch Connected Industry

For Production – Nexeed Automation and IAS



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Track and Track and Trace

Track and Trace
Solution approach

Track and Trace uses **sensors, gateways**, and **services** to make logistical objects and assets intelligent.

Load carriers and deliveries regularly inform the cloud of their location and status, enabling automation and transparency of processes in real time and their analysis.

Asset Tracking
Real-time tracking and monitoring of high-quality load carriers, e.g., receptacles, containers, or mesh boxes in closed cycles

Material Tracking
Real-time tracking and monitoring of time-critical, high-quality, or sensitive transport goods

Track and Trace makes it possible:

- BLE Technology (permanent detection of sensors)
- Robust hardware with battery lifetime > 8 years
- Plug & Play installation (independent of existing IT infrastructures)
- End-to-end tracking solution for the supply chain

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Track and Trace
Plug & Play implementation in the supply chain

Attach sensors (permanently) to assets

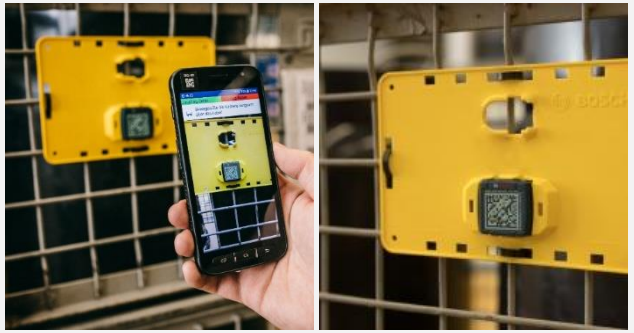
Install gateways at critical milestones or in trailers

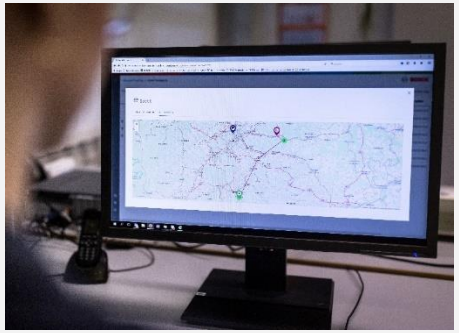
Sensors linked to assets or deliveries are displayed as digital images in the system

Automatic real-time data transfer from the sensor via the gateway to the cloud

Real-time data for operations and optimization

Basis for further services





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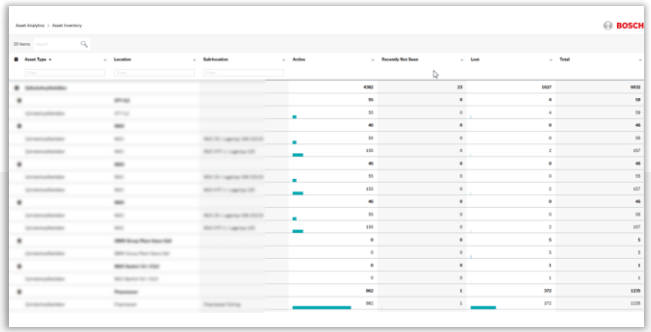
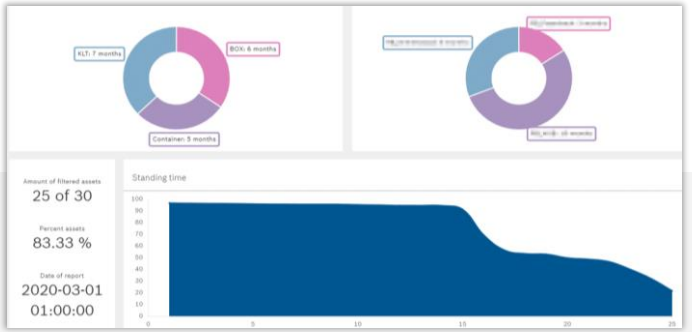
Track and Trace
Analytics reports

Stock

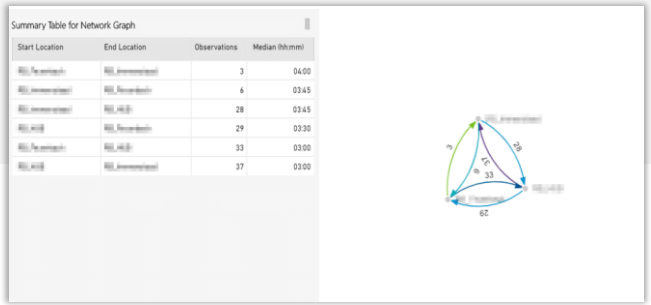


Total productivity

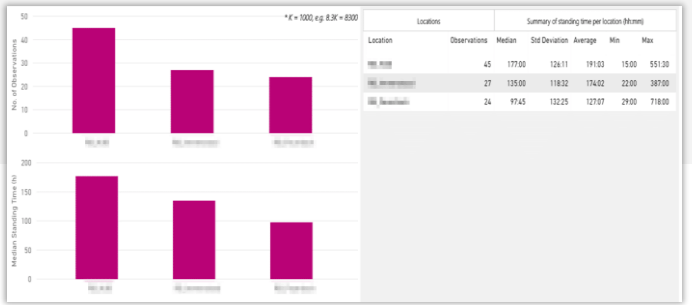


Loss

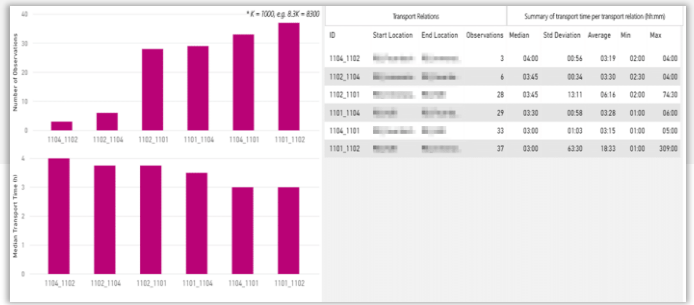
Asset network



Turnaround times



Transport times



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End of Line Solutions

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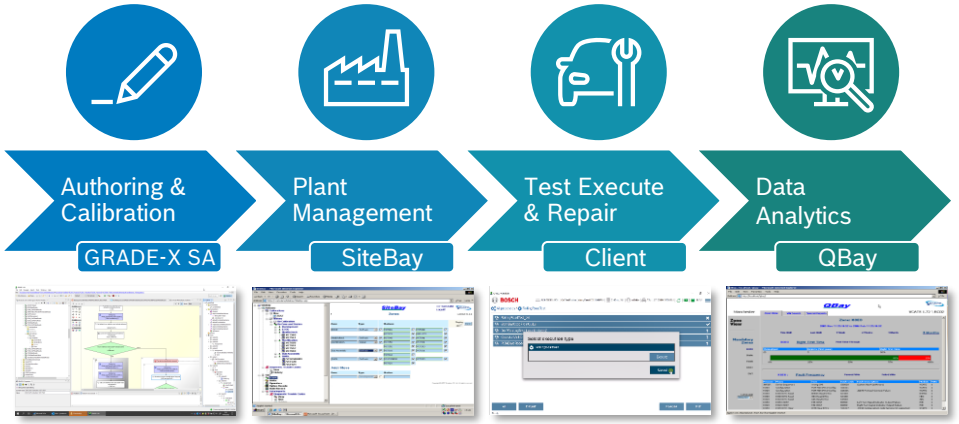
Bosch Automotive Service Solutions
GRADE-X VCATS

Vehicle Configuration And Test System

- Static Testing (Key On, Engine Off)
  - Sub-assembly testing, In Process distributed testing, End-of-line testing
  - Software Download (ECU Flashing) & Module Configuration
  - Integrated Rectification
- Dynamic Testing (Key On, Engine Running)
  - Geometry setting, Rolling Roads, Driver Assistance Calibration
  - Health Check / OK to ship
- Performance monitoring & metrics
- Plant data and quality system Integration



Authoring: **GRADE-X SA** – Integrated Development Environment

Management: **SiteBay** – Release revision control with audit trail

Runtime: **Client** – High performance, multi-threaded test execution

Analytics: **QBay** – Web based quality metric reporting and analysis

Hardware: **IFLEX** – Integrated tester with high performance VCI

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GRADE-X VCATS
Offline Flash Programming Station

Simple Station	Flexible connectivity	Multi ECU sockets	Flashtower
			

- Flexible connector options
- Multi-parallel capability for increased value & throughput

With the upcoming Vehicle Computers (VCU), ECUs needs to be flashed upfront production due to large data volume Software to be capable to flash the other ECUs on-vehicle and to stay in the planned cycle times

EV Testing Solutions
EV battery manufacturing test solutions

- High Voltage Testing for EV Battery Packs
  - Safety interlocks
  - Isolation
  - Calibration
  - Seal pressure test
  - Coolant system test
- High Energy Testing
  - Collaboration with Bosch Rexroth and others
    - VCATS ,GRADE-X and Power system compatibility assured
    - Highest levels of integration and performance metrics possible
  - Power levels beyond 250KW
  - High power charging test and discharging test
  - Battery impedance check
  - Energy reclamation

Tests carried out on either **pre-lid** or **fully assembled** batteries

- Read out part numbers
- Check cell voltages
- Check temperature sensors
- External isolation measurement
- Read DTCs
- Read pack voltage
- Read cell SOC
- Check for cell imbalance
- Internal isolation measurement
- Measure pack voltages
- Measure HVIL voltage
- Crash input verification
- Determine pack internal resistance
- Measure current consumption
- Simulate charge / discharge