

# BATTERY INDUSTRY

EFFICIENT APPLICATION SOLUTIONS

**SICK**  
Sensor Intelligence.

# MODULAR COMPLETE SENSOR SOLUTIONS FOR AUTOMATED GUIDED VEHICLE SYSTEMS AND MOBILE PLATFORMS

Automated guided vehicles and vehicle systems (AGVs) are used in nearly all industrial environments. Whether for production supply, as a transport platform in flow production, or as an integrated component in warehouse logistics – the application possibilities of AGVs have grown considerably in the last few years, as has their importance as flexible, economical and future-proof solutions.

Sensor solutions from SICK help make transport tasks safer, faster and more transparent. Dangers and error sources are systematically eliminated, while countless process steps are accelerated. This is how SICK uses its extensive sensor expertise to provide impressive solutions in all phases of the production and logistics process – and in your own industry.



## Navigation and positioning



Line guidance



Localization



Motion control

## Environmental perception and safety



Collision avoidance



Personnel safety



Safe control

## Load handling



Load detection



Identification and tracking



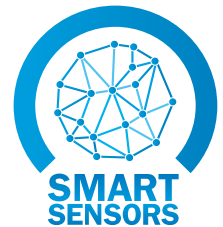
Load positioning

→ [www.sick.com/mobile-platforms](http://www.sick.com/mobile-platforms)

# SMART SENSORS - SUPPLIERS OF INFORMATION FOR INDUSTRY 4.0

## More Efficiency: Four Dimensions of Smart Sensor Technology

Smart Sensors generate and receive data and information which goes beyond traditional switching signals or measured process parameters. They therefore enable substantial increases in efficiency, more flexibility, and better planning security for predictive plant maintenance. Depending on the requirement, Smart Sensors cover up to four dimensions of Smart Sensor technology.



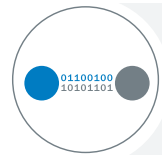
### Enhanced Sensing

Top sensor performance for stable processes



### Efficient Communication

Flexibility and transparency at the lowest field level



### Diagnostics

Highest availability levels thanks to predictive maintenance



### Smart Tasks

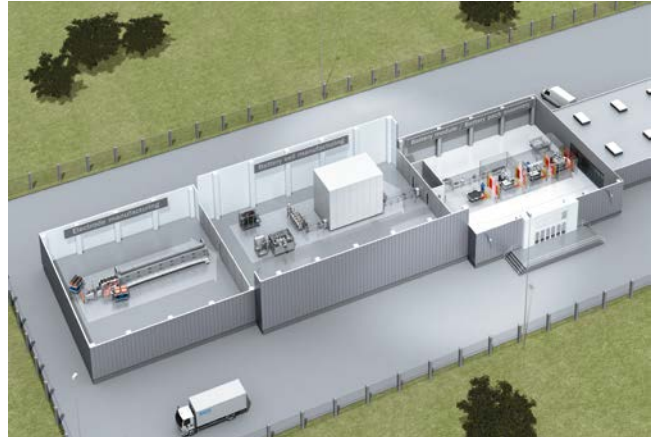
Tailor-made information directly from the sensor



→ [www.sick.com/smart-sensors](http://www.sick.com/smart-sensors)

## CHALLENGES IN THE BATTERY INDUSTRY

Batteries based on different technologies are used in many fields. Regardless of whether in electric vehicles, energy storage systems, tools, or mobile communication devices such as smartphones, batteries are becoming more and more important. And the factors that ultimately decide their success on the market are properties such as quality, price, and service life. The automation of production sites and their processes significantly contributes to meeting market requirements for batteries in terms of quality and price. SICK boasts a unique technology and product portfolio for the diverse manufacturing processes of electrodes, battery cells, and battery modules and packs.



Learn more about sensor solutions for battery industry  
[→ www.sick.com/Battery](https://www.sick.com/Battery)



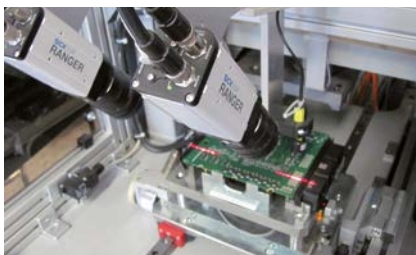
### Detecting and measuring

The automated production of batteries requires flexible production lines, minimum downtime, and high diagnosability. Modern, intelligent sensors from SICK for detecting objects and measuring physical parameters are able to store settings and feature automated teach-in and diagnostic capabilities.



### Protecting

Linking automated production equipment with semiautomated assembly cells requires intelligent and flexible safety concepts. SICK safety solutions ensure the protection of operating personnel, optimize production, and reduce the machine footprint and downtime.



### Monitoring and controlling

Batteries need to fulfill high safety requirements. This demands the utmost reliability in production processes and poses a highly challenging task for quality control. Distance sensors, and vision sensors as well as systems from SICK support nearly every type of monitoring.



### Data management and identification

Reliable identification of objects is a prerequisite for a smooth production flow and forms the basis for traceability and continuous quality improvement. SICK offers a wide range of both permanently installed and mobile readers for bar codes, 2D codes, and RFID technology.

# ELECTRODE MANUFACTURING



## Mobile identification solutions

1D and 2D codes contain important information, such as the type of material and other parameters, for tracing production materials. Hand-held scanners from SICK – both wireless and wired versions – are characterized by reliable and fast code reading, as well as rugged housings.

- Hand-held scanner IDM26x



→ [www.sick.com/IDM26x](http://www.sick.com/IDM26x)



## Access protection at the winding unit

The continuous action of winding up a film sheet represents a dangerous movement. The deTec4 Core safety light curtain reliably monitors access to the winding unit. When used in combination with the modular Flexi Soft safety controller, SICK offers a complete machine safety solution.

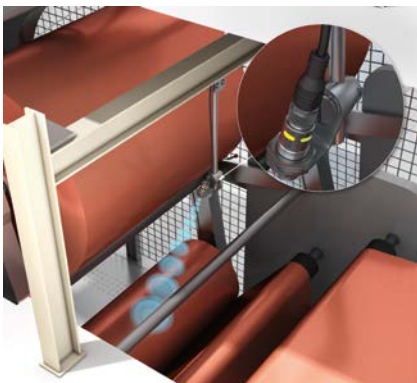
- Safety light curtain deTec4 Core
- Safety controller Flexi Soft
- Safety switch ES21



→ [www.sick.com/deTec](http://www.sick.com/deTec)

→ [www.sick.com/Flexi\\_Soft](http://www.sick.com/Flexi_Soft)

→ [www.sick.com/ES21](http://www.sick.com/ES21)



## Remaining foil control

To ensure continuous operation and minimize machine downtimes, the film must be changed at the right time. The UM18 ultrasonic sensor measures the height of the material on the roll as the film sheet is being unwound. This allows the ultrasonic sensor to detect in advance when the roll will be empty and needs to be replaced.

- Ultrasonic sensor UM18

Alternative products for this application:

- Displacement measurement sensor OD Value
- Mid range distance sensor Dx35



→ [www.sick.com/UM18](http://www.sick.com/UM18)



## Electrode coating thickness measurements

The homogeneity of the electrode coating determines the quality of the cell. Displacement measurement sensors can accurately measure the thickness of the coating down to a few micrometers. Process adjustments are therefore possible right away and scrap is minimized.

- Displacement measurement sensor OD5000



→ [www.sick.com/OD5000](http://www.sick.com/OD5000)

# CELL MANUFACTURING



## Spliceband detection

When changing the roll, the beginning and end of two consecutive rolls are joined together using splicing tape. Color, contrast, luminescence, and glare sensors from SICK detect the tape. As a result, it can be removed when the film is processed further during cell production. A SICK encoder also increases the position detection accuracy.

- Registration sensor Glare
- Incremental encoder DBS36 Core

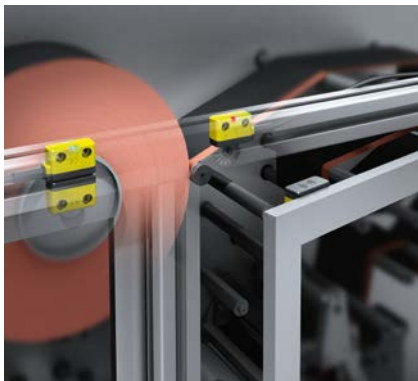
Alternative products for this application:

- Registration sensor KTS Prime



→ [www.sick.com/Glare](http://www.sick.com/Glare)

→ [www.sick.com/DBS36\\_core](http://www.sick.com/DBS36_core)



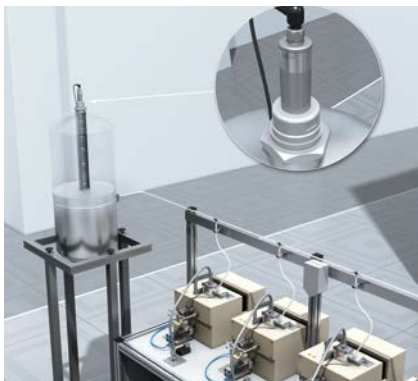
## Monitoring of safety doors

The STR1 non-contact transponder safety switch monitors doors with a protective function. The STR1 can be mounted flexibly and is characterized by high levels of protection against tampering. This ensures that running machines can be stopped when the door is opened and can only be started again when the door is closed.

- Non-contact safety switch STR1



→ [www.sick.com/STR1](http://www.sick.com/STR1)



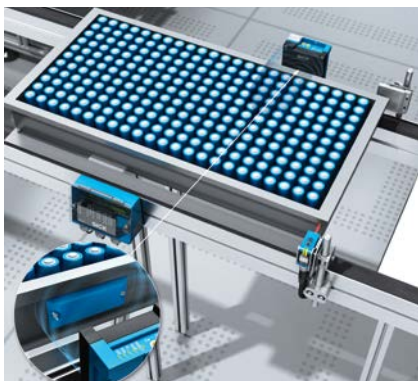
## Filling level measurement

The UP56 ultrasonic level sensor from SICK provides non-contact and wear-free tote level measurement. Aggressive chemicals can also be measured using the PTFE-coated UP56 Pure sensor. As a result, SICK is able to offer level measurement solutions for electrolytes of varying compositions.

- Level sensor UP56 Pure



→ [www.sick.com/UP56\\_pure](http://www.sick.com/UP56_pure)



## Automatic tote identification

During formatting and aging processes, cells for lithium-ion batteries must be put away for several hours or days. Compact RFID read/write devices, which are optimized for logistics and feature an integrated antenna, evaluation unit, and connectivity, such as the RFH6xx, ensure reliable tote identification before they are put away.

- RFID read/write device RFH6xx



→ [www.sick.com/RFH6xx](http://www.sick.com/RFH6xx)

# CELL MANUFACTURING



## Measuring the film tension

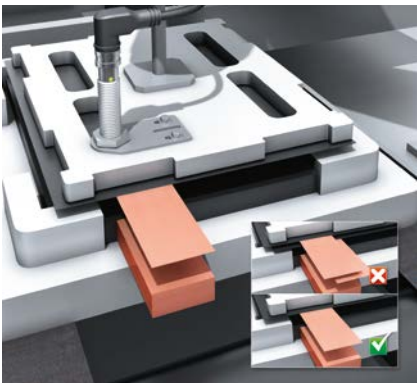
When films are being processed into individual electrode and separator sheets, the film sheet must be kept under tension. The MPS analog positioning sensor determines the film tension using the position of the deflection roller. The simple drop-in mounting process ensures time-saving installation.

- Magnetic cylinder sensor MPS-T or MPS-C



→ [www.sick.com/MPS-T](http://www.sick.com/MPS-T)

→ [www.sick.com/MPS-C](http://www.sick.com/MPS-C)



## Double layer detection of battery cell stacks

The stacking of the electrode and separator sheets is very important for the production of battery cells. If, as a result of adhesion, multiple identical sheets are added at the same time, the result is a defective cell. The IDF inductive MultiTask sensor reliably detects electrodes that are hanging onto one another, thereby minimizing rejects.

- Inductive MultiTask sensor IDF



→ [www.sick.com/IDF](http://www.sick.com/IDF)



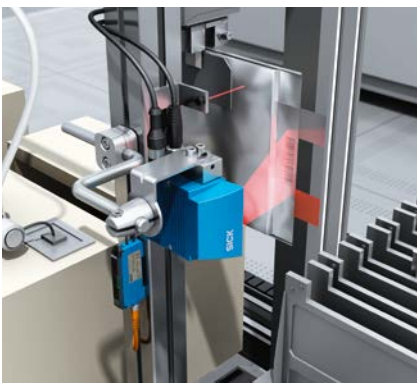
## Edge guiding at the winding unit

To ensure the highest level of quality when winding battery cells, the electrode and separator foils must be positioned accurately. The OL1 optical micrometer, together with the AOD1 evaluation unit, measures the edge position down to a few micrometer and fits directly in front of the winding unit thanks to its small construction.

- Optical micrometer OL1
- Evaluation unit AOD1



→ [www.sick.com/OL1](http://www.sick.com/OL1)



## Identification of cells

SICK offers a wide range of solutions for tracing cells across the entire production process. Bar code scanners from the CLV62x product family are suitable for the identification of cells using 1D bar codes. The WLL180T fiber-optic sensor and fibers from SICK also make it possible to mount a trigger in a way that saves space.

- Bar code scanner CLV62x
- Fiber-optic sensor WLL180T



→ [www.sick.com/CLV62x](http://www.sick.com/CLV62x)

→ [www.sick.com/WLL180T](http://www.sick.com/WLL180T)

## MODULE AND PACK MANUFACTURING



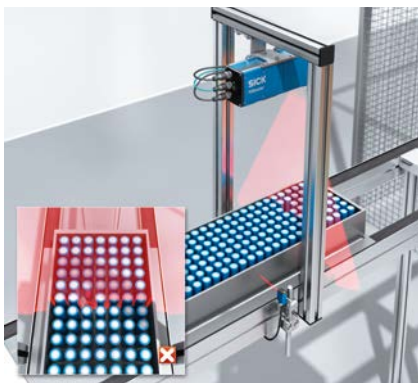
### Multiple code reading

The Lector63x image-based code reader can identify all battery module codes and assign them to the respective cells. Thanks to its large field of view and high depth of field, the Lector63x offers a great degree of flexibility with regard to code positions, object height, and transport speed.

- Image-based code reader Lector63x



→ [www.sick.com/Lector63x](http://www.sick.com/Lector63x)



### Inspection of battery modules

The configurable TriSpector1000 3D vision sensor makes a reliable 3D inspection of individual components in the battery module possible. This includes checking the presence and position of individual cells in the module, for example. As a result, TriSpector1000 can be used as a stand-alone sensor from the beginning to ensure correct mounting.

- 3D vision sensor TriSpector1000



→ [www.sick.com/Trispector1000](http://www.sick.com/Trispector1000)



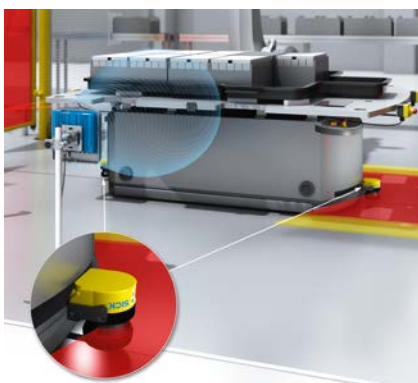
### Detection with miniature sensor

Thanks to its rugged housing design, the W2S-2 miniature photoelectric sensor is the ideal solution for use in flat grippers that have been built with material savings in mind. Even without reflectors, they reliably detect even deep-black or highly reflective objects, such as housing for battery cells, modules, and packs.

- Miniature photoelectric sensor W2S-2



→ [www.sick.com/W2S-2](http://www.sick.com/W2S-2)



### Protection of automated guided vehicles

SICK offers an extensive portfolio of products for the protection of automated guided vehicles in the production of battery packs. When used in combination with a safety controller, safety encoder, and safety switch, the S300 Mini Remote safety laser scanner ensures protection of both human and machine.

- Safety laser scanner S300 Mini Remote
- Safety controller Flexi Soft
- Safety encoder DFS60S Pro



→ [www.sick.com/S300\\_mini\\_remote](http://www.sick.com/S300_mini_remote)

→ [www.sick.com/Flexi\\_Soft](http://www.sick.com/Flexi_Soft)

→ [www.sick.com/DFS60S\\_Pro](http://www.sick.com/DFS60S_Pro)

## SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 8,800 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, SICK is always close to its customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents, and preventing damage to the environment.

SICK has extensive experience in various industries and understands their processes and requirements. With intelligent sensors, SICK delivers exactly what the customers need. In application centers in Europe, Asia, and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes SICK a reliable supplier and development partner.

Comprehensive services round out the offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

**That is “Sensor Intelligence.”**

### **Worldwide presence:**

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Hong Kong, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

Detailed addresses and further locations → [www.sick.com](http://www.sick.com)