



# MACHINE TOOLS

EFFICIENT APPLICATIONS SOLUTIONS

**SICK**  
Sensor Intelligence.

## CHALLENGES IN THE MACHINE TOOLS INDUSTRY

SICK has been shaping the machine tools industry for decades with its innovative and intelligent sensor solutions. Whether in individual machines or automated production cells, SICK's "Sensor Intelligence." helps make machines and systems safer, faster, and more flexible for a wide range of production requirements. Simply achieve complete machine safety using safety sensors and safety controllers that operate in accordance with applicable standards. Selecting the optimal sensors enables you to intelligently automate production processes involving a wide range of application requirements. In addition monitoring production quality is integrated into process. This is where SICK uses its comprehensive industry and sensor expertise to create superior solutions.



Learn more about sensor solutions for the machine tools industry  
[→ www.sick.com/machine\\_tools](http://www.sick.com/machine_tools)



### Detecting and measuring

The trend for small lot sizes and the fulfillment of individual customer requirements demand the need for enhanced flexibility and also efficient production. A multitude of sensors and solutions from SICK, comprising a range of designs, functions, and modes of operation, play a decisive role in meeting this requirement.



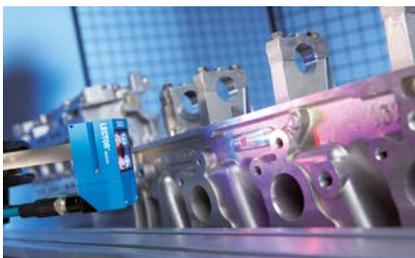
### Protecting

The interaction between man and machine and the harsh ambient conditions that can sometimes be present pose particular challenges with respect to safety technology in the machine tools industry. With this in mind, SICK offers an exceptionally broad portfolio of safety solutions, all of which are characterized by how well they can be integrated in your control system. This is also accompanied by a comprehensive service package that includes consultation, commissioning, training, and education.



### Monitoring and controlling

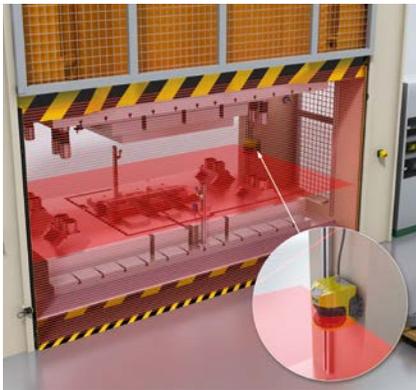
SICK offers reliable solutions for all quality control applications: Photoelectric proximity sensors to check that materials are present in the production process, distance sensors for precise measurement of workpieces, vision sensors to monitor production features, and 3D vision systems for high-end testing. These solutions ensure that the high quality that is demanded in each application is achieved.



### Data management and identification

For automated production processes, workpiece-specific production data is supplied using coded information on a document. This information can then be scanned to enable the corresponding machine programs to be converted automatically. It must be possible for suppliers (e.g., in the automotive industry) to uniquely trace the components they have manufactured. SICK provides practical solutions for these requirements, including stationary code reading systems, mobile bar code scanners, and RFID solutions.

# PRESSES



## Hazardous point protection

The C4000 or deTec4 Core safety light curtain provides hazardous point protection on both sides of the press. The interior of the press is monitored using a secondary protective measure, such as the S3000 safety laser scanner. It prevents the press from starting as long as there is a person inside the press. Once the press has started, the laser scanner is muted when the press is performing its downstroke.

- Safety light curtain / Safety laser scanner



- [www.sick.com/deTec4](http://www.sick.com/deTec4)
- [www.mysick.com/en/deTec4](http://www.mysick.com/en/deTec4)
- [www.mysick.com/en/S3000](http://www.mysick.com/en/S3000)



## Complete machine control with Flexi Soft

The compact Flexi Soft modular safety controller allows comprehensive safety functions to be implemented. "Nonsafe" signals can also be evaluated via standard I/O modules. On electrically driven presses, the Drive Monitor FX3-MOC extends the safety concept with the addition of safe drive monitoring.

- Safety controllers / Drive Monitor



- [www.mysick.com/en/Flexi\\_Soft](http://www.mysick.com/en/Flexi_Soft)
- [www.sick.com/FlexiSoft-Video](http://www.sick.com/FlexiSoft-Video)
- [www.sick.com/drivemonitor-video](http://www.sick.com/drivemonitor-video)



## Measuring pressure, level, and temperature in hydraulic systems

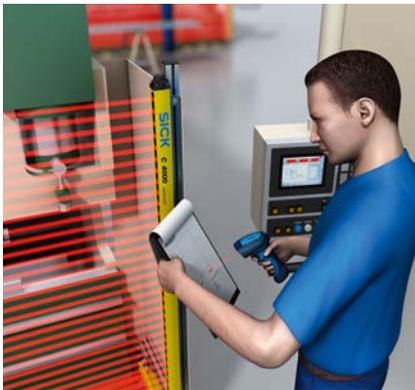
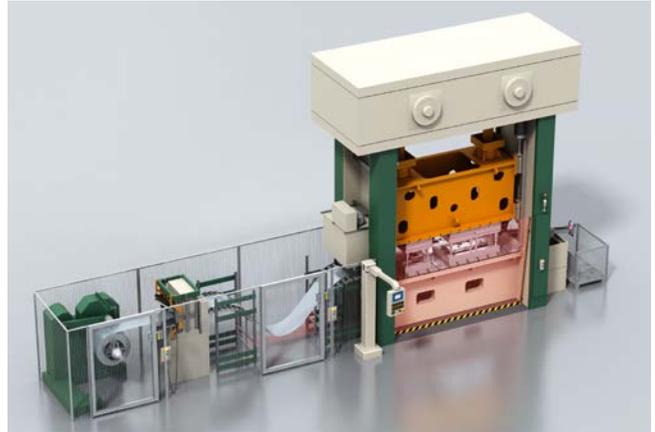
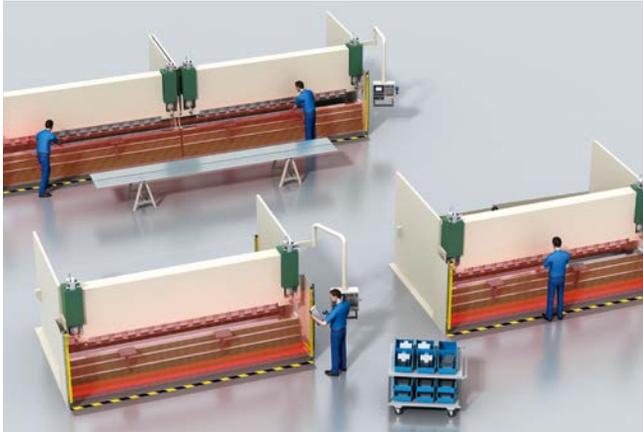
The LFP Cubic level sensor monitors the oil level in the tank within the hydraulic system of the press. The PBS digital pressure switch or a PBT analog pressure transmitter measures the system and forming pressure to ensure the best possible component quality. The TBS temperature switch measures the oil temperature to prevent overheating.

- Fluid sensors



- [www.mysick.com/en/PBS](http://www.mysick.com/en/PBS)
- [www.mysick.com/en/LFP\\_Cubic](http://www.mysick.com/en/LFP_Cubic)
- [www.mysick.com/en/TBS](http://www.mysick.com/en/TBS)

# AUTOMATED PRESSES



## Mobile identification of production data

The rugged IDM160 hand-held scanner is used to read a bar code from an order sheet; this bar code contains all the information required to configure the system for a particular series part. The data is wirelessly transferred to the base station. A majority of the system conversion is completed automatically. The operator receives all the information required for the production series on the display.



→ [www.mysick.com/en/IDM160](http://www.mysick.com/en/IDM160)

- Hand-held scanner



## Metal sheet uncoiling

To ensure a constant feed of material, the uncoiling speed of the sheet coil must be regulated. The DT35 distance sensor continuously measures the radius of the sheet coil throughout the entire unwinding process. The DFS60 incremental encoder uses a friction roller to measure the retraction speed of the sheet.



→ [www.mysick.com/en/DT35](http://www.mysick.com/en/DT35)  
→ [www.sick.com/dx35-video](http://www.sick.com/dx35-video)  
→ [www.mysick.com/en/DFS60](http://www.mysick.com/en/DFS60)

- Distance sensor / Incremental encoder



## Tool monitoring (in-die sensing)

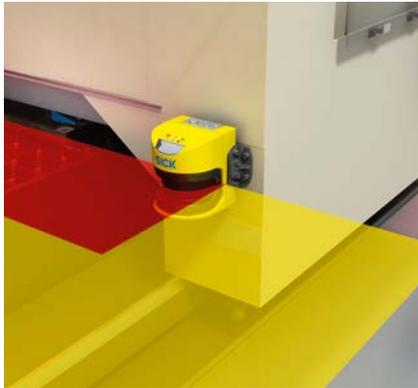
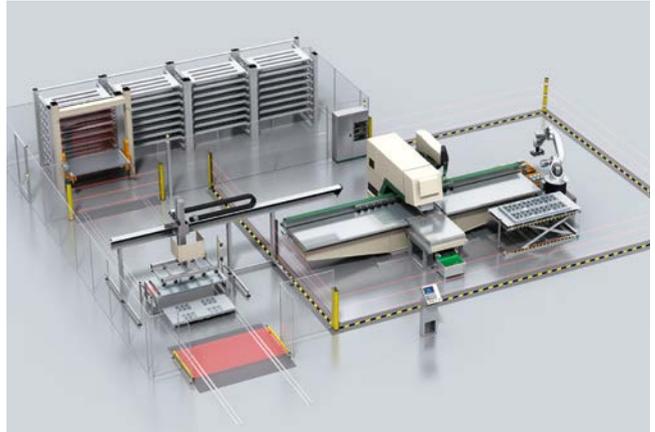
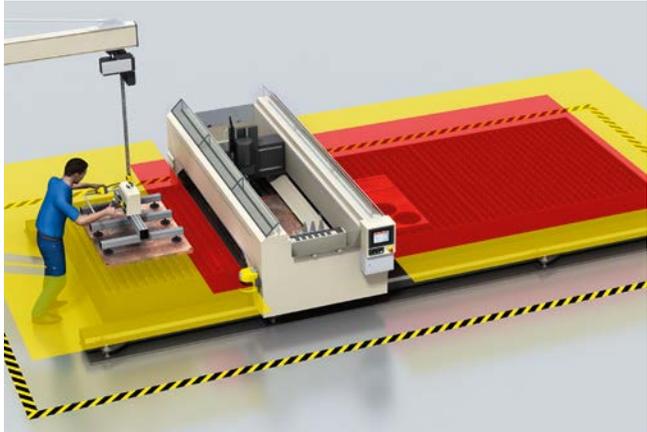
The IQ Flat inductive proximity sensor, which is integrated into the press tool, detects whether the metal workpiece is correctly positioned. The W9L-3 Laser small photoelectric sensor – mounted outside of the tool – detects precise workpiece features. A W27 MultiPac photoelectric sensor enables punching tool breakages to be monitored even when dealing with reflective surfaces.



→ [www.mysick.com/en/IQ\\_Flat](http://www.mysick.com/en/IQ_Flat)  
→ [www.mysick.com/en/W9L-3](http://www.mysick.com/en/W9L-3)  
→ [www.mysick.com/en/MultiPac](http://www.mysick.com/en/MultiPac)

- Inductive proximity sensor / Photoelectric sensors

# CNC PLASMA CUTTING MACHINE LASER CUTTING AND TURRET PUNCHING MACHINES



## Hazardous area protection at the machining table

S3000 safety laser scanners with simultaneous protective fields can be used on both sides of the CNC portal to protect the machine; they can be used as an alternative to M4000 multiple light beam systems or fences. This increases the machine's productivity and simplifies loading and unloading.

- Safety laser scanner



→ [www.mysick.com/en/S3000](http://www.mysick.com/en/S3000)



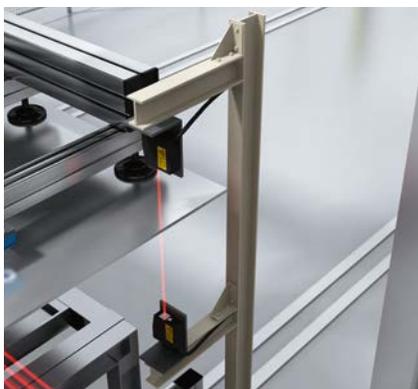
## Height positioning in metal sheet storage

The material lift is used to move stacks of sheets from a transfer carriage or residual sheets from a vacuum nozzle to an interim shelf for storage. The BTF13 wire draw encoder signals the absolute height position of the material lift to the control. The bottom and top final positions of the material lift are monitored by inductive proximity sensors.

- Wire draw encoder / Inductive proximity sensor



→ [www.mysick.com/en/Highline](http://www.mysick.com/en/Highline)  
→ [www.mysick.com/en/IM\\_Standard](http://www.mysick.com/en/IM_Standard)



## Non-contact double sheet monitoring

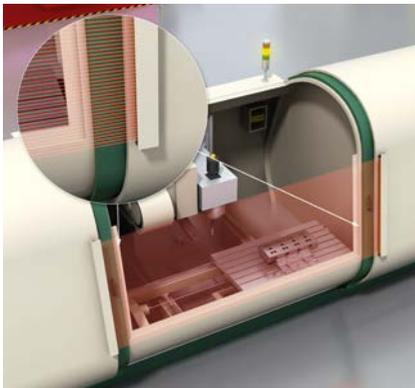
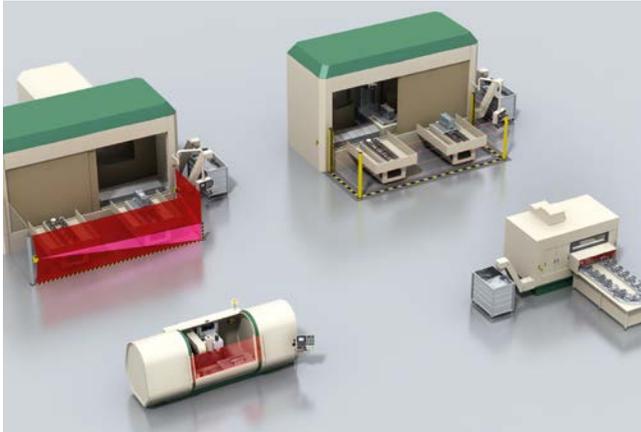
Two OD displacement sensors determine the thickness of the sheet with an accuracy of  $\pm 10 \mu\text{m}$ . This solution reliably detects double sheets and sheet thickness. The non-contact measurement method improves the cycle time and, consequently, the efficiency of the machine. An evaluation unit calculates the measuring signals and transfers the results to the control.

- Displacement sensor



→ [www.mysick.com/en/OD\\_Precision](http://www.mysick.com/en/OD_Precision)

## AUTOMATED CNC MILLING AND TURNING MACHINES



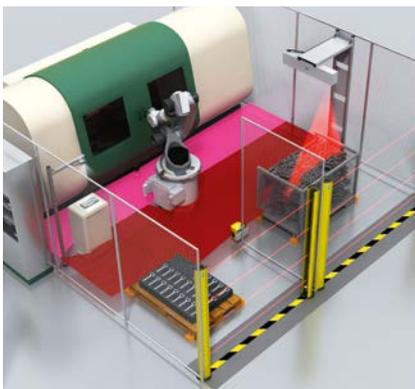
### Hazardous point protection at machine doors that close automatically

The deTec4 Core safety light curtain is installed upstream of the machine door, which closes automatically. The miniTwin has a small size, a flexible mounting design, and no blind zones, enabling easy integration. Used in conjunction with a safety relay or the Flexi Soft safety controller, it enables safety functions to be configured easily.

- Safety light curtain / Safety controller



→ [www.sick.com/deTec4](http://www.sick.com/deTec4)  
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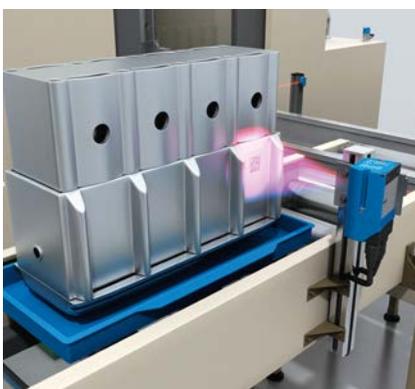
### Part location in boxes

Piston rods are delivered in boxes as bulk materials. The rods must be separated from the boxes for further processing. The PLB system solution supplies the robot with the necessary information to take the parts out of the box individually. The connecting rods are then placed into the machine at the specified position and aligned accordingly. Depending on the required resolution and the inspection characteristics, quality control is performed using the Inspector vision sensor. The shape of the current connecting rod is compared to the dataset taught for an ideal connecting rod

- Robot guidance systems / Vision sensor



→ [www.sick.com/PLB](http://www.sick.com/PLB)  
→ [www.mysick.com/en/PLB](http://www.mysick.com/en/PLB)  
→ [www.mysick.com/en/Inspector](http://www.mysick.com/en/Inspector)



### Identification of the motor block

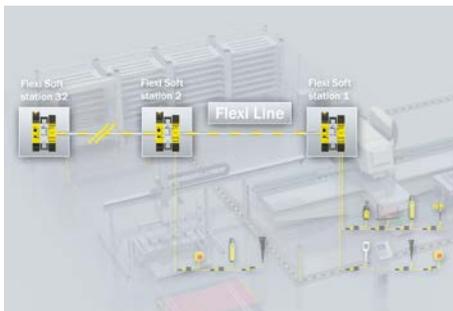
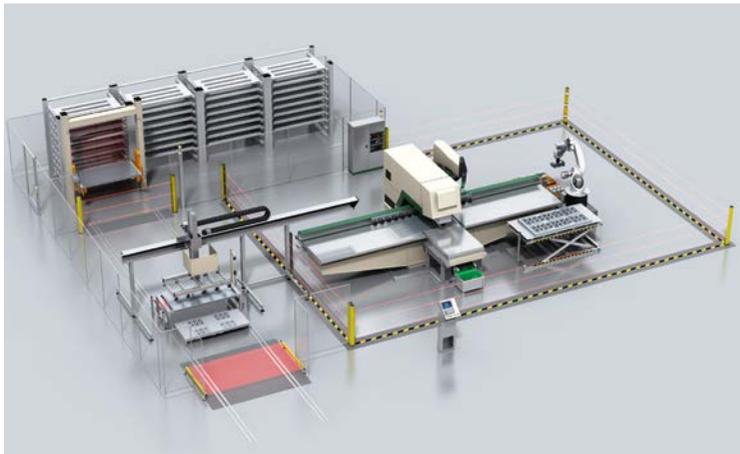
The required information for product tracing is contained in dot-peened 2D codes on the cylinder heads. The codes are located on the bright polished surface and must be clearly identified. The LECTOR®620 image-based code reader performs this task reliably.

- Image-based code reader



→ [www.sick.com/lector-video](http://www.sick.com/lector-video)  
→ [www.mysick.com/en/LECTOR62x](http://www.mysick.com/en/LECTOR62x)

# SAFETY CONTROL SOLUTIONS



## Flexi Line – Modular machine design

The Flexi Line enables the networking of up to 32 Flexi Soft stations with a 2-wire standard cable – no additional hardware is required. Thanks to the unique global definition of the process map (96-bit data transfer rate), specific addressing of the individual stations is no longer necessary. This allows easy modification or expansion of the whole system at any time.



→ [www.mysick.com/en/Flexi\\_Soft](http://www.mysick.com/en/Flexi_Soft)  
 → [www.sick.com/FlexiLine-Video](http://www.sick.com/FlexiLine-Video)

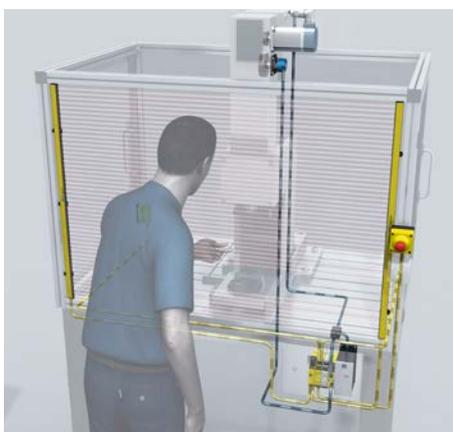


## Flexi Loop – Easy connectivity

The Flexi Loop can cascade up to 32 safety sensors. Safety switches and safety sensors with OSSD outputs can be used regardless of the manufacturer. For each sensor, detailed diagnostics is also available, including information on which sensor was switched and why. Integrated output signals allow the use of interlocks, switches and lamps. Using a unscreened single cable with an M12 plug, the Flexi Soft can support up to eight Flexi Loops, reducing wiring effort and the number of safety inputs in the control cabinet as well as saving costs.



→ [www.mysick.com/en/Flexi\\_Soft](http://www.mysick.com/en/Flexi_Soft)  
 → [www.sick.com/FlexiLoop-video](http://www.sick.com/FlexiLoop-video)



## Motion Control – Safe drive monitor

On electrically driven machines, such as servo-presses, tube bending and CNC plasma cutting machines as well as CNC milling and turning machines, the Flexi Soft Drive Monitor safely monitors speed, standstill, direction of movement, and stop functions. The machine cycle doesn't necessarily need to stop during setup and maintenance - at a reduced speed, it is possible to access the machine manually with minimal risk of injury. This allows the Drive Monitor to improve the machine's productivity. When malfunctions are detected, however, the machine drives are shut down.

## Motion Control



→ [www.sick.com/DriveMonitor](http://www.sick.com/DriveMonitor)  
 → [www.sick.com/drivemonitor-video](http://www.sick.com/drivemonitor-video)  
 → [www.mysick.com/en/flexi\\_soft\\_drive\\_monitor](http://www.mysick.com/en/flexi_soft_drive_monitor)

## SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 6,500 employees and over 50 subsidiaries and equity investments as well as numerous representative offices worldwide, we are always close to our 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.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our 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 us a reliable supplier and development partner.

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

**For us, that is “Sensor Intelligence.”**

### **Worldwide presence:**

Australia, Austria, Belgium/Luxembourg, Brazil, Czech Republic, Canada, China, Denmark, Finland, France, Germany, Great Britain, Hungary, India, Israel, Italy, Japan, Mexico, Netherlands, Norway, Poland, Romania, Russia, Singapore, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, United Arab Emirates, USA

Detailed addresses and additional representatives → [www.sick.com](http://www.sick.com)