

# DRIVES AND CONTROLS

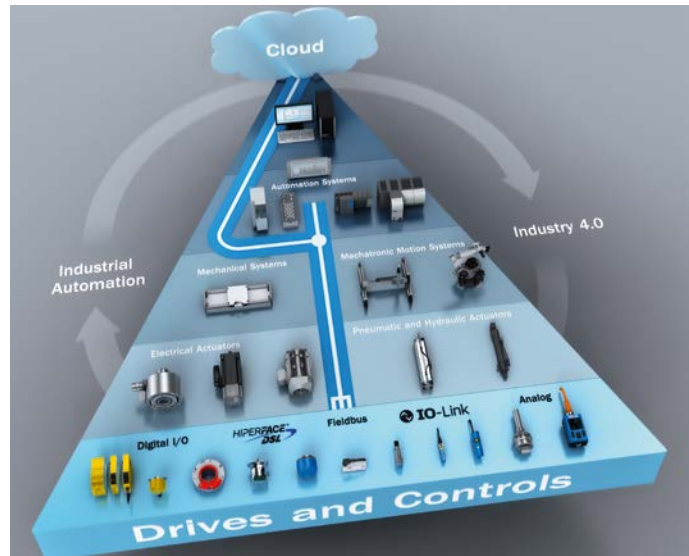
EFFICIENT APPLICATION SOLUTIONS

**SICK**  
Sensor Intelligence.



## CHALLENGES FOR DRIVES AND CONTROLS

Automation and drive technology providers are faced with a challenge: offering their customers electrical, pneumatic and hydraulic drive solutions that are both extremely precise and reliable, while also being durable and dynamic. They must be able to safely record, monitor, and control movements, and considerations such as ease of commissioning and predictive maintenance are just as important as the sensors' monitoring of machine processes. Standardized communication interfaces as well as simple integration into the control environment and the cloud are additional requirements. SICK's intelligent sensors can meet all of these demands.



→ [www.sick.com/drives\\_and\\_controls](http://www.sick.com/drives_and_controls)



### Safe Motion

The innovative Safe Motion concept stands for safe movement monitoring for machines, plants, robots and automated guided vehicle systems. This primarily has to do with protecting humans from injuries, but also protecting capital goods from damage or destruction. That is why SICK provides intelligent sensor systems which enable increases in productivity and efficiency and reduce downtime of the monitored unit at the same time.



### Measurement

Reliable and accurate measurement as well as the recording of data on pressure, flow, level and temperature are of fundamental importance for various industries. SICK has the right solutions for these applications: Electronic pressure transmitters and switches, sensor systems for temperature measurement in liquids and gases as well as level and flow sensor systems for different types of media.



### Recording, monitoring and controlling

SICK offers a wide product portfolio for safely and reliably recording movements or the current position of hydraulic, pneumatic or electrical actuators. Movements and positions can be intelligently monitored and controlled by drive amplifiers and controllers.



### Connectivity

Industry 4.0 is all about digitalization and intelligent networking. The first part of networking involves the integration of the sensor into the overall architecture of an application. A clear description of the required sensor data and how it is combined with the further data world of the application is very important here. With various interfaces, SICK is supporting in the easy and direct transmission of sensor data to the relevant elements within the automation pyramid as well as data transmission to the cloud.



# ACTUATORS

## Hydraulic & Pneumatic Actuators



### Positioning of hydraulic cylinders

Positioning the individual hydraulic cylinders of the excavator arm enables partial automation of work processes. This makes it possible to strip a slope, for example. Rugged MAX linear encoders - integrated into the hydraulic cylinder of the excavator arm - first detect the actual position. The target position is then approached by the hydraulic control.



→ [www.sick.com/MAX48](http://www.sick.com/MAX48)



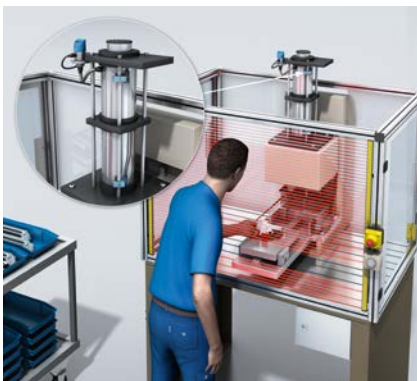
### Pressure, level, and temperature measurement in hydraulic units

A PBS pressure switch measures the system pressure of the hydraulic pump and compares the actual value with the set value. The CFP Cubic capacitive level sensor monitors the level and temperature of hydraulic oil in the unit within the four programmable switching thresholds at the same time. It therefore prevents pump damage caused by too little oil. Alternatively, the LFP Cubic TDR level sensor can be used together with the TBT temperature sensor.



→ [www.sick.com/CFP\\_Cubic](http://www.sick.com/CFP_Cubic)

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



### Monitoring of the end positions of a press cylinder

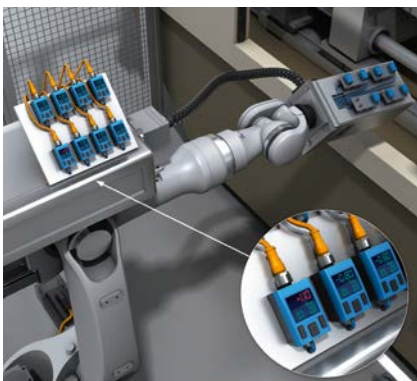
Two MZT8 magnetic cylinder sensors monitor the final positions of the press cylinder. Alternatively, the MPA analog positioning sensor and the PBS pressure switch enable the press force and path to be monitored easily and precisely up to a length of 1,007 mm.



→ [www.sick.com/MZT8](http://www.sick.com/MZT8)

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

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



### Monitoring and definition of the pressure in the vacuum gripper

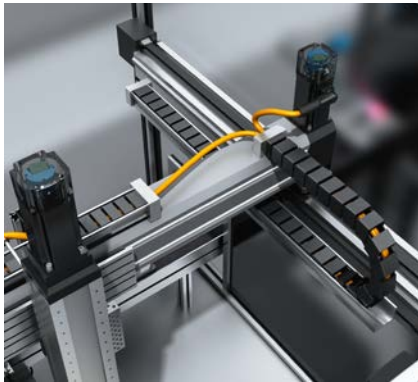
Finished parts are removed from the mold by the vacuum removal gripper on a robot. With its positive and negative pressure ranges, the PAC50 pressure sensor is well suited for determining and monitoring the suction pressure in the gripper. The analog output signals of the PAC50 can be inverted specifically for negative measuring ranges.



→ [www.sick.com/PAC50](http://www.sick.com/PAC50)

# ACTUATORS

## Electrical Actuators



### Gripper positioning of the 3-axis gantry robot

The 3-axis gantry robot removes the component from the work-piece carrier and precisely supplies it to the joining process. Here, it is critical that the movements necessary for positioning within the process are carried out with a high degree of accuracy. The EKM36 motor feedback system with a digital HIPERFACE DSL® interface determines the actual position at a resolution of up to 20 bits per revolution and thus positions the gripper with extreme accuracy. Automatic synchronization with the controller clock optimizes the control loop in the drive. Thanks to the integration of the encoder communication in the motor line, HIPERFACE DSL® reduces cabling needs by 50%. This is an extremely useful benefit, especially for moving axes.



→ [www.sick.com/EKS\\_EKM36](http://www.sick.com/EKS_EKM36)



### Position determination and monitoring on transfer systems

Right angle transfers or shuttle units are typically used for the flexible adaptation of modular transfer systems to different assembly lines. This repositioning of the carriers is typically carried out using small electric motors or pneumatic cylinders. DBS36 Core or DBS60 Core incremental encoders precisely determine the position of electrically driven axes of the transfer system. When using a pneumatic lifting cylinder, MZT8 magnetic cylinder sensors ensure exact position monitoring.



→ [www.sick.com/MZT8](http://www.sick.com/MZT8)

→ [www.sick.com/DBS36\\_Core](http://www.sick.com/DBS36_Core)

→ [www.sick.com/DBS60\\_Core](http://www.sick.com/DBS60_Core)



### Reliable control of a driving unit

An AFM60 EtherCAT® absolute encoder delivers the actual values for control of position speeds, for example on storage and retrieval systems. With its high resolution and repeatability, the encoder ensures that the positioning commands can be executed with precision. The integrated fieldbus interface of the encoder quickly and reliably transmits the respective process data to the control.

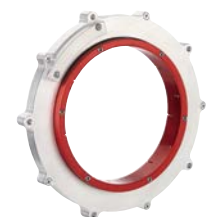


→ [www.sick.com/AFS\\_AFM60\\_EtherCAT](http://www.sick.com/AFS_AFM60_EtherCAT)



### Measuring the conveying speed on a rotary indexing table

To ensure the precise control of the individual rotary machine processes, the speed of the rotary indexing table must be continuously monitored. For this purpose, an SEK160 motor feedback system is mounted directly on the drive shaft of the table's torque motor, which eliminates the need for transmission elements such as toothed belts or couplings. The SEK160 is equipped with the HIPERFACE® industrial interface and thus compatible with all common drive systems.

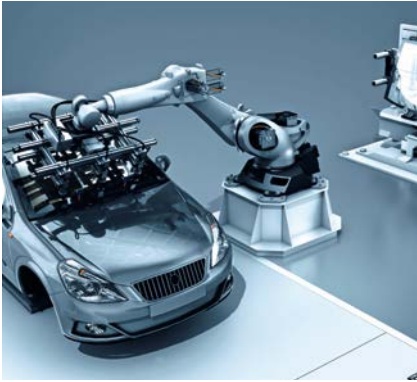


→ [www.sick.com/SEK160](http://www.sick.com/SEK160)



# MOTION SYSTEMS

## Mechatronic Motion Systems



### Efficient robot drives with HIPERFACE DSL®

The EKM36 motor feedback system is ideal for robot drives: Its HIPERFACE-DSL® protocol enables interference-free communication between the motor feedback system and robot control. It only needs two wires, which reduces the wiring in the robot and the costs associated with this. In addition, the EKM36 saves the robot control status data which the user can call up and analyze at any time.



→ [www.sick.com/EKS\\_EKM36](http://www.sick.com/EKS_EKM36)



### Collaborating robots

Collaborating robots, called cobots, are built compactly and require a high degree of repeatable positioning accuracy. The SES/SEM70 and SES/SEM90 rugged motor feedback systems for direct and mechanically rigid mounting on hollow shaft motors or motor-gear combinations are the space-saving solution for modern cobots and are well-suited for the safe operation of cobots when combined with other sensors. The motor feedback systems are maintenance- and wear-free thanks to the bearing-free technology.



→ [www.sick.com/SES\\_SEM70](http://www.sick.com/SES_SEM70)

→ [www.sick.com/SES\\_SEM90](http://www.sick.com/SES_SEM90)

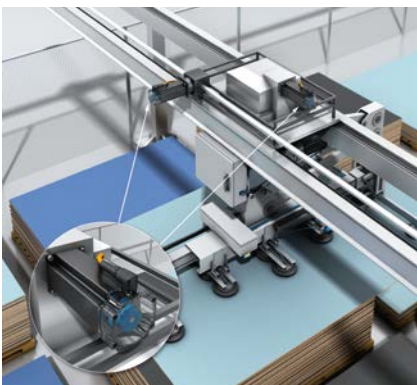


### Position determination of a SCARA robot

A linear motor moves the SCARA robot synchronously to the conveyor belt so that the robot can pick up workpieces with precision. Without making contact, the TTK70 linear encoder determines the absolute position of the robot. The compact read head of the encoder measures the position on coded magnetic tape reference material without causing wear. Using a unique code pattern, the encoder gathers information about the absolute position of the robot along the reference scale and transmits this data directly to the evaluation electronics. Once it has been installed, the TTK70 is immediately available and completely maintenance-free. This saves time and money.



→ [www.sick.com/TTK70](http://www.sick.com/TTK70)



### X-Y-kinematics for stroke movements

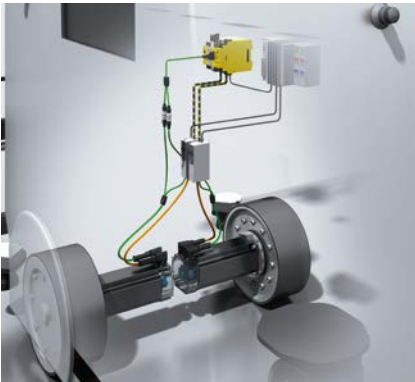
The interface of the EDS/EDM35 motor feedback system enables precise positioning code and safe speed measurement of the vacuum gripper using only two wires. The HIPERFACE DSL® one cable technology from SICK also reduces cable lug and transmits status diagnostic data, such as temperature and speed, to the servo amplifier.



→ [www.sick.com/EDS\\_EDM35](http://www.sick.com/EDS_EDM35)

# AUTOMATION SYSTEMS

## Safe Movement Monitoring



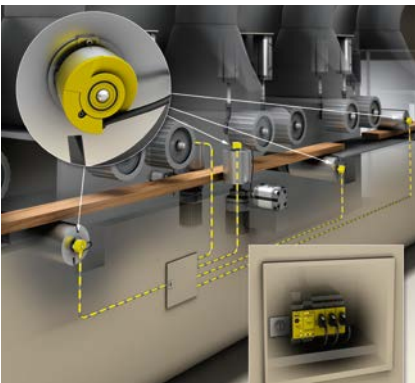
### Motion monitoring via HIPERFACE®

Automated guided vehicles (AGVs) with synchronous servo motors typically feature motor feedback systems for determining and controlling the speed and direction of travel. For example, the SKS/SKM36 or SRS/SRM50 with HIPERFACE® interface are typically used for safe transmission of the signals from the motor to the servo controller. In addition, the Drive Monitor FX3-MOC uses this interface for safe monitoring of vehicle movements as a component of the Flexi Soft safety controller.



→ [www.sick.com/SKS\\_SKM36](http://www.sick.com/SKS_SKM36)

→ [www.sick.com/SRS\\_SRM50](http://www.sick.com/SRS_SRM50)



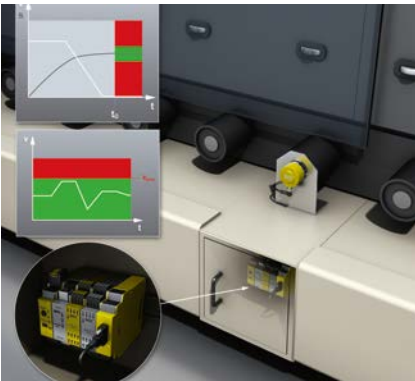
### Reliable speed monitoring of the roller drives

With the FX3-MOC motion control module, the Flexi Soft safety controller monitors the speed of the machine roller easily, flexibly and at low cost. If the machine comes to a standstill, a DFS60S Pro safety encoder monitors the stopping machine rollers together with the safety functions specified for this application which fulfill the requirements up to SIL 2 / PI d.



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

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



### Safe speed in automated production

In automated production, plant availability and the safety of operators must be ensured. That is why the Flexi Soft modular safety controller monitors the axis speeds with the FX3-MOC motion control module and the DFS60S Pro safety encoder. This reliably protects operators and prevents unplanned system downtimes.



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

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



### Monitoring of direction of travel and speed for automated guided carts

The direction of travel and speed of the transport cars must be recorded to ensure that automated guided carts manage curves quickly and safely. The DFS60S Pro safety encoder and the Flexi Soft safety controller with the FX3-MOC motion control module from SICK are ideal for this application. This safe system solution can also be integrated into automated guided carts using very little space.



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

→ [www.sick.com/S300\\_Professional](http://www.sick.com/S300_Professional)

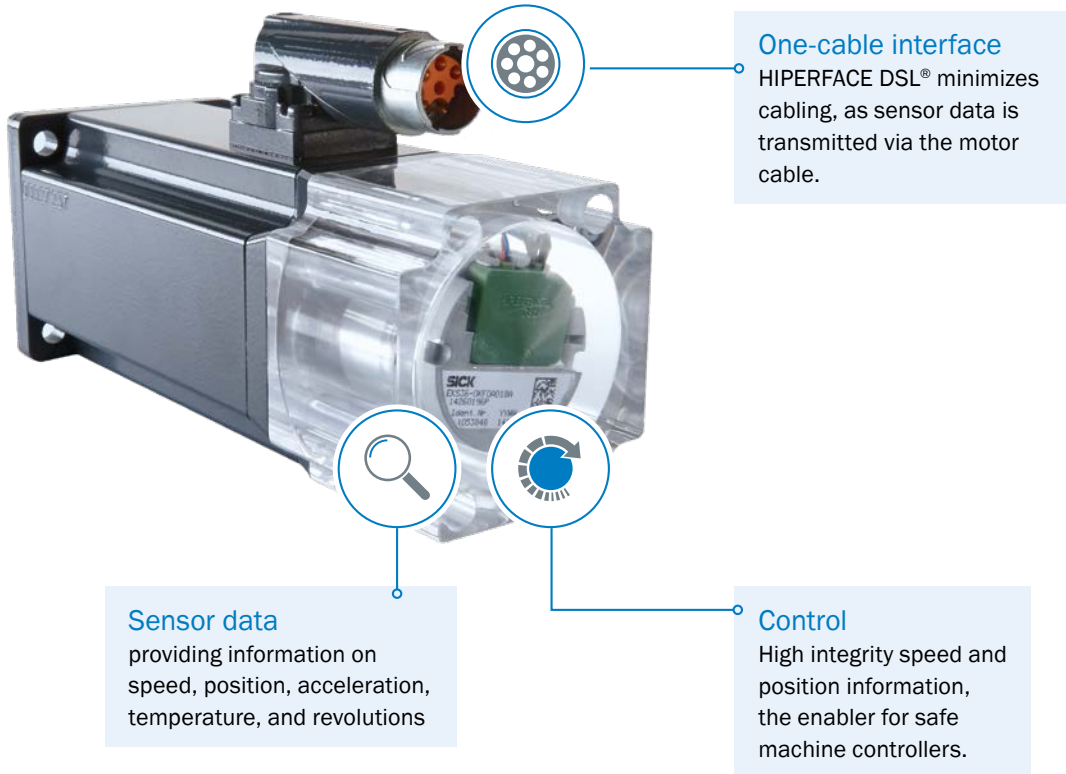
→ [www.sick.com/Safe\\_AGV\\_Easy](http://www.sick.com/Safe_AGV_Easy)

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

## SMART MOTOR SENSORS

### Smart motor sensors keep production running

Smart motor sensors are more than just a data source from the center of the drive. Smart Motor Sensors ensure efficient monitoring at any point when something is moving in a process. In many ways, Smart Motor Sensors are therefore the enablers of the future. And the future is here. With HIPERFACE DSL®, Smart Motor Sensors are already enabling condition monitoring and predictive maintenance. Moreover, they transmit reliable speed and position values for intelligent Safe Motion monitoring on the machine. The machine design is more compact thanks to the lack of a second motor connector and a separate encoder cable.

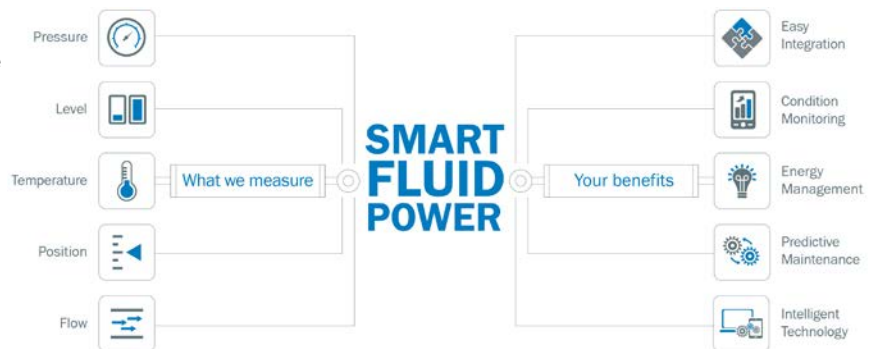


## SMART FLUID POWER

### SICK sensors for pneumatic and hydraulic systems make the difference

Due to their great flexibility and efficiency, hydraulic and pneumatic systems will become increasingly important in the future in mechanical engineering, the consumer goods sector and the electronics, solar and automotive industries. The list of possible and already realized applications is long. Intelligent sensors from SICK improve plant and machine availability. Whether in automated part handling, injection molding machines, hydraulic presses or CNC machines – fluid power sensors already check important function parameters as part of condition monitoring.

The sensors provide an even more sustainable solution for predictive maintenance, which results from condition monitoring. And that is already possible now thanks to SICK.



## SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 9,700 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)