# Robot Vision from SICK: System-based guidance for robot vision

Position determination and part localization in 2D and 3D

Waldkirch, June 2018 – Being showcased at the Automatica trade fair in Munich on June 19–22, 2018, SICK’s Robot Vision portfolio contains a whole range of innovative solutions for 2D and 3D localization of parts in automated, robot-assisted handling processes. Different options are available to suit each task: Streaming cameras, vision sensors, snapshot cameras, or smart cameras become the robot’s eyes based on the measuring ranges, fields of view and volumes of view, resolutions, or part movements involved in the task. The system solutions are designed with easy integration and fast operational readiness in mind, at both installation and operation level. They come ready-configured with all their illumination solutions optimized for the application on board, they allow a vast range of parts to be taught in via the sensor or even from a CAD system, and they incorporate all the software tools that are required for measuring parts and communicating directly with the robot controller. During operation, the integrated system solutions for part localization – which can be used in load carriers, lattice boxes, and containers, as well as on conveyor belts – offer more outstanding features: their excellent precision, repeatability and reliability, short cycle times, and high levels of availability.

Whether you choose the PLR, PLB, or PLOC2D system solution, you’ll benefit from SICK vision technology that enables the robot to localize and identify defined pre-defined objects, as well as decide itself how to grip the respective part.

**3D localization of parts in carriers**

The PLR robot guidance system from SICK is used for the localization of parts in load carriers – providing visual guidance for a robot while it is removing car body panels from a transport frame, for example. This stand-alone system solution comes pre-calibrated from the factory, and all the setup functions that it requires for lightning-fast installation, configuration, and commissioning are incorporated into the solution in a way that makes them easy to use. The integrated web server makes it possible to operate the PLR with any standard browser. Mounted directly on the robot arm, the PLR’s eye-safe laser sensor measures the exact position of both the load carrier and the components it contains. The system compensates for any position tolerances caused by the load carrier being placed imprecisely on the robot station, the parts moving in transit, or dimensional deviations resulting from production – and does so without being disrupted by reflections from components or other environmental factors. Not only that, but it also provides the robot controller’s coordinate system with corrected, exact 3D access coordinates for removing parts.

**Precise determination of component positions when reaching into containers**

SICK has developed the PLB robot guidance system for applications in which a robot needs to remove pre-positioned, unsorted, or stacked parts from a lattice box or a container so that machines can be loaded, for instance. The complete solution, which comes pre-configured, consists of a 3D snapshot camera with high image resolution, a powerful piece of software for 3D shape comparison and localization of parts, plus all the measuring and communication tools that are required for robot integration. As a result, the PLB’s hardware and software are ready for immediate use. And the solution comes with a whole host of special features – like the option of teaching in new parts flexibly via CAD and transferring them to the robot-assisted part handling system. The software elements involved in 3D detection of metal surfaces have also been optimized. This means that reflections from sheet metal, or from turned, forged, or cast parts, do not prevent the measuring function from delivering reliable results or impair the localization accuracy. Finally, not only is the PLB able to deliver exact actual coordinates for robot guidance within a short measurement cycle time, but it is also able to avoid collisions with the tote when positioning the gripper for part removal purposes.

**2D robot guidance in static and dynamic applications**

The PLOC2D sensor system from SICK is designed for automated 2D object localization. It includes a high-performance 2D camera with integrated illumination and the option of optics with a fixed or flexible focus, plus sensor software that features a powerful localization algorithm and integrated motion synchronization. The conveyor tracking function makes it possible to grasp even moving parts on a conveyor belt and provide the robot with the appropriate access coordinates. Every aspect of the PLOC2D robot guidance system is designed to ensure exceptionally short setup times – such as the web-based human machine interface, the straightforward commissioning concept that does not require a separate PC, the specialist software, the expert vision skills, and the user-friendly Easy Teach process for teaching in all kinds of different parts. All the functions required for integration into a variety of robot brands and their controllers are also provided as standard. Through all these features, the PLOC2D – which is able to localize more than 120 parts per minute – makes it possible to work with a whole host of applications, including localization of stamped parts on a conveyor belt, gripping parts in motion, part localization in dynamic secondary packaging processes, and robot-based sorting of different parts.

**Collaboration on an equal footing: SICK sensor solutions for robotics**

Industrial robotics holds one of the keys to establishing automation concepts that are fit for the future – and all the more so if they are able to provide an environment in which humans and robots can work increasingly as colleagues in a range of different scenarios. In these applications, it is the sensors that give robots the ability to perceive their environment accurately – and it is this that enables collaboration on an equal footing. With Robot Vision, Safe Robotics, End-of-Arm Tooling, and Position Feedback, SICK provides the right solutions for every challenge presented by robotics.

The optical and image-based systems in the **Robot Vision** portfolio provide the robot’s eyes, allowing it to detect humans and materials. Visual robot guidance in 2D and 3D makes it possible to deliver highly flexible and productive automation solutions in production, mounting, joining, and handling processes – such as those found in automated glue bead application, weld seam inspection, and bin-picking applications.

**Safe Robotics** from SICK provides solutions that are designed to keep humans safe. They include all the measures that turn the sensitive area close to the robot into a safe workspace. Adaptive perception of the environment takes place with the aid of intelligent, rugged, and reliable sensors and safe systems. These enable unimpaired and safe human intervention into the robot’s working range – allowing people to work closely alongside robots and keeping them safe in the process.

With **End-of-Arm Tooling**, SICK offers sophisticated, intelligent sensors for grippers and robotics tools, designed to keep robots as sensitive as possible and enabling them to work with fingertip precision. The portfolio covers all gripper arm applications and the feed systems associated with them.

In **Position Feedback** solutions from SICK, the motor feedback systems integrated into the drives deliver data on speed and position as well as on the status of the drive. As a result, these smart motor sensors create the sensory foundation for all robot movements.



Image: SICK\_PLOC2D\_IM0077405

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SICK is one of the world’s leading producers of sensors and sensor solutions for industrial applications. Founded in 1946 by Dr.-Ing. e. h. Erwin Sick, the company with headquarters in Waldkirch im Breisgau near Freiburg ranks among the technological market leaders. With more than 50 subsidiaries and equity investments as well as numerous agencies, SICK maintains a presence around the globe. In the fiscal year 2017, SICK had almost 9,000 employees worldwide and achieved group sales of around EUR 1.5 billion.

Additional information about SICK is available on the Internet at http://www.sick.com or by phone on +49 (0) 7681 202 4183.