

PLB

PRECISE LOCALIZATION OF PARTS IN BINS

Robot guidance systems



PLB ROBOT GUIDANCE SYSTEMS

PROCESS OPTIMIZATION AND COST SAVINGS FOR AUTOMATED PARTS HANDLING IN PRODUCTION

Robot-automated parts handling offers considerable potential for manufacturing process optimizations and cost reductions. Parts handling during the loading of machines demands a reliable, flexible solution that is able to adapt to diverse system configurations and specific application requirements. The PLB system from SICK can be used in a wide variety of applications such as automotive powertrain production or cast parts manufacturing.

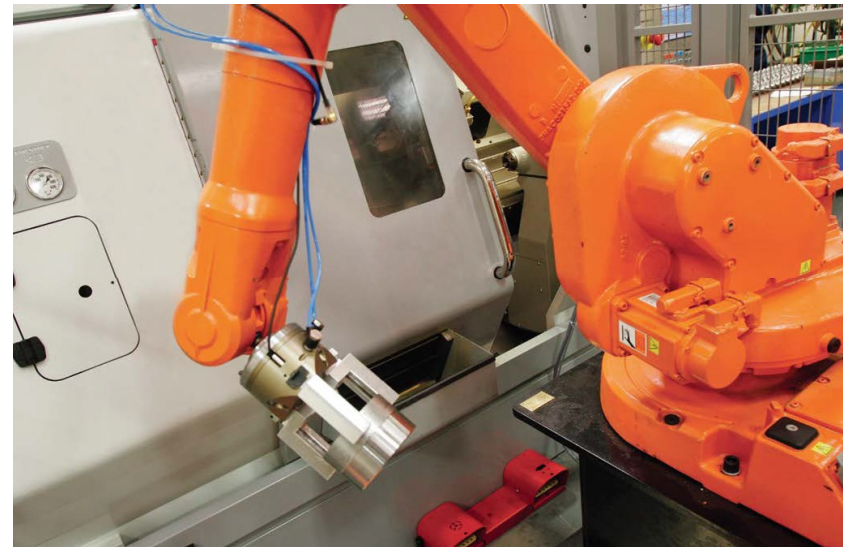
The functionality of conventional machine vision systems is often inadequate for the task of robot guidance. For instance, they do not have any functions for aligning the coordinates of the vision system and the robot or verifying the collision-free positioning of the gripper in the bin. Usually new applications require a substantial amount of programming by the user, making the time and cost for application development too high.

The PLB system provides an alternative to this. By offering flexible CAD-based teach-in of new parts without the need for programming, new applications can be configured within an hour.

With all the tools for integration with the robot available, and 3D-image acquisition optimized for metal surface imaging, it is easy to build the complete application.

Implementation of the system makes it possible to considerably increase the degree of automation in targeted parts handling applications.

The PLB system from SICK is a cost-efficient, user-friendly system for optimizing production equipment by providing robot-assisted parts handling.



EXAMPLES OF USE

The PLB system from SICK has been developed for precise localization of parts in bins and boxes. The system can be used in applications where parts need to be localized and passed to the production process individually. Such applications include handling of

Blanks, cast parts and forged parts

When manufacturing individual components for powertrain and chassis, the blanks are usually collected in bins and transported between the manufacturing cells, for instance lathes or loading systems, in order to cut down on costs.



Components in the assembly process

During assembly, different components and assemblies are taken from boxes, where they are sometimes packed loosely, and combined to form the final product.



Stacked goods

Parts such as pistons, shafts and cylinder heads stacked in several layers on pallets are removed from the pallets and singularized.



LOCALIZATION OF PARTS IN BINS



Product description

The PLB system was developed for precise localization of parts in bins and boxes. It mobilizes the CAD-based teach-in of new parts for easy configuration of new applications and supports short pick-to-pick cycle times and high throughput.

The system comprises a 3D camera and part localization software along with additional tools for easy integration with a higher-level controller. The camera delivers accurate and reliable 3D images and is unaffected by ambient artificial light.

The field-proven tools and functions for alignment of the PLB system with the robot coordinate system, communication with the robot and verification of collision-free gripper positioning relative to the part make it a simple matter to integrate the system in production.

Both the software and hardware are designed to be used out of the box, so you can begin to use the system productively without further preparations.

At a glance

- Localization of parts in bins and boxes independent of part orientation
- 3D camera with superior image quality
- Reliable part localization, even under varying ambient conditions
- Part localization based on matching between CAD model of part and 3D image
- Verification that free space is available for the gripper in reported pick positions
- Complete solution comprising hardware and software preconfigured and tailored for the precise localization of parts in bins
- Integrated tools for coordinate alignment and communication with the robot

Your benefits

- The comprehensive, easy-to-use solution makes it possible to configure new applications quickly and efficiently
- PLB noticeably reduces the effort of analyzing and designing solutions for new applications
- PLB enables reliable robot-automated part-picking without the need for precise part placement in the bin or on the pallet, thereby maximizing part handling uptime
- Features tailored for the target applications ensure high part localization accuracy and short part picking cycle time
- With PLB, no machine vision expertise is needed in order to use and maintain the system
- CAD-based localization makes it easy to introduce new parts in production

Additional information

Detailed technical data	5
Ordering information	5
Dimensional drawings	6

Detailed technical data

Features

System type:	Robot guidance
Applications:	Localization of parts in storage bins
System features:	3D camera and software package for part localization
Camera:	3D snap-shot
Example volume of view (L x W x H):	800 mm x 1,200 mm x 1,000 mm (max. size of field of view) 1,000 mm x 1,200 mm x 750 mm (max. height range)
Nominal working range:	1,000 mm through 2,000 mm
Image resolution (X, Y, Z):	1 mm through 4 mm, depending on the distance from the camera
Light source:	Laser, red, 660 nm, ± 13 nm
Laser class:	2M
3D CAD format:	IGES, STEP
Part size (approximate):	> 100 mm x 100 mm x 100 mm
Localization principle:	Matching of 3D shape between CAD model and 3D image
Output data:	x, y, z (mm), roll, pitch, yaw (degrees)

Performance data

Part localization time:	5 s through 10 s (typical)
Localization accuracy:	< ± 2 mm and < ± 1° (typical)

Interfaces

Communication:	Ethernet, 2x, camera <-> PC, PC <-> robot
Data transfer rate (Ethernet):	1 Gbit/s (camera), 10/100 Mbit/s (robot)
Protocol (Ethernet):	UDP/IP (camera), TCP/IP (robot)
Digital I/O:	24 V DC I/O (1x input, 1x output)

Camera

Mechanical/electrical

Connections:	Power: M12, 8-pin male, Ethernet: RJ45
Supply voltage:	100 V through 240 V AC ± 15 %
Housing material:	Aluminum
Housing color:	Gray, powder-coated
Dimensions (L x W x H):	820 mm x 107 mm x 145 mm
Weight:	13.5 kg
Enclosure rating:	IP 65

Ambient data

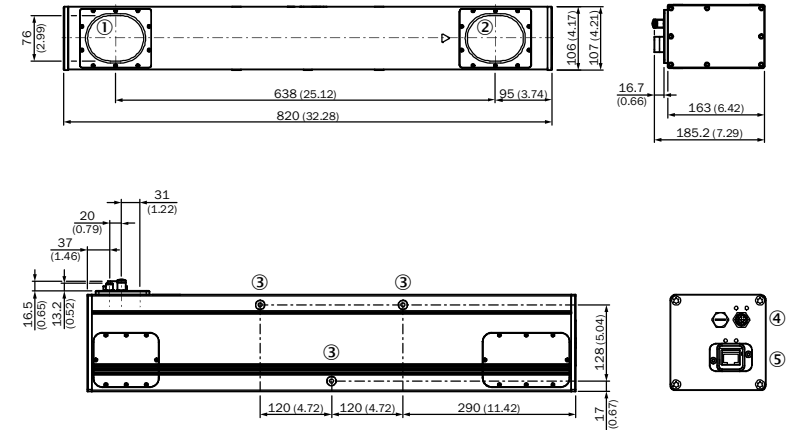
Ambient temperature, operation:	0 °C through 40 °C, non-condensing
Impact load¹⁾:	15 g, 3 x 6 directions
Vibration load¹⁾:	5 g, 58 Hz through 150 Hz

¹⁾ Not during scanning

Ordering information

System type	System characteristics	Type	Part number
Robot guidance	3D camera and software package for part localization	PLB-500	1058009

Dimensional drawings



All dimensions in millimeters (inches)

Key

- ① Image sensor
- ② Laser unit and rotating mirror
- ③ Fastening screw thread (M8 x 15 mm)
- ④ Voltage I/O (M12, 8-pin)
- ⑤ Gigabit Ethernet