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Sensor Intelligence.

# PLB510/540

QUICKSTART en

## 1 About this document

This document contains instructions and descriptions that support the basic setup of the PLB510 and PLB540 systems, including basic image acquisition. This document should be used in conjunction with the Quickstart of the specific camera in the system, which can be found on www.sick.com.

This document is valid for the PLB510 (Visionary-S CX) and PLB540 (Visionary-T Mini CX) systems.

For more information on the PLB system, please refer to the Operating Instruction. The PLB Operating Instruction is included when downloading the PLB software from SICK Support Portal (supportportal.sick.com), see section 6.



## 2 Safety information

### 2.1 Intended use

PLB is a system for precise localization of parts stored in a defined search volume. The system may only be employed in accordance with its intended use.

The PLB system is intended to be used in industrial enviroments. The operator of the production facilities in which the PLB system is to be integrated must implement measures to ensure the safety of persons and equipment in accordance with statutory guidelines and regulations.

The relevant official and legal requirements must always be adhered to when operating the PLB system.

In the case of any other usage or in the event of any modifications to system components (e.g. by opening the camera housing or during the course of assembly and electrical installation) or to the SICK software, any warranty claims against SICK AG shall be null and void.

### 2.2 Operational safety and particular hazards

- Read the entire Quickstart before using the system.
- Connection, assembly, and settings must be performed by competent technicians.
- Do not use the system in explosion-hazardous areas, in corrosive environments, or under extreme environmental conditions.

**CAUTION**

**Optical radiation: Class 1 Laser Product**

The accessible radiation does not pose a danger when viewed directly for up to 100 seconds. It may pose a danger to the eyes and skin in the event of incorrect use.

- Do not open the housing. Opening the housing may increase the level of risk.
- Current national regulations regarding laser protection must be observed.

If the product is operated in conjunction with external illumination systems, the risks described here may be exceeded. This must be taken into consideration by users on a case-by-case basis. Please note the accompanying production documentation.

## 3 Product description

### 3.1 System overview

The PLB system is comprised of a 3D camera and the PLB software.

The 3D camera acquires a precise image of a bin and search volume's contents. The software uses the image to calculate a 3D point cloud. Geometrical shapes are identified in the point cloud and combined to form 3D objects. The camera is factory calibrated, and the image data is represented in millimetres in a coordinate system relative to the 3D camera. To achieve accurate positioning results in world or robot coordinates, the measurements must be aligned to that coordinate system.

The camera serves as a data streamer, from which the image data is transferred to a PC. The camera is configured, started and stopped by the PLB application running on the PC.

### 3.2 Dimensional drawing

PLB510 dimensional drawing (not true-to-scale), see Appendix: A
PLB540 dimensional drawing (not true-to-scale), see Appendix: B

### 3.3 Volume of view

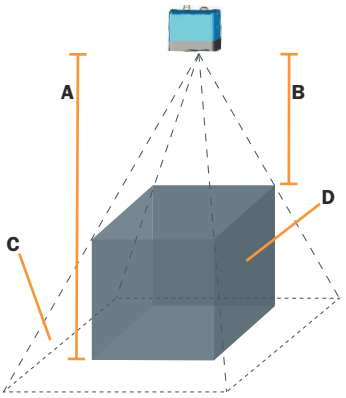



*Figure 1: Example image volume of view*

| | |
|---|---|
| **A** | Maximum distance |
| **B** | Minimum distance |
| **C** | Volume of view |
| **D** | Search volume |

*Visionary cameras*

| Parameter | PLB510 (Visionary-S ) | PLB540 (Visionary-T Mini) |
|---|---|---|
| Min. distance | 1000 mm | 500 mm |
| Max. distance | 2000 mm | 2000 mm |
| Field of view at min. distance[1] | 1000x900 mm | 700x600 mm |
| Field of view at max. distance[1] | 2200x1800 mm | 2800x2300 mm |
| Example search volume[2] | 1000x900x1000 mm | 700x600x1500mm |

[1] Length x Width
[2] Length x Width x Height

## 4 Mounting

- Required parts:
  - Mounting device (bracket) with sufficient load-bearing capacity and suitable dimensions
  - Screws for mounting on the mounting device
- Mount the camera in respect to the preferred volume-of-view, see section 3.3
- The device is fixed properly in position and all the screws are tightened
- Shock and vibration-free mounting
- Try to minimize risk of reflections on the objects to be detected

## 5 Electrical installation

### 5.1 Connectors and pin assignments

The Visionary-S camera uses a M12, 17-pin male connector, for power, and a M12, 8-pin connector, X-coded, for ethernet.

The Visionary-T mini camera uses a M12, 8-pin, A-coded connector, for power, and a M12, 8-pin connector, X-coded, for ethernet.

**Power**

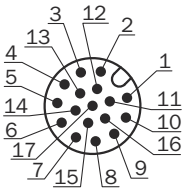



*Figure 2: Visionary-S, power connector*

*Pin assignments for the Visionary-S power connector*

| Pin | Signal |
|---|---|
| 1 | Ground (GND) |
| 2 | 24 V DC ± 15 % – supply voltage |
| 3 | Not connected |
| 4 | Not connected |
| 5 | Not connected |
| 6 | Not connected |
| 7 | TxD (RS-232), Aux – service only |
| 8 | RxD (RS-232), Aux – service only |
| 9 | SENS GND – GND for electrically decoupled inputs |
| 10 | SENS IN1 – switch input, electrically decoupled |
| 11 | Not connected |

| Pin | Signal |
|---|---|
| 12 | Not connected |
| 13 | INOUT 1 |
| 14 | INOUT 2 |
| 15 | SENS IN2 – switch input, electrically decoupled |
| 16 | INOUT 3 |
| 17 | INOUT 4 |

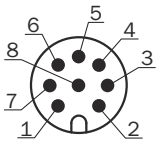



*Figure 3: Visionary-T Mini, power connector*

*Pin assignments for the Visionary-T Mini power connector*

| Pin | Signal |
|---|---|
| 1 | Supply voltage (24 V DC -30% ... +25%) |
| 2 | INOUT 3 |
| 3 | GND – reference mass |
| 4 | INOUT 4 |
| 5 | INOUT 1 |
| 6 | INOUT 5 |
| 7 | INOUT 6 |
| 8 | INOUT 2 |

**Ethernet**

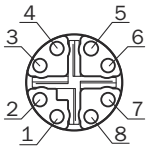



*Figure 4: Ethernet connector*

*Pin assignments for the ethernet connector*

| Pin | Signal |
|---|---|
| 1 | TRD0_P |
| 2 | TRD0_N |
| 3 | TRD1_P |
| 4 | TRD1_N |
| 5 | TRD3_P |
| 6 | TRD3_N |
| 7 | TRD2_P |
| 8 | TRD2_N |

### 5.2 Connecting the device

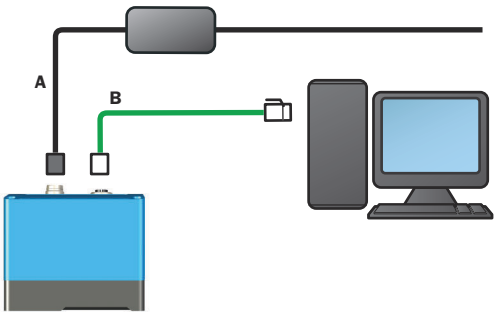



*Figure 5: Example connection diagram*

**A** Power cable
**B** Gigabit ethernet cable

1. Connect the Ethernet connector on the device to the network connector on the PC using a Gigabit Ethernet cable.
   - PC running Windows 10 equipped with a Gigabit Ethernet network interface card, among other specifications
   - It is possible to connect the camera to the PC through a network switch, but it is not recommended.
2. Connect an unpowered power supply to the Power connector on the camera using a Power cable.
3. Switch on the power supply.

For detailed installation instructions and the recommended PC specifications, see the PLB Operating Instruction.

## 6 Operation

This section provides the steps to acquire a basic image to see if the camera is mounted in the correct position. Further instructions can be found in the PLB Operating Instruction, which is included when downloading the PLB software in step 1.

1. Download the latest release of the PLB software (PLB X.X) and the corresponding PLB release of Visionary software (PLB X.X Visionary) from SICK Support Portal, supportportal.sick.com.
   - You must register a user account to access SICK Support Portal.
   - You can access the latest release through the menu options: Systems/Robot Guidance/PLB/Downloads.
2. Install the PLB software (PLB X.X) and the Visionary software (SOPAS ET).
3. Configure the PC Network interface card, enable Jumbo frames and maximize Receive buffers.
4. Start SOPAS ET.
5. Click on **Search devices**.
6. Double-click on the correct camera in the list.

✓ The camera will be added to the project workspace.

7. If incorrect IP address:
   - Click **Edit IP**, then click **Auto** or change the IP address manually. Return with **OK**.
8. Click **Offline** to connect the camera, if not already **Online**.
   - In the pop-up window, select **Read parameters**, then **OK**.
   - Login to the camera (Userlevel: **Service**, Password: CUST_SERV).
9. Click on the options for the device and **Download firmware**.
10. Click **Browse**, and select the correct firmware file (.spk) included in the Visionary software package.
11. Click **Start update**.
12. Login to the camera (Userlevel: **Service**, Password: CUST_SERV).

✓ Download started, pop-up showed when finished.

13. Click **OK**.
14. Click **Close**.
15. Ensure **Update device object in SopasET project** option is enabled, click **Finish**.

✓ Device is updated.

16. If needed, click **Install device driver**, select **Device upload**, and **OK**.

✓ Firmware updated.

**If Visionary-T Mini camera (PLB540), continue from step 22.**

For Visionary-S camera (PLB510):

17. Double-click on the device from the project workspace.
18. Go to **Visual settings** > **Stereo settings**.
19. For the setting **Priority RGB/3D**, select **RGB image quality**.
20. Click **Write parameters to device**.
21. Click **Save the parameters permanently**.

✓ The setting is adjusted for the camera.

22. In the PC Start menu, find and start the application PLB Engine, which opens PLB Studio.

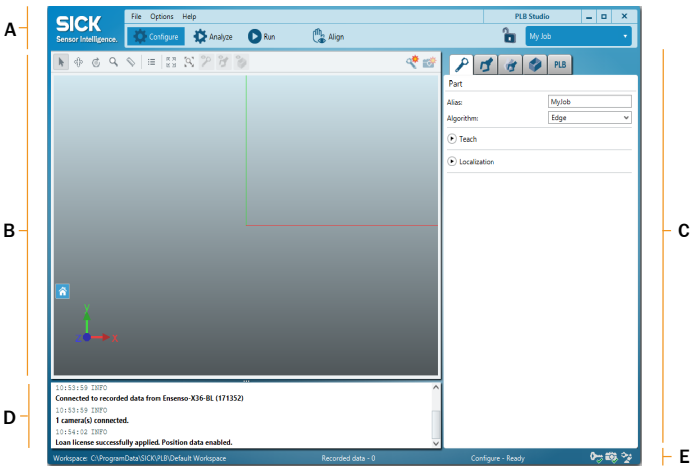



*Figure 6: Overview of PLB Studio*

**A** Menu bar
**B** Visualization area
**C** Parameter editing area
**D** System log
**E** Status bar

23. In the menu bar, click **Configure**.
24. In the parameter editing area, click **System settings**.
25. In the settings for **Cameras**, click **Create new camera**.
26. Select **Visionary-S** or **Visionary-T Mini**.
27. Select if the camera is **Stationary** or **Robot** mounted, and click OK.
28. Go to **Connection settings**.
29. Enter the IP address of the camera (default: 192.168.1.10) in the **IP address** box.
30. Click the checkbox to mark the camera **Enabled**.

✓ The status bar displays the camera icon with a green checkmark when connected.

31. In the visualization area, click **Trigger image acquisition**.

✓ An image is now triggered and shown in the visualization area.

32. Check the image if the camera is at an optimal position for the intended work.
    - Use SOPAS ET to configure the image quality (menu option **Visual settings**, use **Save parameters permanently** for the parameters to be used in the PLB system).
33. In the settings for **Cameras/Connection settings**, click  to enter the licence key for the camera.
    - To be sure to enter the correct licence key, scan the QR/bar code.

✓ The status bar displays the license key with a green checkmark when accepted.

**The recommended workflow to complete the system for operation**

- Robot integration and hand-eye alignment
- Job configuration for part, gripper, pick pose, bin and search volume
- Run mode, to run the PLB system with the robot
- Analyze mode, to optimize the job configuration

## 7 Maintenance

The device contains no user serviceable parts inside. The warranty of the device will be void if opened. The device must not be opened by other parties than SICK.

Clean the housing using a soft cloth. Either use a dry cloth, or dampen it with lukewarm water and a small amount of mild cleaning agent.

Check the screw connections and connectors regularly.

- Visionary-S: Clean the area between the cooling ribs regularly.
- Visionary-T Mini: Ensure adequate heat dissipation to guarantee the availability of the device in continuous operation.

In case of unit failure, please contact the local SICK representative or see section 8, for further instructions.

## 8 Support

For more information about the PLB system, please refer to the PLB Operating Instruction.

For support issues, please visit the online support on: **supportportal.sick.com**

More product information is also available on: **www.sick.com/PLB**

## 9 Technical data

| | PLB510 | PLB540 |
|---|---|---|
| **Part numbers** | PL 1112945 | PP 1132881/PL 1132360 |
| **Interfaces** | Gigabit Ethernet | |
| **Host platform** | PC, Windows 10 | |
| **Supply voltage** | 24 V DC ± 15% | 24 V DC (–30% ... +25%) |
| **Current consumption** | 3 A (max.) | 2 A (max.) |
| **House Dimensions**[1] | 162 mm x 93 mm x 78 mm | 80 mm x 70 mm x 77 mm |
| **Weight** | 1.7 kg | 520 g |
| **Enclosure rating** | IP67 | IP65/IP67 |
| **Shock load**[2] | 15 g/11 ms | 30 g/11 ms |
| **Vibration load**[2] | 5 g, 10 ... 150 Hz | 5 g, 10 ... 500 Hz |
| **Laser class**[3] | 1 (EN/IEC 60825-1:2014, EN/IEC 60825-1:2007) | 1 (EN/IEC 60825-1:2014 (Ed.2), EN/IEC 60825-1:2007 (Ed.2)) |
| **Light source** | Infrared, laser, invisible, 808 nm | Infrared, laser, invisible, 855 nm ± 5 nm |
| **Operating temperature** | 0 ... 40 °C | –10 ... +50 °C[4] |
| **Storage temperature** | –20 ... +70 °C | –20 ... +80 °C |

[1] Length x Width x Height
[2] Not during scanning
[3] Complies with 21 CFR 1040.10 except for deviations described in Laser Notice No. 56, dated May 8, 2019.
[4] Housing operating temperature –10 °C ... +65 °C

## 10 Accessories

*Accessories PLB510*

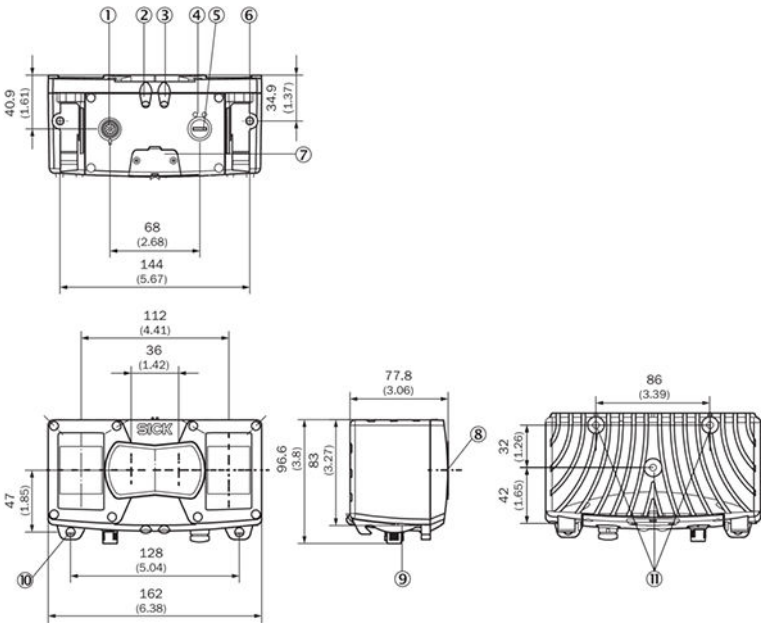
| Accessories | Part no. |
|---|---|
| 10 meter 17 pin power cable | 6048319 |
| 10 meter 8 pin network cable | 2106260 |
| Tilt Mounting Bracket | 2077710 |
| PC | 1134764 |
| Alignment Sphere | CAD-file received upon request from the SICK Support Portal. |

*Accessories PLB540*

| Accessories | Part no. |
|---|---|
| 10 meter 8 pin power cable | 6048434 |
| 10 meter 8 pin network cable | 2106260 |
| Tilt Mounting Bracket | 2124497 |
| PC | 1134764 |
| Alignment Sphere | CAD-file received upon request from the SICK Support Portal. |

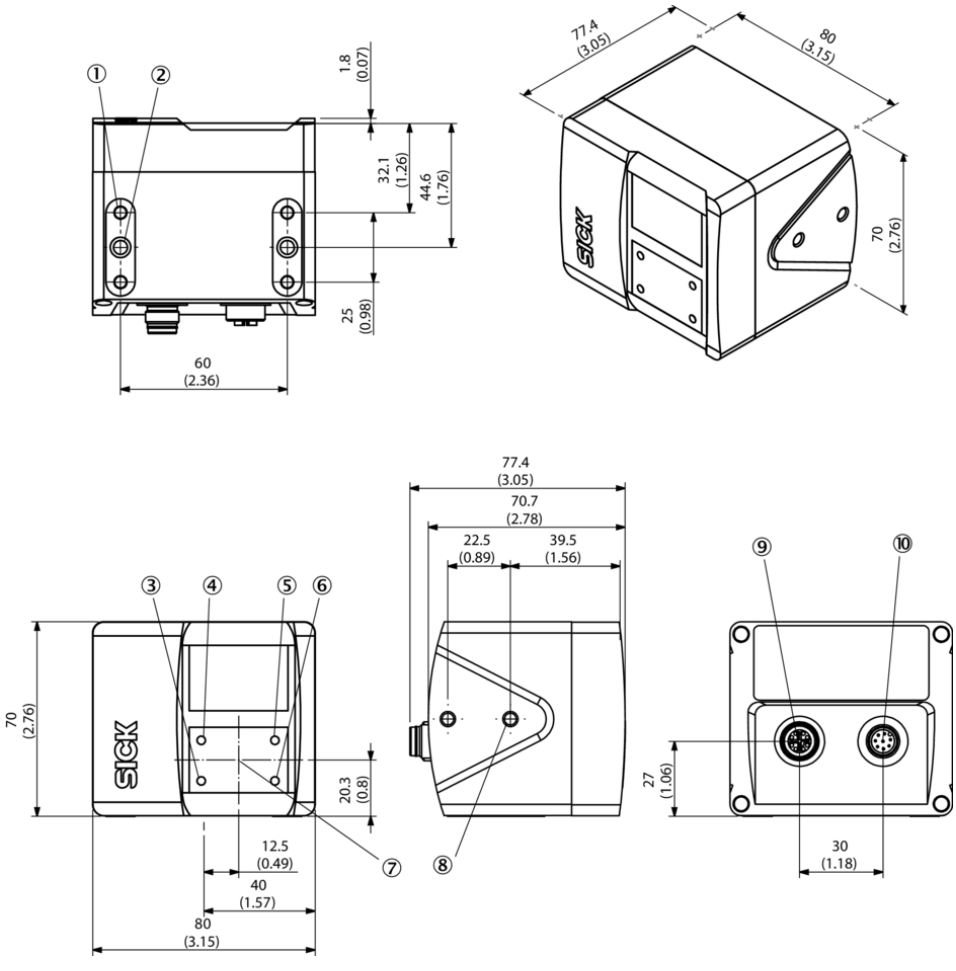
All accessories for the product can be found on: www.sick.com/PLB

**A**




| | |
|---|---|
| ① | Power and I/O (M12, 17-pin) |
| ② | Device display |
| ③ | Application display |
| ④ | Ethernet status displays |
| ⑤ | Ethernet (M12, 8-pin, x-coded) |
| ⑥ | Fastening threads (2x M6, 7 mm deep) |
| ⑦ | Service interface |
| ⑧ | Optical axis |
| ⑨ | Bracket interface |
| ⑩ | Bracket attachment |
| ⑪ | Fastening threads (3x M6, 10 mm deep) |

**B**




| | |
|---|---|
| ① | Threaded mounting hole (4x M5, 7.5 mm depth) |
| ② | Fit (2x ø 5H7, 7 mm depth) |
| ③ | Device status display |
| ④ | Application status display |
| ⑤ | Ethernet status display |
| ⑥ | Application status display |
| ⑦ | Sensor coordinate origin |
| ⑧ | Threaded mounting hole (4x M5, 5.5 mm depth) |
| ⑨ | Ethernet (8-pin, M12, X-coded) |
| ⑩ | Power and I/O (8-pin, M12, A-coded) |