

picoCam2

2D vision

SICK
Sensor Intelligence.



Described product

picoCam2

Manufacturer

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Original document

This document is an original document of SICK AG.



Contents

1	About this document.....	5
1.1	Information on the operating instructions.....	5
1.2	Explanation of symbols.....	5
1.3	Further information.....	6
2	Safety information.....	7
2.1	Intended use.....	7
2.2	Improper use.....	7
2.3	Internet protocol (IP) technology.....	7
2.4	Limitation of liability.....	7
2.5	Modifications and conversions.....	8
2.6	Requirements for skilled persons and operating personnel.....	8
2.7	Operational safety and particular hazards.....	9
3	Product description.....	10
3.1	Scope of delivery.....	10
3.2	Status indicators.....	10
4	Transport and storage.....	11
4.1	Transport.....	11
4.2	Unpacking.....	11
4.3	Transport inspection.....	11
4.4	Storage.....	11
5	Mounting.....	12
5.1	Mounting instructions.....	12
5.2	Mounting the device.....	12
6	Electrical installation.....	13
6.1	Wiring instructions.....	13
6.2	Prerequisites for safe operation of the device.....	13
6.3	Connecting the device electrically.....	14
7	Operation.....	16
7.1	Operation using SICK Vision Suite.....	16
8	Maintenance.....	17
8.1	Maintenance plan.....	17
8.2	Cleaning.....	17
9	Troubleshooting.....	18
9.1	General faults, warnings, and errors.....	18
9.2	Repairs.....	18
9.3	Returns.....	18
9.4	Disposal.....	18

10	Technical data.....	19
10.1	Dimensional drawing.....	19
10.2	Features.....	19
10.3	Mechanics/electronics.....	20
10.4	Performance.....	20
10.5	Interfaces.....	20
10.6	Ambient data.....	20
11	Accessories.....	22
12	Annex.....	23
12.1	EU declaration of conformity / Certificates.....	23
12.2	Copyright notices.....	23
12.3	General cybersecurity notice.....	23

1 About this document

1.1 Information on the operating instructions

These operating instructions provide important information on how to use devices from SICK AG.

Prerequisites for safe work are:

- Compliance with all safety notes and handling instructions supplied.
- Compliance with local work safety regulations and general safety regulations for device applications

The operating instructions are intended to be used by qualified personnel and electrical specialists.



NOTE

Read these operating instructions carefully to familiarize yourself with the device and its functions before commencing any work.

The operating instructions are an integral part of the product. Store the instructions in the immediate vicinity of the device so they remain accessible to staff at all times. Should the device be passed on to a third party, these operating instructions should be handed over with it.

These operating instructions do not provide information on operating the machine or system in which the device is integrated. For information about this, refer to the operating instructions of the specific machine.

1.2 Explanation of symbols

Warnings and important information in this document are labeled with symbols. Signal words introduce the instructions and indicate the extent of the hazard. To avoid accidents, damage, and personal injury, always comply with the instructions and act carefully.



DANGER

... indicates a situation of imminent danger, which will lead to a fatality or serious injuries if not prevented.



WARNING

... indicates a potentially dangerous situation, which may lead to a fatality or serious injuries if not prevented.



CAUTION

... indicates a potentially dangerous situation, which may lead to minor/slight injuries if not prevented.



NOTICE

... indicates a potentially harmful situation, which may lead to material damage if not prevented.



NOTE

... highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

1.3 Further information



NOTE

Further documentation for the device can be found on the online product page at:

- www.sick.com/picoCam2

There, additional information has been provided depending on the product, such as:

- Model-specific online data sheets for device types, containing technical data, dimensional drawing, and specification diagrams
 - EU declarations of conformity for the product family
 - Dimensional drawings and 3D CAD dimension models of the device types in various electronic formats
 - Other publications related to the devices described here
 - Publications dealing with accessories
-

2 Safety information

2.1 Intended use

The picoCam2 is an industrial streaming camera used to take images for visualization and image processing tasks. It is designed for use in industrial environments.

SICK AG assumes no liability for losses or damage arising from the use of the product, either directly or indirectly. This applies in particular to use of the product that does not conform to its intended purpose and is not described in this documentation.

2.2 Improper use

Any use outside of the stated areas, in particular use outside of the technical specifications and the requirements for intended use, will be deemed to be incorrect use.

- The device does not constitute a safety component in accordance with the respective applicable safety standards for machines.
- The device must not be used in explosion-hazardous areas, in corrosive environments or under extreme environmental conditions.
- Any use of accessories not specifically approved by SICK AG is at your own risk.



WARNING

Danger due to improper use!

Any improper use can result in dangerous situations.

Therefore, observe the following information:

- Product should be used only in accordance with its intended use.
- All information in these operating instructions must be strictly observed.
- Shut down the product immediately in case of damage.

2.3 Internet protocol (IP) technology



NOTE

SICK uses standard IP technology in its products. The emphasis is placed on availability of products and services.

SICK always assumes the following prerequisites:

- The customer ensures the integrity and confidentiality of the data and rights affected by its own use of the aforementioned products.
- In all cases, the customer implements the appropriate security measures, such as network separation, firewalls, virus protection, and patch management.

2.4 Limitation of liability

Relevant standards and regulations, the latest technological developments, and our many years of knowledge and experience have all been taken into account when compiling the data and information contained in these operating instructions. The manufacturer accepts no liability for damage caused by:

- Non-adherence to the product documentation (e.g., operating instructions)
- Incorrect use
- Use of untrained staff
- Unauthorized conversions or repair
- Technical modifications
- Use of unauthorized spare parts, consumables, and accessories

With special variants, where optional extras have been ordered, or owing to the latest technical changes, the actual scope of delivery may vary from the features and illustrations shown here.

2.5 Modifications and conversions



NOTICE

Modifications and conversions to the device may result in unforeseeable dangers.

Interrupting or modifying the device or SICK software will invalidate any warranty claims against SICK AG. This applies in particular to opening the housing, even as part of mounting and electrical installation.

2.6 Requirements for skilled persons and operating personnel



WARNING

Risk of injury due to insufficient training.

Improper handling of the device may result in considerable personal injury and material damage.

- All work must only ever be carried out by the stipulated persons.

This product documentation refers to the following qualification requirements for the various activities associated with the device:

- **Instructed personnel** have been briefed by the operator about the tasks assigned to them and about potential dangers arising from improper action.
- **Skilled personnel** have the specialist training, skills, and experience, as well as knowledge of the relevant regulations, to be able to perform tasks delegated to them and to detect and avoid any potential dangers independently.
- **Electricians** have the specialist training, skills, and experience, as well as knowledge of the relevant standards and provisions, to be able to carry out work on electrical systems and to detect and avoid any potential dangers independently. The electrician must comply with the provisions of the locally applicable work safety regulation.

The following qualifications are required for various activities:

Table 1: Activities and technical requirements

Activities	Qualification
Mounting, maintenance	<ul style="list-style-type: none"> ■ Basic practical technical training ■ Knowledge of the current safety regulations in the workplace
Electrical installation, device replacement	<ul style="list-style-type: none"> ■ Practical electrical training ■ Knowledge of current electrical safety regulations ■ Knowledge of the operation and control of the devices in their particular application
Commissioning, configuration	<ul style="list-style-type: none"> ■ Basic knowledge of the Windows™ operating system in use ■ Basic knowledge of the design and setup of the described connections and interfaces ■ Basic knowledge of data transmission
Operation of the device for the particular application	<ul style="list-style-type: none"> ■ Knowledge of the operation and control of the devices in their particular application ■ Knowledge of the software and hardware environment for the particular application

2.7 Operational safety and particular hazards

Please observe the safety notes and the warnings listed here and in other chapters of this product documentation to reduce the possibility of risks to health and avoid dangerous situations.

**WARNING****Electrical voltage!**

Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
 - The power supply must be disconnected when attaching and detaching electrical connections.
 - The product must only be connected to a voltage supply as set out in the requirements in the operating instructions.
 - National and regional regulations must be complied with.
 - Safety requirements relating to work on electrical systems must be complied with.
-

**WARNING****Risk of injury and damage caused by potential equalization currents!**

Improper grounding can lead to dangerous equipotential bonding currents, which may in turn lead to dangerous voltages on metallic surfaces, such as the housing. Electrical voltage can cause severe injury or death.

- Work on electrical systems must only be performed by qualified electricians.
 - Follow the notes in the operating instructions.
 - Install the grounding for the product and the system in accordance with national and regional regulations.
-

3 Product description

3.1 Scope of delivery

The delivery of the device includes the following components:

Table 2: Scope of delivery

No. of units	Component	Remarks
1	Device in the version ordered	Depending on version
1	Printed Quick Start Guide, multi-lingual	Brief information and general safety notes

3.2 Status indicators

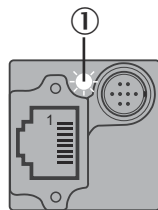


Figure 1: Status indicators

① LED

LED	Description
LED flashes green quickly	Device booting
LED flashes green slowly	Device ready
LED lights up green	Device open
LED lights up red	No firmware loaded

4 Transport and storage

4.1 Transport

For your own safety, please read and observe the following notes:



NOTICE

Damage to the product due to improper transport.

- The device must be packaged for transport with protection against shock and damp.
- Recommendation: Use the original packaging as it provides the best protection.
- Transport should be performed by trained specialist staff only.
- The utmost care and attention is required at all times during unloading and transportation on company premises.
- Note the symbols on the packaging.
- Do not remove packaging until immediately before you start mounting.

4.2 Unpacking

- To protect the device against condensation, allow it to equilibrate with the ambient temperature before unpacking if necessary.
- Handle the device with care and protect it from mechanical damage.

4.3 Transport inspection

Immediately upon receipt in Goods-in, check the delivery for completeness and for any damage that may have occurred in transit. In the case of transit damage that is visible externally, proceed as follows:

- Do not accept the delivery or only do so conditionally.
- Note the scope of damage on the transport documents or on the transport company's delivery note.
- File a complaint.



NOTE

Complaints regarding defects should be filed as soon as these are detected. Damage claims are only valid before the applicable complaint deadlines.

4.4 Storage

Store the device under the following conditions:

- Recommendation: Use the original packaging.
- Do not store outdoors.
- Store in a dry area that is protected from dust.
- So that any residual damp can evaporate, do not package in airtight containers.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: see "Technical data", page 19.
- Relative humidity: see "Technical data", page 19.
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

5 Mounting

5.1 Mounting instructions

- Observe the technical data.
- Protect the sensor from direct sunlight.
- To prevent condensation, avoid exposing the device to rapid changes in temperature.
- The mounting site has to be designed for the weight of the device.
- Protect the device from moisture, contamination, and damage.
- Ensure a sufficient level of cooling using ambient air/convection and/or heat dissipation through mechanical mounting. Observe the permitted operating temperature, [see "Technical data", page 19](#).

5.2 Mounting the device

1. Mount the device using the designated fixing holes, [see "Dimensional drawing", page 19](#).
2. Make the electrical connection. Attach and tighten a voltage-free cable, [see "Connecting the device electrically", page 14](#).
3. Switch on the supply voltage.
- ✓ The LED flashes green.
4. Align the device so that the desired object is recorded.

6 Electrical installation

6.1 Wiring instructions

**NOTE**

Pre-assembled cables can be found online at:

- www.sick.com/picoCam2

**NOTICE****Faults during operation and device or system defects!**

Incorrect wiring may result in operational faults and defects.

- Follow the wiring notes precisely.

**WARNING****Danger of electrical shock if a non-certified power supply unit is used!**

Only use a power supply unit which complies with the safety extra low voltage (SELV) and limited power source (LPS) requirements.

To ensure electrical safety, we recommend using a shielded connecting cable (www.sick.com/picoCam2 under accessories) or earthing the camera housing so that it is connected to ground due to the installation set-up.

6.2 Prerequisites for safe operation of the device

**WARNING****Risk of injury and damage caused by electrical current!**

As a result of equipotential bonding currents between the device and other grounded devices in the system, faulty grounding of the device can give rise to the following dangers and faults:

- Dangerous voltages are applied to the metal housings.
- Devices will behave incorrectly or be destroyed.
- Cable shielding will be damaged by overheating and cause cable fires.

Remedial measures

- Only skilled electricians should be permitted to carry out work on the electrical system.
- If the cable insulation is damaged, disconnect the voltage supply immediately and have the damage repaired.
- Ensure that the ground potential is the same at all grounding points.
- Where local conditions do not meet the requirements for a safe earthing method, take appropriate measures (e.g., ensuring low-impedance and current-carrying equipotential bonding).

The device is connected to the peripheral devices (voltage supply, any local trigger sensor(s), system controller) via shielded cables. The cable shield – for the data cable, for example – rests against the metal housing of the device. The device can be grounded through the cable shield or through a blind tapped hole in the housing, for example.

If the peripheral devices have metal housings and the cable shields are also in contact with their housings, it is assumed that all devices involved in the installation have the **same ground potential**.

This is achieved by complying with the following conditions:

- Mounting the devices on conductive metal surfaces
- Correctly grounding the devices and metal surfaces in the system
- If necessary: low-impedance and current-carrying equipotential bonding between areas with different ground potentials

If these conditions are not fulfilled, equipotential bonding currents can flow along the cable shielding between the devices due to differing ground potentials and cause the hazards specified. This is, for example, possible in cases where there are devices within a widely distributed system covering several buildings.

Remedial measures

The most common solution to prevent equipotential bonding currents on cable shields is to ensure low-impedance and current-carrying equipotential bonding. If this equipotential bonding is not possible, the following solution approaches serve as a suggestion.



NOTICE

We expressly advise against opening up the cable shields. This would mean that the EMC limit values can no longer be complied with and that the safe operation of the device data interfaces can no longer be guaranteed.

Measures for widely distributed system installations

On widely distributed system installations with correspondingly large potential differences, the setting up of local islands and connecting them using commercially available **electro-optical signal isolators** is recommended. This measure achieves a high degree of resistance to electromagnetic interference.

The use of electro-optical signal isolators between the islands isolates the ground loop. Within the islands, a stable equipotential bonding prevents equalizing currents on the cable shields.

Measures for small system installations

For smaller installations with only slight potential differences, insulated mounting of the device and peripheral devices may be an adequate solution.

Even in the event of large differences in the ground potential, ground loops are effectively prevented. As a result, equalizing currents can no longer flow via the cable shields and metal housing.



NOTICE

The voltage supply for the device and the connected peripheral devices must also guarantee the required level of insulation.

Under certain circumstances, a tangible potential can develop between the insulated metal housings and the local ground potential.

6.3 Connecting the device electrically



NOTICE

The device can be supplied with voltage either from an external source or via PoE (Power over Ethernet). The device must not be supplied from both sources at the same time as this can lead to irreparable damage to the device.

1. Ensure the voltage supply is not connected.
2. Connect the device according to the connection diagram.



Figure 2: Pin assignment of the 8-pin connection (Hirose HR25)

- ① Ground (GND)
- ② Flash output, with optocoupler (-)
- ③ General Purpose I/O (GPIO) 1
- ④ Trigger input, with optocoupler (-)
- ⑤ Flash output, with optocoupler (+)
- ⑥ General Purpose I/O (GPIO) 2
- ⑦ Trigger input, with optocoupler (+)
- ⑧ Supply voltage input (V) 12-24 V

7 Operation

7.1 Operation using SICK Vision Suite

The SICK Vision Suite software can be used to parameterize the device and for service and diagnostic purposes.



NOTE

The most up-to-date version of the SICK Vision Suite software can be downloaded from www.sick.com/picoCam2 under Downloads.

8 Maintenance

8.1 Maintenance plan

During operation, the device works maintenance-free.

Depending on the assignment location, the following preventive maintenance tasks may be required for the device at regular intervals:

Table 3: Maintenance plan

Maintenance work	Interval	To be carried out by
Check device and connecting cables for damage at regular intervals.	Depends on ambient conditions and climate.	Specialist
Clean housing.	Depends on ambient conditions and climate.	Specialist
Check the screw connections and plug connectors.	Depends on the place of use, ambient conditions or operating requirements. Recommended: At least every 6 months.	Specialist
Check that all unused connections are sealed with protective caps.	Depends on ambient conditions and climate. Recommended: At least every 6 months.	Specialist

8.2 Cleaning



DANGER

Risk of injury due to hot device surface.

The surface of the device can become hot during operation.

- Before performing work on the device (e.g. mounting, cleaning, disassembly), switch off the device and allow it to cool down.
- Ensure good dissipation of excess heat from the device to the surroundings.



NOTICE

Equipment damage due to improper cleaning.

Improper cleaning may result in equipment damage.

- Only use recommended cleaning agents and tools.
- Never use sharp objects for cleaning.

- ▶ The device must be cleaned regularly from the outside to guarantee heat dissipation and therefore operation. Clean using a dry towel or an industrial vacuum cleaner. Do not use cleaning agents.

9 Troubleshooting

9.1 General faults, warnings, and errors

The SICK Vision Suite software can be used for service and diagnostic purposes.



NOTE

The most up-to-date version of the SICK Vision Suite software can be downloaded from www.sick.com/picoCam2 under Downloads.

In the case of faults that cannot be rectified, please contact the SICK Service department. To find your agency, see the final page of this document.



NOTE

Before calling, make a note of all type label data such as type designation, serial number, etc., to ensure faster assistance.

9.2 Repairs

Repair work on the device may only be performed by qualified and authorized personnel from SICK AG. Interruptions or modifications to the device by the customer will invalidate any warranty claims against SICK AG.

9.3 Returns

- ▶ Do not dispatch devices to the SICK Service department without consultation.
- ▶ The device must be sent in the original packaging or an equivalent padded packaging.



NOTE

To enable efficient processing and allow us to determine the cause quickly, please include the following when making a return:

- Details of the contact person
- Description of the application
- Description of the fault that occurred

9.4 Disposal

If a device can no longer be used, dispose of it in an environmentally friendly manner in accordance with the applicable country-specific waste disposal regulations. Do not dispose of the product along with household waste.



NOTICE

Danger to the environment due to improper disposal of the device.

Disposing of devices improperly may cause damage to the environment. Therefore, observe the following information:

- Always observe the national regulations on environmental protection.
- Separate the recyclable materials by type and place them in recycling containers.

10 Technical data



NOTE

The relevant online data sheet for your product, including technical data, dimensional drawing, and connection diagrams can be downloaded, saved, and printed from the Internet:

- www.sick.com/picoCam2

Please note: This documentation may contain further technical data.

10.1 Dimensional drawing

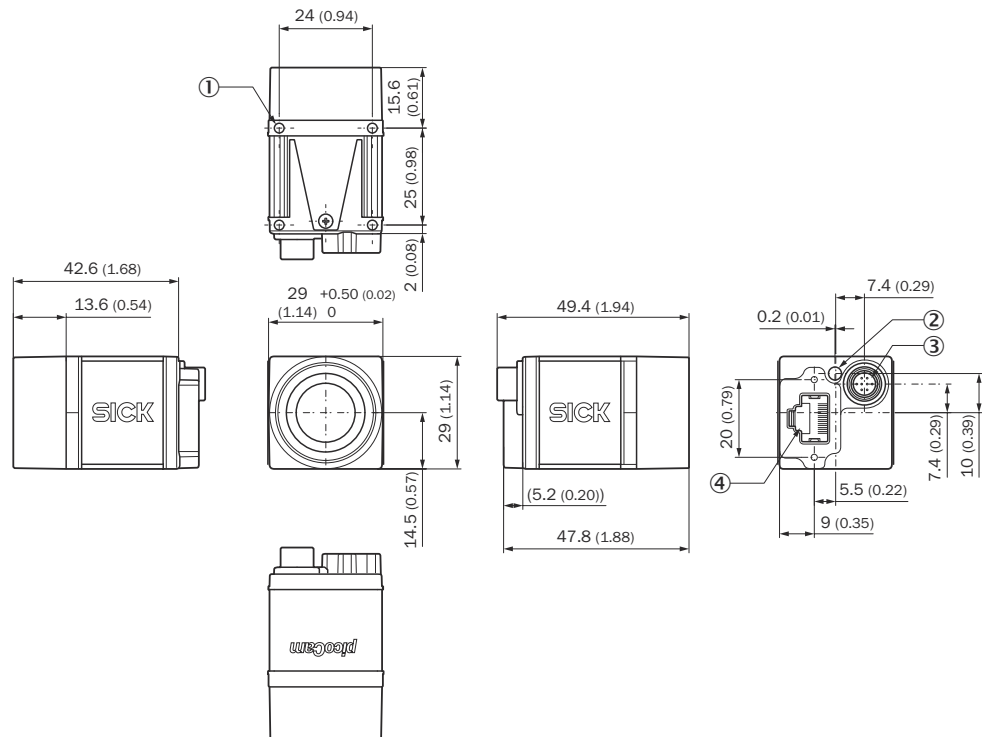


Figure 3: Device dimensions; unit: mm (inch), decimal separator: period

- ① M3 blind-hole thread, 3 mm deep (4x), for mounting
- ② LED for status display
- ③ Power I/O connection, male connector, M12, 6-pin, Hirose
- ④ Gigabit Ethernet connection, RJ45, 8-pin

10.2 Features

Technology	2D snapshot Color for I2DxxxC
Product category	Streaming, flexible
Sensor	I2DxxxC: CMOS Color I2DxxxM: CMOS Monochrome
Sensor used	I2Dx01x: Sony IMX273 I2Dx03x: Sony IMX265 I2Dx05x: Sony IMX264
Shutter technology	Global shutter

Other functions	Line mode, region of interest, long exposure
Lens	C-mount
Optical format	I2Dx01x: 1/3" I2Dx03x: 1/1.8" I2Dx05x: 2/3"

10.3 Mechanics/electronics

Connections	8-pin Hirose male connector
Supply voltage	12 V ... 24 V ¹
Power consumption	≤ 3.1 W
Enclosure rating	IP30
Weight	I2Dx01x/I2Dx05x: 51 g I2Dx03x: 52 g
Dimensions	29 mm x 29 mm x 29 mm

¹ Or PoE



NOTE

Not free of paint wetting impairment substances.

10.4 Performance

Bit depth	12 bit
Sensor resolution	I2Dx01x: 1,456 px x 1,088 px (1.58 megapixel) I2Dx03x: 2,048 px x 1,536 px (3.15 megapixel) I2Dx05x: 2,448 px x 2,048 px (5.01 megapixel)
Sensor size	I2Dx01x: 5,023 mm x 3,754 mm I2Dx03x: 7,066 mm x 5.3 mm I2Dx05x: 8,446 mm x 7,066 mm
Scan/frame rate	I2Dx01x: 79 fps, in free-run mode I2Dx03x: 39 fps, in free-run mode I2Dx05x: 24 fps, in free-run mode
User memory	128 MB
Shutter time	I2Dx01x: 0.025 ms ... 2,000 ms I2Dx03x: 0.030 ms ... 2,000 ms I2Dx05x: 0.033 ms ... 2,000 ms
Pixel size	3.45 μm

10.5 Interfaces

Ethernet	UDP/IP
Data transmission rate	1,000 Mbit/s
Configuration software	SICK Vision Suite

10.6 Ambient data

Impact load	80 g, EN 60068-2-27 (1995-03), EN 60068-2-29 (1995-03)
Vibration load	10 g, 30 Hz ... 500 Hz, EN 60068-2-6 (1996-05)
Ambient operating temperature	0 °C ... +55 °C ¹⁾

Storage temperature	-20 °C ... +60 °C ¹⁾
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1) Relative humidity: 0 % ... 100 %.

11 Accessories



NOTE

Accessories and where applicable mounting information can be found online at:

- www.sick.com/picoCam2
-

12 Annex

12.1 EU declaration of conformity / Certificates

The EU declaration of conformity and other certificates can be downloaded from the Internet at:

- www.sick.com/picoCam2

12.2 Copyright notices

mbed TLS

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The camera firmware uses the mbed TLS library under the Apache license, version 2.0 (<http://www.apache.org/licenses>).

12.3 General cybersecurity notice

Protection against cybersecurity threats requires a comprehensive and holistic cybersecurity concept that must be continuously monitored and maintained. Such a concept consists of organizational, technical, process-related, electronic and physical defense levels and sets up appropriate measures for the different types of risk. SICK's products and solutions must be regarded as an integral part of this concept.

Information on Cybersecurity can be found at: www.sick.com/psirt .

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