OPERATING INSTRUCTIONS

sBot Stop – URCap, sBot Speed – URCap

Safety System

SICK
Sensor Intelligence.

Described product

sBot Stop – URCap, sBot Speed – URCap

Manufacturer

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Original document

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1 About this document

1.1 Purpose of this document

These operating instructions contain the information required during the life cycle of the safety system. This document describes:

- The individual components
- The project planning
- The mounting and electrical installation, insofar as special measures are necessary for the safety system
- The configuration
- The necessary thorough checks
- The commissioning
- The maintenance
- The troubleshooting

1.2 Scope

This operating instructions contain information about the sBot Stop - URCap and sBot Speed - URCap safety systems.

NOTICE
The operating instructions of the components also apply.

The relevant information must be made available to the employees for all work performed on the safety system.

The following documents contain additional information:

Table 1: Available documents

Document type	Title	Part number
Operating instructions	nanoScan3 I/O	8024594

This document is included with the following SICK part numbers (this document in all available language versions):

8025715

1.3 Target groups and structure of these operating instructions

These operating instructions are intended for the following target groups: project developers (planners, developers, designers), installers, electricians, operators, and maintenance personnel.

These operating instructions are organized by the life phases of the safety system: project planning, mounting, electrical installation, commissioning, operation and maintenance.

1.4 Symbols and document conventions

The following symbols and conventions are used in this document:

Safety notes and other notes

DANGER
Indicates a situation presenting imminent danger, which will lead to death or serious injuries if not prevented.

WARNING
Indicates a situation presenting possible danger, which may lead to death or serious injuries if not prevented.

CAUTION
Indicates a situation presenting possible danger, which may lead to moderate or minor injuries if not prevented.

NOTICE
Indicates a situation presenting possible danger, which may lead to property damage if not prevented.

NOTE
Indicates useful tips and recommendations.

Instructions to action

▶ The arrow denotes instructions to action.

1. The sequence of instructions for action is numbered.
2. Follow the order in which the numbered instructions are given.

✓ The check mark denotes the result of an instruction.

1.5 Further information

www.sick.com

The following information is available via the Internet:

- This document in other languages
- Operating instructions and mounting instructions of SICK components suitable for the safety system
- Guide for Safe Machinery (“Six steps to a safe machine”)

2 Safety information

2.1 General safety note

The information and tools will not fulfill the safety requirements for your application without further adjustments being made. The project planning provided by way of example is intended to serve as the basis to allow you to perform your own project planning and programming in line with your specific requirements. What this means is that the information and tools merely provide an example to demonstrate how a safety function can be taken care of.

When it comes to your own project planning and programming, you will need to rely on qualified staff given that it is your responsibility to ensure that the following requirements are complied with at the very least:

- Carrying out a risk assessment
- Taking into account applicable standards
- Verifying and validating the safety functions.

2.2 Intended use

The safety system provides protection against mechanical hazards (crushing, shearing, impact) caused by movement of the robot arm by means of area safeguarding. The safety system can only be used in certain applications.

The safety system must only be used within the limits of the prescribed and specified technical data and operating conditions at all times.

Incorrect use, improper modification or manipulation of the safety system will invalidate any warranty from SICK; in addition, any responsibility and liability of SICK for damage and secondary damage caused by this are excluded.

2.3 Inappropriate use

The safety laser scanner works as an indirect protective measure and cannot provide protection from pieces thrown from application nor from emitted radiation. Transparent objects are not detected.

If necessary, you must take additional measures to provide protection against hazards that do not result from movement of the robot arm.

The safety system is not suitable for the following applications (this list is not exhaustive):

- Outdoors
- Underwater
- In explosion-hazardous areas

2.4 Requirements for the qualification of personnel

The protective device must be planned in, installed, connected, commissioned, and serviced by qualified safety personnel only.

Project planning

For project planning, a person is considered competent when he/she has expertise and experience in the selection and use of protective devices on machines and is familiar with the relevant technical rules and national work safety regulations.

Mechanical mounting, electrical installation, and commissioning

For the task, a person is considered qualified when he/she has the expertise and experience in the relevant field and is sufficiently familiar with the application of the protective device on the machine to be able to assess whether it is in an operationally safe state.

Operation and maintenance

For operation and maintenance, a person is considered competent when he/she has the expertise and experience in the relevant field and is sufficiently familiar with the application of the protective device on the machine and has been instructed by the machine operator in its operation.

3 Product description

3.1 Design

Design

The following elements work together:

- Safety laser scanner (from SICK)
- nanoScan3 Tool - URCap for configuring the safety system (from SICK)
- Robot (from Universal Robots)

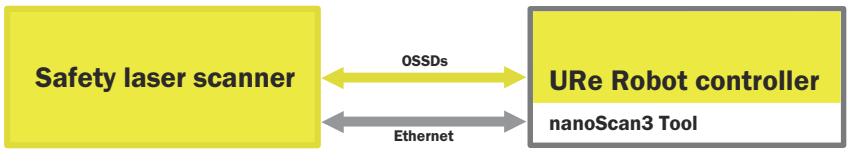

Figure 1: Design

Further topics

- "Components", page 12

3.2 Functionality

Overview

The nanoScan3 configuration software is installed on the robot control and operated on the teach panel. The configuration software can be used to configure specific safety laser scanners from SICK that are connected to the robot controller. The configuration can also be verified in the configuration software.

The scope of configuration is limited to the parameters that are relevant for the application described in this document.

Functions

- Protective stop
- Safety-rated monitored speed (not available in all variants)

Protective stop

The safety laser scanner monitors the point of access to the hazardous area. Detection in protective field PF1 activates the “Trigger protective stop” function. When protective field PF1 frees up, the robot automatically restarts.

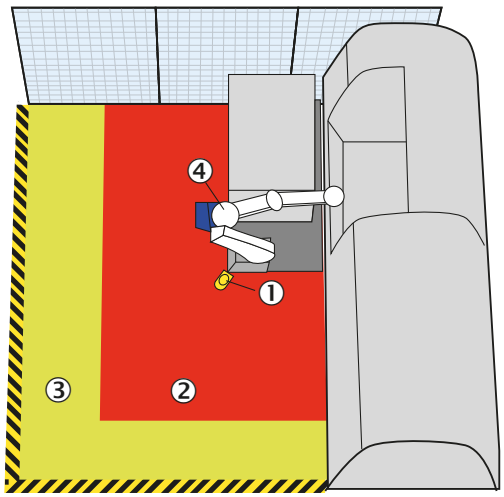

Figure 2: Example robot application with 1 protective field

① Safety laser scanner
② Protective field PF1
③ Warning field
④ Robot

Safety-rated monitored speed

Depending on the selected variant, a safety laser scanner with 2 protective fields is used. If a detection occurs in protective field PF2, the “Trigger safety-rated monitored speed” function is activated. When protective field PF1 frees up, the robot restarts only at reduced speed. As soon as protective field PF2 frees up, the robot resumes work at normal speed.

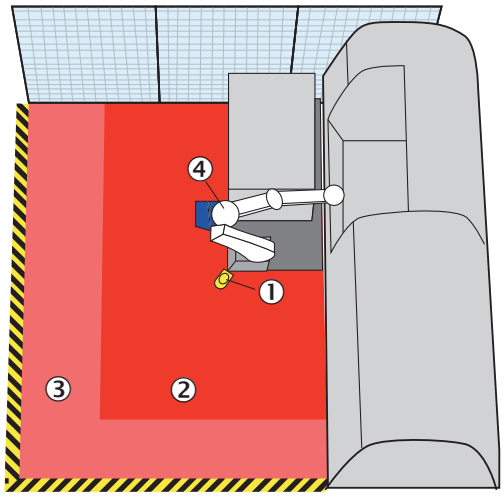

Figure 3: Example robot application with 2 protective fields

① Safety laser scanner
② Protective field PF1
③ Protective field PF2
④ Robot

Variants

Functions	sBot Stop - URCap	sBot Speed - URCap
Protective stop	Yes	Yes

Functions	sBot Stop - URCap	sBot Speed - URCap
Safety-rated monitored speed	No	Yes

Further topics

- "Ordering information", page 43

3.3 Requirements on the application

To use the product, the application must meet the following requirements:

- The robot must be one of the following types from Universal Robots:
  - UR3e
  - UR5e
  - UR10e
  - UR16e
- Robots and humans perform their work in the same workspace, but at different times (cooperation, see "Human-robot interaction", page 13).
- The robot works at a fixed position. If the robot is mounted on a moving table, the safety laser scanner must be mounted on the same table.
- The application requires a protective field ≤ 3 m.
- Access to the hazardous area must be designed so that the protective fields of the safety laser scanner cover the entire point of access to the hazardous area. A person cannot enter or reach into the hazardous area without interrupting the protective fields. It must not be possible to easily walk behind the protective fields.
- Bypassing the protective field (e.g. by reaching around or stepping over it) is not possible and this is ensured by additional measures as necessary.
- It is ensured that persons do not bring any aids into the monitored area with which persons can use to get above the scan plane without interrupting the protective field (e.g. ladder or chair).
- The area to be monitored is free from all airborne particles or process residues in its operational status.

3.4 Product characteristics

3.4.1 Components

Components relevant for the safety system

Table 2: Hardware

Component	Part of the safety system?	Included in scope of delivery
nanoScan3 Core I/O safety laser scanner	Yes	Variant-dependent
nanoScan3 Pro I/O safety laser scanner	Yes	Variant-dependent
Robots of type UR3e, UR5e, UR10e or UR16e	Partially [1)]	No
Three-position enabling device	No	No

1) Only the robot controller safety functions considered in this document are part of the safety system.

Table 3: Software and documentation

Name	Availability
nanoScan3 Tool - URCap	SICK provides you with a ZIP archive when you purchase the safety system.
Complete subsystems for SISTEMA	
Operating instructions for the safety system	
Quickstart for the safety system	

Implementing all the safety functions for the application requires a complete system consisting of sensors, a controller, actuators, and control switches. The user is responsible for the safe design of the complete system and all safety functions.

3.4.2 Human-robot interaction

This safety system is suitable for cooperative human-robot interaction.

Table 4: Types of human-robot interaction

	Application with sequential processing	**Application with simultaneous processing**
Shared workspace	**Cooperation**	Collaboration
Different workspace	(Not interactive)	Coexistence

Cooperative human-robot interaction is characterized by the fact that tasks are being carried out in the same working area at different times.

3.4.3 Functions of the safety system

Safety function	**Trigger**	**Description**
Initiate a protective stop	Protective field PF1 interrupted	Triggers the robot protective stop. Corresponds to stop category 2.
Trigger safety-rated monitored speed	Protective field PF2 interrupted	Only for variants with safety laser scanners with 2 protective fields. Activates robot **Reduced Mode** and therefore speed reduction.

4 Project planning

4.1 Manufacturer of the overall system

The safety system was developed under consideration of typical application cases. A partial safety function can be implemented with the safety system in these application cases. The manufacturer must check whether the safety system is suitable for its specific application case (risk assessment according to ISO 12100). Further protective measures may be required in addition to the safety system.

If the thorough check shows that the safety system is not suitable for the specific application case, the safety system can be used as a basis for an individualized development suitable for the specific application case. This case will not be considered further in this document.

In any event, additional work is necessary for the safety system to be used, e.g. subsequent configuration of the safety controller.

The manufacturer has the following duties:

- Executing a risk assessment.
- Verifying and validating the safety functions.
- Integrating the individual components in accordance with the appropriate standards.
- Please note that C standards have priority compared to statements about this safety system.

4.2 Operating entity of the overall system

Changes to the electrical integration of the safety system in the machine control and changes to the mechanical mounting of the safety system necessitate a new risk assessment. The results of this risk assessment may require the entity operating the machine to meet the obligations of a manufacturer.

Changes to the safety system's configuration may impair the protective function. The effectiveness of the safety system must be checked after any change to the configuration. The person carrying out the change is also responsible for maintaining the protective function of the safety system.

4.3 Design

4.3.1 Position of the safety laser scanner

Requirements for the position of the safety laser scanner

Position the safety laser scanner so that it meets all of the following criteria:

- If the robot is mounted on a moving table, the safety laser scanner must be mounted on the same table.
- The scan plane runs horizontally.
- The scan plane runs 300 mm above the floor.
- The safety laser scanner must be mounted with the optics cover facing upwards.
- The safety laser scanner can monitor the entire point of access to the hazardous area. There are no areas that are not monitored where are person can be present. It is not possible to walk behind the protective field. It may be necessary to use several safety laser scanners for this purpose.

4.3.2 Protective field design

4.3.2.1 Calculating value for **Stop Field radius**

Overview

The **Stop Field radius** value determines the maximum extension of protective field PF1. The value is calculated from the radius of the robot hazardous area and the minimum distance to the hazardous area. Detection in protective field PF1 activates the “Trigger protective stop” function. You must calculate **Stop Field radius** so that the robot comes to a standstill in the event of a protective field interruption before the person reaches the hazardous area.

All other settings for the protective field (e.g. surrounding walls) are made during commissioning.

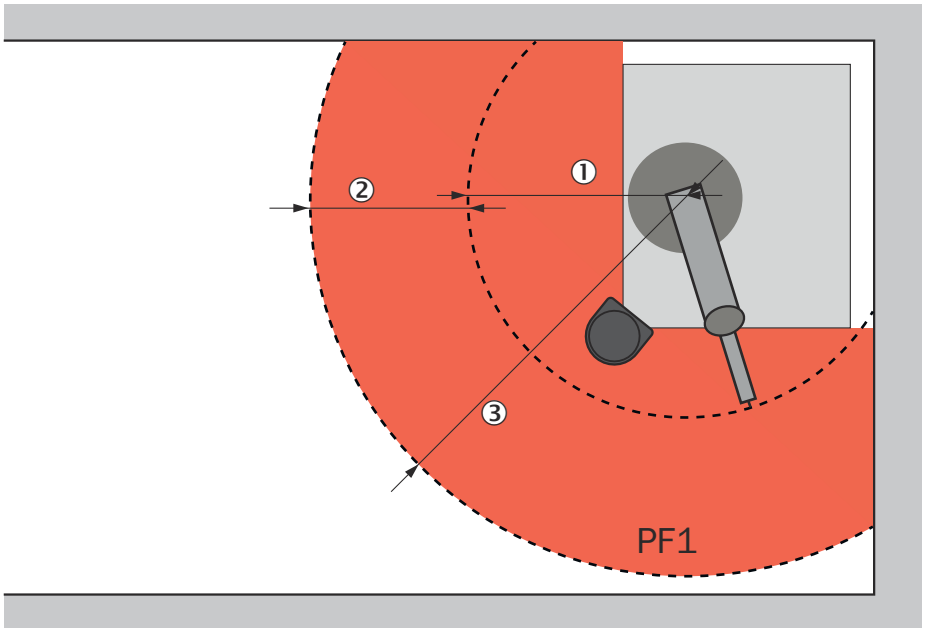

Figure 4: Stop Field radius

① Radius of the robot hazardous area (S_R)

② Minimum distance to the hazardous area for protective field PF1 (S_{PF1})

③ Stop Field radius

Approach

The value for **Stop Field radius** S_{PF1} is composed of the minimum distance to the hazardous area $_{PF1}$ and the radius of the robot hazardous area S_R.

Calculate minimum distance to the hazardous area for protective field PF1 (S_{PF1}).

▶ Calculate the minimum distance to the hazardous area for protective field PF1. The following calculation example according to ISO13855 can be used for this.
$S_{PF1} = K \times (t_{Safetysystem} + t_{Robot}) + TZ + ZR + C$

Parameter	Description
K	Approach speed of a person. The approach speed is 1,600 mm/s according to EN ISO 10218-2.
$t_{Safetysystem}$	Response time of the safety system corresponds to the response time of the safety laser scanner 70 ms
t_{Robot}	Robot stopping time

Parameter	Description
TZ (TT)	Tolerance range of the safety laser scanner 65 mm[1)]
ZR	Supplement for reflection-related measurement errors [2)] 350 mm[1)]
C	Supplement to protect against reaching over in millimeters (mm) C = 1,200 mm – (0.4 × protective field height (mm)) At a protective field height of 300 mm: 1,080 mm

1) Value in delivery state Check the actual value with operating instructions 8024594.
2) Is not required in all applications

Calculating radius of the hazardous area of the robot S_R

▶ Calculate the radius of the hazardous area of the robot S_R. The radius is composed of the scanning range of the robot arm, the size of the end effector and the workpiece.
The radius is the maximum horizontal distance between the center of the robot base and the outermost point of the transported workpiece. Every point that can be reached by the robot arm is part of the hazardous area.

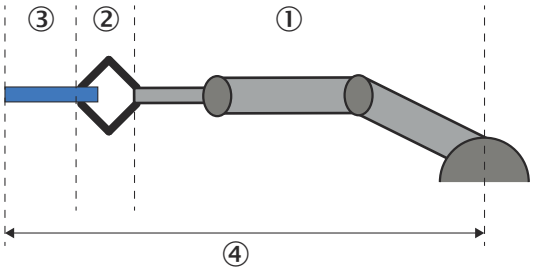

Figure 5: Composition of the radius of the hazardous area of the robot S_R

① Robot arm
② End effector
③ Workpiece
④ Radius of the hazardous area of the robot S_R

Calculating value for **Stop Field radius**

▶ **Stop Field radius** = S_{PF1} + S_R

Further topics

- "Calculating value for Reduced Field radius", page 16

4.3.2.2 Calculating value for **Reduced Field radius**

Overview

The **Reduced Field radius** value determines the maximum extension of protective field PF2. A detection in protective field PF2 triggers the safety-rated monitored speed (Reduced Mode). Protective field PF2 must be larger than protective field PF1.

All other settings for the protective field (e.g. surrounding walls) are made during commissioning.

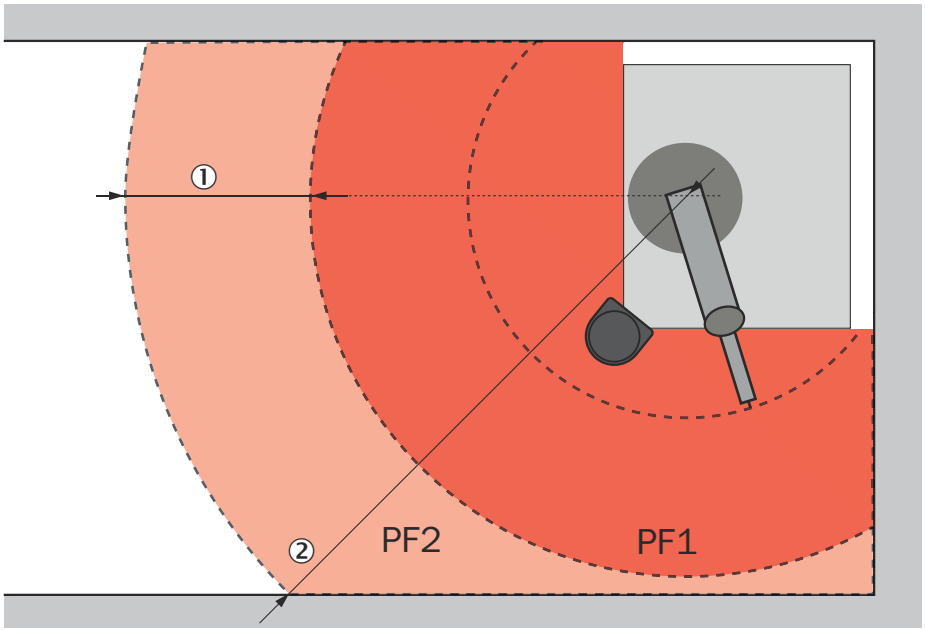

Figure 6: Difference between the minimum distances to the hazardous area

① Difference between safety distances S_{Diff}

② Reduced Field radius

Prerequisites

- Safety system uses 2 protective fields (sBot Speed – URCap)

Influence of S_{Diff} on the minimum distance to hazardous area S_{PF1}

The difference between safety distances S_{Diff} must be > 0 mm. In principle, you can freely design S_{Diff}. However, S_{Diff} has a retroactive effect on the minimum distance to hazardous area S_{PF1}

- S_{Diff} ≤ 912 mm: To calculate the minimum distance to hazardous area S_{PF1}, use the robot stopping time at maximum speed (Normal Mode).
- S_{Diff} > 912 mm: To calculate the minimum distance to hazardous area S_{PF1}, use the robot stopping time at safety-related monitored speed (Reduced Mode).

The value of 912 mm results from the following fact.

Object detection in protective field PF2 triggers the safety-rated monitored speed (Reduced Mode). If the robot monitors the reduced speed before an approaching person is detected in protective field PF1, the values for the reduced speed can be used to calculate the minimum distance to hazardous area S_{PF1}. This leads to a smaller minimum distance to hazardous area S_{PF1}.

It takes 500 ms for the robot to monitor the reduced speed (see robot documentation). The response time of the safety laser scanner is 70 ms. At an approach speed of 1600 mm/s, a difference in the minimum distances 912 mm results.

Approach

▶ **Reduced Field radius = Stop Field radius +** S_{Diff}

Complementary information

In the safety configuration of the robot controller, you can configure the stopping time for the maximum speed (Normal Mode) and the safety-rated monitored speed (Reduced Mode).

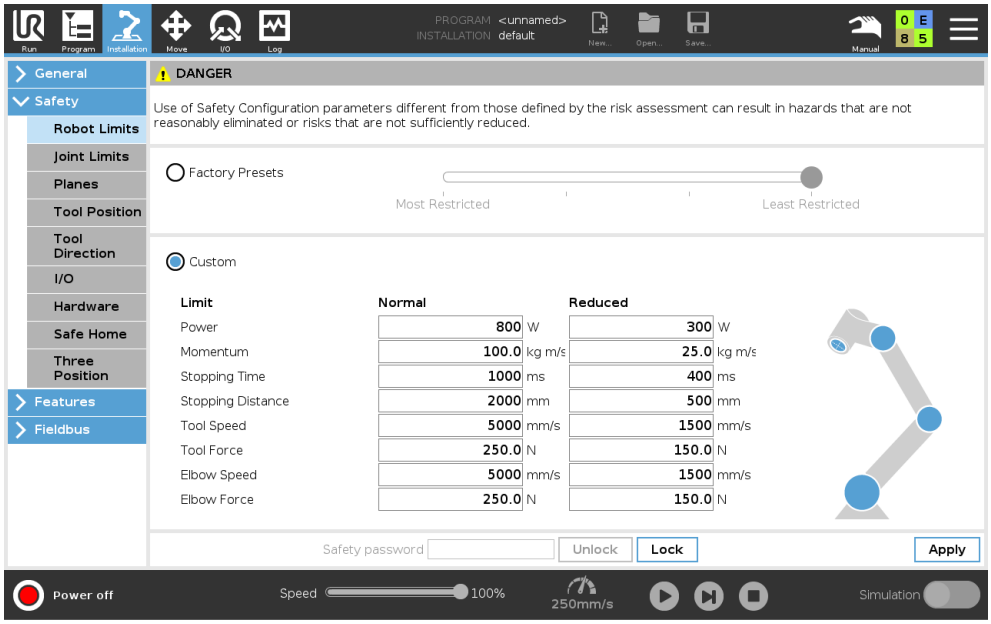

Figure 7: Configuration of the stopping time in the robot controller

Further topics

- "Calculating value for Stop Field radius", page 15

4.3.3 Position of the robot

The robot must be mounted at a fixed position. If the robot is mounted on a moving table, the safety laser scanner must be mounted on the same table. The robot and the safety laser scanner must always be positioned in the same relationship to each other.

If the position of the robot is changed, the protective fields must be reestablished because the environment of the system has changed.

4.3.4 Robot operating modes

Switching the operating mode

Switching the robot operating mode is not part of this safety system. You must select the operating mode and the safety functions via the robot controller in Manual operating mode. You can use the buttons on the teach panel, for example.

This safety system takes the following operating modes into account:

- Automatic
- Manual

Complementary information

Integration of the three-position enabling device in the manual operating mode must be implemented in the robot controller.

Further topics

- "Setting password for switching operating modes", page 24

4.3.5 Implementing emergency stop

Integration of the emergency stop is not part of the safety system. Implementation of the emergency stop via the robot controller is done solely on your authority and responsibility.

4.3.6 Preventing unexpected start-up

Preventing unexpected start-up after switching on the robot is not a part of this safety system. You must implement this function via the robot controller.

4.3.7 Automatic restart

You must attach a “Warning, automatic restart” pictogram to the system (see ISO 7010, registration number W018).

If all protective fields free up in the “Automatic” operating mode, the robot performs an automatic restart. The automatic restart complies with ISO 10218.

4.3.8 Warning field

Depending on the variant, a warning field must be configured in the configuration software. This warning field is not used by the safety system. You can use the signal as you wish in your application.

Signal behavior

- LOW: Warning field free
- HIGH: Object in warning field

4.4 Testing plan

The manufacturer of the machine and the operating entity must define all required thorough checks. The definition must be based on the application conditions and the risk assessment.

The following tests must be planned:

- A thorough check must be carried out during commissioning and following modifications.
  The check must detect if it is possible to enter the hazardous area without being detected.
- The regular thorough checks of the safety system must fulfill certain minimum requirements. The minimum requirements for the thorough check of the safety system comply at least with the sum of the minimum requirements for the thorough check of the components of the safety system (see operating instructions of the components).
  The check must detect if it is possible to enter the hazardous area without being detected. Such possibilities may exist due to modifications, manipulations or external influences.
- In many cases, depending on the application conditions, the risk assessment can determine that further thorough checks are required.

The thorough checks must be carried out by qualified safety personnel or specially qualified and authorized personnel, and must be documented in a traceable manner.

The regular thorough checks serve to assess the effectiveness of the safety system and to identify defects as a result of changes or other influences (e.g., damage or manipulation).

5 Mounting

5.1 For mounting the components

NOTE
Information is included in the operating instructions for the components.

6 Electrical installation

6.1 Electrical installation of the components

NOTE
Information is included in the operating instructions for the components.

6.2 General requirements

The manufacturer must take measures against failures resulting from the same cause. The manufacturer must document this appropriately in SISTEMA. During the electrical installation, the following, for example, must be taken into consideration:

- Protection against overvoltage, overcurrent, etc. per the manufacturer instructions for the individual components
- Measures for controlling the consequences of voltage failure, voltage fluctuations, overcurrent and undercurrent in the voltage supply of the robot controller

6.3 Pin assignment

Important information

NOTE
A complete circuit diagram of the safety system is available as a PDF.

NOTE
The safety laser scanner is supplied with voltage by the robot controller.

Connections of the nanoScan3 Core I/O safety laser scanner (1 protective field)

Table 5: Safety laser scanner connections

Pin (connecting cable color)	Attach with connection on robot controller	Function
1 (brown)	Voltage source +24 V DC	Voltage supply
2 (blue)	CI0	Protective field PF1
3 (white)	Voltage source 0 V DC	Voltage supply
4 (green)	CI1	Protective field PF1
5 (pink)	–	Warning field The shape of the warning field can be configured via the software. The warning field has no function within the safety system. You can use the warning field freely.
Ethernet	Ethernet	Network connection between safety laser scanner and robot controller

Connections of the nanoScan3 Pro I/O safety laser scanner (2 protective fields)

Table 6: Safety laser scanner connections

Pin (connecting cable color)	Attach with connection on robot controller	Function
1 (brown)	Voltage source +24 V DC	Voltage supply

Pin (connecting cable color)	Attach with connection on robot controller	Function
2 (blue)	Voltage source 0 V DC	Voltage supply
3 (white)	CI0	Protective field PF1
4 (green)	CI1	Protective field PF1
6 (yellow)	CI2	Protective field PF2
7 (black)	CI3	Protective field PF2
Ethernet	Ethernet	Network connection between safety laser scanner and robot controller

Complementary information

The enabling device is connected to the CI4/CI5 terminals of the robot controller.

7 Installation

7.1 Installing nanoScan3 Tool - URCap

Approach

1. Copy **nanoScan3_Tool_[...].urcap** file from SICK ZIP directory onto USB stick.
2. Connect USB stick to robot controller.
3. In the robot control:
   Hamburger menu > **SETTINGS** > **SYSTEM** > **URCAPS** > **PLUS icon**
4. Search for and select **nanoScan3_Tool_[...].urcap** file.
5. Click on **OPEN**.
6. Reboot robot controller.

8 Configuration

8.1 Requirements for software and functional scope

Table 7: Functional scope of SICK components

Component	Functional scope
nanoScan3 Core I/O	1.0.0
nanoScan3 Pro I/O	1.0.0

Table 8: Version for robots

Software	Version
Polyscope	5.6

8.2 Configuration of the robot controller

8.2.1 Setting password for switching operating modes

Approach

1. Click on the Hamburger icon.
2. Under **Password**, select the **Mode** menu item.
3. In the **New password** and **Confirm new password** fields, enter the desired password.
4. Click on **Apply**.

✓ You can switch between the operating modes using the icon at the top right. You must enter the password defined above to change to Manual operating mode.

8.2.2 Configuring inputs of the robot controller

Prerequisites

Robot is in manual operating mode.

Approach

1. Select **Installation** in the robot controller.
2. Under **Safety**, select the **I/O** menu item.
3. Assign the functions to the inputs.

Input Signal	Function Assignment
config_in[0], config_in[1]	Automatic Mode Safeguard Stop
config_in[2], config_in[3]	Variant-dependent • 1 protective field (sBot Stop – URCap): Unassigned • 2 protective fields (sBot Speed – URCap): Reduced Mode
config_in[4], config_in[5]	3-Position Switch

Example

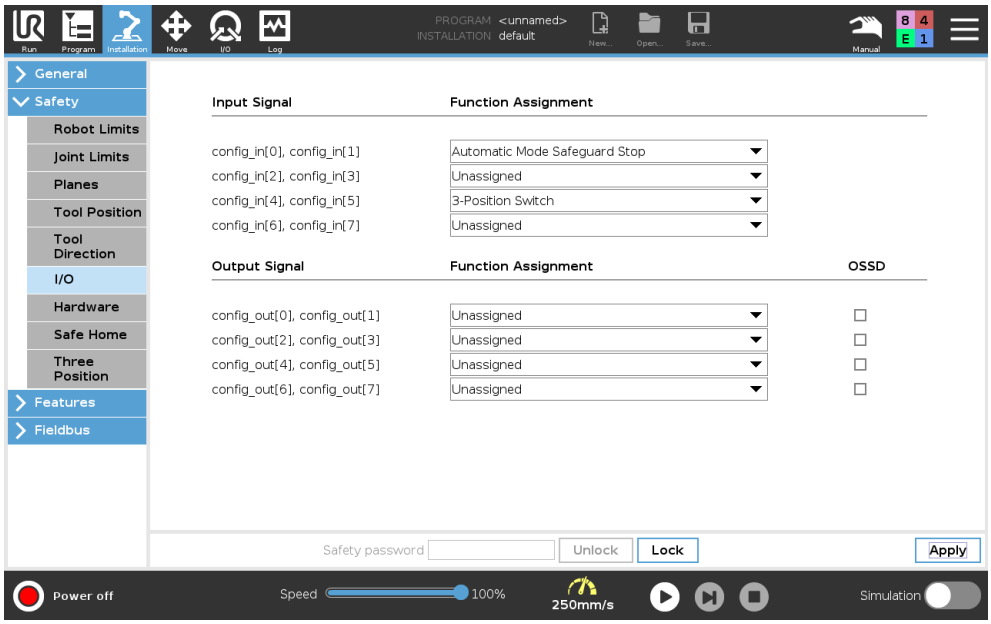

Figure 8: Example configuration with 1 protective field

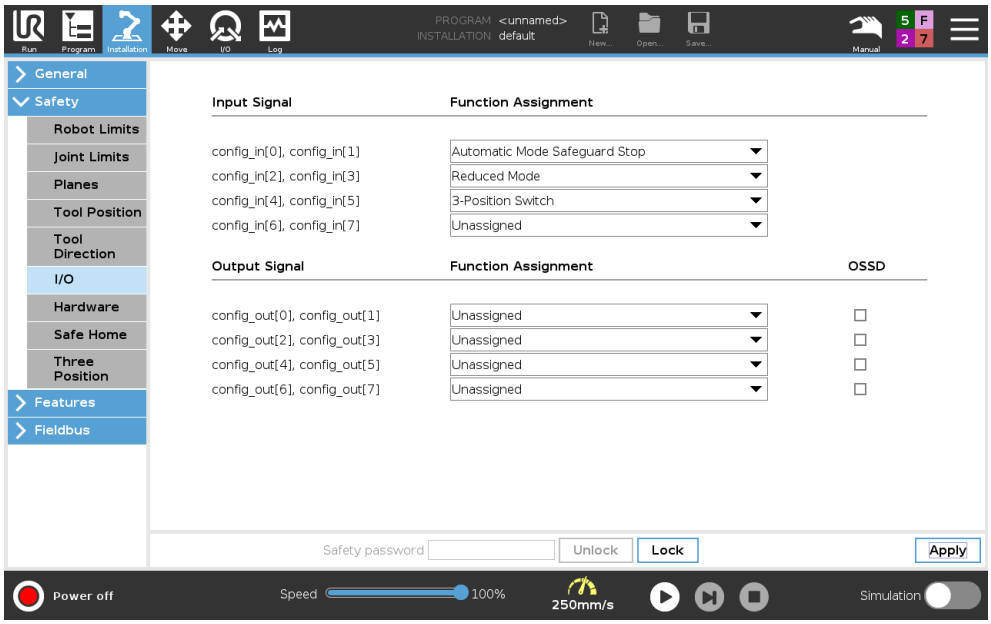

Figure 9: Example configuration with 2 protective fields

8.2.3 Configuring network

Approach

1. Click on the Hamburger icon.
2. Under **System**, click on **Network**.
3. Activate **Static Address**.
4. Configure network settings as desired. The subnet address specified here must match the subnet address configured in the nanoScan3 Tool - URCap configuration software.

8.3 Configuring the safety laser scanner

8.3.1 Starting nanoScan3 Tool configuration software

1. Click on **Installation** in the robot controller.
2. Under **URCaps**, click on **nanoScan3 Tool**.

✓ The start screen is displayed.

8.3.2 Configuration in 2 steps

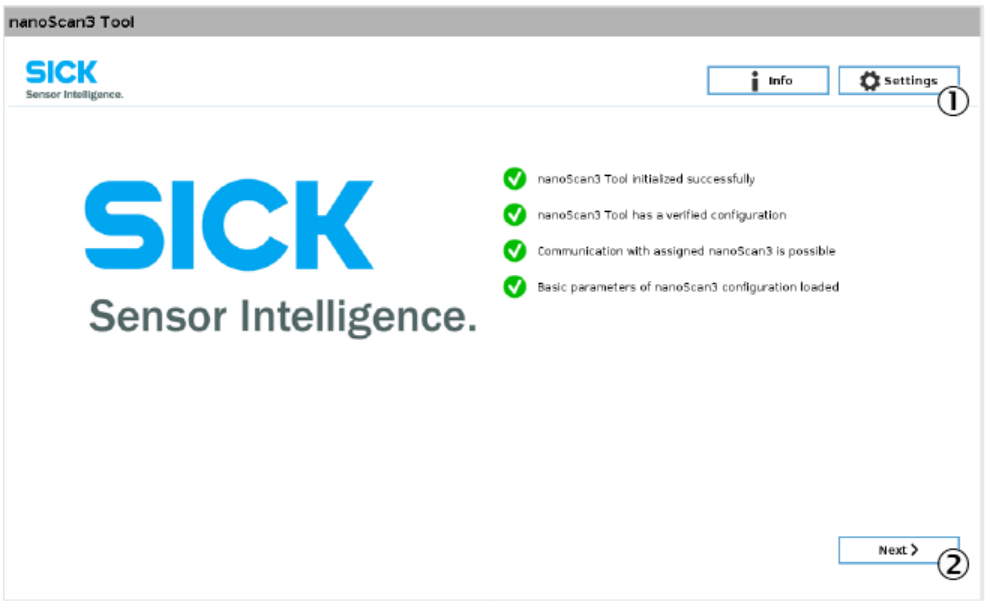

Figure 10: Start screen

Number	Menu	Function
1	**Settings**	General configuration Here, for example, the dimensions of the table or safety-relevant distances are configured. The general configuration usually only needs to be carried out during initial commissioning.
2	**Next**	Configuration of fields The fields are configured in the layout screen. You can then check and transfer the configuration. The fields must be reconfigured as soon as the position or the environment of the robot is changed.

8.3.3 General configuration

8.3.3.1 Logging in

8.3.3.1.1 Logging in as service technician

Approach

1. In the start screen, click on **Settings**.

✓ The **Settings** dialog is displayed.

2. During the first login, the password must be changed. Use the following standard password:
   SICKSAFE
   Enter new desired password 2 × and click on **Approve**.
3. Enter selected password for service technician.

4. Click on **Login**.
✓ You are registered as a service technician. The configuration menu opens.

8.3.3.1.2 Resetting the password for service technician

Approach

1. In the start screen, click on **Settings**.
✓ The **Login** dialog is displayed.
2. Click on **Forgot PW**.
✓ A reset code is displayed on the screen.
3. Follow the instructions on the screen to contact SICK technical support. Technical support can be provide a reset key using the reset code. Do not leave the dialog until the reset key is available.
4. Enter reset key in the **Service technician Password** field and click on **Login**.
5. Assign desired password 2 × and click on **Approve**.
✓ The password is assigned. You can log in with the new password.

8.3.3.2 Configuring table

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the **Desk** tab. Alternatively, click on the table.
2. In the **Width** and **Length** fields, enter the table dimensions.
✓ The table display is adjusted.
3. Click on **Apply**.
✓ The **Success** dialog is displayed. Confirm dialog to continue.

8.3.3.3 Configuring position of the robot

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the **Robot** tab. Alternatively, click directly on the robot.
2. In the **X** and **Y** fields, configure the position of the robot.
3. Click on **Apply**.
✓ The **Success** dialog is displayed. Confirm dialog to continue.

Complementary information

Safety-relevant values are marked with the following symbol:

8.3.3.4 Configuring mode and distances for field generation

Overview

Under the **Fields** tab, you can select the mode in which the fields can be configured. When the **Robot Centric** mode is selected, the calculated safety-relevant distances can be entered.

Prerequisites

- You are registered as a service technician.
- The value for Stop Field radius was calculated during project planning.
- The value for Reduced Field radius was calculated during project planning.

Approach

1. Click on **Fields**.
2. Select mode.
   - **Free Fields**
     No distances are configured in this mode. Responsibility for safe design of the protective fields thus lies with the person who carries out commissioning.
   - **Robot Centric**
     Distances are configured in this mode. These distances are circular with the robot base at the center of the circle. The distances are displayed during commissioning and are taken into account in the automatic generation of fields.
3. Enter values for safety-relevant distances.

   Table 9: Parameters in the Fields tab

Distance	Description
Warning Field radius	Distance of the warning field to the robot.
Reduced Field radius	The calculated minimum distance for triggering the safety-rated monitored speed.
Stop Field radius	The calculated minimum distance for triggering the protective stop.

4. Click on **Apply**.

✓ The **Success** dialog is displayed. Confirm dialog to continue.

Complementary information

Safety-relevant values are marked with the following symbol:

Further topics

- "Calculating value for Stop Field radius", page 15
- "Calculating value for Reduced Field radius", page 16

8.3.3.5 Configuring information for application

Important information

NOTE
These settings are optional and not required for operation of the safety system.

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the **App** tab.
2. In the **Application name** and **Project name** fields, enter the desired information.
3. Click on **Apply**.

✓ The **Success** dialog is displayed. Confirm dialog to continue.

8.3.3.6 Assigning passwords for the service technician or operator

Overview

You can assign passwords for the different user groups here. If desired, you can specify that all actions are performed by a single user group.

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the **Pass** tab.
2. If desired, activate the **Use one user for all actions** checkbox. If the option is activated, the Operator user role loses all rights. All actions that require authentication can only be performed by the Service technician user role.
3. To change the password for the service technician, activate the **Change service technician password** checkbox, enter the desired password in the **New password** field and repeat in the **Confirm new password** field.
4. To change the password for the operator, activate the **Change operator password** checkbox, enter the desired password in the **New password** field and repeat in the **Confirm new password** field.
5. If desired, activate the **User signature required to activate safety** checkbox. If the option is activated, the user must save a signature to complete commissioning. For example, the report can be used to track which user performed commissioning.
6. Click on **Apply**.

✓ The **Success** dialog is displayed. Confirm dialog to continue.

8.3.3.7 Configuring the safety laser scanner

8.3.3.7.1 Assigning safety laser scanners

Prerequisites

- You are registered as a service technician.

Approach

1. In the graphic overview, click on the free placeholder (e.g. **A**). Free placeholders are gray.

✓ A list of available and not yet assigned safety laser scanners is displayed.

2. If several safety laser scanners are used, click on **Identify** if needed.

✓ The display of the selected safety laser scanner flashes.

3. If the desired safety laser scanner is not displayed, if applicable click on **Rescan** to update the list.
4. Click on **Assign** to assign the desired safety laser scanner to a position.

✓ The desired safety laser scanner is assigned to the position. The view changes to the **Password** tab.

Complementary information

The safety laser scanner must be assigned a password to enable operation.

If the safety laser scanner is in its delivery state, the IP address must be adjusted after password assignment.

Further topics

- "Configuring the connection data", page 31
- "Assigning password for the safety laser scanner", page 32

8.3.3.7.1.1 Removing safety laser scanners

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the desired safety laser scanner. Placeholders with assigned safety laser scanner are orange.

✓ A garbage can icon appears next to the safety laser scanner.

2. Click on the garbage can icon.
3. Click on **Apply**.

8.3.3.7.2 Configuring position of the safety laser scanner

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the desired safety laser scanner. Placeholders with assigned safety laser scanner are orange.
2. Click on the **Position** tab.
3. In the **X** or **Y** fields, enter the offset between the zero point of the coordinate system (lower left table corner) and the center point of the safety laser scanner. The center point of the safety laser scanner is marked on the top side.
4. In the **Rotation** field, enter the alignment of the safety laser scanner in degrees.

✓ The entered alignment of the safety laser scanner is displayed with a mark in the preview. This mark must correspond to the 90° mark on the top of the safety laser scanner.

5. Click on **Apply**.

✓ The **Success** dialog is displayed. Confirm dialog to continue.

Example

In this example, the safety laser scanner is mounted on the lower right corner (B). The table is 1,200 mm × 600 mm.

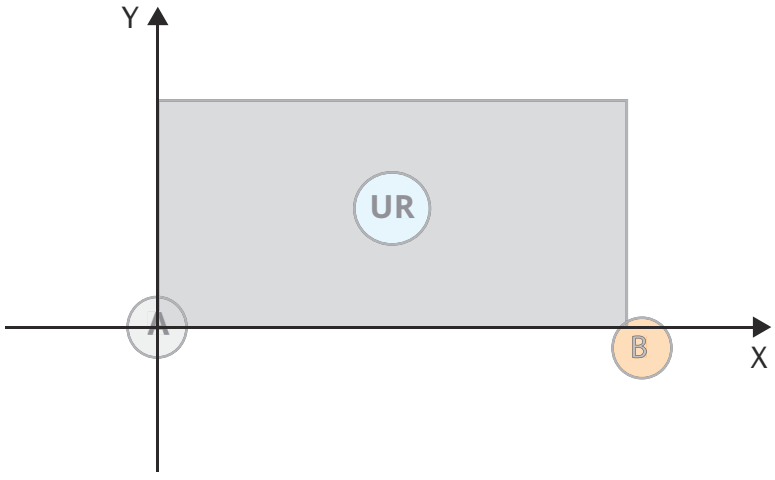

Figure 11: Example positioning of a safety laser scanner at position B

The X and Y values for the safety laser scanner can be determined by measuring the offset between the center point of the safety laser scanner and the table corner. If you calculate the offset of the safety laser scanner to the table corner with the coordinates of the table corner, you get the values for **X** and **Y**.

	X	Y
Offset between safety laser scanner and the lower right table corner	80 mm	– 80 mm
Coordinates of the lower right table corner	1,200 mm	0 mm
Position values for safety laser scanners	**1,280 mm**	**-80 mm**

Complementary information

Safety-relevant values are marked with the following symbol:

8.3.3.7.3 Configuring name of the safety laser scanner

Important information

NOTE
These settings are optional and not required for operation of the safety system.

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the desired safety laser scanner. Placeholders with assigned safety laser scanner are orange.
2. Click on **Name**.
3. In the **Name** field, enter the desired name.
4. Click on **Apply**.

✓ The **Success** dialog is displayed. Confirm dialog to continue.

8.3.3.7.4 Configuring the connection data

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the desired safety laser scanner. Placeholders with assigned safety laser scanner are orange.
2. Click on the **Address** tab.
3. In the **IP Address**, **Subnet** and **Router** fields, enter connection data.
4. Click on **Apply**.

✓ The **Success** dialog is displayed. Confirm dialog to continue.

8.3.3.7.5 Assigning password for the safety laser scanner

Overview

You must assign a password for the safety laser scanner before the settings can be transmitted to the device.

Prerequisites

- You are registered as a service technician.

Approach

1. Click on the desired safety laser scanner. Placeholders with assigned safety laser scanner are orange.
2. Click on the **Password** tab.
3. In the **Current nanoScan3 password** field, enter the password of the safety laser scanner (in delivery condition: “SICKSAFE”)
4. In the **New nanoScan3 password** and **Confirm new nanoScan3 password** fields, enter the desired password.
5. Click on **Apply**.

✓ The **Success** dialog is displayed. Confirm dialog to continue.

Complementary information

The password for the safety laser scanner can only be reset with the Safety Designer configuration software.

8.3.3.8 Verifying settings

Prerequisites

- You are registered as a service technician.

Approach

1. Click on **Verify**.

✓ The **Plausibility Checks** window is displayed. The software automatically checks whether the configuration is plausible. A failed test is labeled with the following symbol:

In some cases, you can navigate directly to the corresponding setting by clicking on the following icon:

2. Click on **Proceed**.

✓ The configuration report is displayed.

3. Check configuration report.
4. Click on **Verify**.
5. Click on **Logout** to return to the start screen.

✓ The **Success** dialog is displayed. Confirm dialog to continue.

8.3.4 Configuration of fields

8.3.4.1 Checking requirements for configuration of fields

Approach

1. Start nanoScan3 Tool - URCap configuration software.

✓ The start screen is displayed. The readiness for configuration of the fields is signaled via several parameters.

2. Make sure that all parameters are displayed in green.
3. Click on **Next**.

Further topics

- "Error messages on the start screen", page 41

8.3.4.2 Teaching in area

Overview

Before configuring the fields, the environment must be taught into the configuration software. The safety laser scanner scans the environment for this reason. The taught-in contour is taken into account when creating the fields so that walls are not considered, for example.

Approach

1. Click on **Teach**.
2. Use the slider on the right side to set the delay time for teach-in. During this time, persons can leave the scan area.
3. Click on **Teach area**.
4. Leave the area.

✓ The safety laser scanner scans the environment.

✓ In **Robot Centric** mode, the configured safety-relevant distances are combined with the results of the scan to automatically generate the fields..

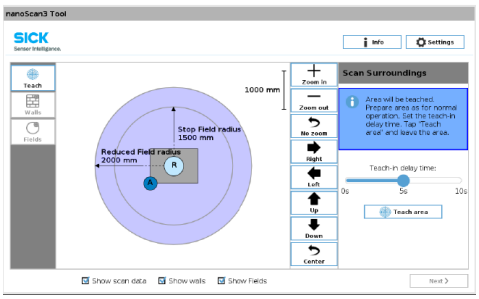

Figure 12: Before teach-in

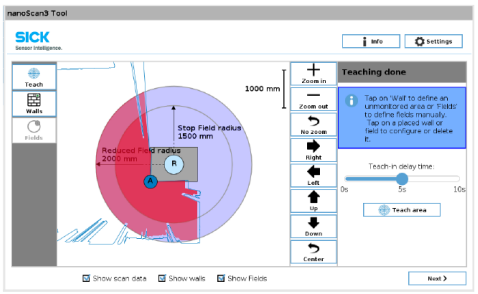

Figure 13: After teach-in

8.3.4.3 Defining walls

Overview

With the **Walls** functions, areas can be excluded from monitoring. This allows you to take into account physical guards that could not be detected by the safety laser scanner when teaching in the area, e.g. fences or covers made of acrylic glass. It can also be used to define areas in which persons cannot be present.

Important information

WARNING
Unmonitored areas

Persons or parts of the body to be protected may not be recognized or not recognized in time in case of non-observance.

▶ Only use this function for physical guards where it is not possible to climb over, reach over, crawl under, etc.

Prerequisites

- The area has been taught in.

Approach

1. Click on **Walls**.
2. Draw a line in the layout.

✓ The wall is drawn. The protective fields are adjusted so that areas behind the wall are no longer monitored.

Complementary information

The lines must be drawn so that they do not end in the middle of a field. This would mean that a person from an unmonitored area could step directly into the protective field. The required minimum distances would possibly not be observed.

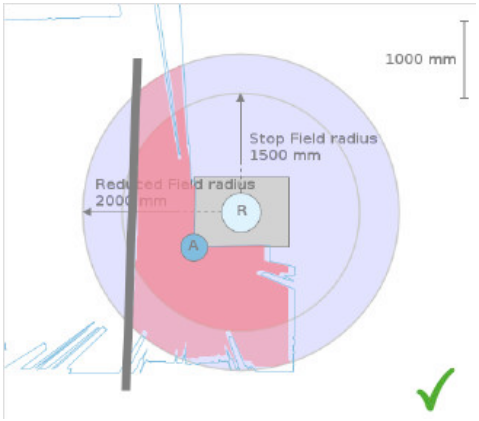

Figure 14: Valid line

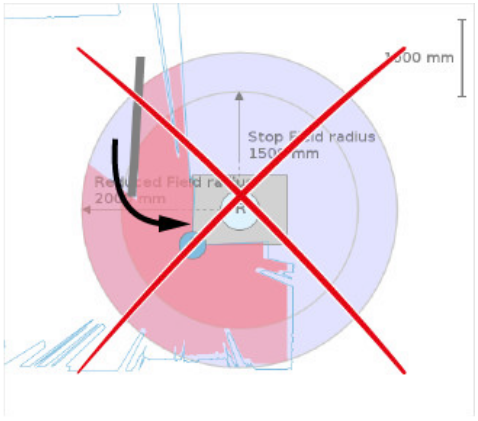

Figure 15: Invalid line

8.3.4.4 Drawing fields manually

Overview

With the **Fields** function, the fields can be drawn manually.

Prerequisites

- The area has been scanned.
- **Free Fields** mode is active (**Settings**).

Approach

1. Click on **Fields**.
2. In the preview, click on the position where the circle is to be placed.

✓ 2 circles with different radii are displayed.
The inner circle is for the protective field for the “Trigger protective stop” function.
sBot Stop – URCap only: The outer circle is for the warning field.
sBot Speed – URCap only: The outer circle is for the protective field for the “Trigger safety-related monitored speed” function.

3. Use the displayed tools to configure the circles as desired and confirm by ticking the check mark (see figure 16).
sBot Speed URCap only: When configuring the outer circle, make sure that the value of S_{Diff} specified in the configuration is maintained.

✓ The drawn circles are combined with the results of the scan. The protective fields are generated.

4. If necessary, draw other circles to protect all relevant areas with protective fields.

✓ Several circles are merged into a single field.

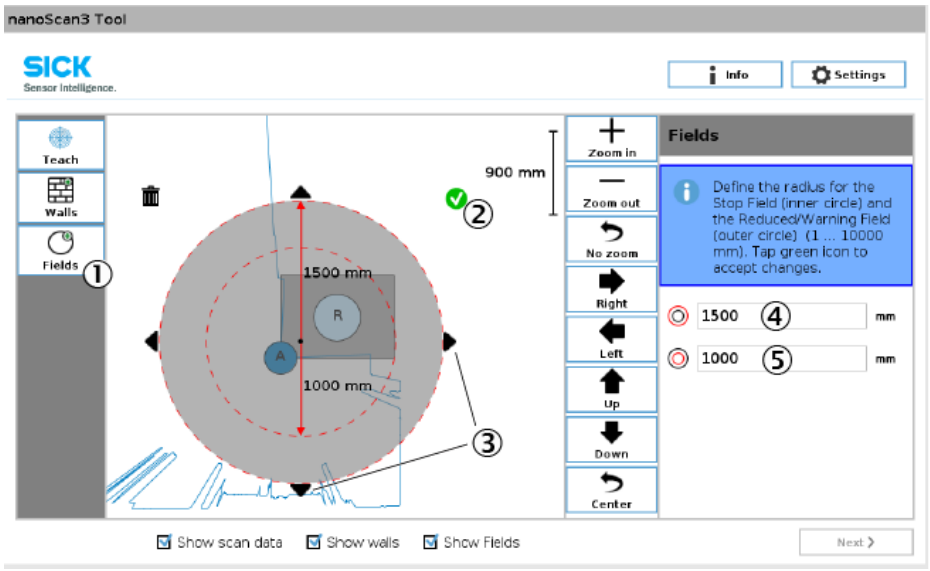

Figure 16: Drawing fields manually

① **Fields** function
② Save changes.
③ Move circle.
④ Adjust Warning Field or Reduced Field Radius.
⑤ Adjust Stop Field Radius.
⑥ Delete circle.

8.3.5 Transferring configuration to device

Prerequisites

- Protective fields can be configured.

Approach

1. Click on **Next**.
✓ The **Confirmation** dialog is displayed.
2. Enter the password of the user and confirm with **Yes**.
3. Confirm dialog for transferring the configuration with **Yes**.
✓ Configuration is being transferred to the device.

8.3.6 Checking configuration

Overview

You can check the configuration in the **Commissoning** screen. The view shows the real time data of the safety laser scanner.

Important information

DANGER
Unmonitored areas
The robot does not stop or does not stop on time.

- ▶ Perform test carefully.
- ▶ This requires appropriate expertise and experience. You must be able to assess if the system is operationally safe.

Prerequisites

- Configuration has been transferred to the device.

Approach

1. Check the following points:
   - The blue areas are not monitored. Persons cannot stay in blue areas or are protected from movement of the robot by other measures.
   - The display on the lower edge visualizes the switching behavior of the fields. Green = Field free; Red = detection in field. The Stop Field switches inputs CI0 and CI1. If available, the Reduced Field switches the inputs CI2 and CI3.
   - Access to the hazardous area is only possible through the Stop Field.
   - It is not possible to bypass the fields, e.g. by stepping over them. It is not possible to stay in the hazardous area without being detected in the Stop Field.
2. Click on **Next**.

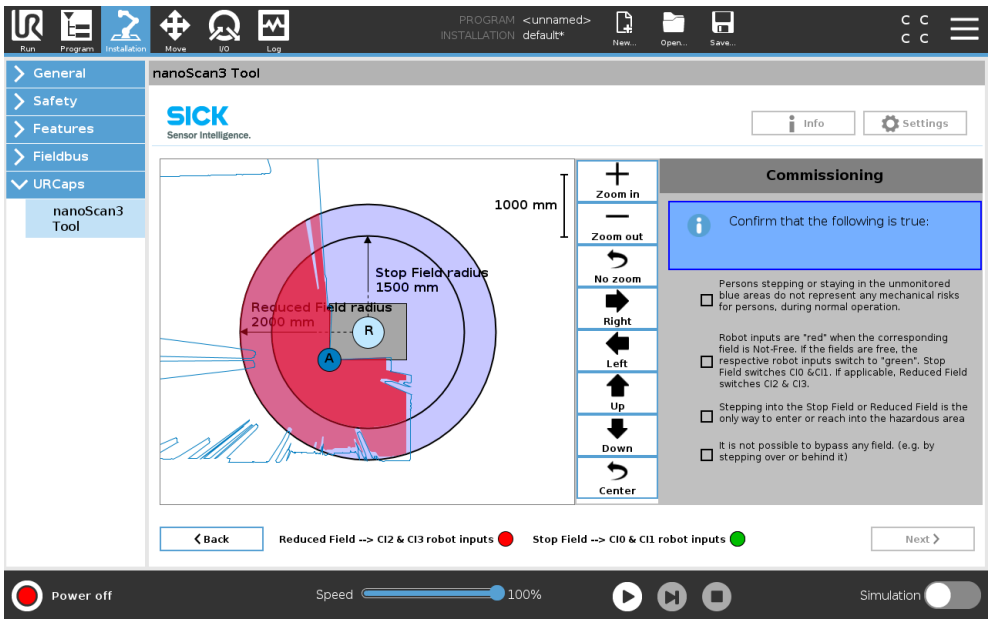

Figure 17: Check configuration

9 Commissioning

9.1 Safety

DANGER
Dangerous state of the machine

During commissioning, the machine or the protective device may not yet behave as you have planned.

- Make sure that there is no-one in the hazardous area during commissioning.

9.2 Overview of initial commissioning

Approach

Step	Approach	See
1	Identify hazardous area and determine suitable position for safety laser scanner.	Operating instructions of the safety system, chapter “4.3 Design.”
2	Mount the safety laser scanner.	Mounting instructions of the safety laser scanner
3	Connect components in line with circuit diagram and supply with voltage.	Circuit diagram
4	Install nanoScan3 Tool configuration software on the robot controller.	Operating instructions of the safety system, chapter “7.4.1 Opening project file.”
5	Configure the robot controller.	Operating instructions of the safety system, chapter “8.2 Configuring robot controller”
6	Configure safety laser scanner with nanoScan3 Tool.	Operating instructions of the safety system, chapter “8.3 Configuring safety laser scanner.”
7	Put safety system into operation.	Operating instructions of the safety system, chapter “9.3 Performing commissioning at a new location”
8	Verify and validate the safety functions.	Operating instructions of the safety system, chapter “17.1 Checklists”

9.3 Performing commissioning at a new location

Overview

If the safety laser scanner is mounted on a table together with the robot, the location of the table can be changed without having to reconfigure the safety system from scratch. Only the fields need to be reconfigured and the configuration transferred to the safety laser scanner. The configuration of the fields is safety relevant. The responsibility for the safety of the application thus lies with the person who carries out commissioning at a new location. The fields can also be configured by users with the Operator role.

Important information

WARNING
Unmonitored or not completely monitored areas

The robot does not stop or not on time.

- Ensure that the fields are only configured by users who can evaluate a safe working condition.

Approach

Configuring fields (short description)

1. In the start screen, click on **Next**.
✓ The layout screen is displayed.
2. Scan the area.
3. If necessary, define areas not to be monitored with the **Walls** function.
4. When **Free Fields** mode is activated in the general settings, define the fields with the **Fields** function. Otherwise the fields are generated automatically.
5. Click on **Next**.

Transferring configuration (short description)

6. Follow instructions to transfer configuration to device.

Checking configuration (short description)

7. Check the configuration in the **Commissoning** screen.
8. Click on **Next**.

Completing commissioning

The **Report** screen shows an overview of the configuration. Commissioning is complete when the configuration is confirmed.

9. Otherwise the user signature is entered in the **User signature** field.
10. Click on **Activate Safety**.
✓ Robot is secured.

Further topics

- "Checking requirements for configuration of fields", page 32
- "Teaching in area", page 33
- "Defining walls", page 33
- "Drawing fields manually", page 34
- "Transferring configuration to device", page 35
- "Checking configuration", page 35

10 Operation

10.1 Operating the components

NOTE
Information is included in the operating instructions for the components.

10.2 Regular thorough check

The test is intended to ensure that the hazardous area is monitored by the protective device and any attempted access to the hazardous area is prevented.

- Carry out the checks according to the instructions from the manufacturer of the machine and from the operating entity.

11 Maintenance

11.1 Maintenance of the components

NOTE
Information is included in the operating instructions for the components.

12 Troubleshooting

12.1 Troubleshooting the components

NOTE
Information is included in the operating instructions for the components.

12.2 Error messages on the start screen

Several tests are performed when starting the software. Failed tests are labeled with a red icon.

The following information help you rectify the cause for the failed test.

Failed test	Possible measure
nanoScan3 Tool initialized succesfully	Restart software.
nanoScan3 Tool has a verified configuration	Verify the configuration in the **Settings** menu.
Communication with assigned nanoScan3 is possible	Check cabling and type of the connected safety laser scanner. Check network configuration.
Basic parameters of nanoScan3 configuration successfully loaded	Check configuration of the safety laser scanner. Contact SICK if necessary.

12.3 Carry out diagnosis

Approach

1. Click on Info.
2. Click on Diagnostic.

✓ Diagnostic information is shown.

12.4 Displaying last verified report

Approach

1. Click on **Info**.
2. Click on **Last verify report**.

✓ The last transferred configuration is displayed. If you want, you can save it on a USB data card.

13 Technical data

13.1 Data sheet

Table 10: sBot Stop – URCap, sBot Speed – URCap data sheet

Performance level	PL d
SIL claim limit	SILCL 2 (IEC 62061)
Safety integrity level	SIL 2 (IEC 61508)
Protective field range	≤ 3.0 m
Warning field range	≤ 10 m
Safe state	The robot is at a standstill.

Table 11: Defined parameters of the safety laser scanner [1]

Protective field resolution	70 mm
Multiple sampling	2
Scan cycle time	30 mm
Application type	Stationary
External device monitoring (EDM)	Deactivated
Universal I/O 1	Warning field (sBot Stop – URCap only)
Universal I/O 2	OSSD pair 2, OSSD A (OSSD 2.A) (sBot Speed – URCap only)
Universal I/O 3	OSSD pair 2, OSSD B (OSSD 2.B) (sBot Speed – URCap only)

1 In principle, these parameters can be configured on the safety laser scanner. In this safety system, however, the parameters are permanently set to the specified values.

14 Ordering information

14.1 Scope of delivery

Table 12: Hardware scope of delivery

Component	sBot Stop – URCap	sBot Speed – URCap
nanoScan3 Core I/O safety laser scanner	1×	–
nanoScan3 Pro I/O safety laser scanner	–	1×
System plug for safety laser scanner	1×	1×
Connecting cable M12, 8-pin, straight, A-coded <-> open cable, 10 m	1×	–
Connecting cable M12, 17-pin, straight, A-coded <-> open cable, 10 m		1 ×
Mounting kit 1b (with protection for optics cover) for safety laser scanner	1×	1×

Table 13: Software scope of delivery

nanoScan3 Tool - URCap	Provided upon purchase.
Circuit diagram	
SISTEMA project file	
Operating instructions	

14.2 Ordering information

sBot Stop – URCap, sBot Speed – URCap ordering information

The differences between the safety system variants are in the type of safety laser scanner.

Table 14: Safety system ordering information (hardware and software)

Name	Safety laser scanner included in package	Functions	Part number
sBot Stop – URCap	nanoScan3 Core I/O (1 protective field)	• Protective stop	1111884
sBot Speed – URCap	nanoScan3 Pro I/O (2 protective fields)	• Protective stop • Safety-rated monitored speed	1111885

If you already possess the required hardware, you can order the software separately.

Table 15: Software ordering information

Name	Description	Part number
nanoScan3 Tool - URCap	• nanoScan3 Tool - URCap for integration into the robot controller • Operating instructions	1115032

15 Spare parts

15.1 Spare parts for the safety system

Table 16: Ordering information for safety laser scanner

Product	Type code	Part number
nanoScan3 Core I/O safety laser scanner	NANS3-AAAZ30AN1	1100333
nanoScan3 Pro I/O safety laser scanner	NANS3-CAAZ30AN1	1100334

Table 17: Ordering information for system plug

Accessories for		Connection type	Type code	Part number
Device	Part number			
nanoScan3 Core I/O	1100333	Cable with plug connector M12 Ethernet connection	NANSX-AAABAEZZ1	2104949
nanoScan3 Pro I/O	1100334	Cable with plug connector M12 Ethernet connection	NANSX-AAACAEZZ1	2104860

Table 18: Brackets ordering information

Part	Part number
Mounting kit 1b (with protection for optics cover)	2111768

Table 19: Optics cover ordering information

Part	Part number
Optics cover for nanoScan3 (with seal and screws)	2111696

16 Accessories

16.1 Connectivity

Table 20: Ethernet cable, M12, 4-pin, D-coding on RJ45 ordering information

Part	Type code	Part number
Male connector, straight, 2 m cable, RJ45 male connector	YM2D24-020PN1MRJA4	2106182
Male connector, straight, 5 m cable, RJ45 male connector	YM2D24-050PN1MRJA4	2106184
Male connector, straight, 10 m cable, RJ45 male connector	YM2D24-100PN1MRJA4	2106185

17 Glossary

Dangerous state	A dangerous state is a status of the machine or facility, where people may be injured. Protective devices prevent this risk if the machine is operated within its intended use. The figures in this document always show the dangerous state of the machine as movement of a machine part. In practice, there are different dangerous states, such as: • Machine movements • Electrical parts • Visible and invisible beam • A combination of multiple hazards
EDM	External device monitoring
Enabling device	Additional manually operated device used in conjunction with a start control and which, when continuously actuated, allows a machine to function. (EN ISO 12100)
External device monitoring	The external device monitoring (EDM) monitors the status of downstream contactors. In order to use external device monitoring, positively guided contactors must be used to switch off the machine. If the auxiliary contacts of the positively guided contactors are connected to the external device monitoring, the external device monitoring checks whether the contactors switch correctly when the OSSDs are switched off.
Hazardous area	Hazardous area is any space within and/or around machinery in which a person can be exposed to a hazard. (ISO 12100)
OSSD	Output signal switching device: signal output for the protective device, which is used for stopping the dangerous movement. An OSSD is a safety switching output. The functionality of each OSSD is tested periodically. OSSDs are always connected in pairs and must undergo dual-channel analysis for safety reasons. An OSSD pair is formed from 2 OSSDs that are connected and analyzed together.
PL	Performance level (ISO 13849)
Protective field	The protective field protects the hazardous area of a machine or vehicle. As soon as the electro-sensitive protective device detects an object in the protective field, it switches the associated safety outputs to the OFF state. This signal can be passed to controllers resulting in the dangerous state coming to an end, e.g. to stop the machine or the vehicle. A horizontal or vertical protective field is required, depending on the application. The electro-sensitive protective device can therefore be mounted in horizontal or vertical alignment, depending on the requirements.
Protective stop	Type of interruption of operation that allows a cessation of motion for safeguarding purposes and which retains the program logic to facilitate a restart. (ISO 10218-1)

Reset	When a protective device has sent a stop command, the stopped state must be maintained until a reset device is activated and the machine can be restarted in a second step. The reset brings the protective device back to the monitoring state after it has sent a stop command. The reset also quits the start-up or restart interlock of a protective device, so that the machine can be restarted in a second step. The reset must only be possible, when all safety functions and protective devices are functional. The reset of the protective device must not introduce any movement or dangerous situations itself. The machine is only permitted to start after the reset once a separate start command has been sent. • Manual resets are performed using a separate, manually operated device, such as a reset pushbutton. • Automatic resets by the protective device are only permitted in special cases, if one of the following conditions is met: o It must not be possible for people to be in the hazardous area without triggering the protective device. o It must be ensured that no people are in the hazardous area during or after the reset.
Resolution	The resolution of an active opto-electronic protective device (also known as the sensor detection capability) is the minimum size of an object for it to be reliably detected.
Response time	The protective device's response time is the maximum time between the occurrence of the event leading to the sensor's response and supply of the switch-off signal to the protective device's interface (for example OFF state of the OSSD pair).
Safety function	Function of a machine whose failure can result in an immediate increase of the risk(s). (ISO 12100)
Scan cycle time	The scan cycle time is the time the sensor needs for a complete scan of its detection area. Example: Time required by the mirror of a safety laser scanner for one rotation.
SIL	Safety integrity level
SILCL	SIL claim limit (IEC 62061)
Stop Category 2	A controlled stop with power left available to the robot. The safety-related control system monitors that the robot stays at the stop position.
Universal I/O	Universal I/O can be configured as universal input or as universal output.
Warning field	The warning field monitors larger areas than the protective field. Simple switching functions can be triggered with the warning field, e.g. a warning light or an acoustic signal can be triggered if a person approaches, even before the person enters the protective field. The warning field must not be used for safety applications.

18 Annex

18.1 Checklists

18.1.1 Checklist for initial commissioning and commissioning

Important information

NOTE

This checklist should be retained and kept with the machine documentation to serve as a reference during recurring thorough checks.

This checklist is not a substitute for initial commissioning or periodic thorough checks by qualified safety personnel.

Tests for the “Protective stop” safety function

Table 21: Tests for the “Protective stop” safety function

Test sequence	Expected result	Result OK?
1. Start the robot in “Automatic” operating mode. 2. Insert test object into protective field PF1 to trigger detection. 3. While the test object is detected in protective field PF1, change to “Manual” operating mode. 4. Actuate the enabling device. 5. Start robot program using teach panel.	The robot carries out a protective stop if something is detected in protective field PF1. Via the icon in the lower left corner of the teach panel, you can see how the robot changes from **Normal Mode** to **Automatic Mode Safeguard Stop**. When changing to the “Manual” operating mode, the status in the teach panel changes to **System Three Position Enabling**. When the enabling device is actuated, the status in the teach panel changes depending on the variant of the safety system. • For safety systems with 1 protective field: **Normal Mode** • For safety systems with 2 protective fields: **Manual Mode** In the “Manual, reduced speed” operating mode, the robot can also move when the enabling device is actuated while protective field PF1 is interrupted. Document the settings of the “Safety-rated monitored speed” function in the “Comments” field:	Yes ☐ No ☐
Comments:		

Tests for “Safety-rated monitored speed” safety function

Table 22: Tests for “Safety-rated monitored speed” safety function

Test sequence	Expected result	Result OK?
1. Start the robot in “Automatic” operating mode. 2. Insert test object into protective field PF2 to trigger detection.	The robot reduces its speed. Via the icon in the lower left corner of the teach panel, you can see how the robot changes from **Normal Mode** to **Reduced Mode**. Document the settings of the “Safety-rated monitored speed” function in the “Comments” field:	Yes ☐ No ☐
Comments:		

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