OPERATING INSTRUCTIONS

airWiper

Needs-based cleaning for outdoorScan3

SICK
Sensor Intelligence.

Described product

airWiper

Manufacturer

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Legal information

Original document

This document is an original document of SICK AG.

Contents

1 About this document

1.1 Scope

Product

This document applies to the following products:

- Product code: airWiper

Document identification

Document part number:

- This document: 8027429
- Available language versions of this document: 8027361

You can find the current version of all documents at www.sick.com.

Other documents relevant for the product

Table 1: Available documents

Document	Title	Part number
Operating instructions	outdoorScan3 Core I/O	8023150
Operating instructions	outdoorScan3 – EtherNet/IP™	8023153
Operating instructions	outdoorScan3 – PROFINET	8027929

1.2 Target groups of these operating instructions

Some sections of these operating instructions are intended for certain target groups. However, the entire operating instructions are relevant for intended use of the product.

Table 2: Target groups and selected sections of these operating instructions

Target group	Sections of these operating instructions
Project developers (planners, developers, designers)	"Project planning", page 11 "Technical data", page 31
Installers	"Mounting", page 26
Safety experts (such as CE authorized representatives, compliance officers, people who test and approve the application)	"Project planning", page 11 "Technical data", page 31
Operators	"Troubleshooting", page 30
Maintenance personnel	"Maintenance", page 28 "Troubleshooting", page 30

1.3 Additional information

www.sick.com

The following information is available on the Internet:

- Data sheets and application examples
- CAD data and dimensional drawings
- Certificates (e.g. EU declaration of conformity)
- Guide for Safe Machinery Six steps to a safe machine

1.4 Symbols and document conventions

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.

2 Safety information

2.1 General safety notes

Product integration

DANGER
The product can not offer the expected protection if it is integrated incorrectly.

- ► Plan the integration of the product in accordance with the machine requirements (project planning).
- ► Implement the integration of the product in accordance with the project planning.

Mounting and electrical installation

DANGER
Death or severe injury due to electrical voltage and/or an unexpected startup of the machine

- ► Make sure that the machine is (and remains) disconnected from the voltage supply during mounting and electrical installation.
- ► Make sure that the dangerous state of the machine is and remains switched off.

Repairs and modifications

DANGER
Improper work on the product

A modified product may not offer the expected protection if it is integrated incorrectly.

- ► Apart from the procedures described in this document, do not repair, open, manipulate or otherwise modify the product.

2.2 Intended use

The intended use of the safety laser scanner is described in the operating instructions of the safety laser scanner.

The airWiper is used to clean water droplets off the optics cover.

2.3 Requirements for the qualification of personnel

The product must be configured, installed, connected, commissioned, and serviced by qualified safety personnel only.

Project planning

You need safety expertise to implement safety functions and select suitable products for that purpose. You need expert knowledge of the applicable standards and regulations.

Mounting, electrical installation and commissioning

You need suitable expertise and experience. You must be able to assess if the machine is operating safely.

Operation and maintenance

You need suitable expertise and experience. You must be instructed in machine operation by the machine operator. For maintenance, you must be able to assess if the machine is operating safely.

3 Product description

3.1 Device overview

Overview

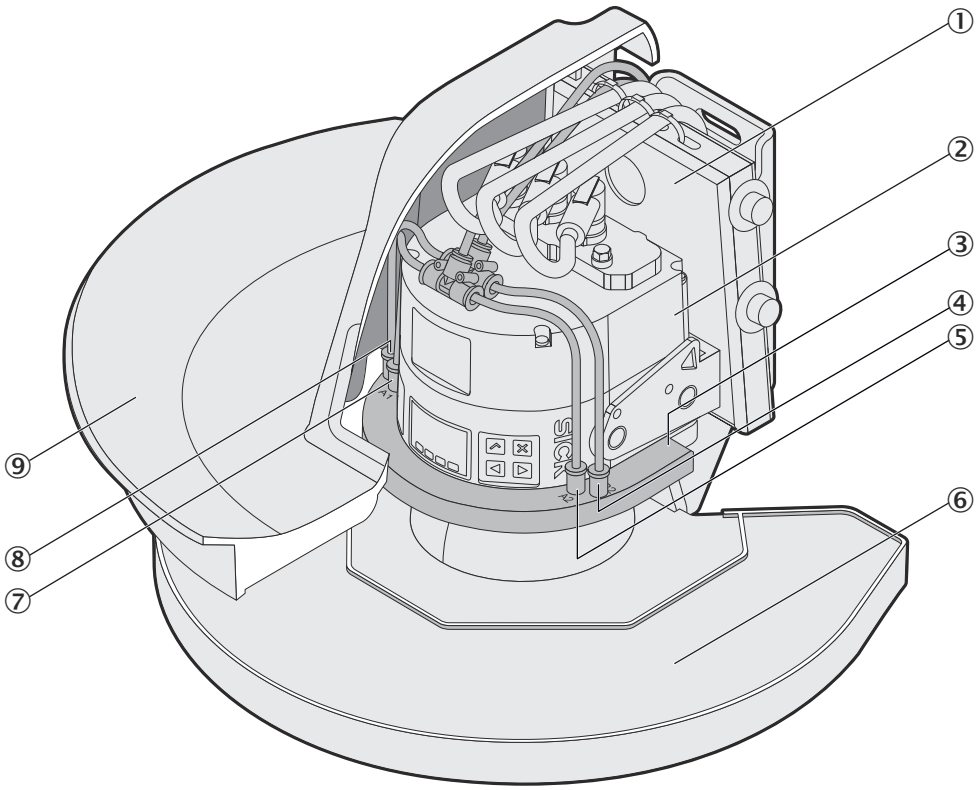

Figure 1: Device overview

① Mounting kit 3
② outdoorScan3
③ airWiper
④ Compressed air connection B2
⑤ Compressed air connection A2
⑥ Splash guard
⑦ Compressed air connection A1
⑧ Compressed air connection B1
⑨ Weather protection hood

3.2 Design and function

Overview

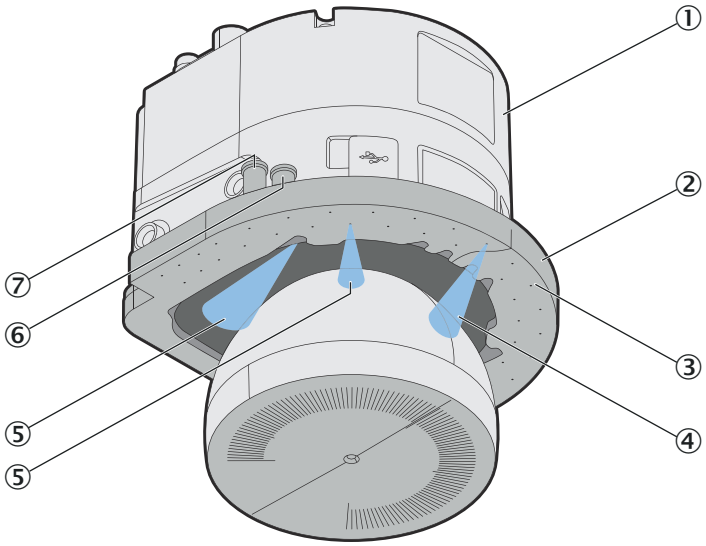

Figure 2: Safety laser scanner with airWiper

① outdoorScan3
② airWiper
③ Air nozzle
④ Air blasts on the curved part of the optics cover (channel B)
⑤ Air blasts on the base (channel A)
⑥ Compressed air connection A1
⑦ Compressed air connection B1

Design

The airWiper is mounted on the safety laser scanner as an accessory. On the inside and underneath are air nozzles through which compressed air is directed at the optics cover.

The nozzles on the inside, and the inner air nozzles underneath are used for cleaning the base. They are supplied with compressed air via the compressed air connections A1 and A2 (channel A). The outer air nozzles underneath are used to clean the curved part of the optics cover. They are supplied with compressed air via compressed air connections B1 and B2 (channel B).

The compressed air connections of a channel are not connected to each other. Connections 1 and 2 of each channel must be supplied with compressed air together, e.g., via a T-connector.

The compressed air supply, controller, valves, etc. are not part of the airWiper. These are additionally required.

Function

Compressed air lines are connected to the compressed air connections. When the optics cover needs to be cleaned, compressed air is passed through the lines. Compressed air exits through the air nozzles and blows water droplets off the optics cover.

Further topics

- "Example: Compressed air supply with compressor", page 35

4 Project planning

4.1 Needs-based cleaning using the airWiper

Overview

To enable the airWiper to clean the optics cover using compressed air when required, valves are located between the compressed air supply and the airWiper. A controller opens the valves when cleaning is required. The controller can open the valves on manual request or on a signal from the safety laser scanner.

The airWiper can only clean the optics cover effectively if the pressure system and the activation are tailored to the specific requirements. The following examples serve as a guide. You need to adapt the examples to the application and the compressed air supply used, and optimize them in a targeted manner.

Prerequisites

- The safety laser scanner is mounted with the optics cover facing down.
- The safety laser scanner is protected from the ambient conditions during operation. It is protected by the weather protection hood or by mounting it in a cladding, as described in the operating instructions of the safety laser scanner.
- The safety laser scanner is mounted so that no small objects (e.g., cables) are in the protective field, even if the safety outputs do not switch to the OFF state as a result.
- There are no objects (e.g., cables) between the base and the curved part of the optics cover that could interfere with the contamination measurement.
- The requirements on the compressed air are met, see "Technical data", page 31.

Automatic cleaning operation

You can use signals from the safety laser scanner to trigger the cleaning.

The safety laser scanner continuously measures the contamination of the optics cover. You can use the signals **Contamination warning** and **Contamination error** to trigger the airWiper. In addition to or instead of this, warning fields can serve as triggers.

You can evaluate the signals of the safety laser scanner using a controller. The controller activates the compressed air for the individual channels via valves. In the case of the outdoorScan3 Core I/O, you can also directly control individual components such as relays and valves without a controller. The electrical data of the outdoorScan3 Core I/O can be found in its operating instructions.

Two stage cleaning

Two-stage cleaning is particularly effective in many cases and requires less compressed air than single-stage cleaning. In two-stage cleaning, channel A first cleans the base. Channel B is then additionally activated so that both channels clean the base and the curved part of the optics cover together. This two-stage cleaning step is usually repeated several times in one cleaning operation.

Stop criteria and exclusion conditions

If the airWiper is triggered automatically, then in many cases it is useful to define stop criteria and exclusion conditions.

The cleaning process ends as soon as the triggering signal is no longer present or as soon as the stop criterion occurs.

Examples:

- Stop criteria: Occasionally the airWiper cannot remove all contamination. Without a stop criterion, the controller would trigger the airWiper again and again. This can lead to increased energy consumption or premature draining of the compressed air tank. If configured appropriately, the controller will abort cleaning after a reasonable time. In most cases, the optimum cleaning effect is achieved after a maximum of 10 cleaning steps.
- Exclusion conditions: In certain situations, cleaning should not take place, for example when the vehicle is stationary and there is temporarily a particularly large amount of water present. If configured appropriately, the controller will ignore signals that normally trigger the airWiper in such cases.

Depending on your application, you can implement the stop criteria and exclusion conditions using a controller or using relays, switches, etc.

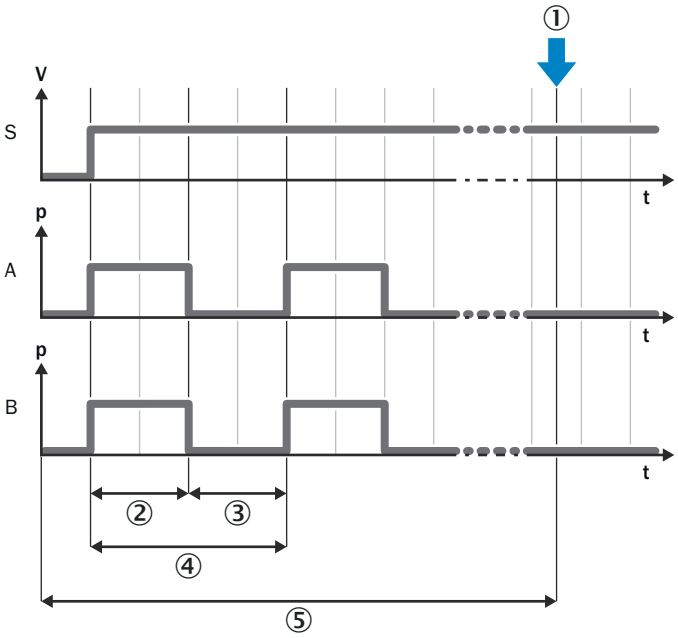

Figure 3: Single stage cleaning

S Trigger signal of the safety laser scanner, e.g., contamination warning, warning field
A Compressed air in channel A
B Compressed air in channel B
V Voltage
p Pressure
t Time
① Stop condition: the cleaning process ends at this time at the latest, even if the contamination has not been removed
② Cleaning with channel A and B
③ Pause
④ Cleaning step
⑤ Cleaning process

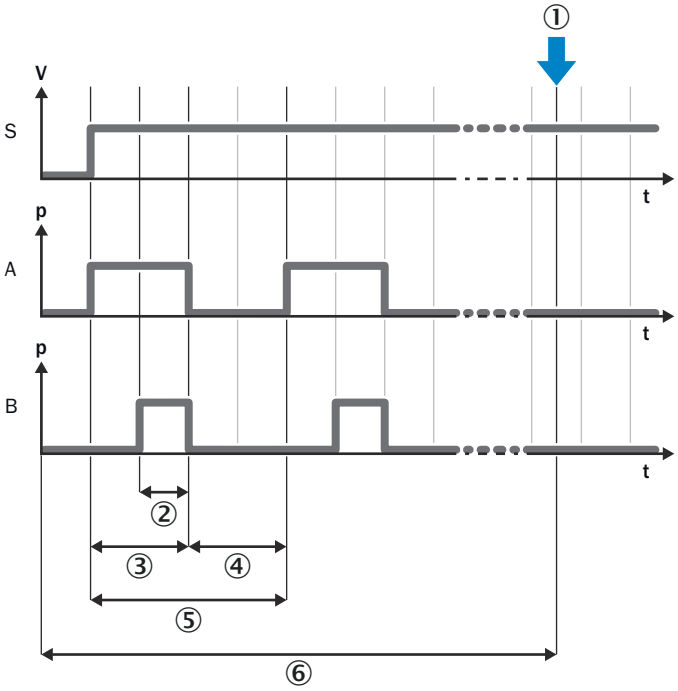

Figure 4: Two stage cleaning

S Trigger signal of the safety laser scanner, e.g., contamination warning, warning field
A Compressed air in channel A
B Compressed air in channel B
V Voltage
p Pressure
t Time
① Stop condition: the cleaning process ends at this time at the latest, even if the contamination has not been removed
② Cleaning with channel B
③ Cleaning with channel A
④ Pause
⑤ Cleaning step
⑥ Cleaning process

Complementary information

When contaminated water dries, it leaves residues on the optics cover. The airWiper cannot remove these residues. If you use a sensitive trigger, the airWiper can remove the water before it dries so that cleaning is more thorough.

An oil-free compressor with a compressed air tank and filter regulator or a compressed air bottle is required for the compressed air supply. For automatic cleaning, a controller or individual components such as relays etc. are required.

The compressed air may cause unexpected noise during cleaning. Persons in the vicinity should, if necessary, be made aware of the possibility of noise developing.

Further topics

- "Example: Compressed air supply with compressor", page 35

4.2 Example: situation-dependent cleaning with different intensities

Overview

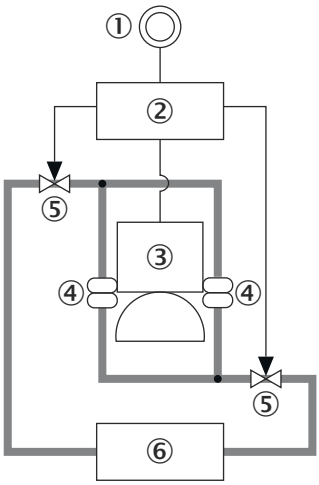

Figure 5: Example: situation-dependent cleaning with different intensities (schematic representation)

① Pushbuttons
② Control systems
③ Safety laser scanners
④ airWiper
⑤ Valve
⑥ Compressed air supply

The safety laser scanner with a network connection automatically triggers different cleaning operations depending on the degree of contamination. The cleaning operation can also be triggered manually.

The cleaning process ends as soon as the triggering signal is no longer present or as soon as the stop criterion occurs.

The following cleaning operations are available:

- Two-stage preventive cleaning when a warning field reports a detection or the safety laser scanner reports a contamination warning. Preventive cleaning removes water droplets early so that the safety laser scanner does not switch to the OFF state.
- Two-stage efficient cleaning when the safety laser scanner reports a contamination error. Efficient cleaning removes water droplets when the safety laser scanner has already switched to the OFF state.
- System cleaning when manually requested using a pushbutton. System cleaning removes condensate from the compressed air lines and airWiper, e.g., after a long downtime.

Prerequisites

Parts needed:

- Compressed air source
- Compressed air lines
- Compressed air valves
- Control systems
- Pushbuttons
- Electrical cables

Configuration example

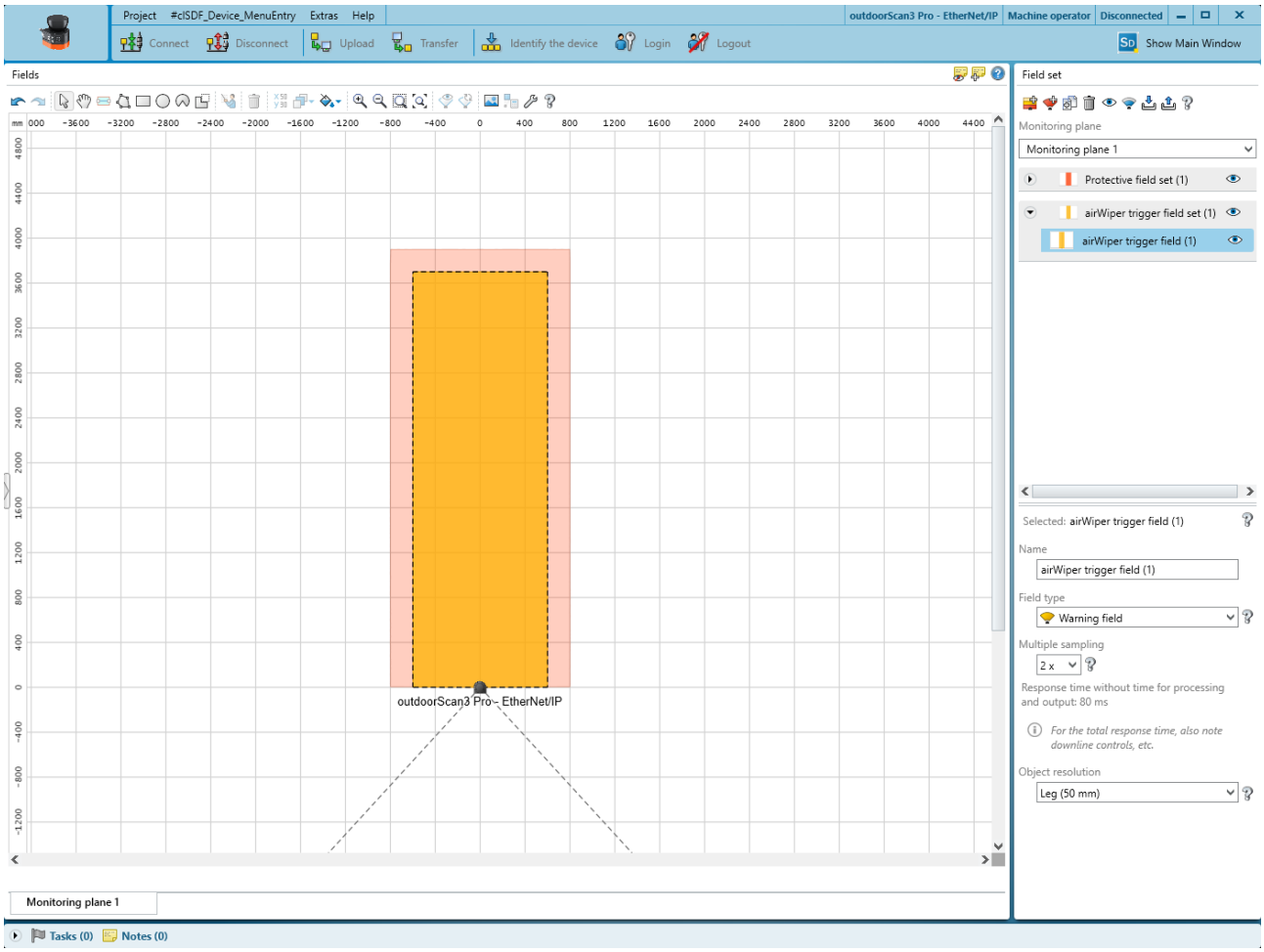

Figure 6: Warning field as a trigger for preventive cleaning

The warning field has approximately the same size as the protective field. The warning field has a finer resolution and a lower multiple sampling setting than the protective field so the warning field triggers the airWiper before the protective field reports a detection.

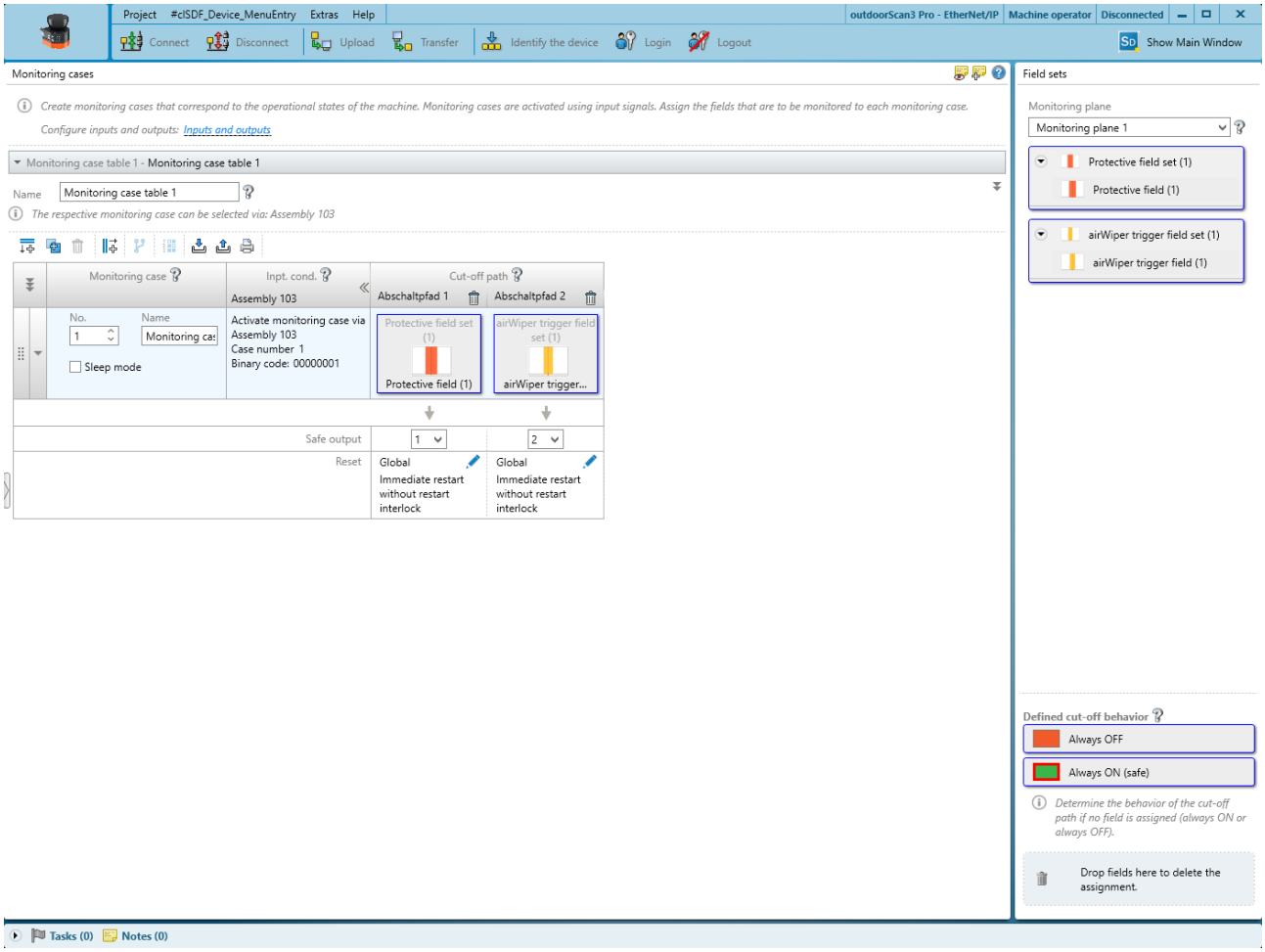

Figure 7: Monitoring case table

The output of the warning field and the output of the contamination warning are evaluated in the controller in such a way that they trigger the preventive cleaning.

The output of the contamination error is evaluated in the controller in such a way that it triggers the efficient cleaning.

The button is evaluated in the controller in such a way that it triggers the system cleaning.

Recommended parameters for cleaning

Preventive cleaning

1 Stop condition after 2 cleaning steps
2 Air supply for connections A: 200 ms concurrently for each step
3 Air supply for connections B: For each step start 100 ms after connections A, duration 100 ms
4 400 ms pause
5 Total duration of a cleaning step: 600 ms

Efficient cleaning

1 Stop condition after 4 cleaning steps
2 Air supply for connections A: 400 ms concurrently for each step
3 Air supply for connections B: For each step start 200 ms after connections A, duration 200 ms
4 400 ms pause
5 Total duration of a cleaning step: 800 ms

System cleaning

1 1 cleaning step
2 Both channels concurrently
3 Air supply for connections A and B: 5 s each

Complementary information

outdoorScan3 Core I/O:

- This example is only transferable to the outdoorScan3 Core I/O to a limited extent as it only has a few outputs, especially if monitoring case switching is used.

If you suitably evaluate the network signals, you can use different conditions for the start and end of the cleaning process:

- Cleaning operation starts in case of a contamination error.
- Cleaning operation is continued after the contamination error ends.
- Cleaning operation ends only when the contamination warning ends.

Other possible triggers:

- Fixed time interval
- Time interval that depends on the weather
- Small warning field as a trigger for efficient cleaning

Sensitivity of the warning field used as a trigger:

- The warning field should have a finer resolution than the protective field so it detects contamination before the protective field reports a detection.
- The warning field should have a lower multiple sampling setting than the protective field so it detects contamination before the protective field reports a detection.
- The radius r of the warning field influences the sensitivity. r < 1 m: low sensitivity, 1 m ≤ r ≤ 2 m: medium sensitivity, r > 2 m: high sensitivity.
- If a warning field covers the entire scanning angle of 275°, it is very sensitive. Contaminants are also detected and removed outside the area where protective fields are located. If parts of the scanning angle are covered, e.g., by the vehicle trim, the warning field must be appropriately adjusted.
- If a warning field only covers the area where protective fields are also located, it is less sensitive. This enables, for example, the consumption of compressed air to be reduced.

4.3 Example: two-stage cleaning, triggered by warning field or contamination warning

Overview

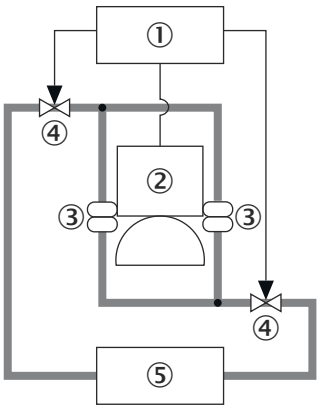

Figure 8: Example: two-stage cleaning, triggered by warning field or contamination warning (schematic representation)

① Control systems
② Safety laser scanners

③ airWiper
④ Valve
⑤ Compressed air supply

The outdoorScan3 Core I/O triggers two-stage cleaning when a warning field reports a detection or when a contamination warning is present.

The cleaning process ends as soon as the triggering signal is no longer present or as soon as the stop criterion occurs.

Prerequisites

Parts needed:

- Compressed air source
- Compressed air lines
- Compressed air valves
- Control systems
- Electrical cables

Configuration example

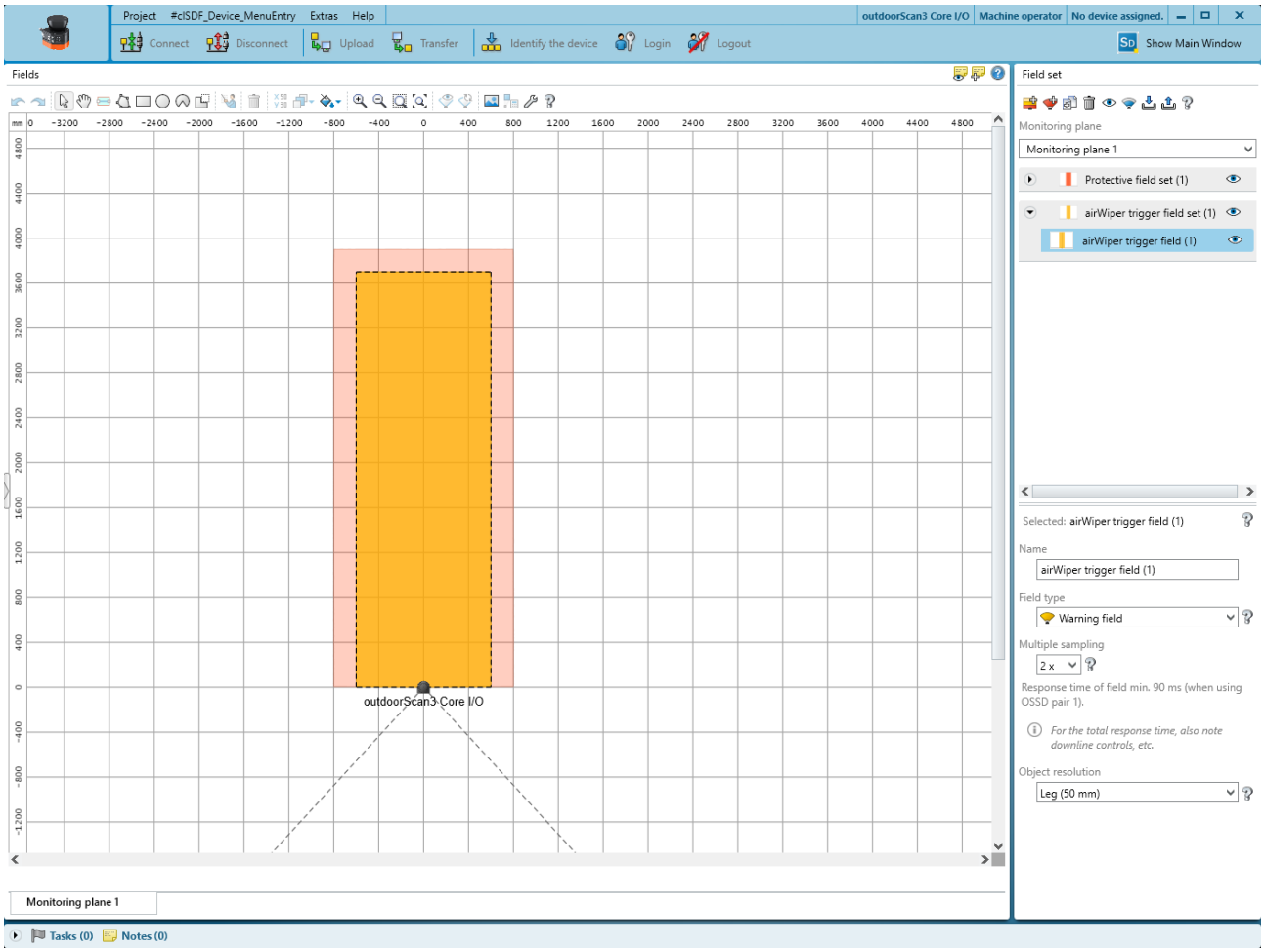

Figure 9: Warning field as a trigger for preventive cleaning

The warning field has approximately the same size as the protective field. The warning field has a finer resolution and a lower multiple sampling setting than the protective field so the warning field triggers the airWiper before the protective field reports a detection.

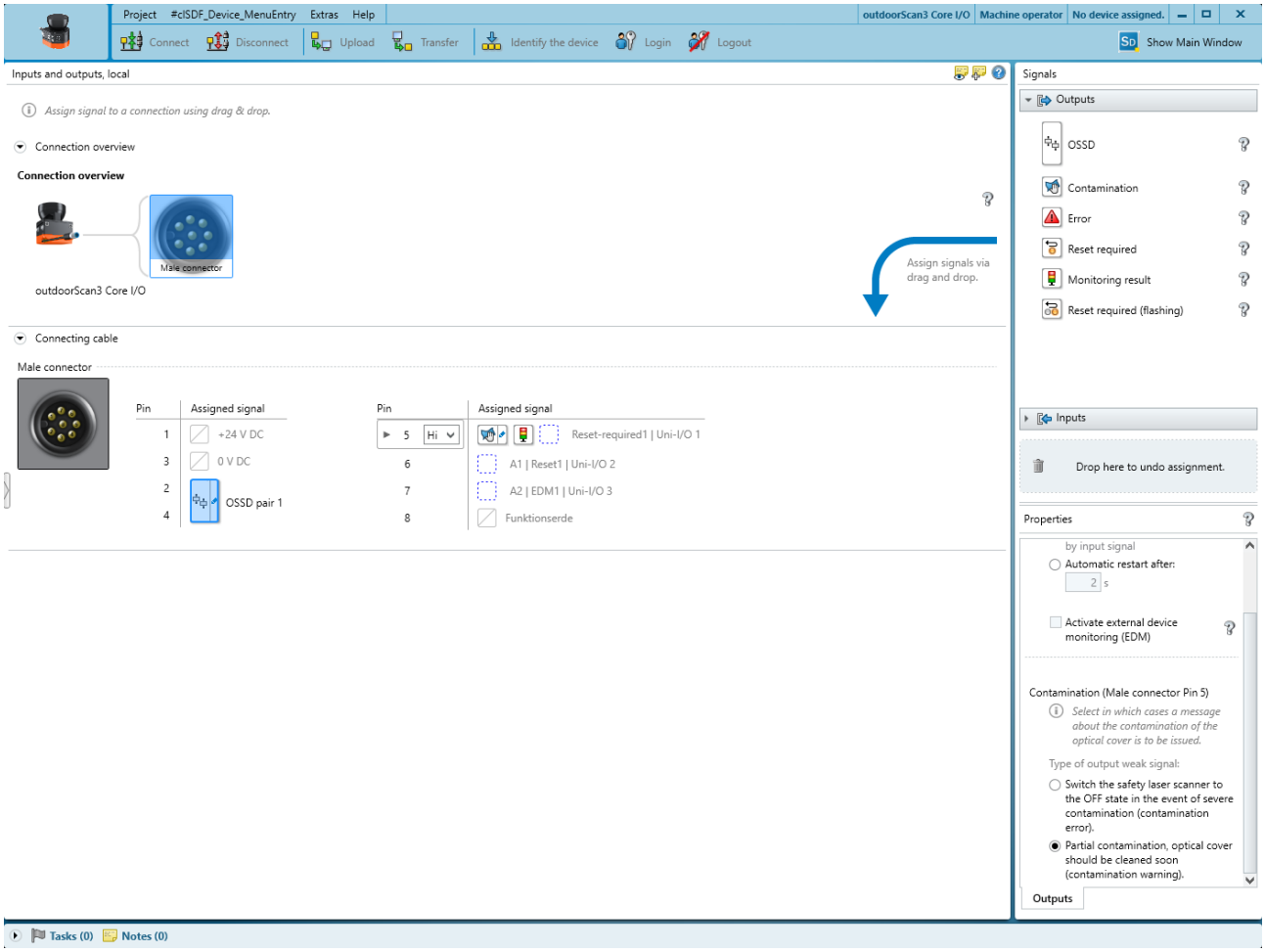

Figure 10: Contamination warning as a trigger for preventive cleaning

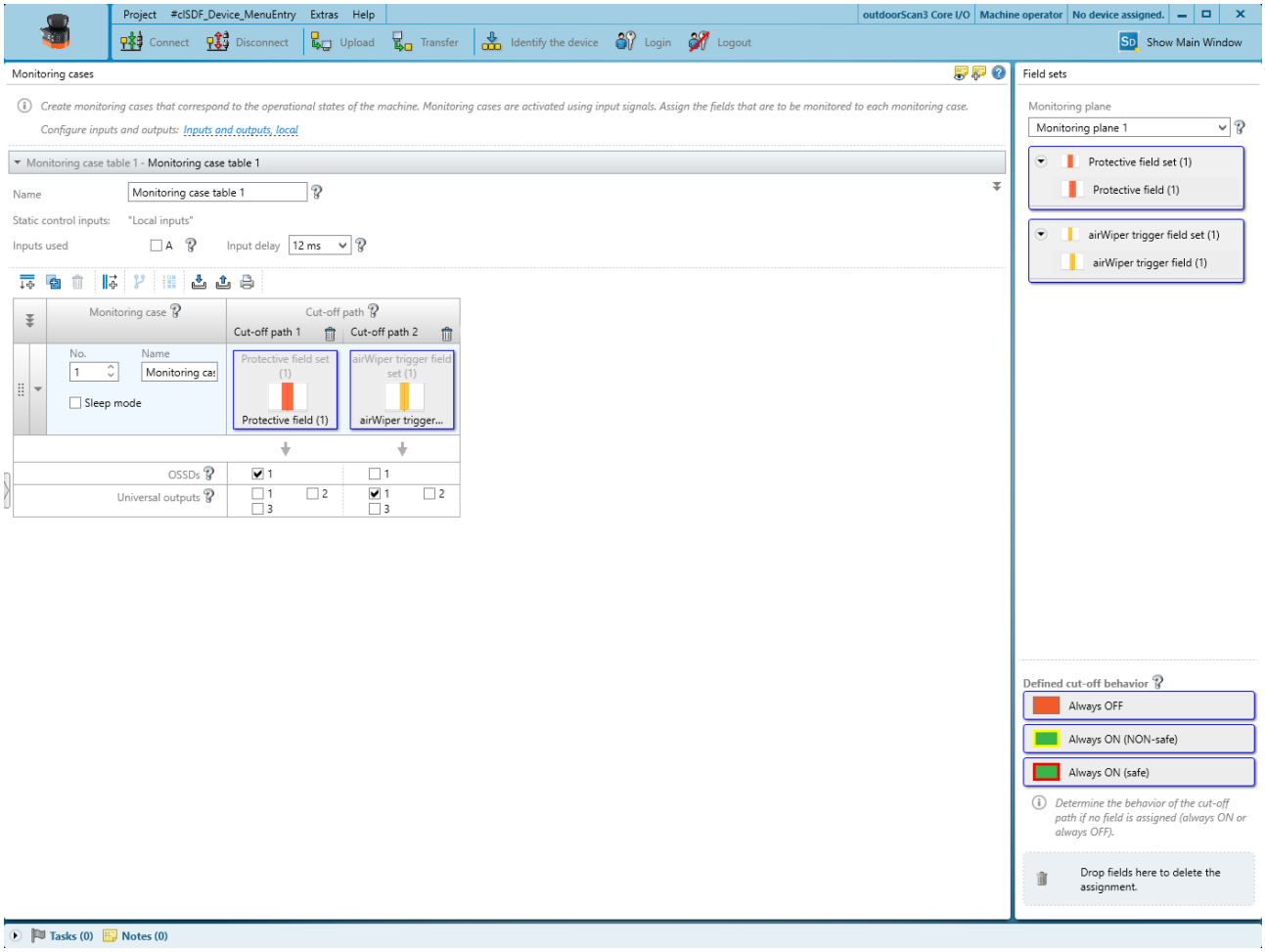

Figure 11: Monitoring case table

Universal I/O 1 serves as an output for the warning field and for the contamination warning. The output is evaluated in the controller in such a way that it triggers cleaning.

Recommended parameters for cleaning

Preventive cleaning

1 Stop condition after 2 cleaning steps
2 Air supply for connections A: 200 ms concurrently for each step
3 Air supply for connections B: For each step start 100 ms after connections A, duration 100 ms
4 400 ms pause
5 Total duration of a cleaning step: 600 ms

Complementary information

You can adapt the example to your application, for example by using only one of the two signals as a trigger or by changing the duration of the cleaning. The parameters should be selected in such a way that the improvement in availability is in reasonable proportion to the consumption of compressed air and energy.

This example is transferable to devices with a network connection. In this case the controller must evaluate both the signal for the warning field and the signal for the contamination warning.

4.4 Example: single-stage cleaning, triggered by small warning field or contamination error

Overview

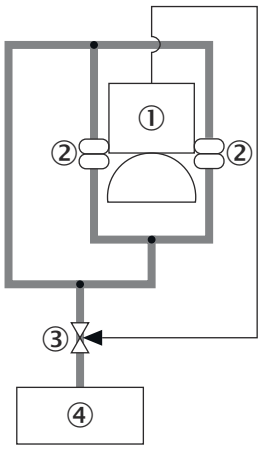

Figure 12: Example: single-stage cleaning, triggered by small warning field or contamination error (schematic representation)

① Safety laser scanners
② airWiper
③ Valve
④ Compressed air supply

The outdoorScan3 Core I/O triggers a cleaning operation when a small warning field reports a detection or when a contamination error is present. In this example, the airWiper does not require a controller.

The cleaning process ends as soon as the triggering signal is no longer present or as soon as the stop criterion occurs.

Prerequisites

Parts needed:

- Compressed air source
- Compressed air lines
- Compressed air valve
- Electrical cable for activating the valve

Configuration example

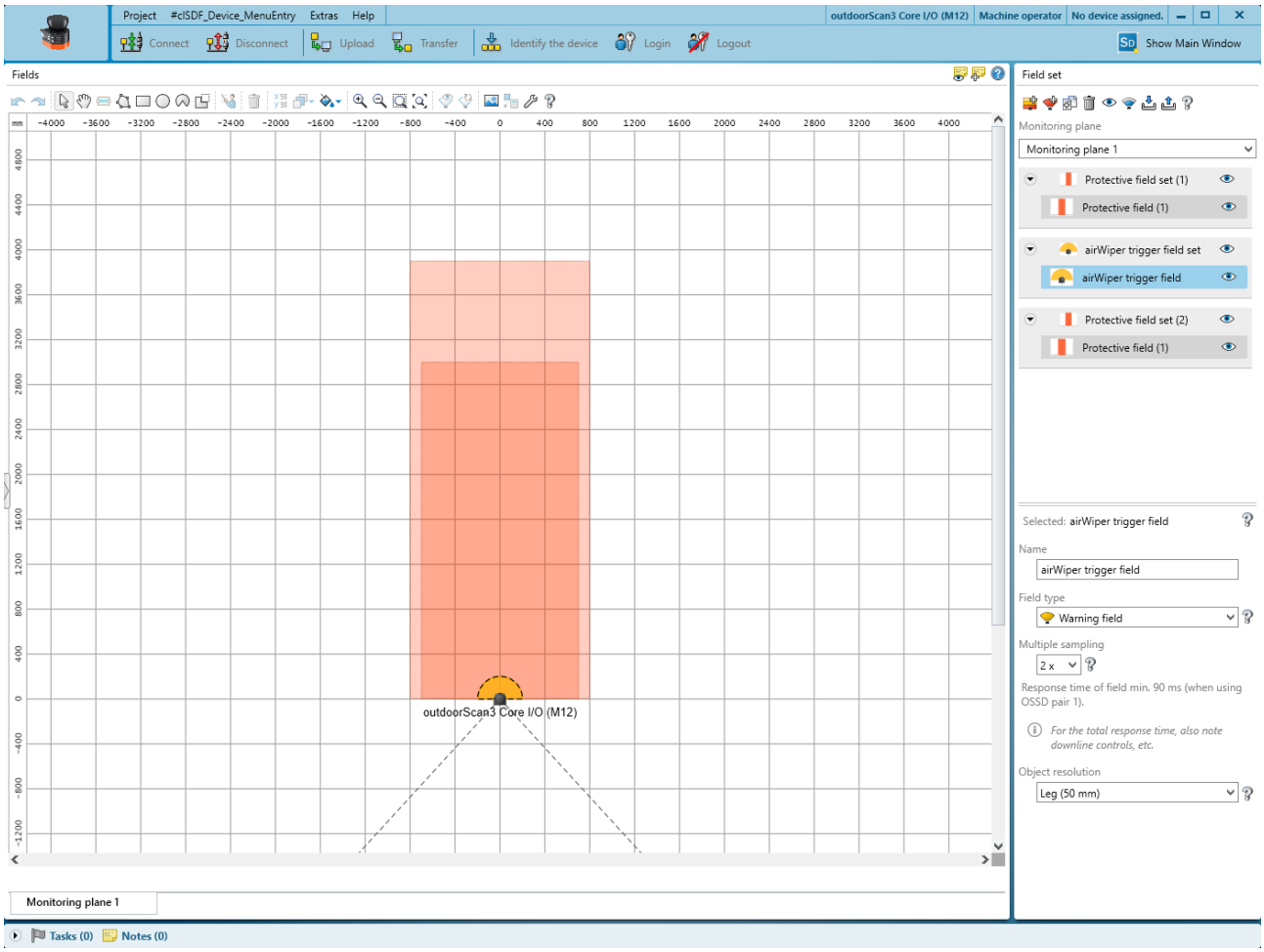

Figure 13: Small warning field as a trigger for efficient cleaning

The warning field covers an angle of 180° and has a small radius of approx. 200 mm. The warning field has a finer resolution and a lower multiple sampling setting than the protective field.

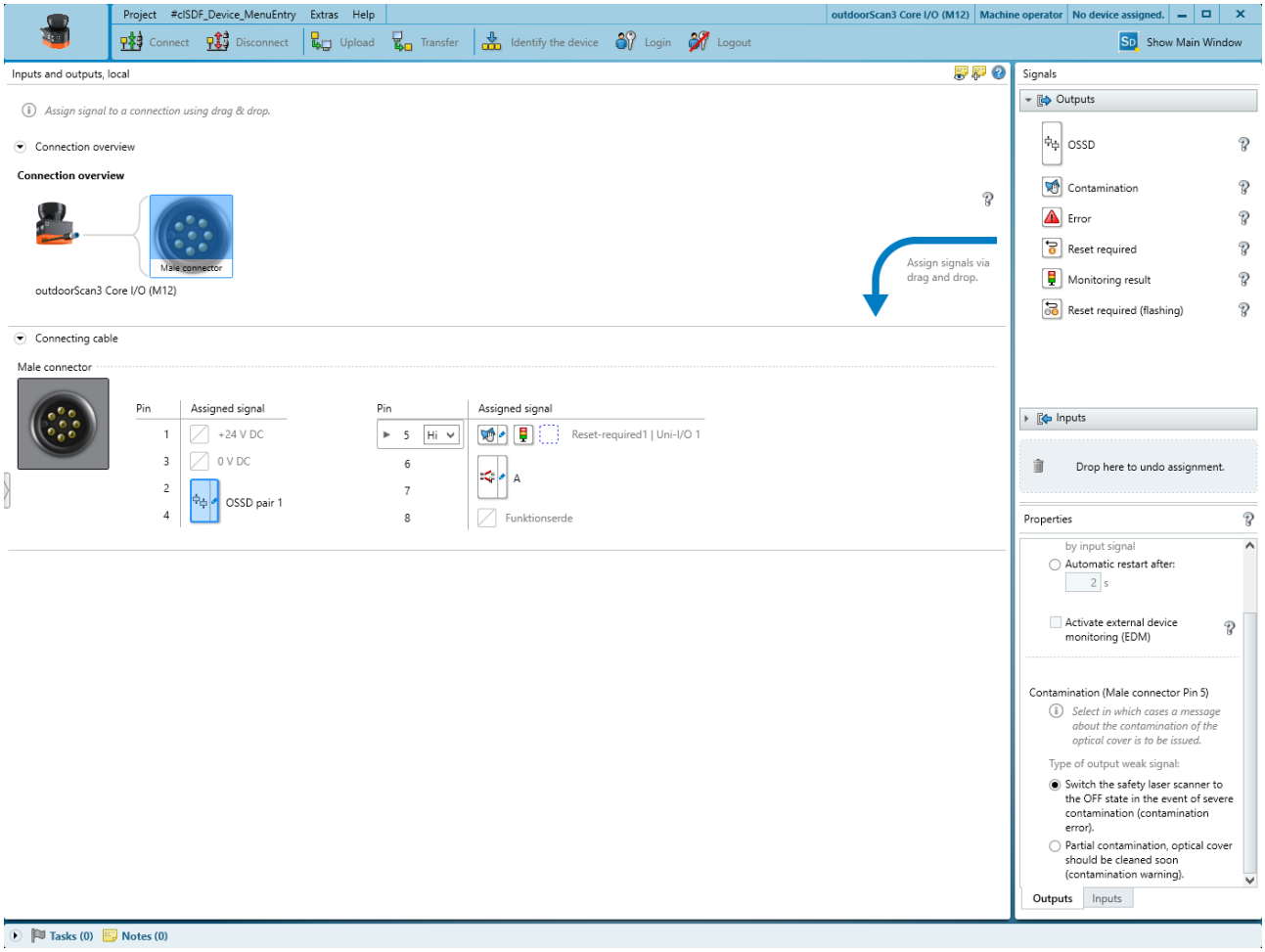

Figure 14: Contamination error as a trigger for efficient cleaning

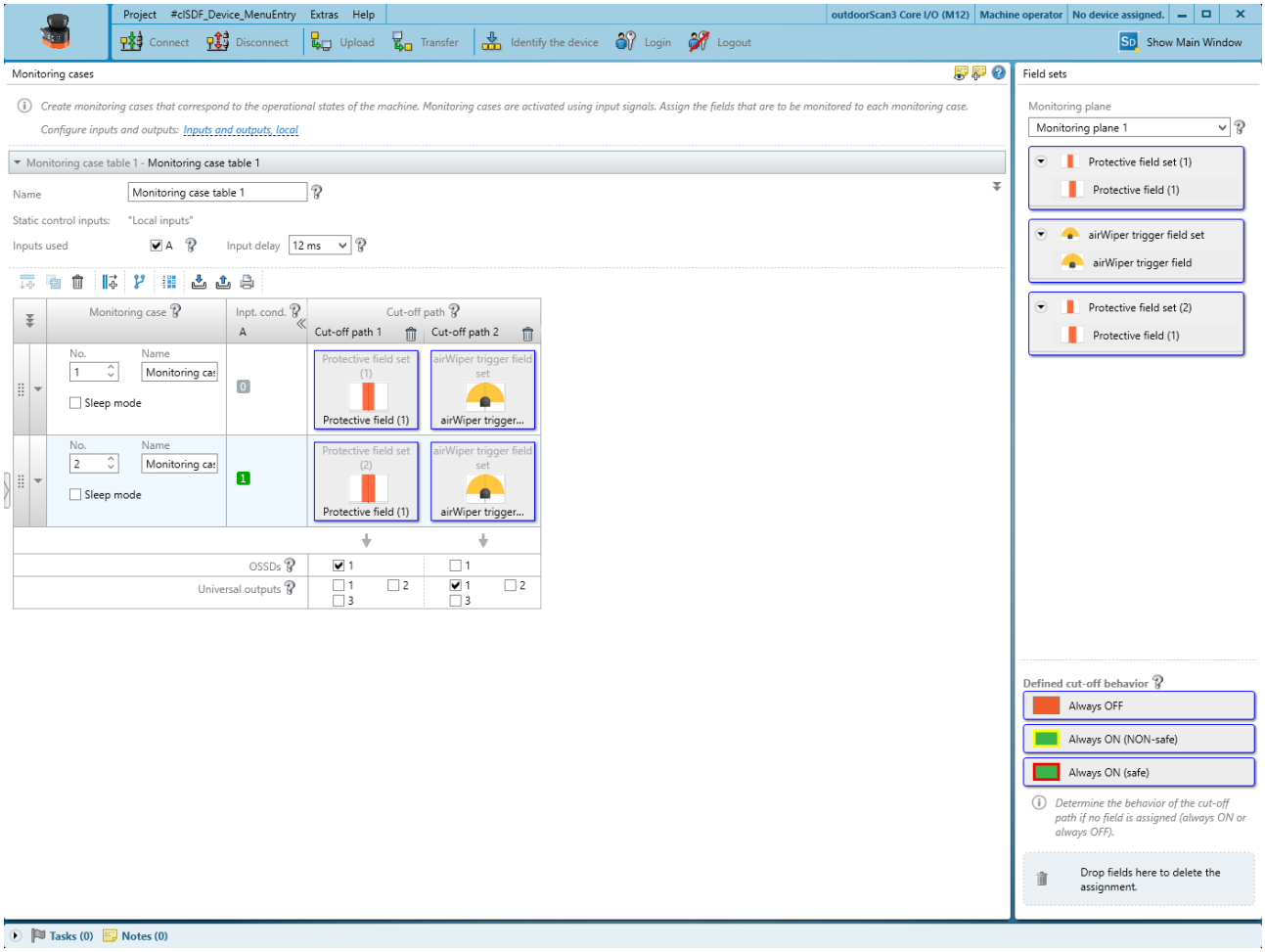

Figure 15: Monitoring case table

Universal I/O 1 serves as an output for the small warning field and for the contamination error. The output is evaluated in the controller in such a way that it triggers cleaning.

Recommended parameters for cleaning

Efficient cleaning

1 Stop condition after 4 cleaning steps
2 Air supply for connections A and B: 400 ms concurrently for each step
3 400 ms pause
4 Total duration of a cleaning step: 800 ms

Complementary information

You can adapt the example to your application, for example by using only one of the two signals as a trigger or by changing the duration of the cleaning. The parameters should be selected in such a way that the improvement in availability is in reasonable proportion to the consumption of compressed air and energy.

If you use a timing relay or a time delay valve, you can implement two-stage cleaning even without a controller.

The electrical data of the outputs can be found in the operating instructions of the outdoorScan3 Core I/O.

4.5 Multiple safety laser scanners with airWiper

Overview

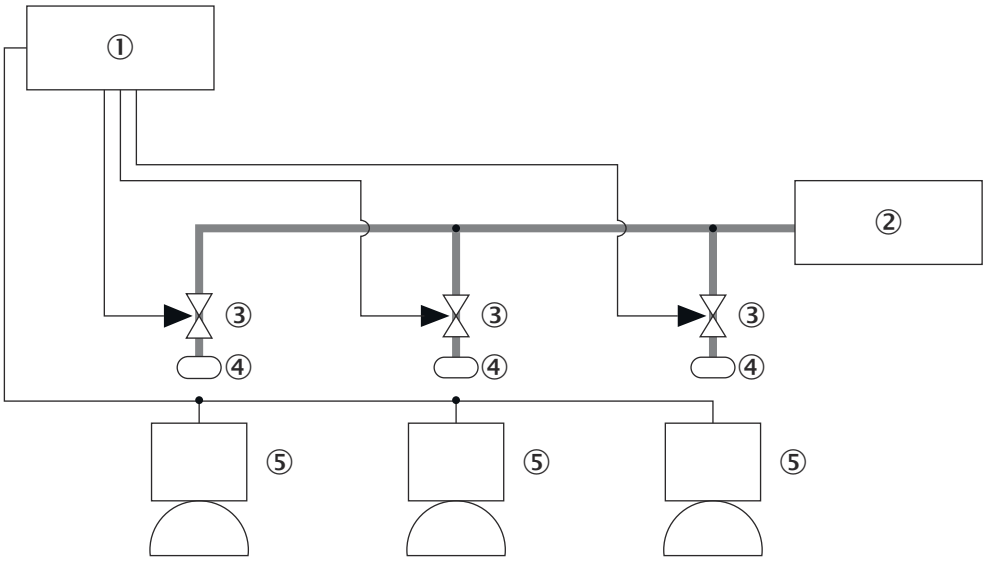

Figure 16: Multiple safety laser scanners with airWiper (schematic representation)

① Control systems
② Compressed air supply
③ Valve
④ airWiper
⑤ Safety laser scanners

Multiple safety laser scanners with airWiper

If the airWipers of several safety laser scanners are supplied from a common compressed air source, then it must be ensured that the compressed air is sufficient for all airWipers. The pressure must be sufficient even if several airWipers are activated at the same time.

If the pressure is not sufficient to supply all airWipers at the same time, then you need to use the controller to ensure that the airWipers are activated one after the other.

5 Mounting

5.1 Connecting the compressed air hose

Important information

WARNING

Concealment by compressed air lines

Compressed air lines or other small objects in the near range (< 50 mm in front of the optics cover) may not be detected and may obscure persons or body parts in the protective field.

- ► Route compressed air lines so that they do not protrude into the required viewing slit.
- ► Ensure that no small objects (e.g., cables) are in the protective field, even if this means that the safety outputs do not switch to the OFF state.
- ► Ensure that there are no objects between the base and the curved part of the optics cover (e.g., cables) that could interfere with the contamination measurement.

NOTICE

To prevent dirt getting into the airWiper and blocking the nozzles, the compressed air connections are sealed with protective caps at delivery.

- ► Remove the protective caps first just before connecting the compressed air hose.
- ► Seal unused compressed air connections with protective caps.

Prerequisites

Compressed air hose

- Outer diameter: 4 mm
- Cut square
- Deburred

Approach

1. Slide the ring on the compressed air connection in the direction of the airWiper and hold it in place.
2. Carefully pull out the protective caps.
3. Insert the compressed air hose as far as it will go. Make sure that the compressed air hose is inserted into the seal.
4. To check for a secure hold, pull lightly on the compressed air hose.

Further topics

- "Device overview", page 9

5.2 Detaching the compressed air hose

Prerequisites

- The compressed air supply is switched off and vented.

Approach

1. Slide the ring on the compressed air connection in the direction of the airWiper and hold it in place.
2. Carefully pull out the compressed air hose.

3. If the compressed air connection is not being used, insert the protective caps as far as it will go.
4. To use the compressed air hose again, cut off the damaged part.

5.3 Replacing the compressed air connection

Overview

The compressed air connections are replaceable. The airWiper is equipped as standard with connections for 4 mm compressed air hoses. You can use other compressed air connections with an M5 thread instead. The nominal diameter of the compressed air connections should not be less than the nominal diameter of the individual channels. Otherwise the air flow will be limited and the cleaning effect reduced.

Prerequisites

Tool required:

- Hex key, 2.5 mm

Approach

1. Unscrew the existing compressed air connection using a hex key.
2. Screw in the new compressed air connection with new seal. Tightening torque: 1.3 Nm.

Further topics

- "Data sheet", page 31

6 Maintenance

6.1 Regular cleaning

Overview

The safety laser scanner and the optics cover must be cleaned regularly as per the operating instructions of the safety laser scanner.

The airWiper must be cleaned regularly to prevent the air nozzles from clogging or corroding. In environments where heavy contamination or salt water (e.g., due to road salt) occur, the airWiper must be cleaned more frequently.

Important information

DANGER
Improper work on the product
A modified product may not offer the expected protection if it is integrated incorrectly.

► Apart from the procedures described in this document, do not repair, open, manipulate or otherwise modify the product.

Approach

1. Moisten a clean, soft cloth and use it to wipe all air nozzles of the airWiper (on the inside and underneath).
2. Activate the airWiper to clean the air nozzles.
3. Check the air nozzles for visible residues.
4. Check the cleaning function.

Further topics

- "Regular thorough check", page 28

6.2 Maintenance of the compressed air supply

Overview

Depending on the selected compressed air supply, the system should be serviced regularly. The following instructions are intended as a guide only. Depending on your application, additional or different measures may be required.

Approach

► Drain any condensed water at the condensate drain.
► Clean and check the particle filter.
► Check, clean and, if necessary, replace the oil filter.
► Flush the compressed air lines before commissioning and after a long downtime.

6.3 Regular thorough check

Overview

The safety laser scanner must be checked regularly in accordance with the inspection plan of the safety laser scanner (for more information, see the operating instructions of the safety laser scanner, “Inspection plan” section).

The airWiper must be checked regularly.

Approach

1. Wet the optics cover with tap water from a spray bottle.
2. Activate the airWiper.
3. Visually check that the droplets are evenly cleaned off the optics cover.
4. If air nozzles are permanently clogged, contact the responsible SICK subsidiary. The airWiper must be cleaned by SICK.

Complementary information

You can view the current contamination measurement values in Safety Designer by opening the report and updating it if necessary. If you read and compare the values before and after cleaning, you can estimate the effectiveness of the cleaning.

For devices with a network connection, you can also retrieve the values via CoLa2. For more information, refer to the technical information “microScan3, outdoorScan3, nanoScan3: Data output via UDP and TCP/IP" (part number 8022706).

7 Troubleshooting

7.1 Troubleshooting

Prerequisites

- No pressure must be applied when working on parts carrying compressed air.

Troubleshooting

If the airWiper does not work despite cleaning, the entire system must be checked.

Important points to isolate the fault:

- Settings and signals of the safety laser scanner
- Settings and signals of the controller
- Compressed air supply (pressure, available air)
- Switching behavior of the valves
- Electrical and pneumatic lines and connections
- Air nozzles of the airWiper

Further topics

- "Regular cleaning", page 28
- "Regular thorough check", page 28

8 Technical data

8.1 Data sheet

Table 3: Mechanical data for the airWiper

Compressed air connections	4 × push-pull connection for the compressed air hose (ø 4 mm), replaceable, M5 male thread
Nominal size	
Channel A1	2.1 mm
Channel A2	2.1 mm
Channel B1	1.6 mm
Channel B2	1.7 mm
Weight	140 g
Material	Aluminum, anodized
Color	Black

Table 4: Compressed air

Operating medium	Compressed air
Purity class	ISO 8573-1 [7:4:4]
Input pressure	Typ. 400 kPa (200 kPa ... 600 kPa, 2.0 bar ... 6.0 bar)
Temperature of compressed air	< 50 °C

8.2 Compressed air consumption

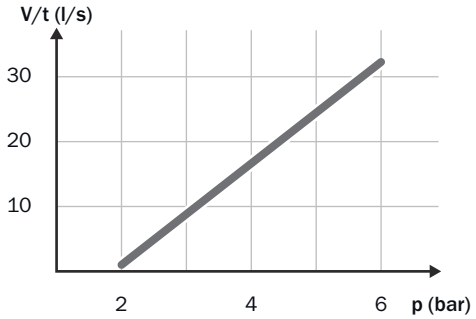

Figure 17: Compressed air consumption, converted to 1 bar (100 kPa)

V/t Required compressed air volume per unit of time for all channels in l/s (air volume at 100 kPa)

p Pressure at the inlet of the airWiper

8.3 Dimensional drawings

airWiper kit for outdoorScan3 Core I/O

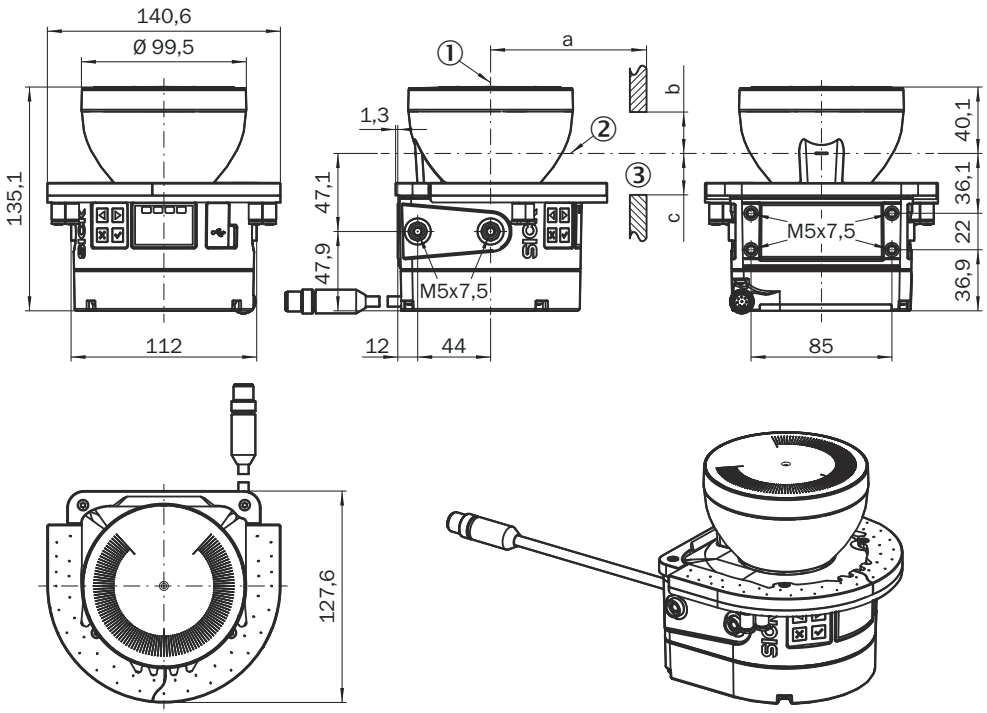

Figure 18: airWiper kit for outdoorScan3 Core I/O

All dimensions in mm.

① Mirror rotational axis

② Scan plane

③ Required viewing slit

- a: Length of the viewing slit
- b: Minimum height above the scan plane
- c: Minimum height below the scan plane

airWiper Kit outdoorScan3 Pro – EtherNet/IP™, outdoorScan3 Pro – PROFINET

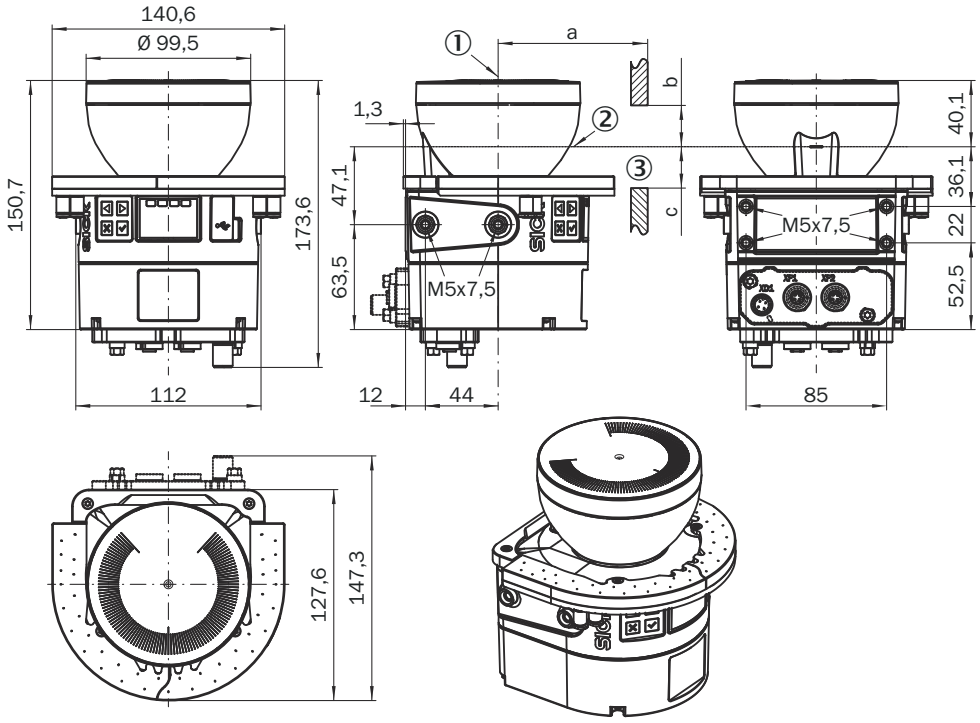

Figure 19: airWiper Kit outdoorScan3 Pro – EtherNet/IP™, outdoorScan3 Pro – PROFINET

All dimensions in mm.

① Mirror rotational axis

② Scan plane

③ Required viewing slit

- a: Length of the viewing slit
- b: Minimum height above the scan plane
- c: Minimum height below the scan plane

Required viewing slit

If the device is installed in paneling, for example, you must ensure that the laser beam can exit unhindered. The reflected laser beam must also reach the device unhindered. That means the viewing slit must be large enough.

The required minimum height and width of the viewing slit depends on the following parameters, among others:

- Deviation from the ideal flatness of the scan field at the end of the viewing slit
- Light spot size at the end of the viewing slit
- Vibrations that affect the flatness of the scan field or the geometry of the viewing slit

For a viewing slit with length a ≤ 200 mm, the viewing slit must be at least 50 mm high (b, c ≥ 25 mm). The viewing slit must be wide enough to leave at least 23 mm of space free next to each field.

If the viewing slit is longer (a > 200 mm), a case-by-case consideration is required.

► Contact the responsible SICK subsidiary.

9 Ordering information

9.1 Ordering information for the airWiper kit

Table 5: Ordering information: airWiper kit for outdoorScan3, with system plug

Part	Part number
airWiper kit for outdoorScan3 Core I/O, with system plug	1124784
airWiper kit for outdoorScan3 Pro - EtherNet/IP™, with system plug	1124781
airWiper Kit outdoorScan3 Pro – PROFINET, with system plug	1128913

Table 6: Ordering information: airWiper kit for outdoorScan3, without system plug

Part	Part number
airWiper kit for outdoorScan3 Core I/O, without system plug	1124785
airWiper kit for outdoorScan3 Pro - EtherNet/IP™, without system plug	1124782
airWiper Kit outdoorScan3 Pro – PROFINET, without system plug	1128912

10 Annex

10.1 Example: Compressed air supply with compressor

Overview

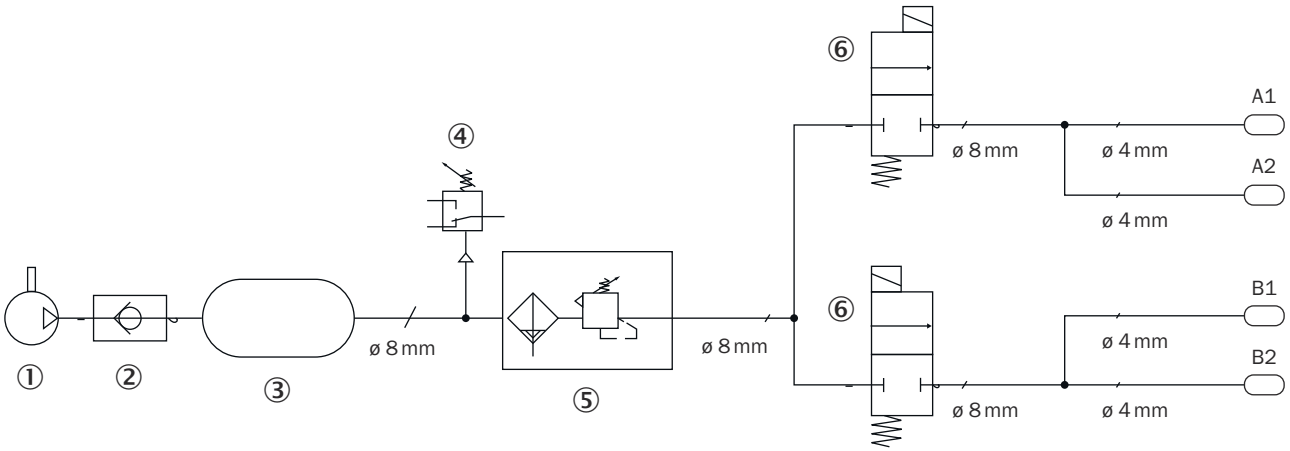

Figure 20: Example: Compressed air supply with compressor

① Oil-free compressor
② Non-return valve
③ Compressed air tank
④ Pressure switch
⑤ Filter regulator and oil filter
⑥ Valve

Components

- Oil-free compressor
- Non-return valve: Compressors do not usually start up under backpressure. The output line of the compressor is therefore vented before start-up. If no non-return valve is present between the compressor and the compressed air tank, the complete system is depressurized each time.
- Compressed air tank: The compressor increases the pressure in the compressed air tank to a predetermined value (maximum 1,000 kPa = 10 bar), then the compressor switches off. The compressed air tank should hold enough compressed air for at least 2 to 3 cleaning cycles.
- Pressure switch: The pressure switch controls the compressor using an upper and a lower threshold. When the value falls below the lower threshold, the compressor switches on. When the upper threshold is reached, the compressor switches off. If the lower threshold value is set too low, the pressure may drop to such an extent that the cleaning effect is reduced. If the upper threshold is set too high, the compressor may not be able to reach it or may have difficulty reaching it, require a lot of energy, or may be damaged.
- Filter regulator: The filter regulator removes particles and condensate from the compressed air. It limits the operating pressure to the set value.

- Oil filter: An additional oil filter removes oil and oil-containing aerosols from the compressed air.
- Compressed air lines: The nominal diameter of the compressed air lines at the individual compressed air connections of the airWiper must be at least as large as the nominal diameter of the corresponding channel. The nominal diameter of the compressed air lines between the compressor and the valves must be sufficiently dimensioned so that all connected channels can be adequately supplied with compressed air. Otherwise the air flow will be limited and the cleaning effect reduced.

Condensate

Ambient air is compressed in the compressor. The humidity in the air can condense in the process. The condensate must be drained regularly.

Water condenses in the following cases, for example:

- During gas compression: When air is compressed, its water absorption capacity decreases and excess water condenses. Compressors therefore usually have a condensate drain.
- During gas cooling: When air cools, its water absorption capacity also decreases and excess water condenses. If zones with different temperatures occur in the system, it must be ensured, especially at the transitions, that condensate is avoided or discharged. When air is compressed, it becomes warm and usually cools down again after the compressor. Water can therefore also condense in the compressed air line behind the compressor. Possible countermeasures include a condensate drain, or a line layout that ensures this condensate flows back to the compressor.
- If the compressor draws in warm air, which then cools down in the system (e.g., when changing from indoors to outdoors or when air is drawn in from warm areas of the vehicle), water can also condense in other parts of the system. To prevent water from collecting in a compressed air line, the compressed air lines should not contain any U-shaped segments. The compressed air lines should consistently slope downwards toward either the compressed air tank or the airWiper so that condensate drains either into the compressed air tank or to the airWiper.

Complementary information

If condensate has collected in the compressed air lines, for example after a long downtime, system cleaning is recommended. Compressed air is passed through the compressed air lines to remove condensate from the lines and from the airWiper.

Further topics

- "Data sheet", page 31

11 List of figures

12 List of tables

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