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SAFE HUMAN DETECTION MODULE INTEGRATION TUTORIAL

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PREPARATION STEPS

- Hardware
- Mounting a laser scanner
- Wiring Device
- Defining safety areas

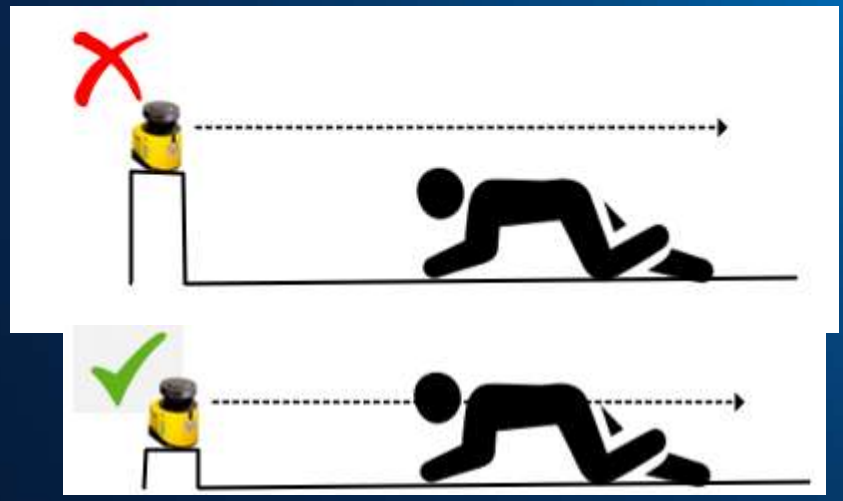
Hardware

- Following hardware is utilized in this example
  - Kuka KR6 R900 SIXX robot
  - Sick S300 laser scanner

Positioning - Safety laser scanners

1. Appropriate height
   - Avoid bypassing of protective zone
2. Clean environment
   - Prevent dust and condensation
3. Obstacle-free environment
   - Possible obstacles are configured after installation
   - Avoid shadows in FOV
4. Avoid reflective objects or strong light sources
   - May affect measurement results
5. Avoid electromagnetic interference
   - E.g. Welding cables

1.



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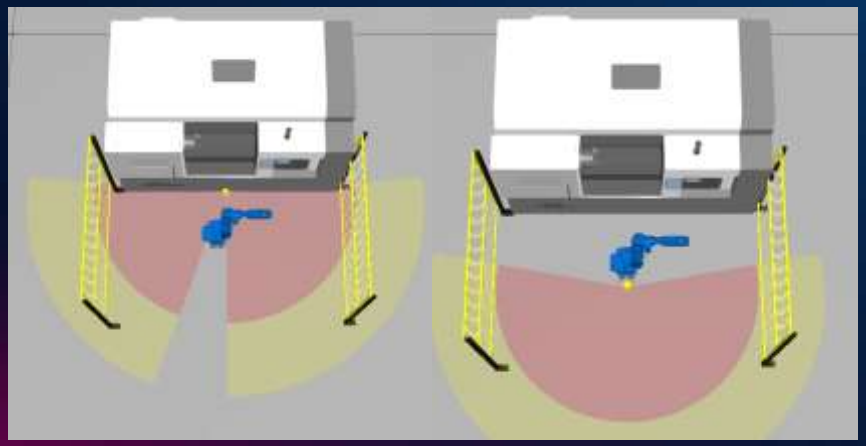


Fig. 1. Guidelines for safety scanner positioning.

Mounting - Safety laser scanners

- Vertical or horizontal mounting
  - Vertical commonly used for machine openings and doorways
- Mounting kits offered by manufacturer
- Mounting guidelines:
  - Protect the device from moisture, dirt and damage
  - Ensure the visibility of device information and status indicators
  - Leave enough space for the device's electrical connectors
  - Avoid excessive shock or vibration during mounting and operation

Fig. 2. Example of horizontal mounting of a safety scanner using a protective mounting kit.

Wiring – Safety Laser Scanner

13. GUEST JUMP 2 / ERROR

14. WARN

15. RESET REQ

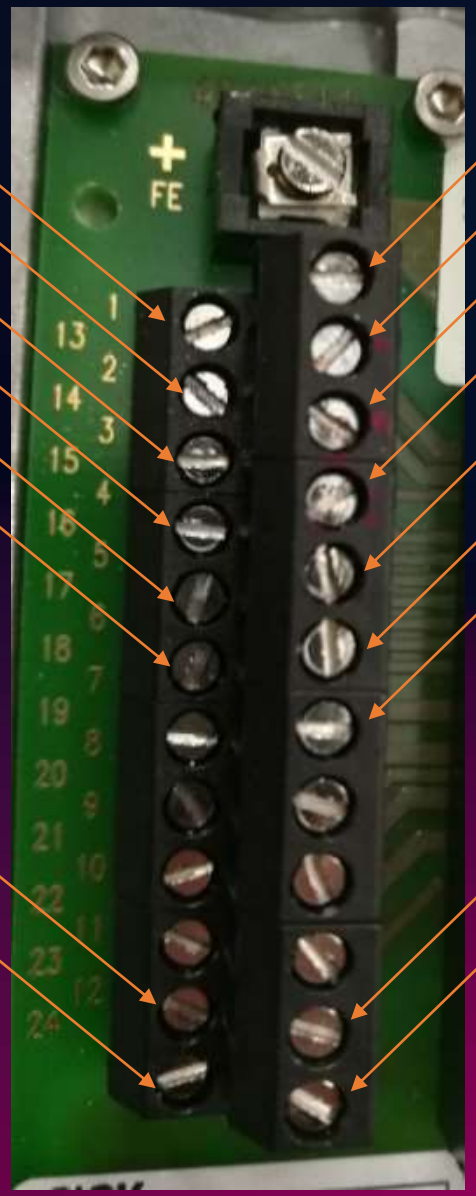
16. STANDBY

17. EFIa

18. EFIb

23. TxD-

24. TxD+



1. 24VDC

2. 0VDC

3. OSSD1

4. OSSD2

5. RESET

6. EDM

7. GUEST JUMP 1

11. RxD-

12. RxD+

Pin	Signal	Function	Standard
FE	Functional earth		■
1	24 V DC	Supply voltage S300	■
2	0 V DC	Supply voltage S300	■
3	OSSD1	Output signal switching device	■
4	OSSD2	Output signal switching device	■
5	UNI-I/ O1 / RESET/ C1	Universal I/O or input, reset, or (for the S300 Professional and Expert) static control input C	■
6	UNI-I/ O2 / EDM	Universal I/O or input, external device monitoring	■
7	A1 or INC1_0	Static control input A or dynamic control input (incremental encoder) 1 or connection for a jumper for addressing as guest [4]	■
8	A2 or INC1_90	Static control input A or dynamic control input (input for incremental encoder) 1	
9	B1 or INC2_0	Static control input B or dynamic control input (input for incremental encoder) 2	
10	B2 or INC2_90	Static control input B or dynamic control input (input for incremental encoder) 2	
11	RxD–	RS422 interface for measurement data output	■
12	RxD+		■
13	UNII/O3 / ERR/WEAK	Universal I/O or application diagnostic output for error or contamination or connection for a jumper for addressing as guest [4]	■
14	UNII/O4 / WF	Universal I/O or application diagnostic output for Object in the warning field	■
15	UNII/ O5 / RES_REQ/C2	Universal I/O or application diagnostic output for Reset required, or (for the S300 Professional and Expert) static control input C	■
16	STBY	Control input for standby mode	■
17	EFI_A	Enhanced function interface = safe SICK device communication	■
18	EFI_B		■
19	24 V DC	Supply voltage for incremental encoder 1	
20	GND		
21	24 V DC	Supply voltage for incremental encoder 2	
22	GND		
23	TxD–	RS-422 interface for measurement data output	■
24	TxD+		■

Electrical connections - Basics

- EDM (External Device Monitoring)
  - Input used to monitor states of safety relay or logic
  - High-state signal wired via external device's N.C (normally closed) contacts
    - If this signal is absent, an external device is not de-energised when tripped or is malfunctional
  - Prevents resetting the safety device upon external device malfunction

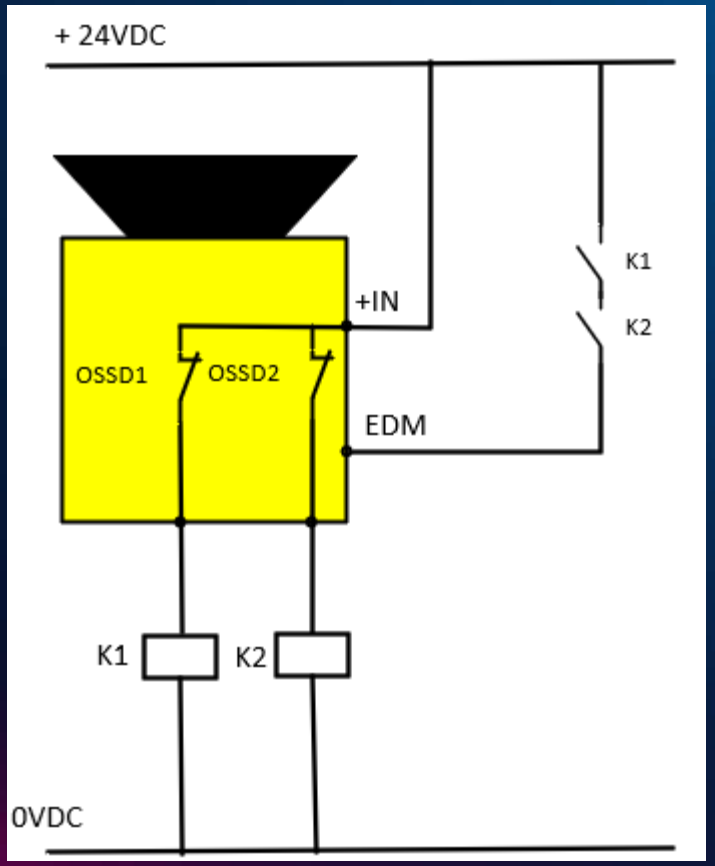


Fig. 2. Illustration of EDM.

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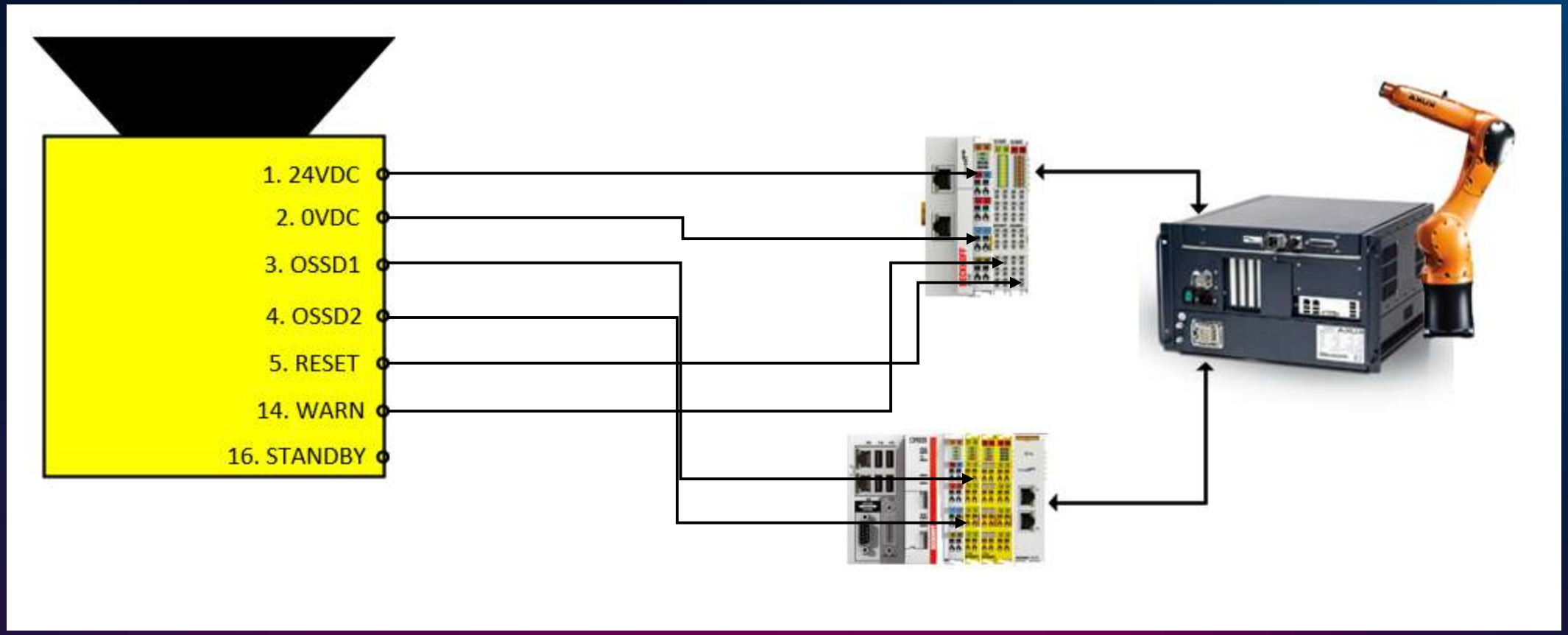
Wiring - Safety laser scanners

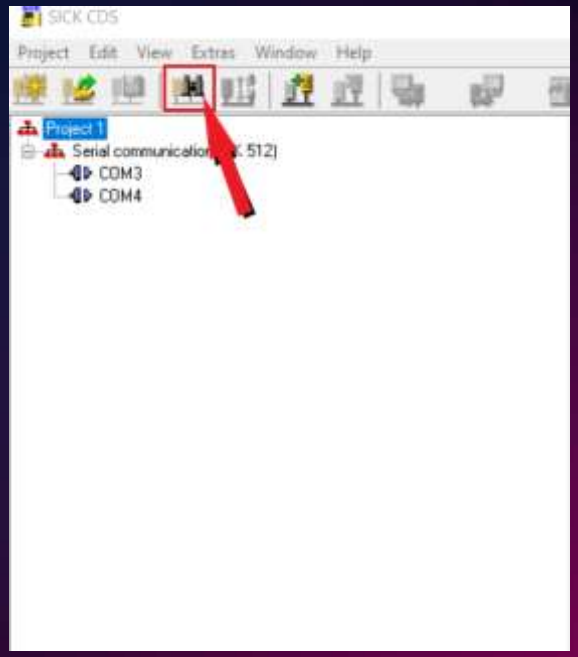


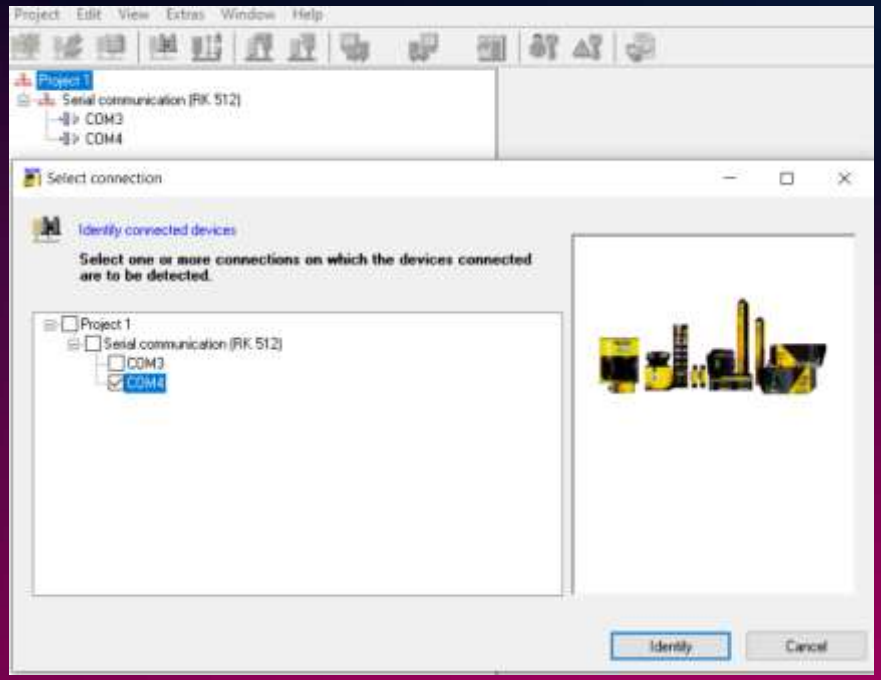
Interfacing computer with equipment

- Connect the scanner to a configuration PC using the M8 x 4/USB configuration cable

Interfacing computer with equipment

- Start the Configuration & Diagnostic Software
- Click on ”Identify project” in the toolbar.
- Select the correct communication port and click ”Identify”.
- If the port is not known, select all ports, then click ”Identify”.





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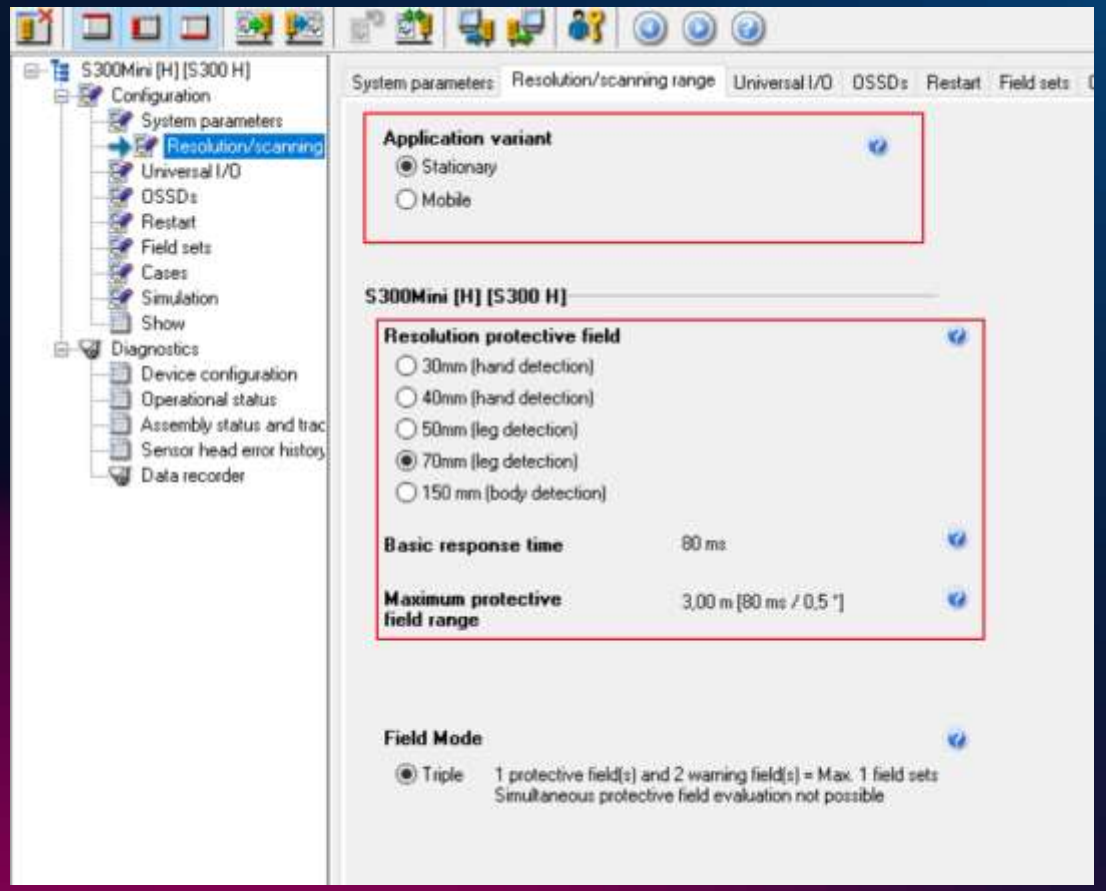
Configuring device

- Choose stationary or mobile application.
- Choose the desired scanning resolution. The software automatically calculates the response time and maximum range.
- Click ”Universal I/O” on the sidebar when done.



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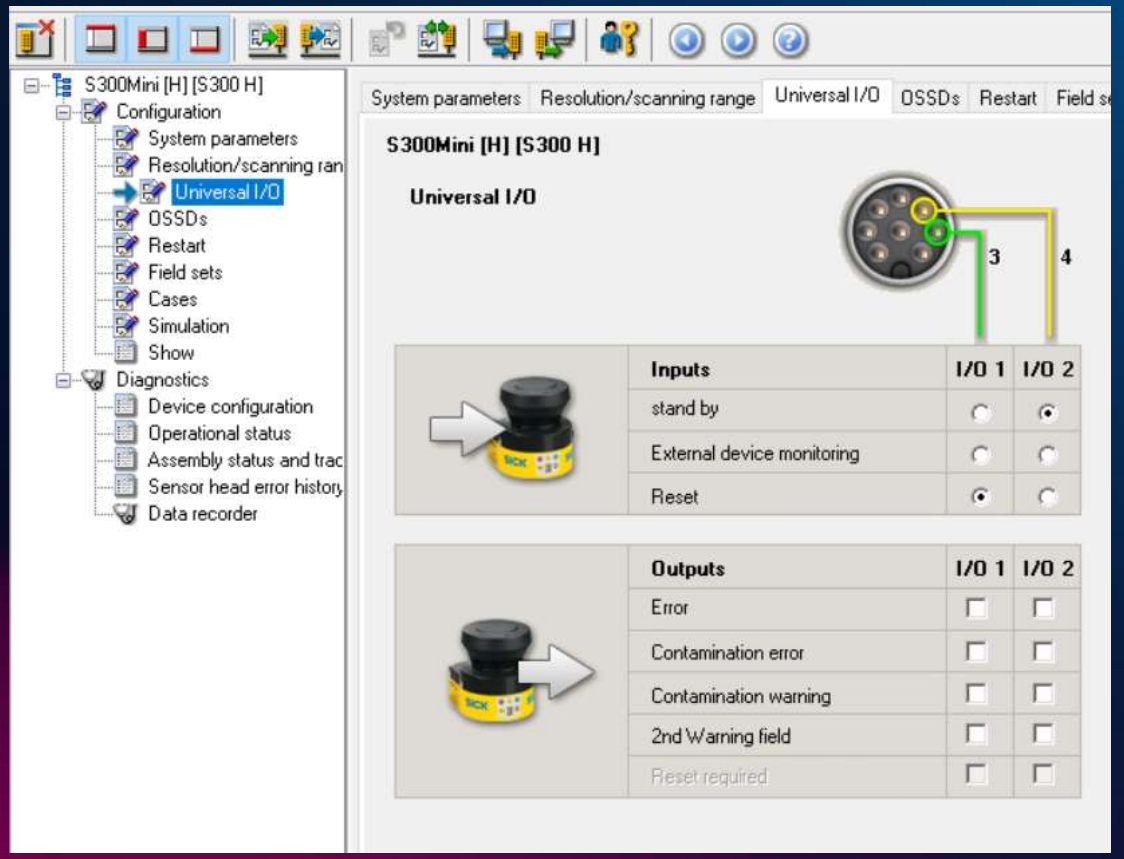
Configuring device

- Assign the I/O for your application.
- In this case, two I/O pins are available and wired as standby and reset inputs.
- The software displays the correct wire coloring for OEM cable.
- When done, click ”OSSDs” in the sidebar.



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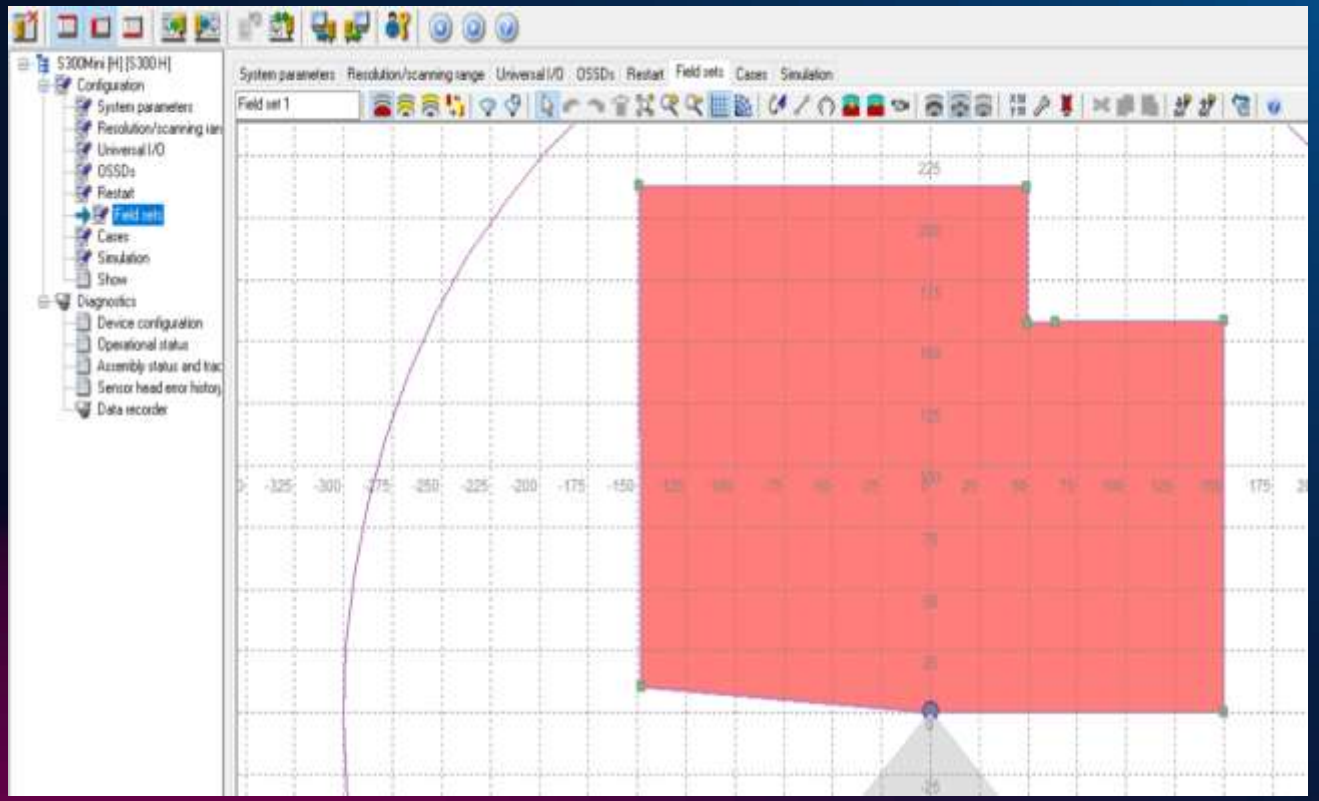
Configuring device

- Here is the graphical interface for protective and warning zone design. The scanner is presented at the gridline origin
- Since this scanner is used for doorway monitoring, the entire area is monitored by a protective field.
- Click on ”Cases” when done.



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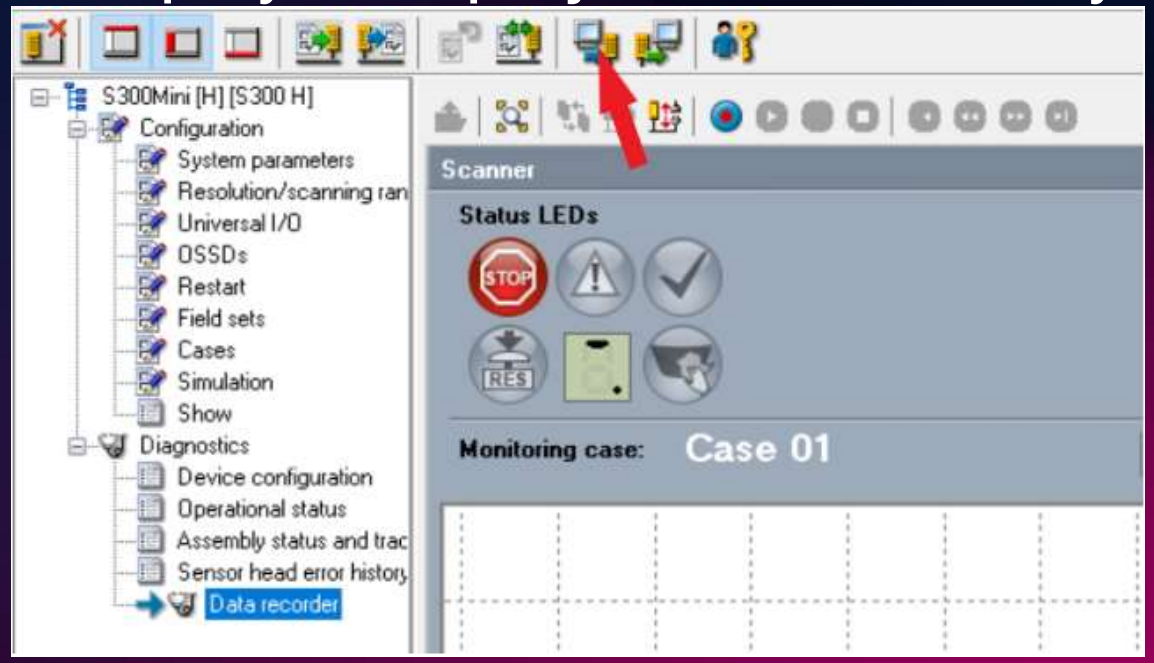
Commissioning

- At this point, the configuration project is complete. The configuration needs to be transferred to the scanner.
- Click on the ”Transfer to device” button on the toolbar.
- The project will be transferred. The scanner reinitializes and deploys the project automatically.



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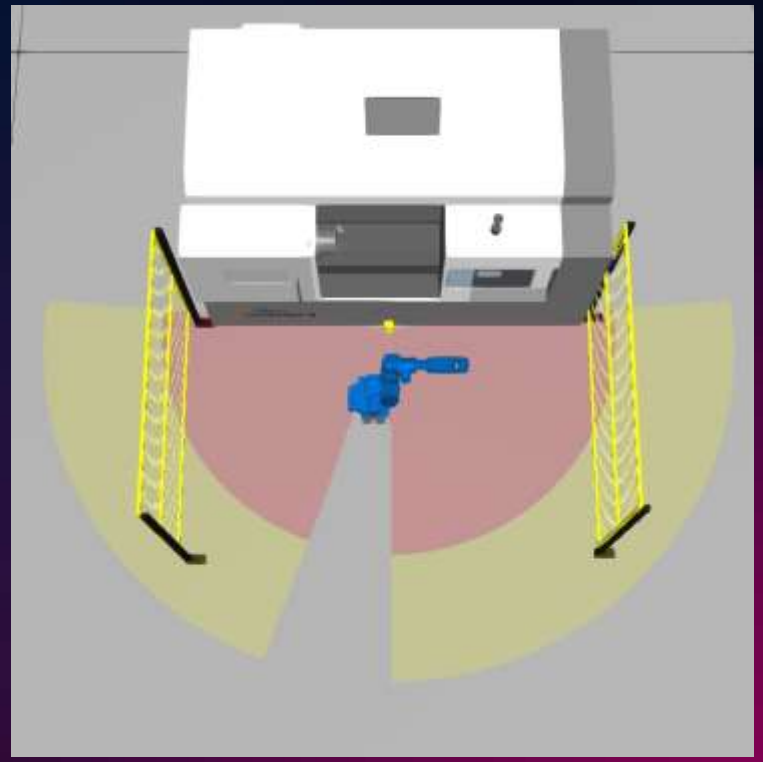
Summary

- This concludes the introduction to training package
- Thank you for participating in our training!



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