Inxpect Safety Radar Equipment URCap instruction

User manual

Revision	***Author***	***Date***	***Notes***
v01	Emma Varrenti	01/11/2023	Initial version

Revision	***Approved by***	***Date***
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1. About this document

1.1. Scope

The goal of this user manual is to describe the Inxpect SRE Urcap and its functionalities, to help both programmers and final users with the streamlined integration between Inxpect sensors and UR robots.

1.2. Further information

Further information about the UR+ ecosystem and the Inxpect SRE URCap can be found on the dedicated Inxpect's website: https://www.inxpect.com/en/products/URCap/ or on the Universal Robot website: https://www.universal-robots.com/plus/products/inxpect-spa/inxpect-safety-radar-equipment/

All the other info related to the Inxpect portfolio are available at https://tools.inxpect.com, as for example:

- User manuals and mounting instructions of Inxpect products suitable for the use in the UR ecosystem
- 100S_200S TUTORIAL - Robotic cell configuration
- 100S_200S TUTORIAL - Universal Robot e-Series configuration
- 100S_200S Cable specifications
- 100S_200S EPLAN parts

2. Introduction

Inxpect sensors are safety devices operating under the Machinery Directive and meant to be used to reduce the risk associated with industrial machineries and processes.

They are radar based devices, able to detect the presence of the operators inside dangerous areas and performing the following safety functions:

- access detection: to detect the access of a person in the defined detection zone
- restart prevention: to detect the presence of an operator in the defined monitored area by sensing the micro-movements

To properly design the safety around a robot application, please refer to the document "Inxpect SRE-UR+ Safety Guide.pdf" available at https://www.inxpect.com/en/downloads/ which, together with the other above mentioned documents, fulfills the requirements and provides a comprehensive guide to the safety implications related to the use of the Inxpect system.

The safety performance parameters of an Inxpect system are available in the Instruction Manual. The most relevant safety parameters are the following:

- SILcl 2 according to IEC/EN 62061
- SIL 2 according to IEC 61508
- PL d according to EN ISO 13849-1
- Performance Class D according to IEC TS 62998-1
- Type 3 ESPE according to IEC 61496-1
- Type 3 ESPE according to UL CRD 61496-3

The system is assessed by third parties notified bodies for the following compliance:

- Machinery Directive (2006/42/EU)
- Radio Equipment Directive (2014/53/EU)
- RoHS III (2015/863)

The declaration of conformity, as well as product certificates, can be found at the following link: https://www.inxpect.com/downloads

2.1. What is the Inxpect Safety Radar Equipment URCap

The Inxpect Safety Radar Equipment URCap is a Java-based plugin installed on the UR robot controller, to extend the functionalities of PolyScope. The interaction is possible via the UR teach pendant.

The Inxpect SRE URCap plugin integrates Inxpect sensors with the Universal Robots products.

All relevant information about the Inxpect devices are available on the teach pendant, as for example the status of the system inputs and outputs, the status of the detection fields, diagnostics, events log, etc..

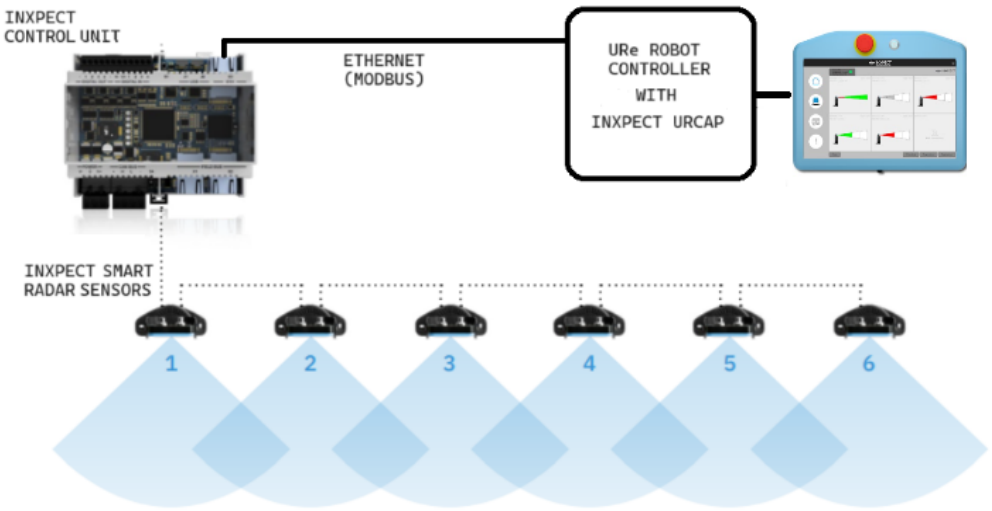
2.2. Ecosystem design

An Inxpect system is composed of a control unit and up to six smart radar sensors. It is possible to choose the sensor and control unit models with the technical specifications that best suit the application. More info about the Inxpect systems can be found on the company website (https://www.inxpect.com/en/products/)

Thanks to the URCap plugin, the user can view the status of the Inxpect devices. In any case, the safety configuration of the system (like e.g. monitored areas, I/O settings and system parameters) must be done using the Inxpect Safety application, which can be downloaded from https://tools.inxpect.com.

Considering the ecosystem Inxpect - Universal Robots, all the following elements work together:

- Inxpect devices
- Inxpect URCap (developed for the Universal Robots)
- Universal Robots devices



2.3. Requirements

To use the Inxpect SRE URCap, it is required UR Polyscope version 5.5 or higher.

The UR robot (E-series) must be one of the following:

- UR3e
- UR5e

- UR10e
- UR16e

2.4. How to install and launch the plugin

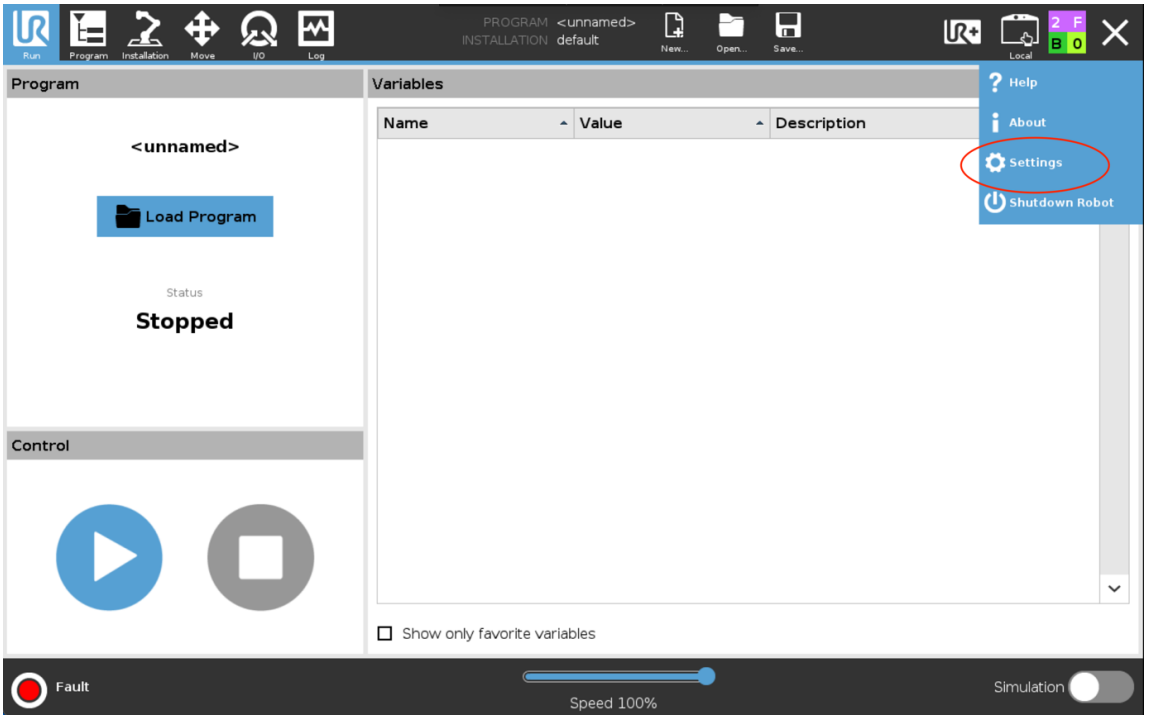
Here are some instructions on how to install the URCap on a UR robot.

Pre-requisites:

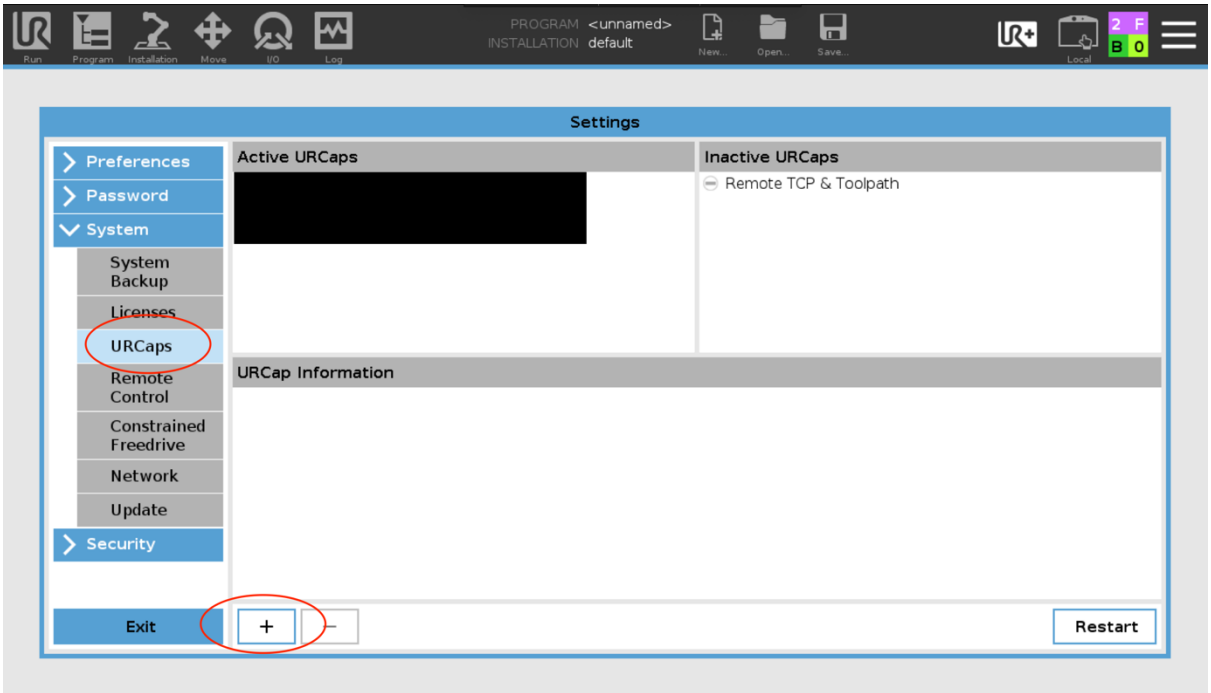
- Flash drive containing the ".urcap" file.
- Robot running polyscope 5.5 or higher.

Instructions:

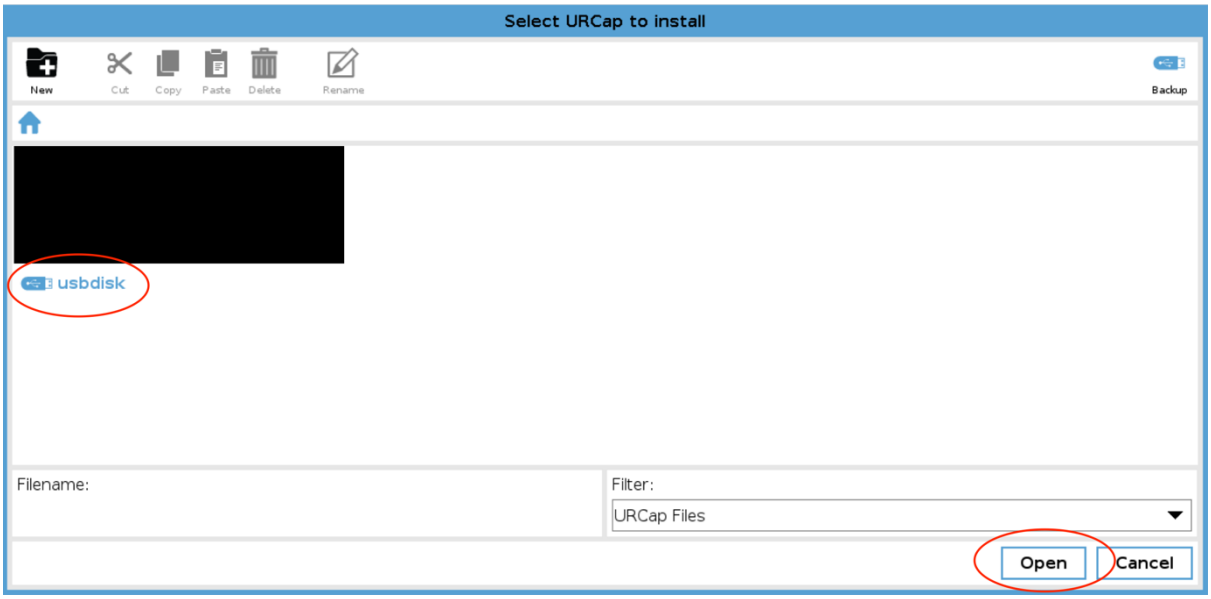
1. First navigate to the hamburger menu in the top right corner. Then click on *Settings*.



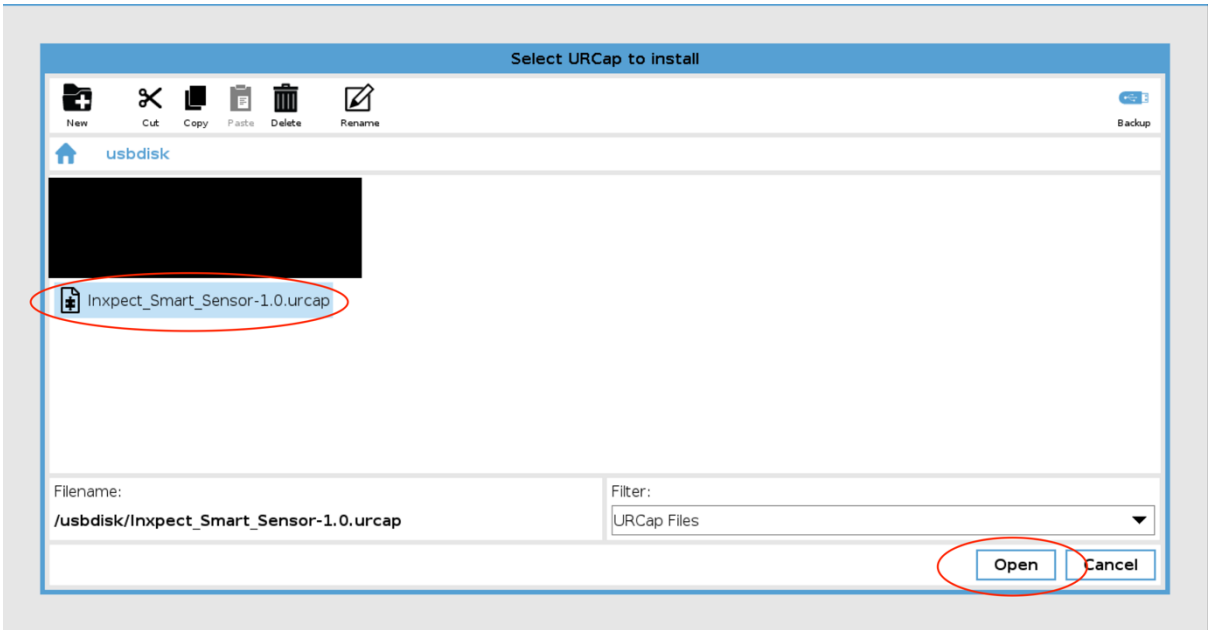
2. Inside *Settings*, go to *System* and then *URCaps*. Inside *URCaps* click on the plus symbol.



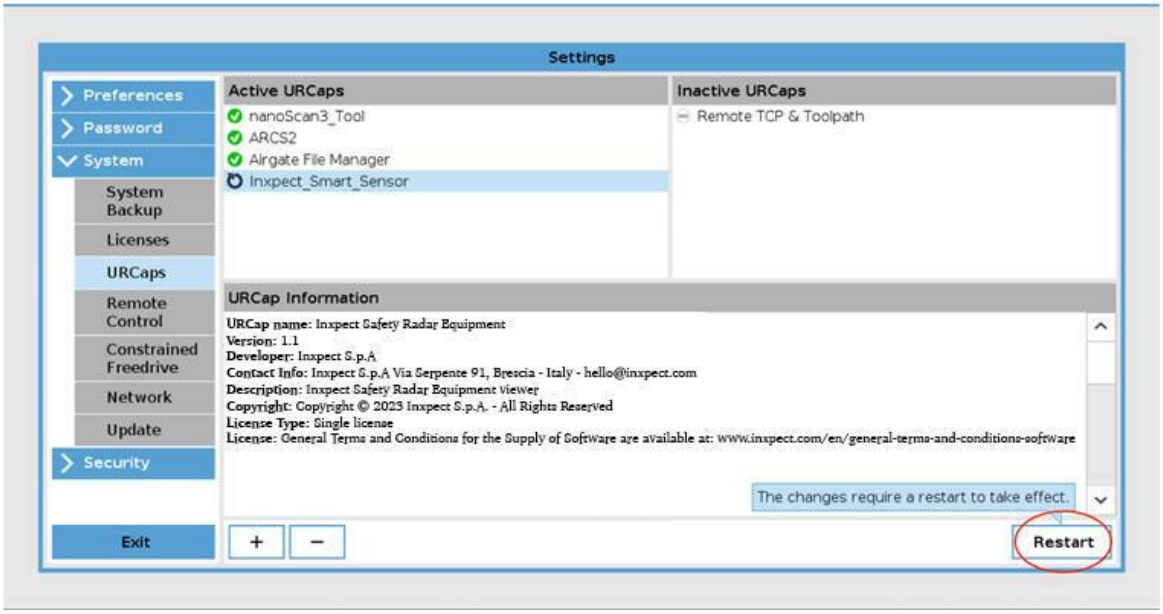
3. Select the USB drive, and click on *Open*



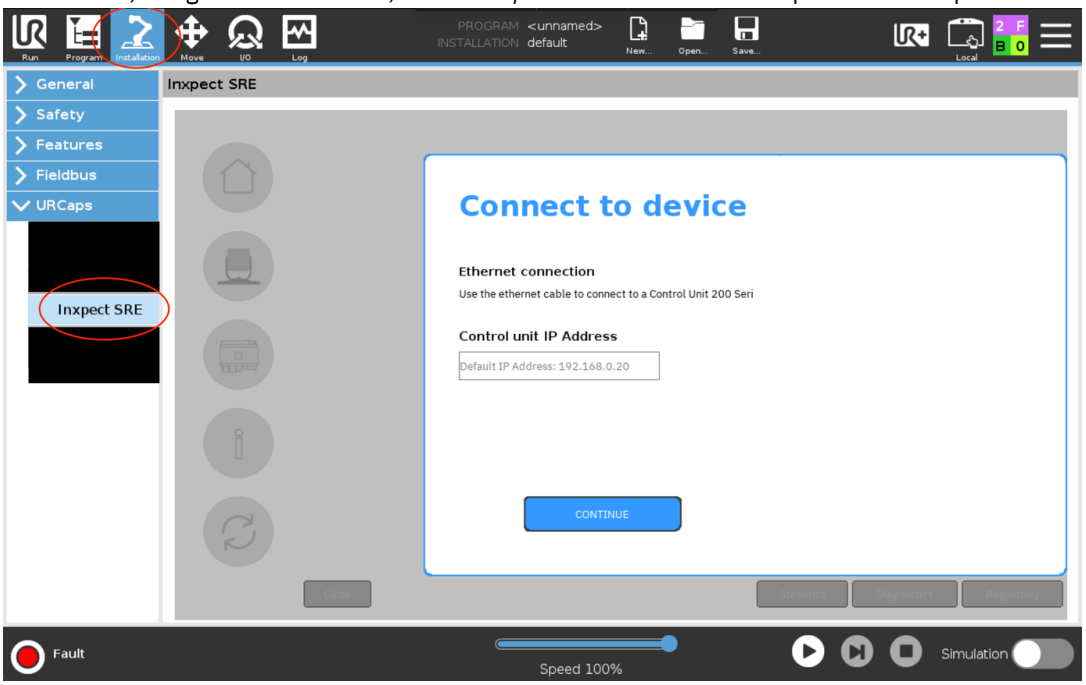
4. Select the URCap and click *Open* once again.



5. Now click on *Restart* and the URCap will be installed after reboot.



6. After reboot, navigate to *Installation*, then *URCaps* and then select the Inxpect SRE URCap



3. Details of the URCap

After the configuration of the Inxpect Safety Radar Equipment via the Inxpect Safety application, it is possible, using the URCap, to monitor the status of the system, to have an overview of the installed devices, to analyze the events log, etc.

Please note that URCap is used only in viewer mode and it is not possible to modify the configuration of the Inxpect system with this plugin.

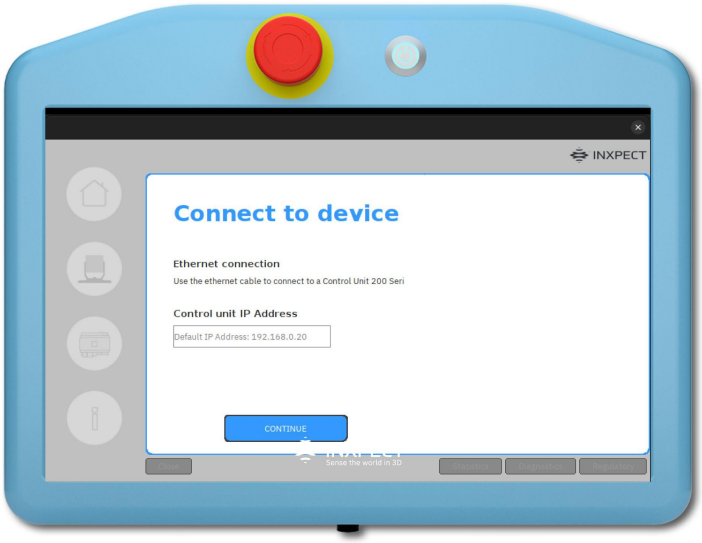
Here below is a short description of the major functionalities of the Inxpect SRE URCap.

Pre-requisites:

- Inxpect Safety radar system configured by the Inxpect Safety application
- Connection via Ethernet cable between the Inxpect Control Unit and the UR controller (be sure that they are on the same subnet)

3.1. Connection

To establish the connection to the system, via Modbus, insert the IP address of the Inxpect Control Unit (default: 192.168.0.20) and click on *Continue*.



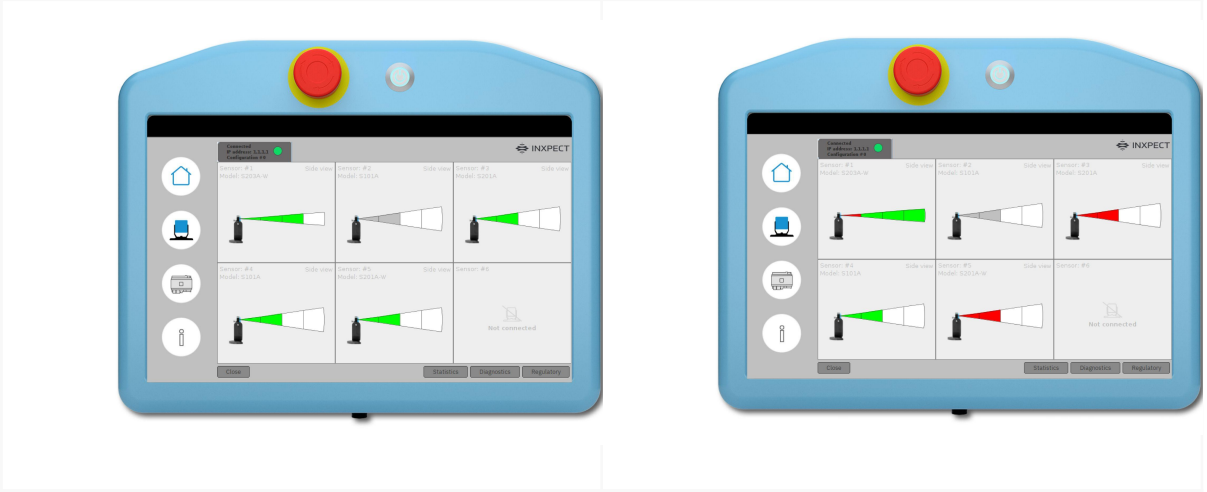
3.2. Main page

After the connection, the main page is shown. A real-time feedback about the Ethernet connection is available in the top left label.

In the main page, a complete overview of the connected sensors is shown. It is possible to return to this screen at any time by clicking on the home button in the sidebar.

Color legend of the detection fields:

- green: no detection
- red: detection
- grey: muted sensor
- white: not configured



3.3. Smart sensor page

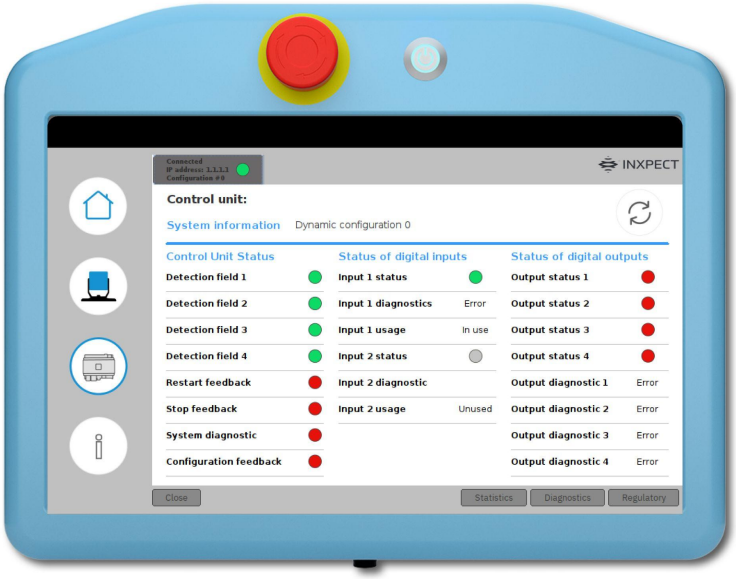
A detailed view of each smart sensor is available in the smart sensor page. Every sensor can be selected and explored clicking on the left list called Smart Sensors.

In the table, all the status of the detection fields, target distance, target angle, working mode of each sensor can be monitored.

It is possible to return to this screen at any time by clicking on the Sensor icon in the sidebar.

3.4. Control unit page

The control unit page can be opened clicking on the Control unit icon in the sidebar. All the status (control unit, digital inputs and outputs) can be quickly checked.



3.5. Information view

All information about smart sensors and control units are available by clicking on the *i* icon on the sidebar, as for example Sensor and Control unit IDs, models, HW version, FW version, etc.

3.6. Statistics

The *Statistics* button at the bottom opens a pop-up for viewing the real time count of alarms in the various detection fields. It is possible to reset the count at any time by clicking on the *Reset* button.

Every time the URCap is closed, this count is reset to zero.

3.7. Diagnostic

Carry out diagnostics can be done by clicking on the *Diagnostics* button at the bottom. Diagnostic information is shown. To correctly interpret the Diagnostic error code, please consult the Modbus reference guide, available at https://tools.inxpect.com

3.8. Regulatory

The Inxpect Regulatory and the Inxpect Tools page can be consulted scanning the QR codes in the pop-up.

3.9. Close

To close the URCap, please click on the *Close* button at the bottom.

4. Ordering information

To properly configure the UR-Inxpect ecosystem, the suitable components to be installed are:

- Up to six 100 or 200 Series sensors, like for example:
  - S201A-W: Smart Sensor 200 SERIES - Advanced FOV, 5m range
  - S201A-WL: Smart Sensor 200 SERIES - Advanced FOV, 9m range
  - S203A-W: Smart Sensor 200 SERIES - Vertical FOV 12°, 5m range

    - S203A-WL: Smart Sensor 200 SERIES - Vertical FOV 12º, 9m range

- One control unit with Ethernet connection (either type A or B, fw 2.0.0 or higher), like for example:
    - C201B-P: Control Unit 200 SERIES - PROFIsafe, Ethernet and digital I/O
    - C201B-F: Control Unit 200 SERIES - FSoE, Ethernet and digital I/O
    - C202B: Control Unit 200 SERIES - Ethernet and digital I/O

- One URCap : Inxpect Safety Radar Equipment

Note: a comprehensive list of available sensors and control units can be found at the following link:
https://www.inxpect.com/en/products/