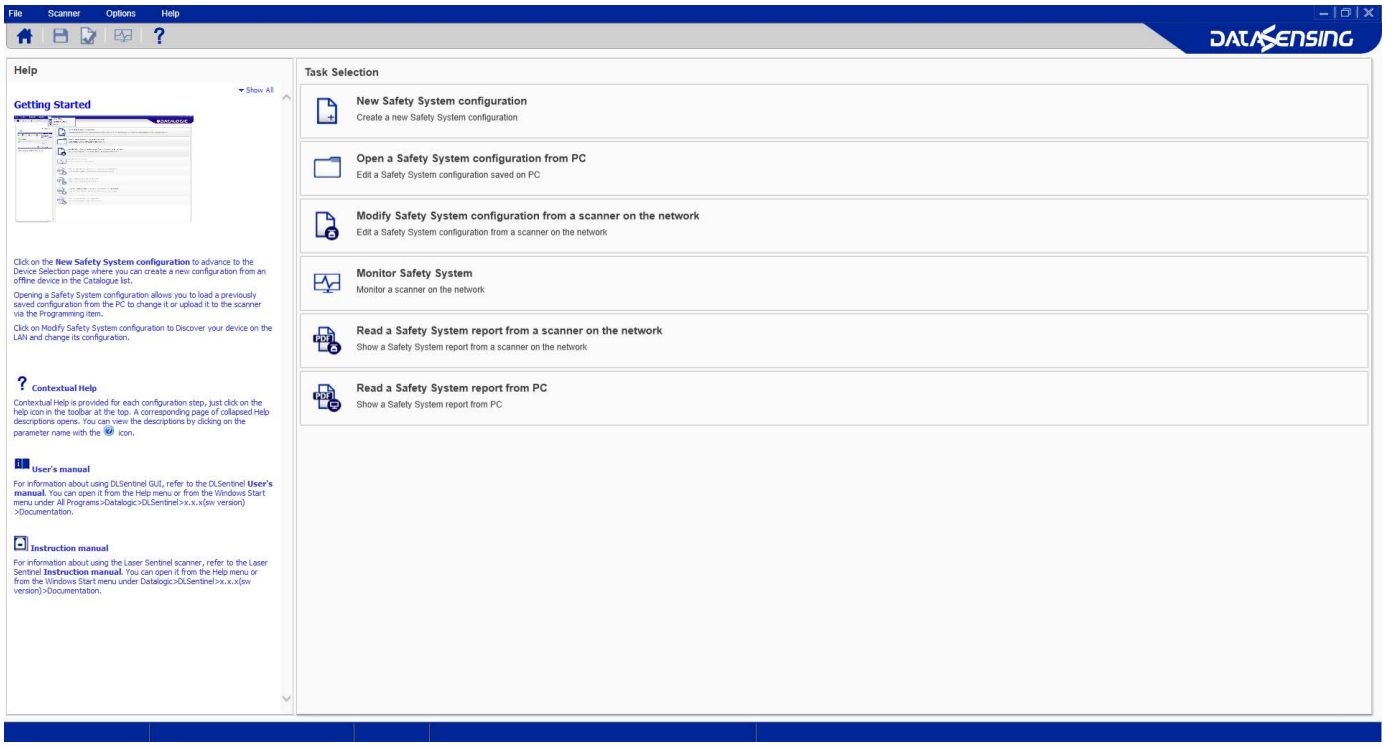
DLSentinel

USER'S MANUAL



Laser Sentinel User Interface Client Application

DATASENSING

Datasensing S.r.l.
Strada S. Caterina 235
41122 Modena
Italy
Tel. +39 059 420411
Fax +39 059 253973

© 2024 Datasensing

All rights reserved. Without limiting the rights under copyright, no part of this documentation may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means, or for any purpose, without the express written permission of Datasensing S.r.l. Owners of Datasensing products are hereby granted a non-exclusive, revocable license to reproduce and transmit this documentation for the purchaser's own internal business purposes. Purchaser shall not remove or alter any proprietary notices, including copyright notices, contained in this documentation and shall ensure that all notices appear on any reproductions of the documentation. Electronic versions of this document may be downloaded from the Datasensing website (www.datasensing.com).

Disclaimer

Datasensing has taken reasonable measures to provide information in this manual that is complete and accurate, however, Datasensing shall not be liable for technical or editorial errors or omissions contained herein, nor for incidental or consequential damages resulting from the use of this material. Datasensing reserves the right to change any specification at any time without prior notice.

Trademarks

Datasensing and the Datasensing logo are trademarks of Datasensing S.r.l. Datalogic and the Datalogic logo are registered trademarks of Datalogic S.p.A. in many countries, including the U.S. and the E.U.

Patents

See www.patents.datasensing.com for patent list.

Original Instructions (ref. 2006/42/EC)

Current manual refers to DLSentinel version 4.0.0 and later.

GRAPHIC USER INTERFACE END USER LICENSE AGREEMENT

Whenever YOU download or use the GRAPHIC USER INTERFACE ("GUI") this End User License Agreement ("License") applies to YOU, as final end user, and Licensor. Licensor means Datalogic IP Tech S.r.l. having its registered office at Via San Vitalino 13, 40012 Calderara di Reno, VAT number 03159561202, Italy. This License governs your use of the GUI and related user documentation (the "GUI"). Any Open Source used in a conjunction with the Software is subject to the Open Source licenses available at the following website: http://www.datalogic.com/oss.

By downloading and/or using the GUI, YOU are agreeing to the terms of this License. If YOU don't agree with any of these terms, YOU cannot download or use the GUI.

a. License. Subject to the restrictions this License, Licensor grants YOU a non-exclusive, non-transferable, non-sublicensable, limited license to download, install and use in object code form a single copy of the GUI only on one single computer that YOU own or control, which system requirements shall comply with requirements provided by Licensor, and solely in conjunction with Datalogic Laser Sentinel, defined below, for which it is intended for use.

Title to the licensed GUI shall be and remain with Licensor or the third party from whom Licensor has obtained a license right. This License does not grant to YOU any intellectual property rights on GUI.

b. License Restrictions. YOU may not distribute or make the GUI available over a network where it could be used by multiple devices at the same time, unless otherwise permitted in writing by Licensor.

YOU may not rent, lease, lend, sell, redistribute or sublicense the GUI. YOU may not copy (except as expressly permitted by this), decompile, reverse engineer, disassemble, attempt to derive the source code of, modify or adapt the GUI, in whole or in part, merge the GUI into another program, use the GUI in any manner inconsistent with this License or create derivative works of the GUI, any updates, or any part thereof (except as and only to the extent any foregoing restriction is prohibited by applicable law or to the extent as may be permitted by the licensing terms governing use of this License). YOU may print copies of any user documentation provided in online or electronic form for your personal use. If YOU breach these restrictions, YOU may be subject to prosecution and damages and this License would be immediately terminated.

c. Changes of License. Licensor reserves the right to change all or a part of the License at any time. If Licensor does that, Licensor will post the changed terms at the following website: http://www.datalogic.com. Click on Support > Search by product and enter the Laser Sentinel family name, then select your product from the dropdown list. Click on the Software & Utilities link to download the License.

IF YOU CONTINUE TO USE THE GUI AFTER LICENSOR POST CHANGED TERMS, THEN YOUR USAGE WILL CONSTITUTE YOUR EXPLICIT ACCEPTANCE OF THE CHANGED TERMS.

Licensor is constantly evolving its products. This means Licensor may change or discontinue GUI (and/or our website and any of our other services) without notice or any liability to YOU.

d. Termination. The license is effective until terminated by YOU or Licensor. Your rights under this license will terminate automatically without notice from the Licensor if (i) YOU fail to comply with any term(s) of this license; (ii) YOU delete the GUI; and, to the extent applicable, (iii) YOU use the GUI in connection with a paid service or paid product, the end of the time period specified at time of purchase. Upon termination of the license, YOU shall cease all use of the GUI, and destroy all copies, full or partial, of the GUI.

e. Datalogic Laser Sentinel. The GUI may enable access to Datalogic laser product, Datalogic Laser Sentinel for configuration purposes.

f. Intellectual Property Rights. Except for the rights explicitly granted in this License, Licensor retains and/or control all right, title and interest (including all copyright, patents, trademarks, service marks, trade secrets, or other intellectual property rights) in the GUI, including the copies of the GUI on your computer. YOU acknowledge that the GUI constitutes valuable trade secrets of Licensor or its third-party licensors and that the GUI is protected by intellectual property laws and treaties. YOU shall not remove, modify, or take any other action that would obscure any copyright, trademark, patent marking, or other intellectual property notices contained in or on the GUI. Certain of the product and service names used in this License and in the GUI may constitute trademarks of Licensor or third parties. YOU are not authorized to use any such trademarks, except as it is permitted by applicable laws and agreements. All trademarks are the property of their respective owners.

g. NO WARRANTY. YOU EXPRESSLY ACKNOWLEDGE AND AGREE THAT USE OF THE GUI IS AT YOUR SOLE RISK AND THAT THE ENTIRE RISK AS TO SATISFACTORY QUALITY, PERFORMANCE, ACCURACY AND EFFORT IS WITH YOU. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THE GUI IS PROVIDED "AS IS" AND “AS AVAILABLE”, WITH ALL FAULTS AND WITHOUT WARRANTY OF ANY KIND, AND APPLICATION PROVIDER HEREBY DISCLAIMS ALL WARRANTIES AND CONDITIONS WITH RESPECT TO THE GUI AND ANY SERVICES, EITHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES AND/OR CONDITIONS OF MERCHANTABILITY, OF SATISFACTORY QUALITY, OF FITNESS FOR A PARTICULAR PURPOSE, OF ACCURACY, OF QUIET ENJOYMENT. LICENSOR DOES NOT WARRANT AGAINST INTERFERENCE WITH YOUR ENJOYMENT OF THE GUI, THAT THE FUNCTIONS CONTAINED IN, THE GUI WILL MEET YOUR REQUIREMENTS, THAT THE OPERATION OF THE GUI OR SERVICES WILL BE UNINTERRUPTED OR ERROR-FREE, OR THAT DEFECTS IN THE GUI WILL BE CORRECTED. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY LICENSOR OR ITS AUTHORIZED REPRESENTATIVE SHALL CREATE A WARRANTY. SHOULD THE GUI PROVE DEFECTIVE, YOU ASSUME THE ENTIRE COST OF ALL NECESSARY REPAIR OR CORRECTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR LIMITATIONS ON APPLICABLE STATUTORY RIGHTS OF A CONSUMER, SO THE ABOVE EXCLUSION AND LIMITATIONS MAY NOT APPLY TO YOU.

h. Limitation of Liability. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT SHALL LICENSOR BE LIABLE FOR PERSONAL INJURY, OR ANY DIRECT, INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES WHATSOEVER, INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, LOSS OF DATA, BUSINESS INTERRUPTION OR ANY OTHER COMMERCIAL DAMAGES OR LOSSES, ARISING OUT OF OR RELATED TO

YOUR USE OR INABILITY TO USE THE GUI, HOWEVER CAUSED, REGARDLESS OF THE THEORY OF LIABILITY (CONTRACT, TORT OR OTHERWISE) AND EVEN IF APPLICATION PROVIDER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME JURISDICTIONS DO NOT ALLOW THE LIMITATION OF LIABILITY FOR PERSONAL INJURY, OR OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THIS LIMITATION MAY NOT APPLY TO YOU.

i. Export. YOU may not use or otherwise export or re-export the GUI except as authorized by United States law and the laws of the jurisdiction in which the GUI was obtained. In particular, but without limitation, the GUI may not be exported or re-exported (a) into any U.S. embargoed countries or (b) to anyone on the U.S. Treasury Department's list of Specially Designated Nationals or the U.S. Department of Commerce Denied Person's List or Entity List or to anyone towards whom any EU Council Regulation impose restrictive and sanctioned measures. By using the GUI, you represent and warrant that you are not located in any such country or on any such list. YOU also agree that YOU will not use these products for any purposes prohibited by United States and EU law, including, without limitation, the development, design, manufacture or production of nuclear, missiles, or chemical or biological weapons.

l. Open source. Portions of GUI include or operate with Open Source software ("Open Source Software").

Open Source Software is software covered by a publicly available license governed solely under Copyright law, whereas the complete terms and obligations of such license attach to a licensee solely through the act of copying, using and/or distributing the licensed software, such obligations often include one or more of attribution obligations, distribution obligations, copy left obligations, and intellectual property encumbrances. The use of any Open Source Software is subject to the terms and conditions of this License as well as the terms and conditions of the corresponding license of each Open Source Software package. If there is a conflict between the terms and conditions of this License and the terms and conditions of the Open Source Software license, the applicable Open Source Software license will take precedence. Licensor is required to reproduce the software licenses, acknowledgments and copyright notices as provided by the authors and owners, thus, all such information is provided in its native language form, without modification or translation. Please reference and review the above mentioned information to identify which Open Source Software packages have source code provided or available.

m. Confidentiality. YOU acknowledge that GUI content and associated documentation, including the specific design and structure of individual programs, constitute trade secrets and/or copyrighted material of Licensor (and/or its third party's licensors). YOU shall keep the GUI and any related material in strict confidence with all applicable laws. YOU shall not disclose, provide, or otherwise make available the Proprietary Information of Licensor or its third-party licensors to any person and YOU will use such information only for internal business purposes. YOU shall take steps to protect this information no less securely than if it were your own intellectual property. The provisions of this Proprietary Information Section shall survive and continue for five (5) years after the termination of this License.

n. Applicable Law/Jurisdiction.

n.1 Both parties agree to the application of the laws of the country in which YOU obtained the license to govern, interpret, and enforce all of Your and Licensor's respec-

tive rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this License, without regard to conflict of law principles. The United Nations Convention on Contracts for the International Sale of Goods does not apply.

n. 2 All rights, duties, and obligations are subject to the courts of the country in which YOU obtained the license.

For licenses granted to You who operate in the countries specified below, the following terms apply:

For Americas.

This License and the rights of the parties hereunder shall be governed by and construed in accordance with the laws of the State of Oregon U.S.A, without regard to the rules governing conflicts of law. The state or federal courts of the State of Oregon located in either Multnomah or Lane counties shall have exclusive jurisdiction over all matters regarding this License, except that Licensor shall have the right, at its absolute discretion, to initiate proceedings in the courts of any other state, country, or territory in which YOU reside, or in which any of your assets are located. In the event an action is brought to enforce the terms and conditions of this License, the prevailing party shall be entitled to reasonable attorneys' fees, both at trial and on appeal.

Use, duplication, or disclosure of the Software by the U.S. Government is subject to the restrictions for computer software developed at private expense as set forth in the U.S. Federal Acquisition Regulations at FAR 52.227-14(g), or 52.227-19 or in the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013(c)(1)(ii), whichever is applicable.

For Europe, Middle East and Africa

This License and the rights of the parties hereunder shall be governed by and construed in accordance with the laws of Italy, without regard to the rules governing conflicts of law. Italian Court of Bologna shall have exclusive jurisdiction over all matters regarding this License, except that Licensor shall have the right, at its absolute discretion, to initiate proceedings in the courts of any other state, country, or territory in which YOU reside, or in which any of Your assets are located. In the event an action is brought to enforce the terms and conditions of this License, the prevailing party shall be entitled to reasonable attorneys' fees, both at trial and on appeal.

For Asia- Pacific Countries

The validity, interpretation and construction of the License shall be governed by and construed in accordance with Laws of the Republic of Singapore. Parties expressly disclaim the application of the United Nations Convention for International Sale of Goods.

Any dispute arising out of or in connection with this contract, including any question regarding its existence, validity or termination, shall be referred to and finally resolved by arbitration administered by the Singapore International Arbitration Centre ("SIAC") in accordance with the Arbitration Rules of the Singapore International Arbitration Centre ("SIAC Rules") for the time being in force, which rules are deemed to be incorporated by reference in this clause. The seat of the arbitration shall be Singapore.

The number of arbitrators will be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties will appoint a third arbitrator who will act as chairman of the proceedings. Vacancies in the post of chairman will be filled by the president of the SIAC. Other vacancies will be filled by the respective nominating party. Proceedings will continue from the stage they were at when the vacancy occurred. If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator will be the sole arbitrator, provided that the arbitrator was validly and properly appointed. All proceedings will be conducted, including all documents presented in such proceedings, in the English language. The English language version of these terms and conditions prevails over any other language version.

n3. Attorneys' Fees. In the event an action is brought to enforce the terms and conditions of this License, the prevailing party shall be entitled to reasonable attorneys' fees, both at trial and on appeal. Proposals, oral or written, and all other communications between the parties relating to the subject matter of this License. Any terms and conditions of any purchase order or other instrument issued by YOU in connection with this License which are in addition to, inconsistent with or different from the terms and conditions of this License shall be of no force or effect. This License may be modified only by a written instrument duly executed by the parties. Any waiver by either party of any condition, part, term, or provision of this License shall not be construed as a waiver of any other condition, part, term or provision or a waiver of any future event or circumstance. If any provision of this License is held unenforceable, or invalid, the remainder of the License shall continue in full force and effect.

Effective. November 10, 2017.

TABLE OF CONTENTS

PREFACE IX
About this Manual ix
Manual Conventions ix
Technical Support x
Support Through the Website x

CHAPTER 1. DLSENTINEL GRAPHIC USER INTERFACE 1
Program Description 1
Before using DLSentinel 2
Installing DLSentinel 2
Minimum System Requirements 2
Program Installation 2
DLSentinel user interface 4
Main menu 5
Toolbar buttons 6
Task selection 6
Laser Sentinel configuration checklist 7

CHAPTER 2. LASER SENTINEL CONFIGURATION 8
Establishing Ethernet Communications with the Scanner 8
DLSentinel Device Discovery through a Network 9
Point-to-Point Configuration PC Static IP Addressing Alignment 10
Modify Safety System Configuration from a Scanner on the Network 14
Configuration Settings 16
Output Configuration 17
Zone Set Configuration 19
Input Configuration 20
Detection Configuration 22
Profinet/Profisafe Configuration 23
Zones Configuration 26
Acting on Drawn Objects 32
Selecting and Visualizing Areas on the Graph 39
New Configuration Selection 40
Save the Configuration 41
Open a Previously Saved Safety System Configuration From PC 42

CHAPTER 3. PROGRAMMING AND MONITORING FUNCTIONS 45
Programming 45
Monitoring And Controller Simulator 48
ACCESS CONTROL 52
Assign or Change Passwords 52
Reset a Password 55
FIRMWARE UPDATE 56
Checks after Firmware Update 57
FACTORY RESET 59
ADVANCED MONITORING 61

PREFACE

ABOUT THIS MANUAL

This User's Manual is provided for users seeking advanced technical information, including connection, programming, maintenance and specifications. The Quick Reference Guide (QRG) and other publications associated with this product can be downloaded free of charge from the website listed on the back cover of this manual.

Manual Conventions

The following conventions are used in this document:

The symbols listed below are used in this manual to notify the reader of key issues or procedures that must be observed when using the reader:

NOTE

Notes contain information necessary for properly diagnosing, repairing and operating the reader.

CAUTION

The CAUTION symbol advises you of actions that could damage equipment or property.

WARNING

The WARNING symbol advises you of actions that could result in harm or injury to the person performing the task and/or persons in the vicinity of the source of danger.

TECHNICAL SUPPORT

Support Through the Website

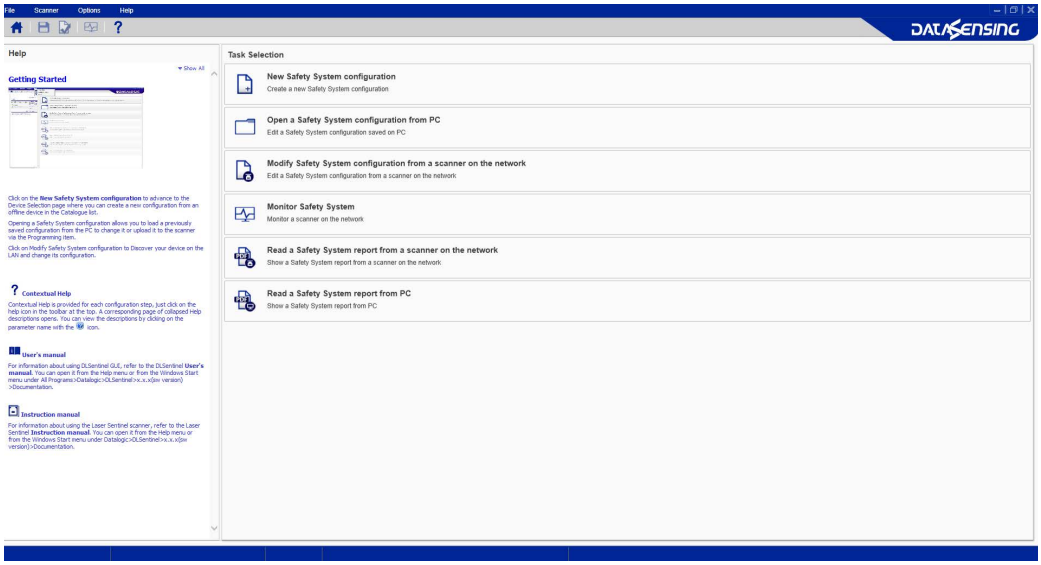
Datasensing provides several services as well as technical support through its website. Log on to (www.datasensing.com).

For quick access, from the home page click on the search icon, and type in the name of the product you're looking for. This allows you access to download Data Sheets, Manuals, Software & Utilities, and Drawings.

CHAPTER 1
DLSENTINEL GRAPHIC USER INTERFACE

PROGRAM DESCRIPTION

DLSentinel is a User Interface client application that provides device configuration for the Laser Sentinel series of safety laser scanners. It is installed in and runs on Windows-based PCs, and connection takes place through an Ethernet TCP/IP interface.



Main features

A summary of the DLSentinel main features is listed below:

- Settings for changing the device password and to manage the network configuration
- User and Session Language configuration in real time
- System configuration
- Report
- Manual

BEFORE USING DLSENTINEL

To employ the device, a safety configuration with the DLSentinel GUI must be created, where the user will enter all the parameters, configure inputs and outputs and create monitored areas.

INSTALLING DLSENTINEL

The DLSentinel client application software needs to be installed on your PC to configure the safety laser scanner.

Minimum System Requirements

To ensure proper interfacing with the system, the personal computer must meet the following minimum requirements:

COMPONENT	RECOMMENDED	MINIMUM
Processor(s)	Pentium 4	Pentium 4
Clock frequency	>= 3 GHz	>= 2 GHz
RAM	2 GB	1 GB
Free hard drive space	70 MB	70 MB
Monitor resolution	1280x768	1024x768
Supporting Operating System	Windows 10, Windows 11	

Besides the components listed in the table above, your PC must be equipped with the following hardware and software drivers:

- Installed Ethernet network card and installed driver
- One free 100 Mbps Ethernet port

Program Installation

DLSentinel is a Datasensing safety laser scanner configuration tool providing several important advantages:

- Intuitive Graphical User Interface for rapid configuration
- Defined configuration directly stored in the device
- Discovery and IP address setting features to facilitate remote configuration
- Device Monitoring and Controller Simulator

To install DLSentinel

1. On the PC that will be used for configuration, download the free setup file from the Datasensing website: https://www.datasensing.com/eng/downloads-dw-82.html
   Unzip the file and run the installation program by double-clicking the **SetupDlSentinel.msi** file. The downloaded folder also contains Windows Framework (dotNetFx40_x86_x64.exe) provided by Datasensing in case you need to update your operating system. Run the .msi setup file first, and only install the framework .exe file if requested.

2. Follow the setup procedure and accept all terms and conditions required for this software release.

3. When the installation is complete, the DLSentinel entry is created in the Start > All Programs menu under “Datasensing” along with a desktop icon.

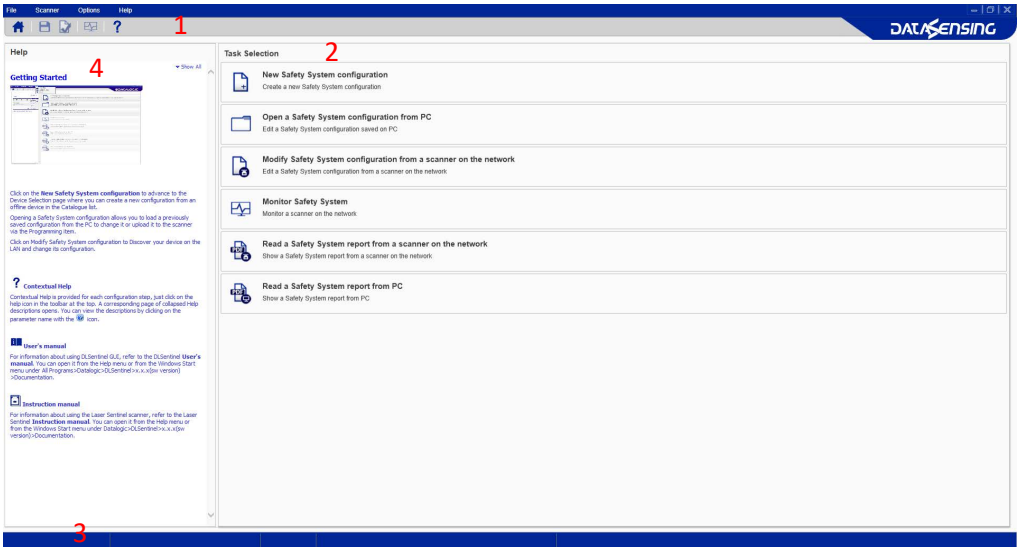
4. Before launching DLSentinel, you have to create the network LAN with the same address as the new device. Follow the connection procedure described in "Modify Safety System Configuration from a Scanner on the Network" on page 14.

NOTE

A dedicated computer running DLSentinel must be connected to a safety laser scanner through the Ethernet port to perform the configuration and monitoring features.

DLSENTINEL USER INTERFACE

After launching DLSentinel to configure devices or handle reports, the DLSentinel Task Selection shows the following main areas:



1. **Main Menu and Toolbar Area** – The DLSentinel main features.

2. **Task Selection Area** – Presents a list of the tasks that can be performed from DLSentinel. These selections are also available in the File and the Scanner Menus (**Main Menu Area**).

3. **Status Bar** – A reserved area that keeps specific information about the connected device. It displays information on the current network status, the connected device status, the connector and the application type.

4. **Help Online** – A Help Guide that includes all the information and parameters to create a proper configuration. For the next configuration steps, the help online is available/visible only by clicking on the dedicated button ? in the toolbar.

Main menu

FILE	
New Configuration	To create a new Device Configuration
Open Configuration from PC	To open a previously saved Configuration on the local drive
Read from PC	**Report**: shows a Safety System Configuration Report saved on PC
Save	Saves the current configuration or report on PC
Exit	To exit the DLSentinel user interface

SCANNER	
Discovery	Searches for a Device connected to the Network (LAN)
Direct Connect	To connect to a device by entering its IP address
Open Configuration from scanner	To open a configuration from a device
Open Shape from file	To insert a previously saved shape in a zone
Apply Configuration	To apply a configuration to a connected device
Read from Scanner	**Report**: shows a Safety System Configuration Report saved on PC
	Open log from memory scanner
Settings	**Change Network Configuration**
	Change Access Controls
	Reset Password
	Factory Reset
Update Firmware	To update the Firmware file
Window Replacement	To start the Window Replacement procedure

OPTIONS	
Change Language	Allows the user to change the display language used for DLSentinel in real time. The selected language will also be used for successive sessions.
DLSentinel Log	**Extract Log**
Report Settings	**Measure Unit**
	System Coordinate
Advanced Monitoring	Allows receiving measurement distance data and information about the status of the device(s).

HELP	
User's Manual	Opens the DLSentinel User's Manual

HELP	
Instruction Manual	Opens the Laser Sentinel Instruction Manual
About	Opens a window that contains DLSentinel release version information

Toolbar buttons

ICON	DESCRIPTION
	Getting Started: allows the user to start a session by clicking on one of the Task Selection options.
	Save: saves the current configuration or report session.
	Configuration Validator: this tool allows you to check the new configuration in DLSentinel before sending it to the device. By clicking on this option, a validation test will be made on the entire configuration in DLSentinel. A pop-up window will appear displaying either a list of configuration errors or validating the configuration.
	Monitoring: starts a monitoring session.
	Help Online: displays a window that includes the help online guide and it shows the parameters depending on the selected configuration step.

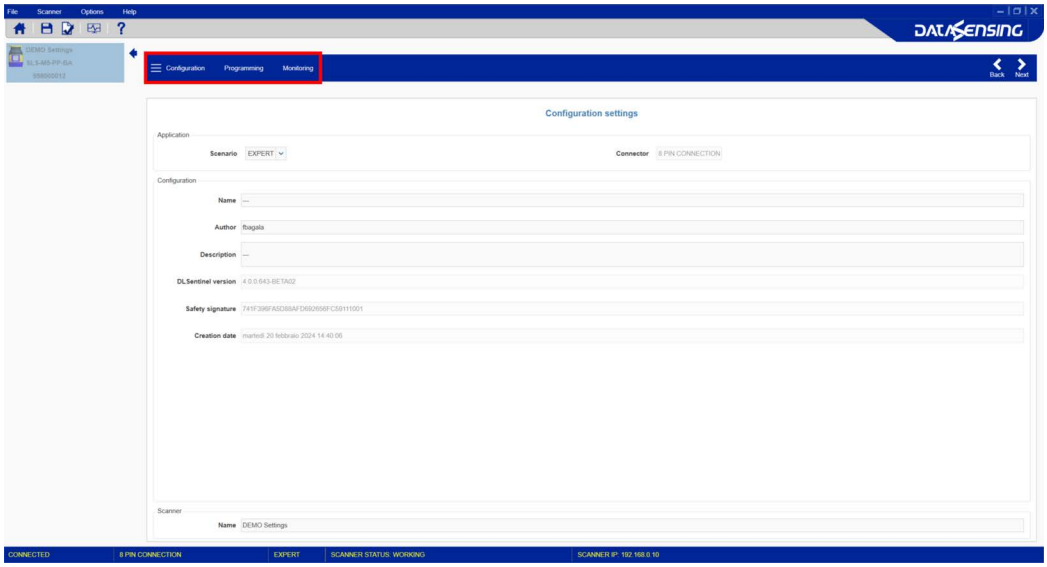
Task selection

The right side of the main window includes the list of the Task selection. The list is explained in the chart below.

ICON	DESCRIPTION
	New Safety System Configuration: to create a new Safety System Configuration on a Virtual Scanner.
	Open a Safety System Configuration from PC: to open and edit a Configuration saved on PC.
	Modify Safety System Configuration from a Scanner on the Network: to edit a Safety System Configuration from a Scanner on the Network.
	Monitor Safety System: to enter the monitoring function of a connected Device.
	Read a Safety System Report from a Scanner on the Network: to view, print or save a Safety System Configuration Report.
	Read a Safety System Report from PC: to view or print a Safety System configuration report stored on PC.

LASER SENTINEL CONFIGURATION CHECKLIST

DLSentinel allows creating, testing and validating a device configuration. Complete configuration can only be performed on a connected device (Online).



The main steps to configure the Laser Sentinel are:

1. **CONFIGURATION**: create the configuration through Settings, Outputs, Zone Set, Inputs, Detection, Profinet/Profisafe, Zones.
2. **PROGRAMMING**: upload the configuration and generate the report file.
3. **MONITORING**: test and monitor the device functioning with the new configuration.
4. **PROGRAMMING**: validate the configuration (accept it or reject it).

NOTE

At first connection, the device has no pre-set configuration. The display shows the following icon indicating that the Laser Sentinel is waiting for configuration. You need to define a new configuration as described in Chapter 2, Laser Sentinel Configuration**.**

CHAPTER 2
LASER SENTINEL CONFIGURATION

ESTABLISHING ETHERNET COMMUNICATIONS WITH THE SCANNER

The first thing to do is connect the configuration PC to the Laser Sentinel scanner through the Ethernet port. There are two different methods of establishing Ethernet communications with the Laser Sentinel depending on the network restrictions of the plant in which it is installed.

If the plant provides an Ethernet network to which the Laser Sentinel is connected, then the Discovery feature can be used by connecting the configuration PC to the network, as described in "DLSentinel Device Discovery through a Network" on page 9.

If there is no Ethernet network available or it is restricted, then the configuration PC must be connected point-to-point with the Laser Sentinel and its IP address must be aligned to the Laser Sentinel default address to establish communication, as described in "Point-to-Point Configuration PC Static IP Addressing Alignment" on page 10.

NOTE

When connecting and using the device with your PC for the first time, use a point-to-point connection with the factory default IP addresses, as described in "Point-to-Point Configuration PC Static IP Addressing Alignment" on page 10**. This is to avoid any network conflicts in the Ethernet communication.**

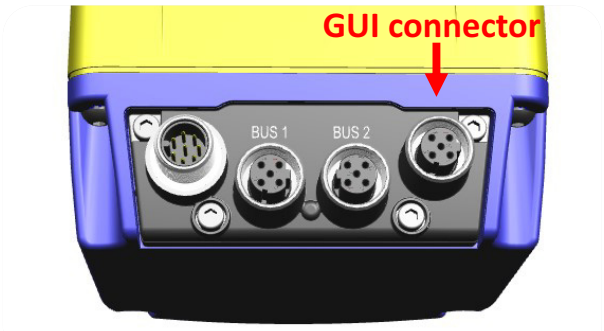
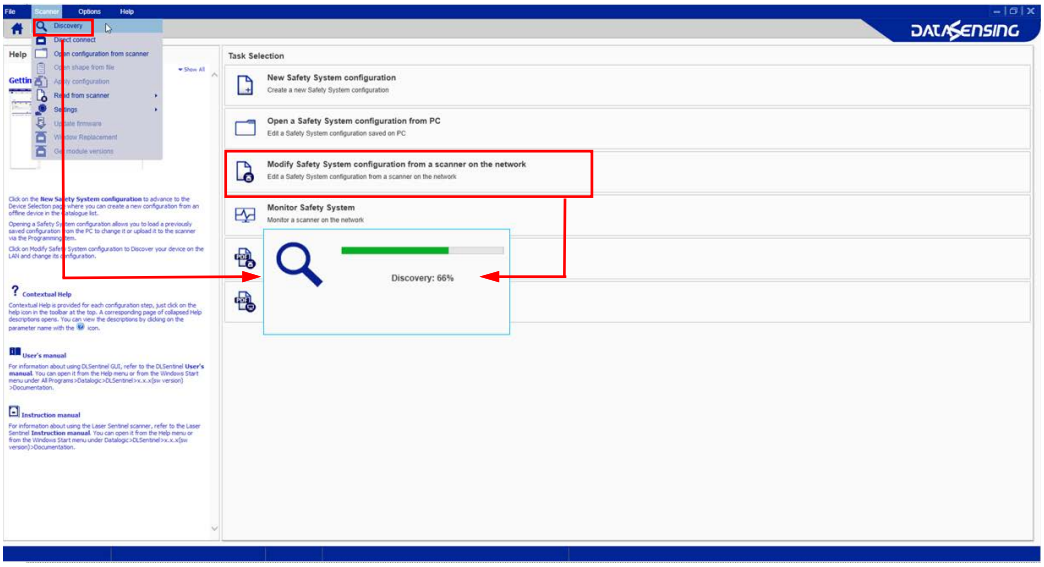


Figure 1 - GUI Connector

DLSentinel Device Discovery through a Network

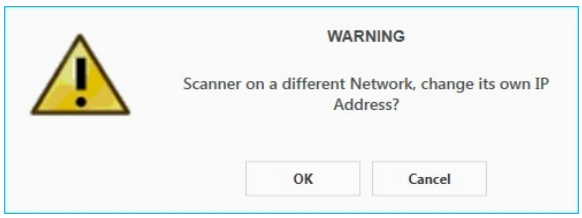
DLSentinel has a discovery feature to find the connected device.

1. Click on the **Discovery** item in the Scanner menu to search for the connected device. Alternatively, you can select the **Modify Safety Configuration** item from the task menu.

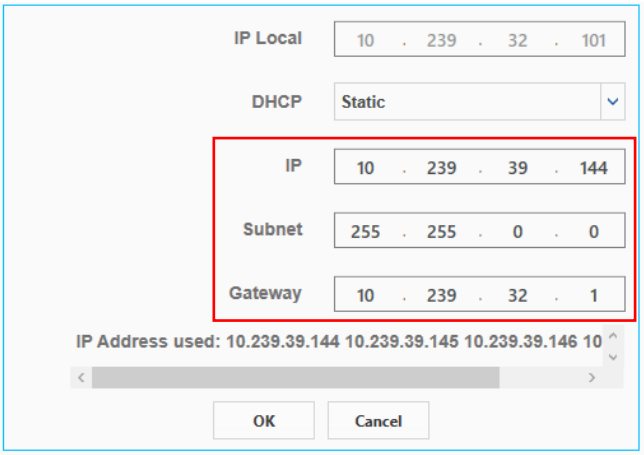


The User Interface opens and displays the device with its own default IP Address (192.168.0.10). Any other device on the network will also be discovered.

2. Click on the discovered device to place it in the Device Configuration panel. A warning message will be displayed indicating that the device is not on the same network and prompts you to align it with the network.



3. Click OK and then change the IP Address parameters in the Network Configuration window to align them with your network. Consult your network administrator for these parameters.



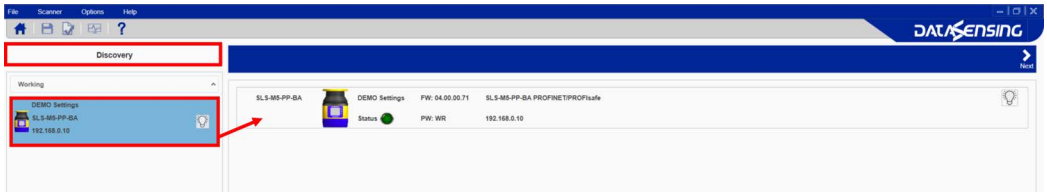
NOTE

Each Laser Sentinel also reserves the successive IP Address for internal functions.

4. Click OK to accept the new IP Address parameters. The device resets.

5. Click on the Discovery button. DLSentinel will rediscover the device with the new IP Address.

6. Click on the device to load it into the task area.



7. Click on the white right-pointing arrow on the upper right side on the main panel to download the current configuration from the device to the PC. DLSentinel is now connected to the device.

NOTE

If you are connecting the device for the first time or after a Factory Reset (see Appendix C, Factory Reset**), the display will show a "NO CONF" message until a new configuration is loaded.**

NOTE

See "Modify Safety System Configuration from a Scanner on the Network" on page 14 **for modifying the current configuration or** "Open a Previously Saved Safety System Configuration From PC" on page 42 **for downloading a previously saved configuration from the PC.**

Point-to-Point Configuration PC Static IP Addressing Alignment

It is possible to connect a configuration PC directly to the device using the Ethernet TCP/IP interface (point-to-point).

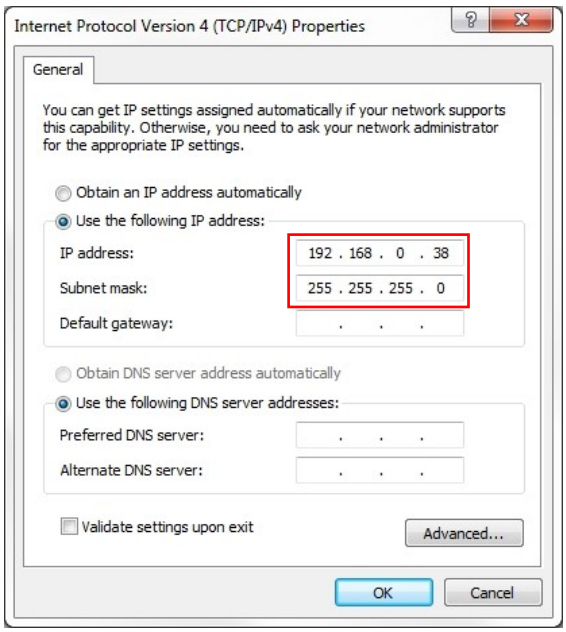
NOTE

When connecting and using the device with your PC for the first time, this procedure is recommended to avoid any network conflicts in the Ethernet communication.

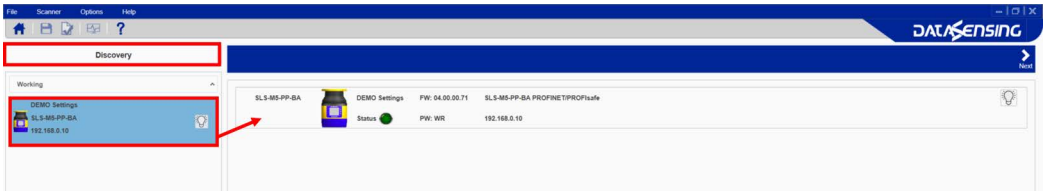
The Ethernet IP Addressing parameters must be aligned between the configuration PC and the scanner. Please follow the procedure below.

The default Laser Sentinel static assignment Ethernet IP Address is: **192.168.0.10**.

1. Connect the device to the LAN port of your PC and switch it on.
2. Before changing the Ethernet network settings on the PC running the GUI, close any open applications that use network resources (e.g. Outlook, Web browser).
3. On the configuration PC, from the Control Panel>Network and Internet>Network and Sharing Center, click on the Local Area Connection link and open the properties window.
4. Select the Internet Protocol Version 4 (TCP/IPv4) item and open the properties window.
5. Set the IP Address fields as follows: 192.168.0.xx, where “xx” is any number differing from the device address and click *OK* to save. The PC is now aligned with the Laser Sentinel default network.



6. Launch DLSentinel from the configuration PC.
7. Click on the Discovery button. DLSentinel will discover the device with the default IP Address.
8. Click on the device to load it into the task area.

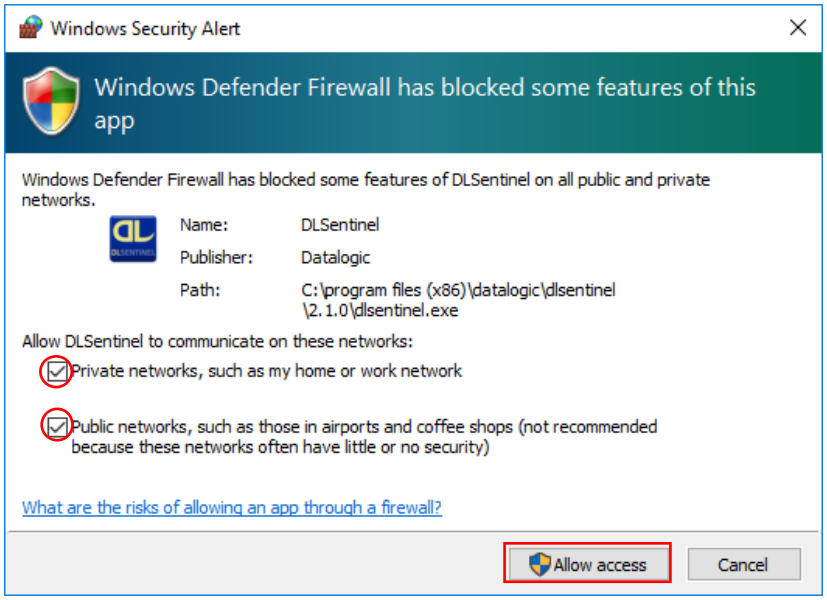


9. If **Windows Firewall** is active on the configuration PC, a pop-up window will appear after discovering the device.

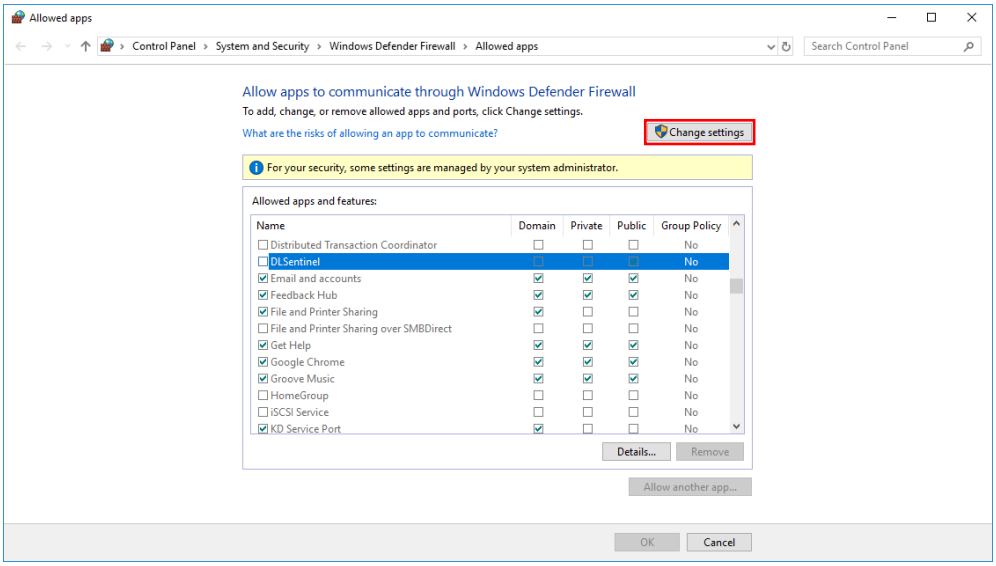
NOTE

If no firewall window appears, but an “Unable to connect” message is still shown, it may be due to the antivirus firewall installed on you PC.

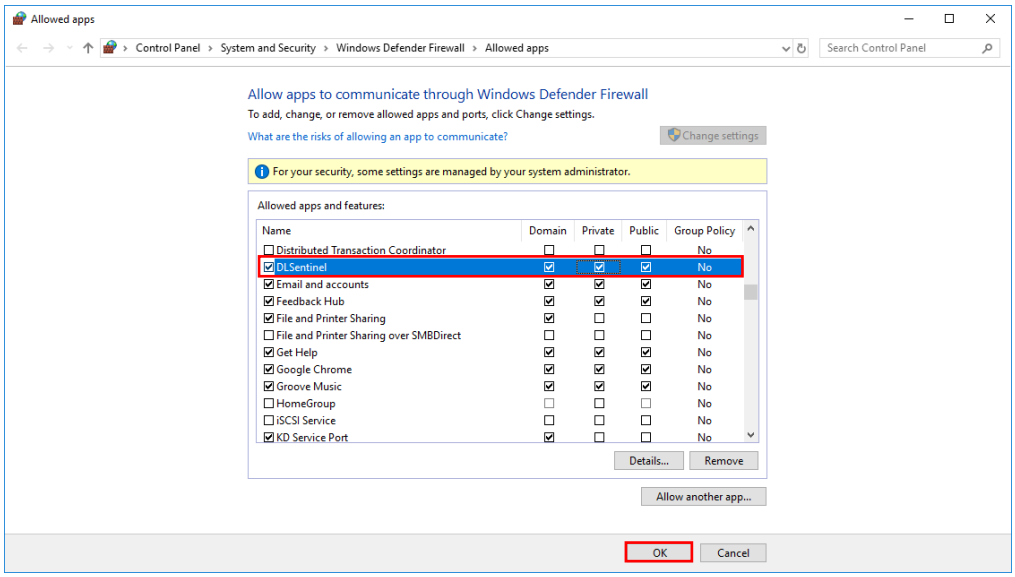
Do not close the pop-up window before allowing access to both private and public networks of the PC to communicate and exchange data with the device through the Ethernet port.



If you close the pop-up window before confirming the Firewall authorization, go to Control Panel>System and Security>Windows Defender Firewall>Allowed apps and click on “Change settings”.



Scroll down the list and check the boxes on the DLSentinel row as shown in the figure below, then click *OK*. The Firewall is now disabled on DLSentinel.



NOTE

If you cannot find DLSentinel on the program list, uninstall and reinstall the software and follow the procedure described in point 9.

10. Back on DLSentinel, click on the white right-pointing arrow on the upper right side on the main panel to download the current configuration from the device to the PC. DLSentinel is now connected to the device.

NOTE

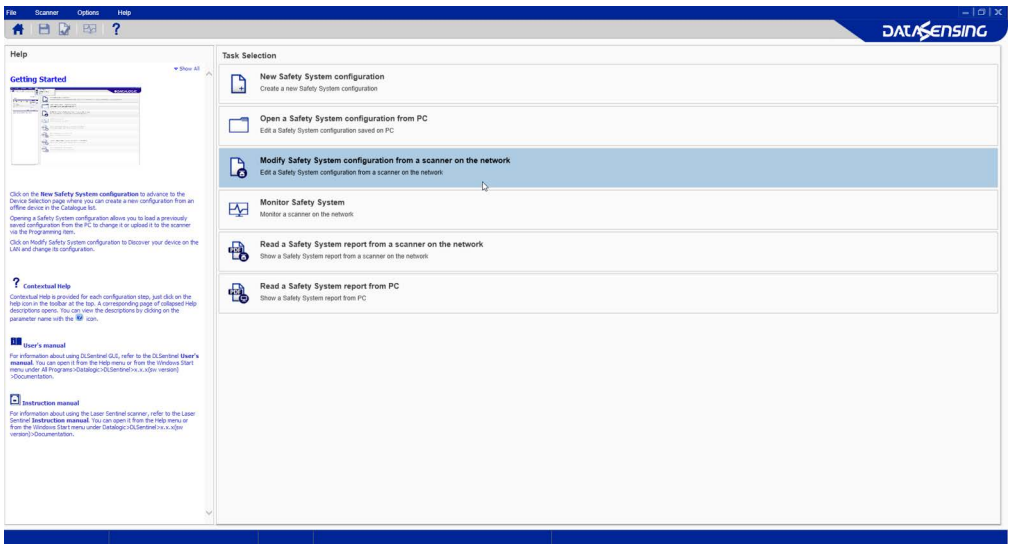
If you are connecting the device for the first time or after a Factory Reset (see Appendix C, Factory Reset**), the display will show a "WAITING CONF" message until a new configuration is loaded.**

NOTE

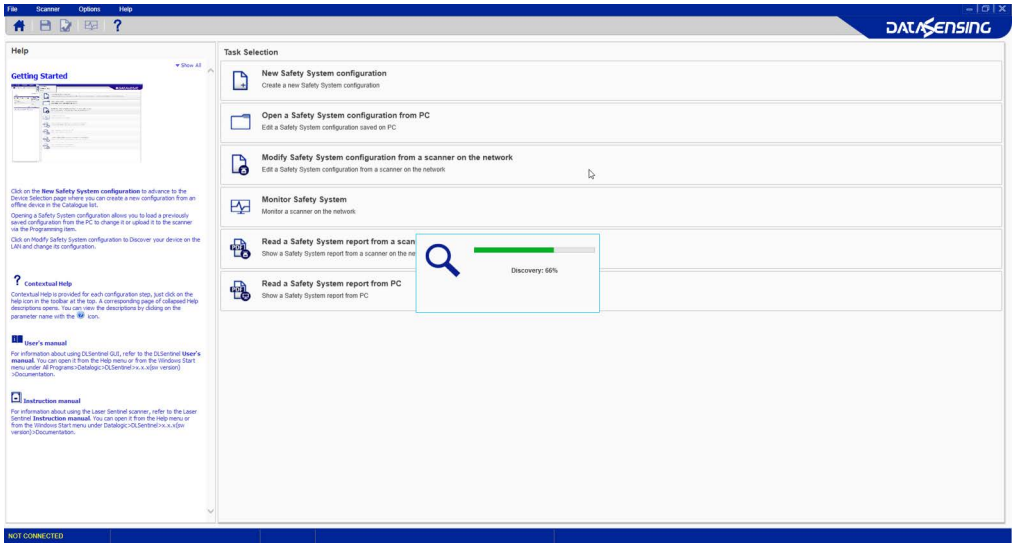
See "Modify Safety System Configuration from a Scanner on the Network" on page 14 **for modifying the current configuration or** "Open a Previously Saved Safety System Configuration From PC" on page 42 **for downloading a previously saved configuration from the PC.**

MODIFY SAFETY SYSTEM CONFIGURATION FROM A SCANNER ON THE NETWORK

1. Click on Modify Safety System Configuration From a Scanner on the Network task to edit a configuration on a device on the Network (Online Configuration).



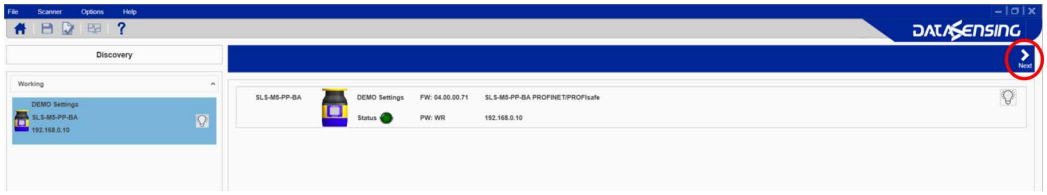
DLSentinel will enter Discovery mode to search for a connected device.



NOTE

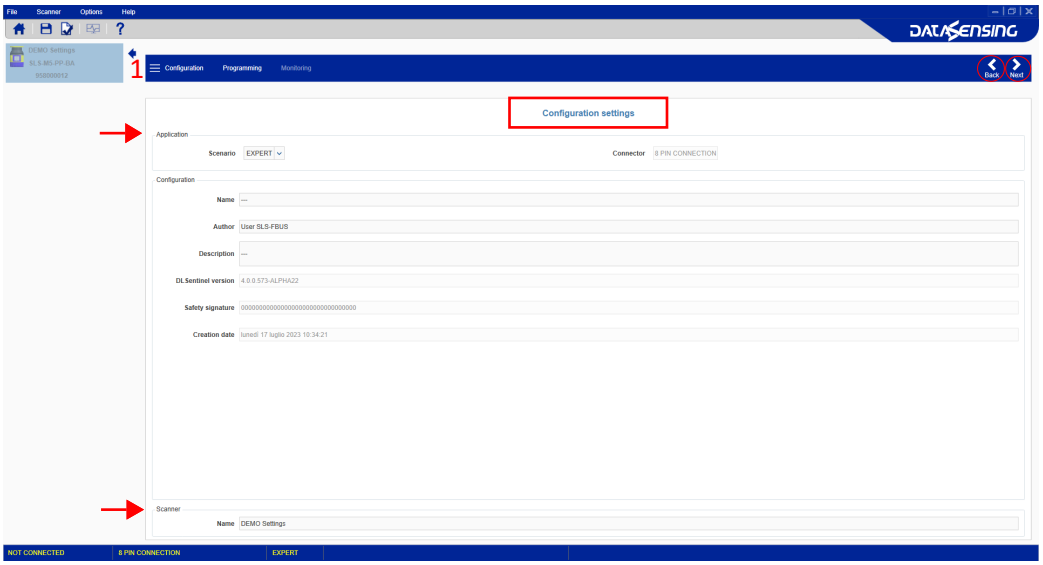
If the Laser Sentinel and the PC LAN are not aligned, it will be necessary to set the network configuration settings. See "Establishing Ethernet Communications with the Scanner" on page 8**.**

2. Click on the white right-pointing arrow on the upper right side on the main panel to download the current configuration from the device to the PC. DLSentinel is now connected to the device.



Configuration Settings

The first page is the **Configuration Settings** page, which contains information about the application.



Scenario to select the configuration type (depending on the application).

- **Vertical:** Same as expert but requires that Reference Points be defined in the Zone configuration (they are not optional for Vertical applications).
- **Expert:** provides the maximum configuration possibilities for the device. It contains the entire set of parameters, regardless of the device use.

It is possible to view and edit some of the parameters in the **Configuration** section, such as:

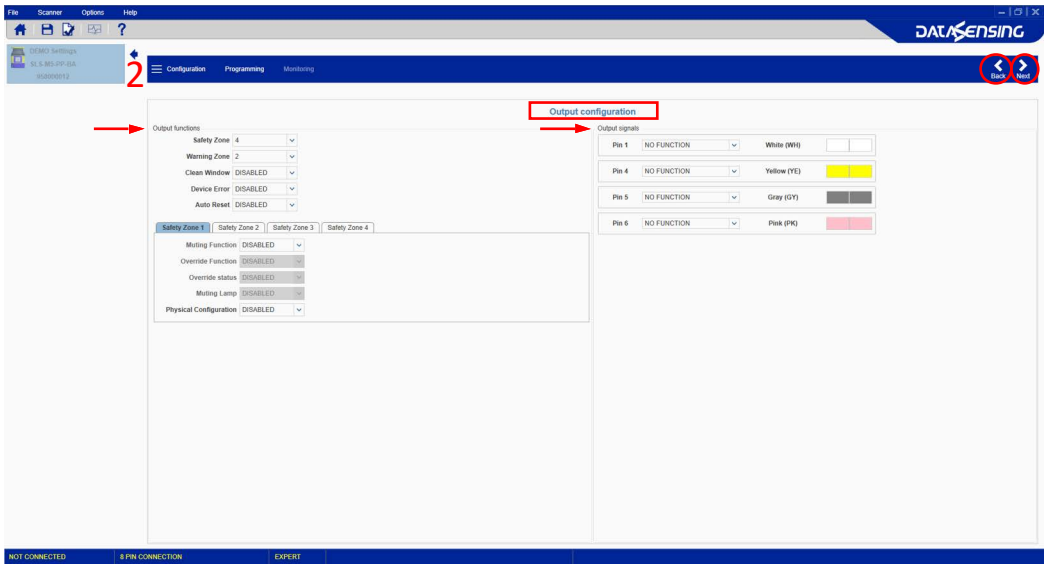
- **Name**: A name to identify the configuration.
- **Author**: A name to identify the author.
- **Description**: A short text description to identify the configuration.
- **DLSentinel Version**: (Read-only). The software version of DLSentinel.
- **Safety Signature**: (Read-only). This is a 16-byte unique identifier randomly generated by DLSentinel based on the time and date when the configuration is downloaded into the scanner.
- **Creation Date**: (Read-only). The date and time the configuration was created.
- **Scanner**: A name to identify the scanner.

NOTE

To proceed with the configuration, click on the white right-pointing arrow on the upper right side on the main panel. To go back to the previous page, click on the white left-pointing arrow.

Output Configuration

The Output Configuration page displays the following parameters for the SLS-Fieldbus models:



Output Functions

- **Safety Zone:** to select the number of Safety Zone to be monitored within the active zone set (up to 8).
- **Warning Zone:** to select the number of Warning Zone to be monitored within the active zone set (up to 7).
- **Clean Window:** if enabled, the “Clean Window” device error/warning is output on the selected pin.
- **Device Error:** if enabled, any device error is output on the selected pin.
- **Auto Reset:** if enabled, the scanner will automatically reset after 10 seconds from the error condition and will resume normal operation. The Auto Reset function will be permanently inhibited if the device locks in INTFx more than 5 times within 15 minutes. In this case a power cycle is necessary to reactivate the scanner.

NOTE

Auto Reset can be configured in the Output Configuration page, but it is not an output function.

- **Muting Function:** if enabled, the safety laser scanner can operate under controlled conditions where an object can pass through the Safety Zone without the scanner switching to the Off-state.
- **Override Function:** if enabled, when the muting function is enabled, the safety laser scanner can enable override to force the safety function deactivation to clear the safety zone form a work cycle anomaly.
- **Override Status:** when the override function is active, the status of override is signaled. Override status is valid on output pin only for Safety Zone 1.
- **Muting Lamp:** if the Muting function is enabled for Safety Zone 1, an optional muting lamp can be connected to a scanner output signal to indicate when the scanner is functioning in Muting (dangerous area temporarily unprotected) or Override for the Safety Zone 1 only.

NOTE

The maximum number of Safety Zone, Warning Zone and Muting shall be 8 (e.g., 3 Safety Zones, 3 Warning Zones, 2 Muting zones is an allowed configuration).

Safety Zone 1

Only for the Safety Zone 1, Physical Configuration can be enabled to allow the user to select output signals for Override Status and Muting Lamp when they are enabled.

Safety Zone 2…8

The Muting and Override function can be enabled or disabled according to the constraint of maximum 8 among Safety, Warning, Muting zones. These functions are handled by the Fieldbus protocol through the Process image.

Output signals

This parameter group assigns the signals of the output functions to the scanner pins only for the Safety Zone 1 if Physical configuration is enabled, except for Clean Window and Device Error which can be always assigned.

Each pin is also associated with color-coded cable wiring according to safety equipment regulations and standards.

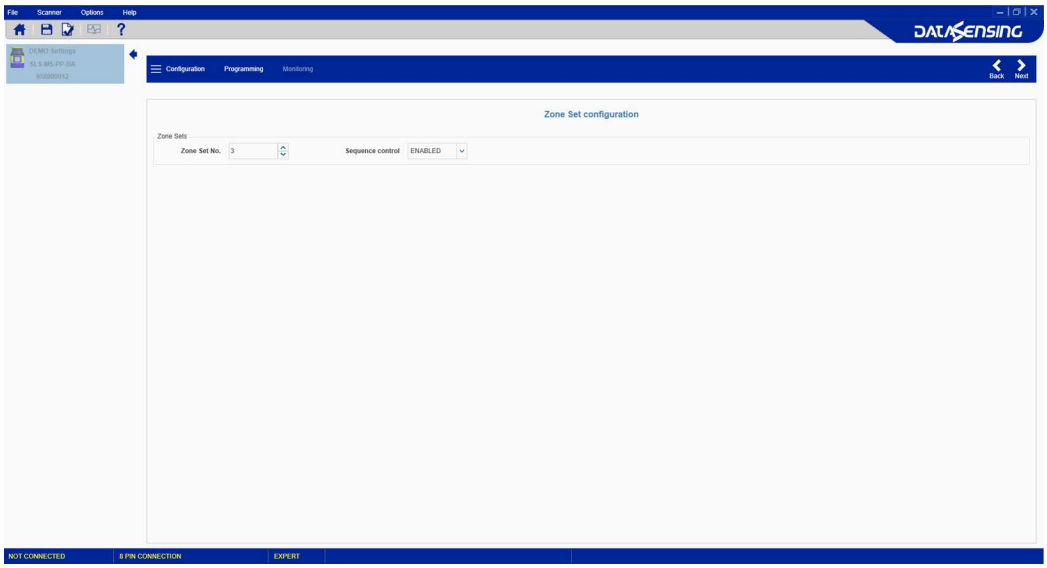
The following pins are available for the Safety Laser Scanner Fieldbus:

- **Pin 1 (White Wire), Pin4 (Yellow Wire), Pin 5 (Gray Wire), Pin 6 (Pink wire)**

If an alarm is enabled, these pins can be assigned to the Clean Window or Device Error output. If the Override Function is enabled (Muting function enabled), these pins can be assigned to the Override Status. If Muting Lamp is enabled (Muting function enabled) these pins can be assigned as the Muting Lamp output. Otherwise, they must be assigned here as No Function.

Zone Set Configuration

The Zone Set Configuration page displays the following parameters for the SLS-Fieldbus models:



Zone Set Parameters

- **Zone Set No.**
  To select the number of Zone Sets to use for the configuration. The default value is one Zone Set (no Area Switching). By pressing the up arrow more Zone Sets can be added. Please note that you can select max. 70 Zone Sets for SLS-Fieldbus models.
- **Sequence control**
  If more than one zone set (Zone Set No.) is selected, the Sequence control can be ENABLED or DISABLED by the user. If ENABLED, the change of zone set from x to y shall be admissible only for a sequential number of the zone set (incremental or decremental), i.e., y=x+1 or y=x-1. If the user tries to activate a different zone set from y=x+1 or y=x-1, the device goes to a safe condition and the error INPUTCF3 is shown on the display.

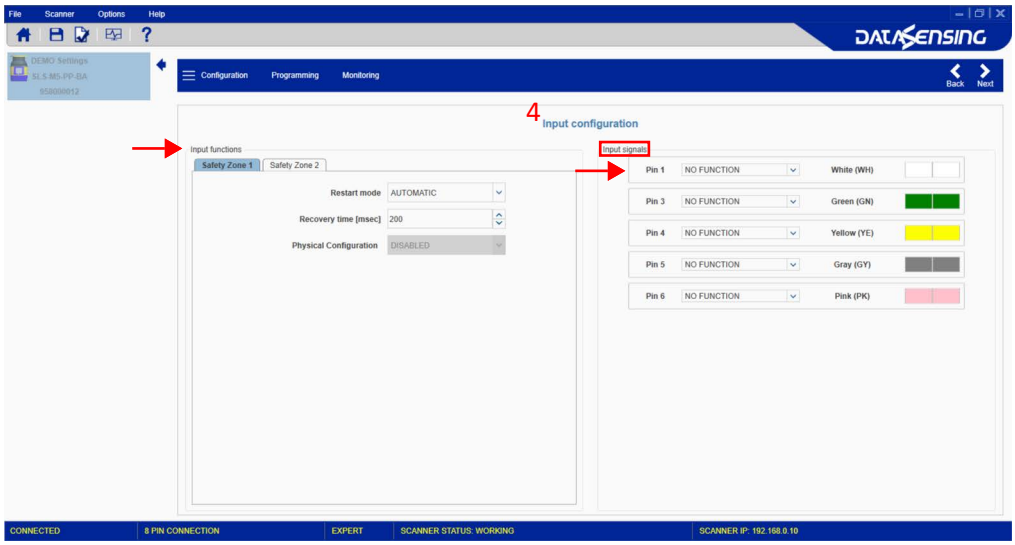
  E.g.: if three zone sets are configured, if Sequence control is ENABLED, zone set No.3 shall be activated only if the current zone set active is the zone set No. 2. or zone set No. 4.

  When the maximum number of configured Zone Set is reached, the next incremental admissible Zone Set is the first one, otherwise, if Zone Set No. is set to 0 the error INPUTCF2 is shown on the display.

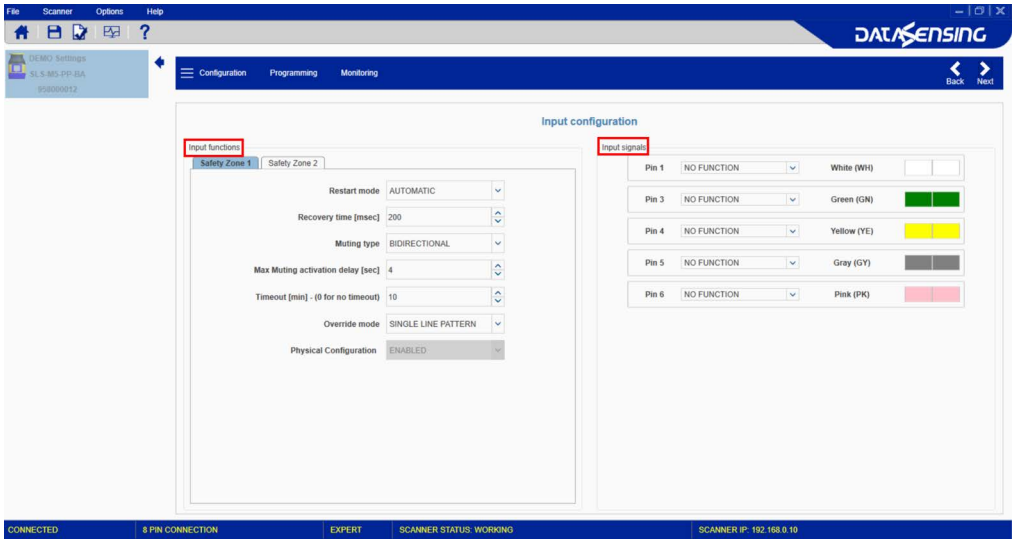
  E.g.: if three zone sets are configured, if Sequence control is ENABLED, after zone set No.3, the next incremental admissible zone set is the zone set No. 1.

Input Configuration

The **Input Configuration** page displays the following parameters for all the Safety Zones defined:



If the Physical Configuration is ENABLED (for Safety Zone 1), the Input Configuration page displays the following parameters:



Input Functions

- **Restart Mode**: for each Safety Zone it's possible to select the restart mode.
  -Automatic: the Laser Sentinel automatically returns the SafetyStatusZone bit of the process image to 0 after all detected objects are removed from the Safety Zone and the configured Recovery Time elapses.
  -Manual: the Laser Sentinel returns the related SafetyStatusZone bit of the process image to 1 after all detected objects are removed from the Safety Zone and the related RestartSafetyZone bit is set to 0 after a transition 0-1-0. (see Instruction Manual for details) by the controller. When the objects are removed, the InterlockReqZone bit is set to 1 in the Process Image (by the SLS) to inform the controller that Restart is possible. Only for the SafetyZone1, if Physical Configuration is enabled, a manual Restart switch (push-button) can be used on the selected pin and shall be pressed for at least 500 msec. If the Restart switch is pressed while an object is still inside the Safety Zone, the Laser Sentinel switches to a failure lockout state and must be Reset.
- **Recovery Time**: this parameter is only significant for Automatic Restart Mode. The recovery time is the time between the object removal from the Safety Zone and

the SafetyStatusZone bit achieving the value 1. The minimum Recovery Time is 200 msec. This can be increased to 60000 msec in 1 msec increments.

Only for the Safety Zone 1, if Physical Configuration is enabled:

- **Muting Type**: the Muting function can be used in two different configurations:
  -Unidirectional: this is when objects can pass through the Safety Zone from only one direction. It requires two Muting sensors be connected to the Laser Sentinel inputs.
  -Bidirectional: this is when objects can pass through the Safety Zone from both directions. It requires four Muting sensors be connected to the Laser Sentinel inputs.
- **M coeff**.: for Unidirectional Muting, the M coefficient is the delay multiplier that causes the Muting function to end. This is the multiplier of the activation delay between the two sensors. It can be set from 2 to 16.
- **Max Muting Activation Delay**: this is the maximum delay between the Muting sensors activation that will still allow the Muting function to be enabled. If the second Muting sensor is activated after this max. delay, the Laser Sentinel will not enter Muting.
- **Timeout**: this defines the maximum duration for the Muting function regardless of the Muting sensors state. The values range from 10 to 1080 minutes. If set to 0, the Muting function is indefinite. This means that Muting will continue as long as the Muting conditions exist.
  Attention: User is warned that the latter setting is not compliant with IEC 61496-1.
- **Override**: when the Muting function is enabled, enabling the Override input allows forcing the safety function deactivation to clear the safety zone from a work cycle anomaly.
- **Override Mode**: the available override modes are single line pattern, edge, and trigger. See the Laser Sentinel Instruction Manual for details.

Input Signals

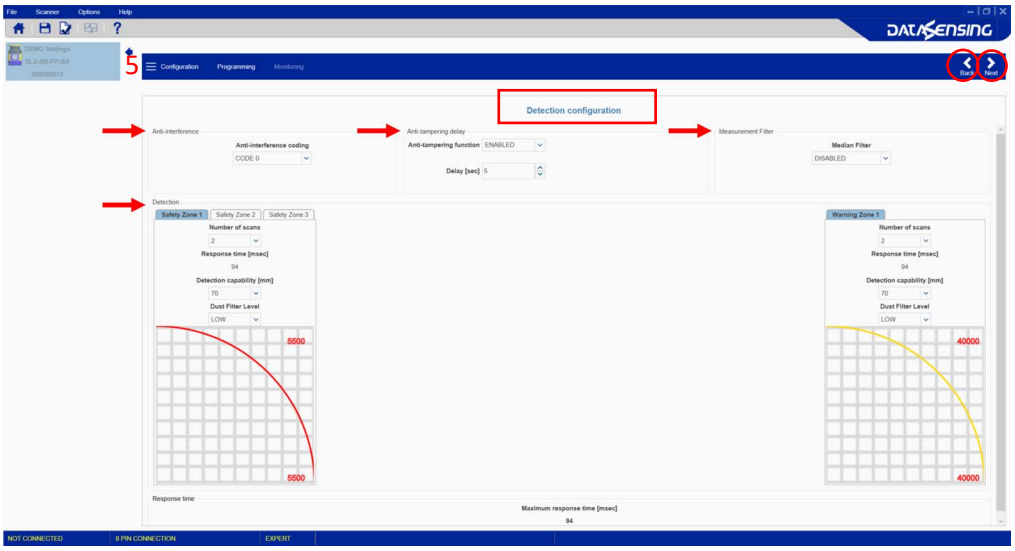
This parameter group assigns the signals of the input functions to the scanner pins. Each pin is also associated with color-coded cable wiring, according to safety equipment regulations and standards.

The following pins are available

- **Pin 1 (White Wire), Pin4 (Yellow wire), Pin5 (Gray wire), Pin6 (Pink wire)**
  If these pins have been assigned as Alarm, Override Status or Muting Lamp output, they are not available. If they haven't been assigned yet, they can be assigned to one of the Muting input signals, the Muting Override input signal or as a manual Restart or Reset input. If these inputs are not used, select No Function.
- **Pin 3 (Green Wire)**
  This pin is only input, it can be assigned to one of the Muting input signals, the Muting Override input signal or as a manual Restart or Reset input.

Detection Configuration

The **Detection Configuration** page displays the following parameters:



Detection Parameters

- **Anti-interference coding:** This parameter changes the scan cycle time (default = 42ms for maximum of 4 Safety + Warning zones). This helps avoid interference among scanners working in the same environment.
- **Number of Scans:** Select the number of scans required to validate detection. This parameter has a direct impact on the **Response Time**, which is the time from when an object is detected in the Safety Zone to when the StatusSafetyZone bit of the Process Image is set to 0. The Response Time ranges from 94 to 2065 ms according to configuration. Check the chapter “Response Time and Scan Cycle Settings” of the Instruction Manual for further details.
- **Detection Capability:** The ability to detect an object of given dimensions within the detection zone. Objects greater than or equal to the selected value can be detected both for the Safety and Warning Zones.
- **Anti-Tampering Delay:** choose whether to enable the function and the delay time for its activation.
- **Measurement Filter:** a median filter on the measurement can be enabled or disable to have smoothed corners of the object detected.
- **Dust Filter Level** must be set according to different conditions specific to the application. In general, it is the sensibility to various levels of airborne particles that impact the response of the Laser Sentinel detection.
  -High Dust Filter Level is used in dirty environments to filter (ignore) detection of airborne particles from being confused with objects to detect. The Laser Sentinel is less sensitive to dust and therefore avoids shutting down the machinery unnecessarily.
  -Mid
  -Low Dust Filter Level is used in cleaner environments where airborne particles have little effect on object detection.

Dust Filter Level should be set to the lowest value that still allows the machinery to work without detections due to dust.

NOTE

In addition to the level of airborne particles in the Laser Sentinel environment, some special lighting conditions also affect the detection sensibility. These conditions are:

- **high reflective backgrounds within 3 meters of the Safety Zone boundary,**
- **the presence of bright light within +/- 5 ° of the detection plane.**

The additional distance must be included in the Minimum Safety Distance calculations for these cases.

NOTE

Disabling the Anti-Tamper function or selecting a delay time longer than 5 s is an exception to the product standard that must be evaluated by personnel experienced in the functional safety of the application in order to verify the risks and take appropriate countermeasures.

Profinet/Profisafe Configuration

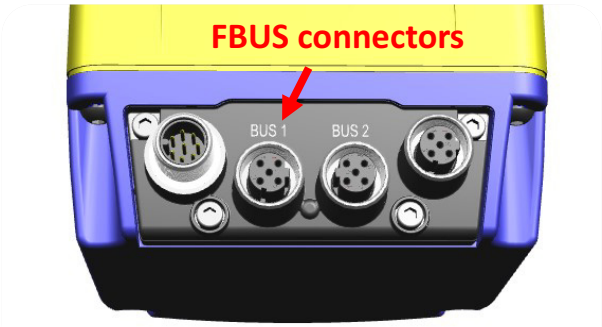
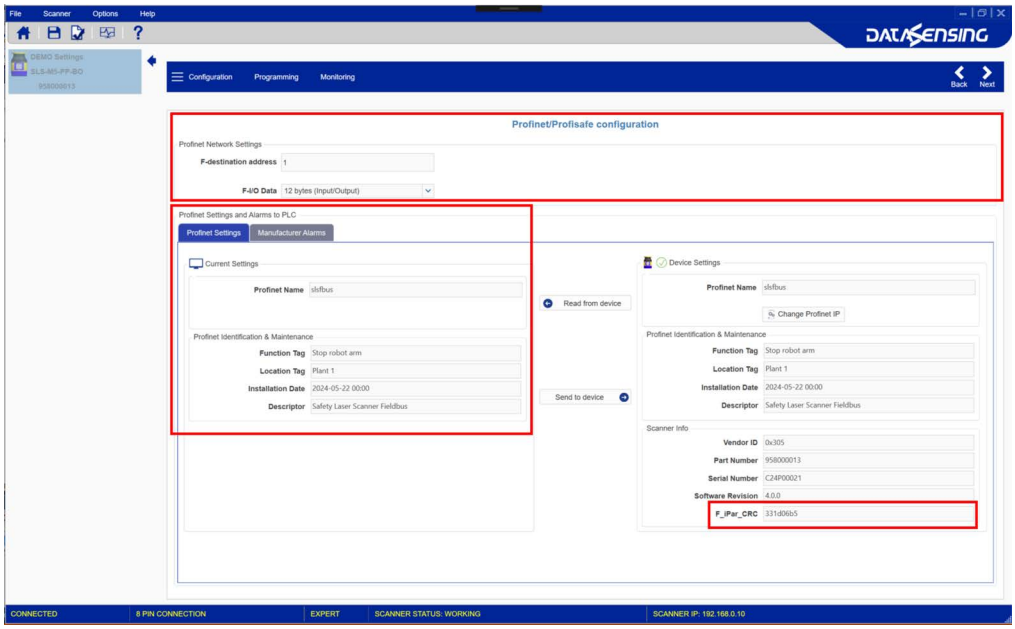


Figure 2 - Fieldbus connector

PROFINET/PROFIsafe configuration page shows the following parameters:



Profinet Network Settings:

- **F-destination address**: unique address for the SLS within the Fieldbus network.
- **F-I/O Data:** define the I/O cyclic data to be exchanged between the SLS and the controller (7 or 12 byte Input/Output). It is possible to select only output data (7 or 12 byte Output, from SLS to the controller). In this condition, any input cyclic data from the Controller is neglected and only one Zone Set is configurable.

Profinet/Profisafe Settings and Alarms to PLC

- **Profinet Settings:** define the settings of the SLS within the PROFINET network.
  -Profinet Name: Allows you to assign a PROFINET name that is unique in the network. The name may not be in use already for another device in the PROFINET network. It can only contain lowercase letters, numerals, and periods and hyphens. The DLsentinel stores the PROFINET name retentively in the device.

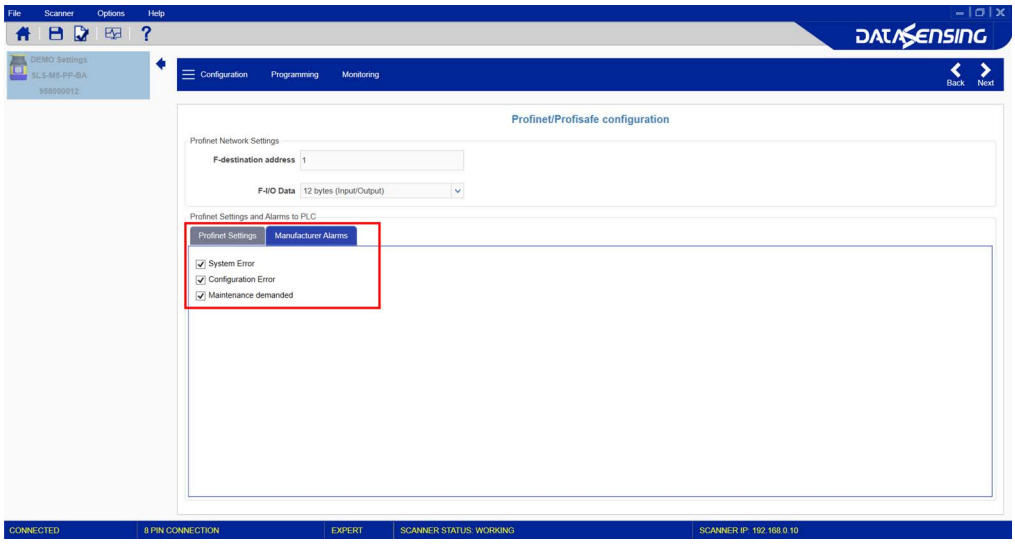
NOTE

The PROFINET name, F-Destination address and F-I/O data changes are valid only after a power cycle of the device.

-Function Tag, Location Tag, Installation Date, Descriptor: Identification&Maintenance parameter for the identification and maintenance function within the PROFINET network.
These parameters are not sent to device with the DLSentinel configuration but they can be read or sent directly from/to device through the related buttons.
If the values in the DLSentinel and the values in the device differ, you can read (Read from device) the values out from the SLS and adopt them in the DLSentinel. Alternatively, you can transmit (Send to device) values from the DLSentinel directly to the device.

- **Scanner Info:** the F_iPar_CRC stored in the device can be read. If a process image with check of F_iPar_CRC is used, the F_iPar_CRC value must be provided in the software configuration of the controller (e.g. PLC).
- **Manufacturer Alarms:** define which manufacturer specific Alarms shall be transmitted to the PLC within the process image (see Instruction Manual for details about the classification of alarms). If the respective check mark is set, the alarm, if present, is transmitted to the controller. Otherwise, if the respective mark is not set, the alarm, if present, is not transmitted to the controller, but the error is

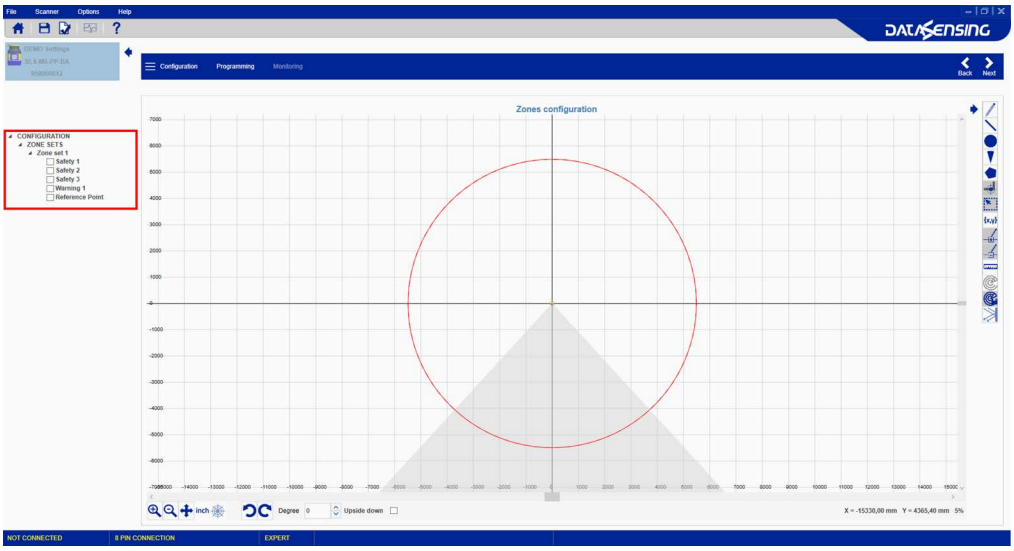
shown on the display and the device goes in an error state accordingly to the alarm occurred.



Zones Configuration

In the **Zones Configuration**, tools are provided to draw the Safety and Warning Zones as well as Reference Points. It is possible to select different shapes and different functions to manage the areas on the graph.

The panel on the left side allows selecting the areas to handle on the graph (Safety, Warning, or Reference Points) and managing them individually. See the paragraph on Selecting and Visualizing Areas on the Graph.

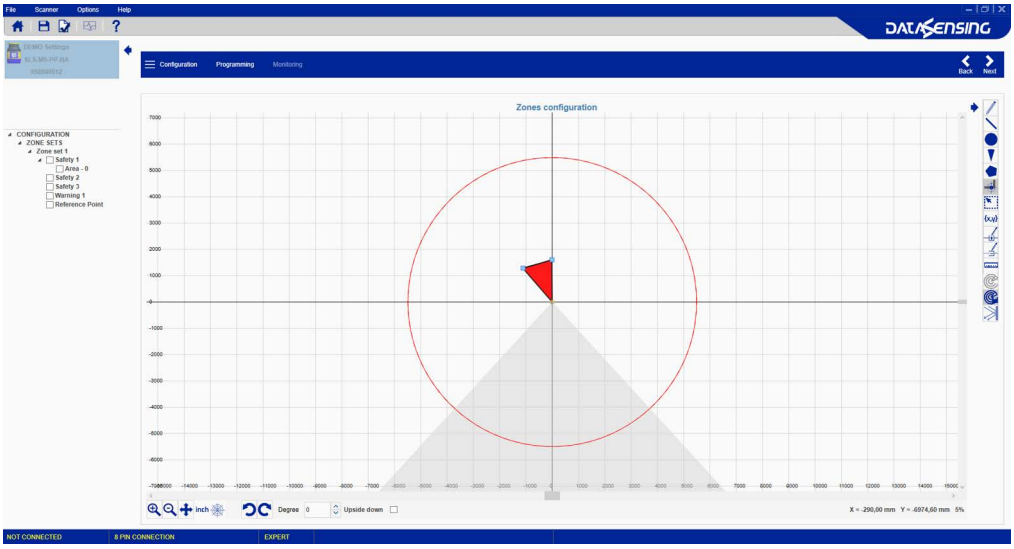


NOTE

This is the last step in defining the configuration. To complete configuration (load it onto the scanner, test it and Accept it), see Chapter 3, Programming and Monitoring Functions**.**

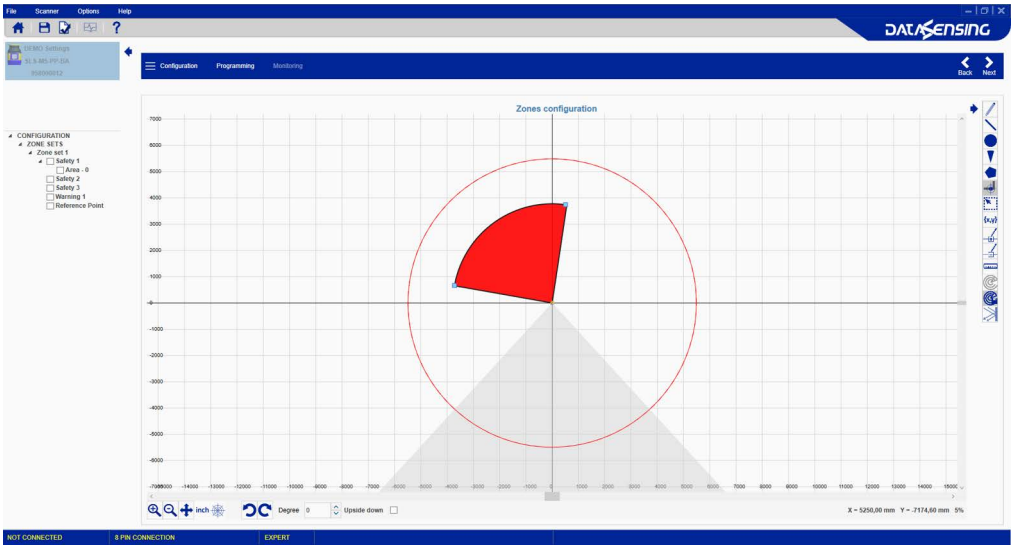
ICON	DESCRIPTION
	Click this button to free-hand draw an area by holding pressed the left button of the mouse and dragging it across the graph. Once finished, release the left button.

ICON	DESCRIPTION
	Click this button to draw a straight-edged area by holding pressed the left button of the mouse and dragging it across the graph. Once finished, release the left button.



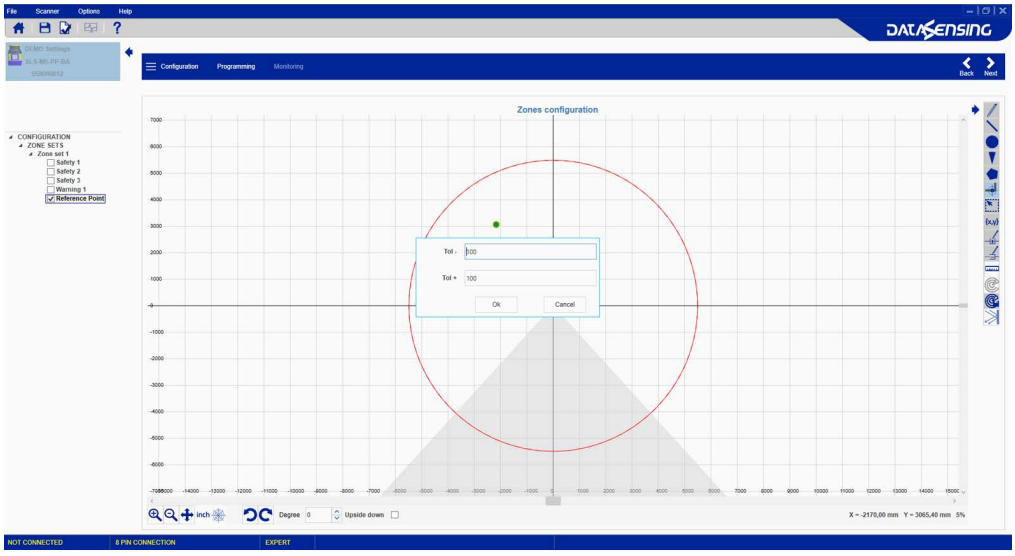
ICON	DESCRIPTION
	Click this button to draw a circle shaped area with its center at the scanner by holding pressed the left button of the mouse and dragging it across the graph. Once finished, release the left button.

ICON	DESCRIPTION
	Click this button to draw an arc shaped area by holding pressed the left button of the mouse and dragging it across the graph. Once finished, release the left button.



ICON	DESCRIPTION
	Click this button to draw a polygon shaped area. Left-click and release the mouse button on a point in the graph and drag the mouse to draw the area. Left-click again to start the next edge of the polygon area. Once finished, double-click the left button.

ICON	DESCRIPTION
	Click this button to draw Reference Points.



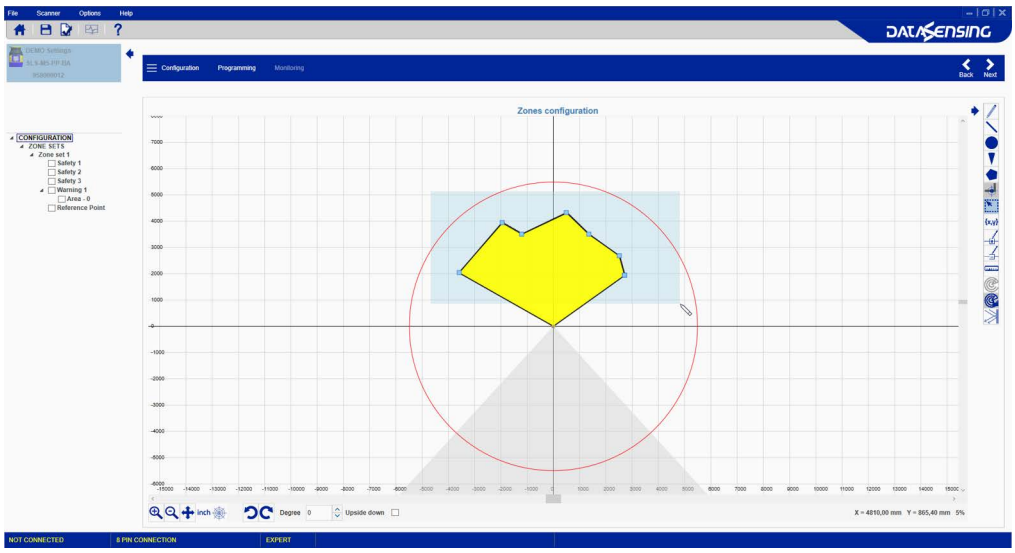
NOTE

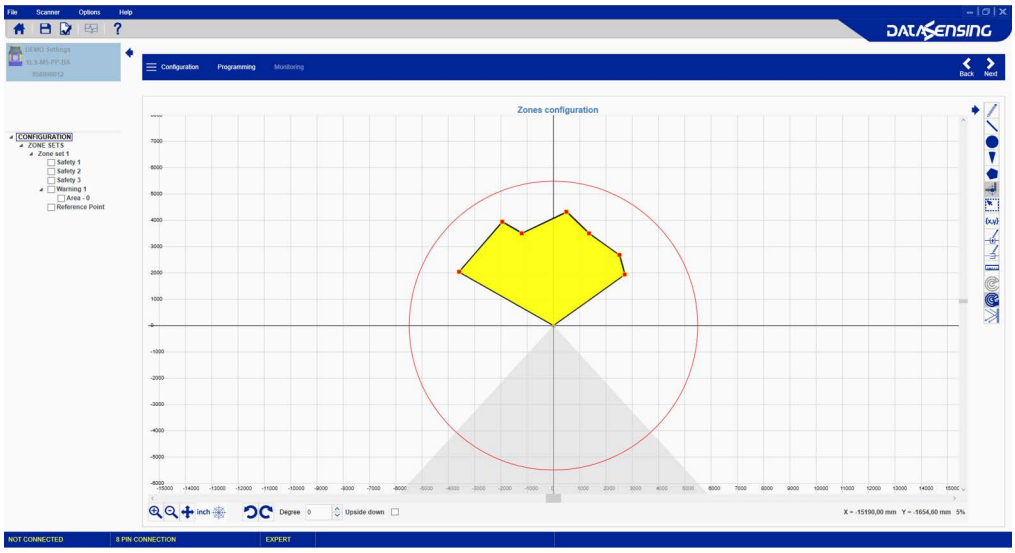
To activate this function, select the REFERENCE POINT area on the left pane.

Specify the distance tolerance of the reference point from the scanner along the ray ("+" means farther from the scanner, "-" means closer to the scanner).

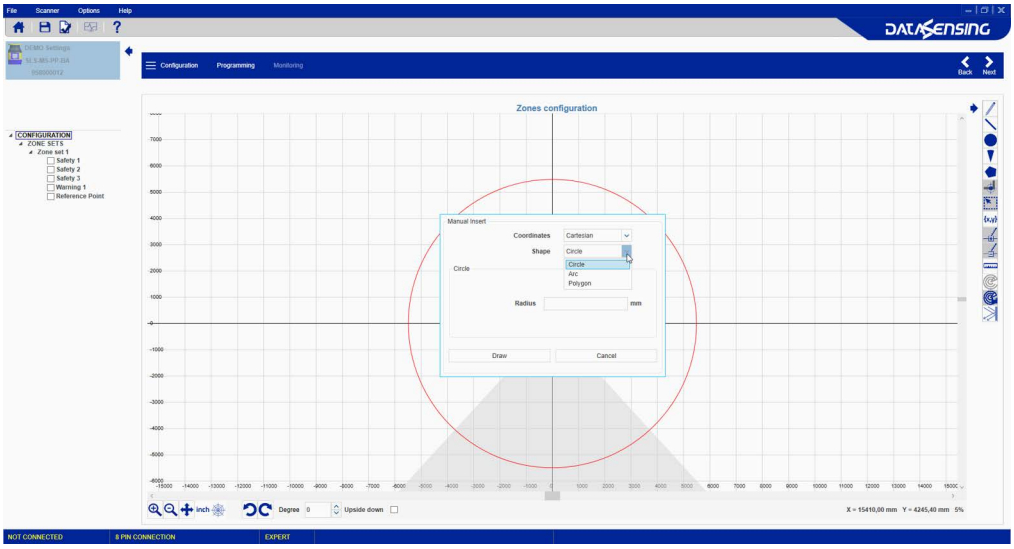
There must be a minimum of 3 and a maximum of 15 Reference Points. Reference points monitoring is a safety function used to monitor any change in position of the scanner, a protective structure or a moving structure located at the specified reference point. These structures either allow or prevent access to the dangerous area and are therefore outside the monitored Safety Zone. When the device detects a change in position at the Reference Points exceeding the specified tolerance, the safety function is activated. This function is required for Vertical applications. See the Laser Sentinel manual for more details.

ICON	DESCRIPTION
	Click this button to create a selection and resize a group of selected points. The points included in the selection will turn red. Drag and drop one of them to edit the whole group.





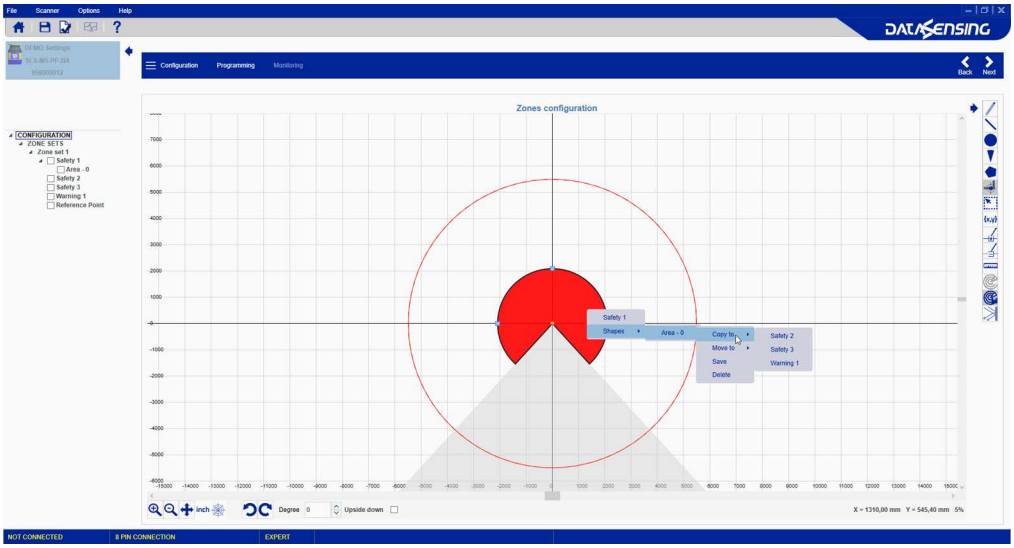
ICON	DESCRIPTION
	Click this button to draw an area by selecting the type of shape (circle, arc or polygon) and directly inserting the measurements and coordinates.



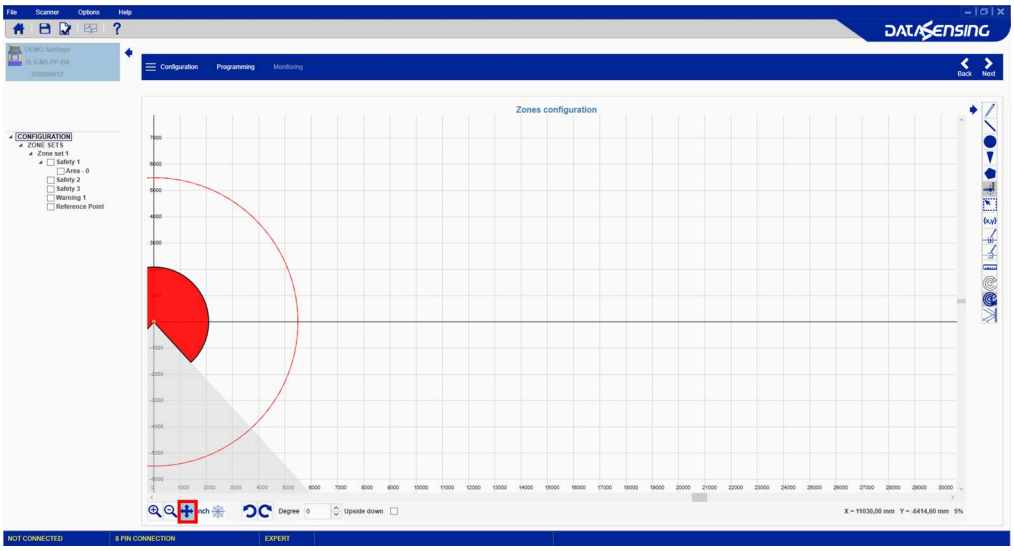
Acting on Drawn Objects

Once the area has been drawn, it is possible to access an edit menu by right-clicking on the selected area. This menu allows:

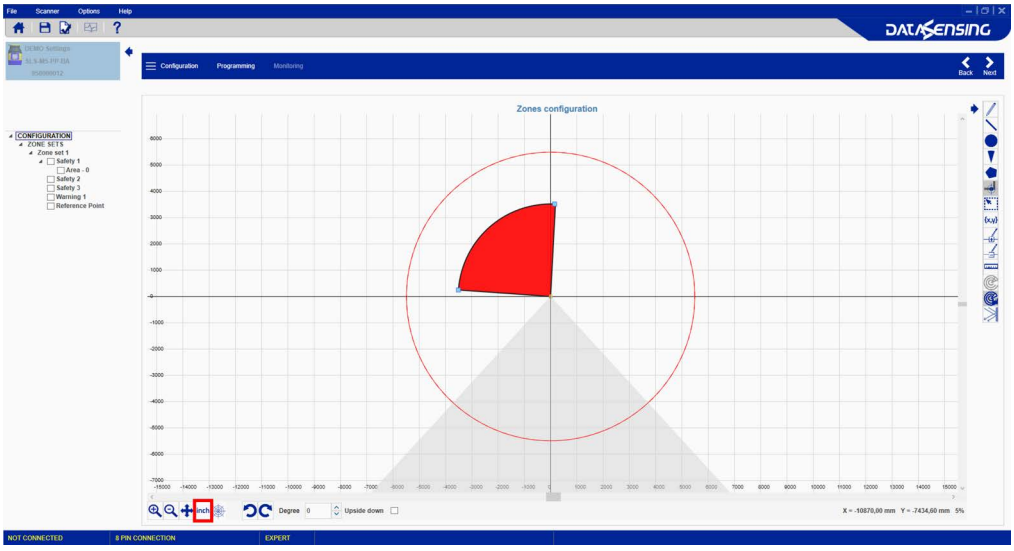
- copying a drawn object between Warning and Safety of the same Zone
- moving a drawn object between Warning and Safety
- of the same Zone
- saving a drawn object
- deleting a drawn object



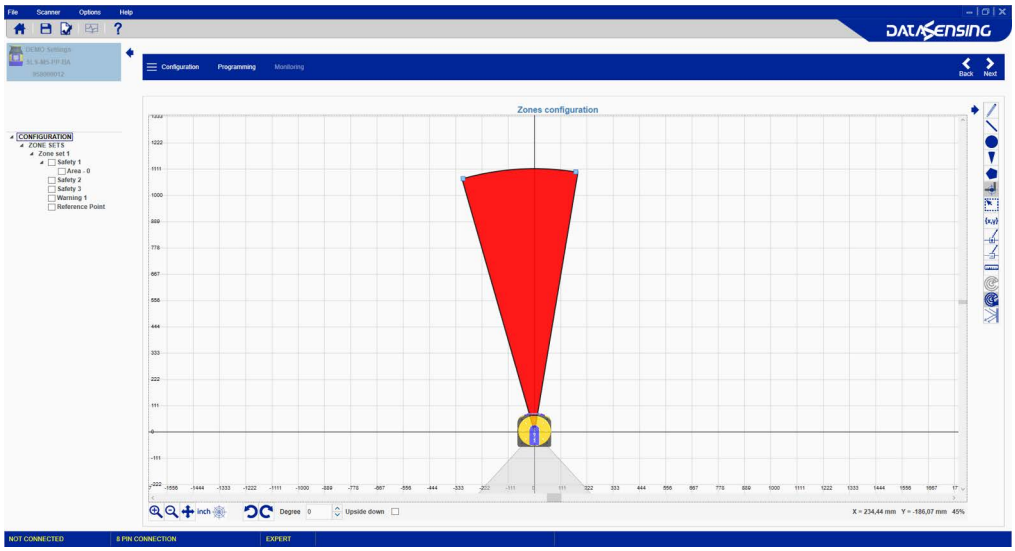
ICON	DESCRIPTION
	Click this button to move (drag) the graph in any direction. Once finished, re-click on the button.



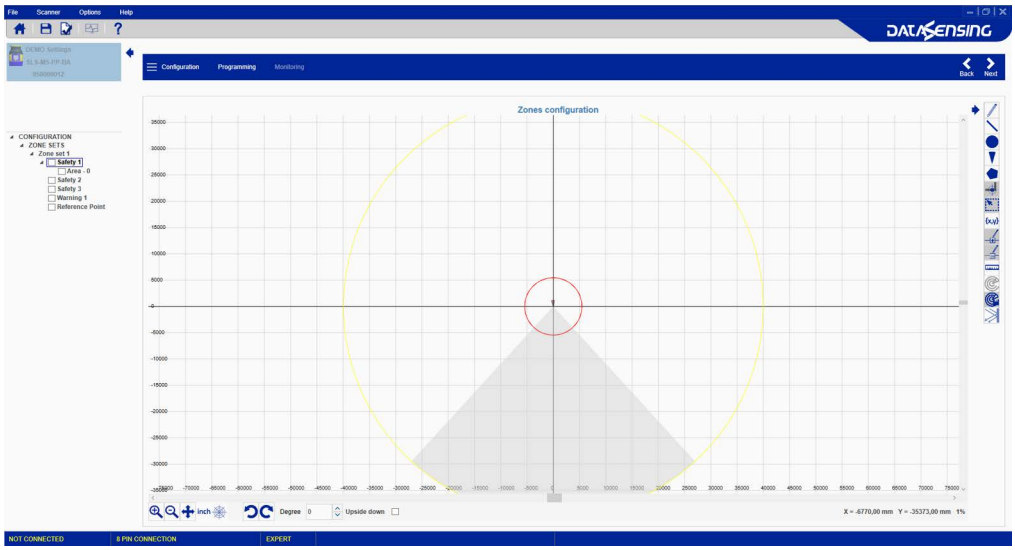
ICON	DESCRIPTION
	Click this button to toggle the graph unit of measurement between inches and millimeters.



ICON	DESCRIPTION
	Click this button to zoom in on the graph. Clicking multiple times continues to zoom in.

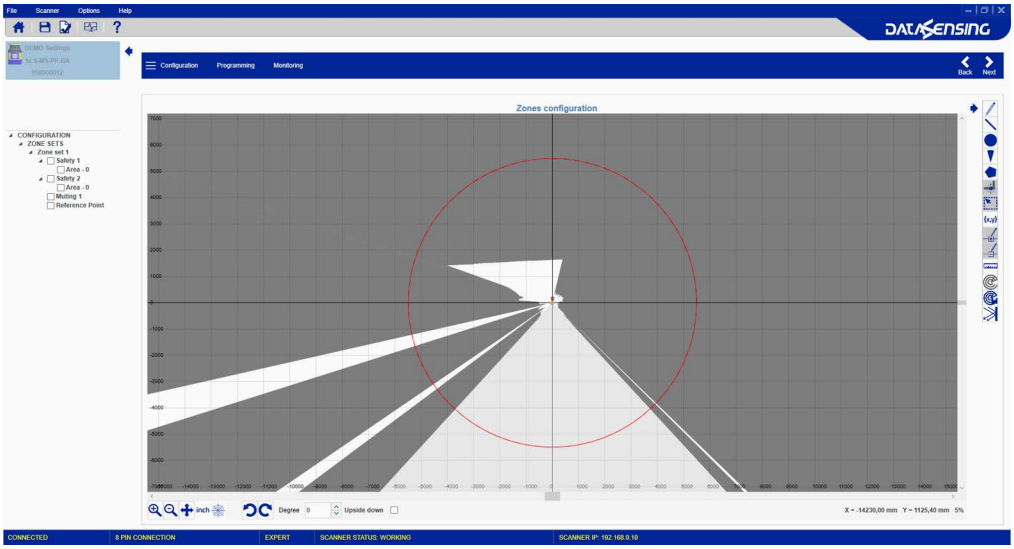


ICON	DESCRIPTION
	Click this button to zoom out on the graph. Clicking multiple times continues to zoom out.



ICON	DESCRIPTION
	Click this button to toggle the graph coordinates between Cartesian and Polar.

ICON	DESCRIPTION
	Click this button to enter the Teach In feature. This function scans and shows the area surrounding the device. It displays a white area that is free from obstacles and therefore can be assigned to a safety or a warning zone. The grey areas are detected obstructions.



ICON	DESCRIPTION
	This function is the Teach In Area Assignment, to assign a zone type to the detected white area. After choosing Teach In, select the checkbox of either the safety zone or warning zone in the left pane and then click this button to assign it.

NOTE

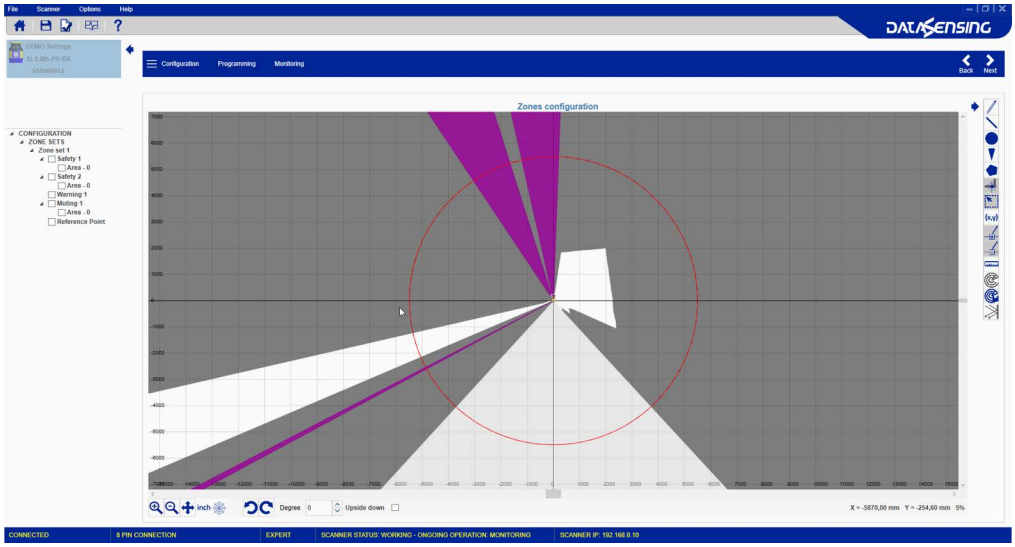
Teach In and Draw Teach in Zone are only available if the device is online.

ICON	DESCRIPTION
	Click this button to add a new point to a shape. The new point must be inserted along the shape perimeter.

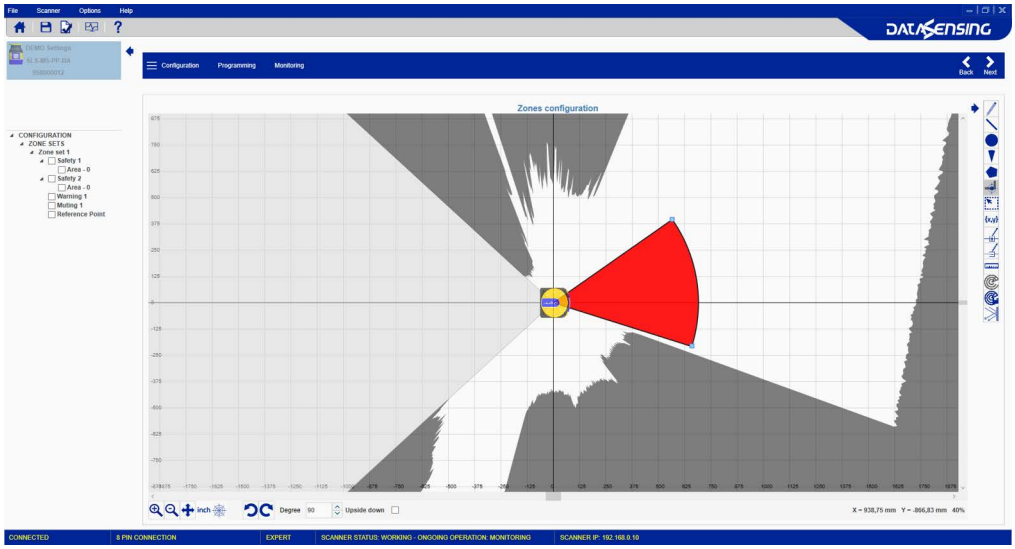
ICON	DESCRIPTION
	Click this button to remove a point from a shape.

ICON	DESCRIPTION
	Click on a point on the graph and drag the cursor to measure the distance.

ICON	DESCRIPTION
	Click this button to show reflective objects. These will be shown in purple.



ICON	DESCRIPTION
	Click one of these buttons to rotate the view 45 degrees to the left or to the right.

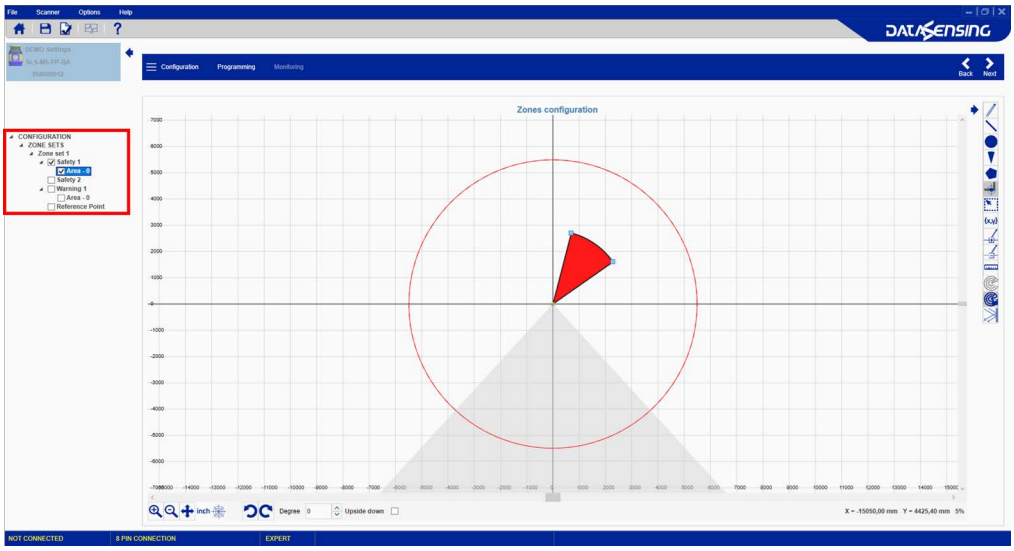


NOTE

It is also possible to flip the view by checking the “Upside down” box.

Selecting and Visualizing Areas on the Graph

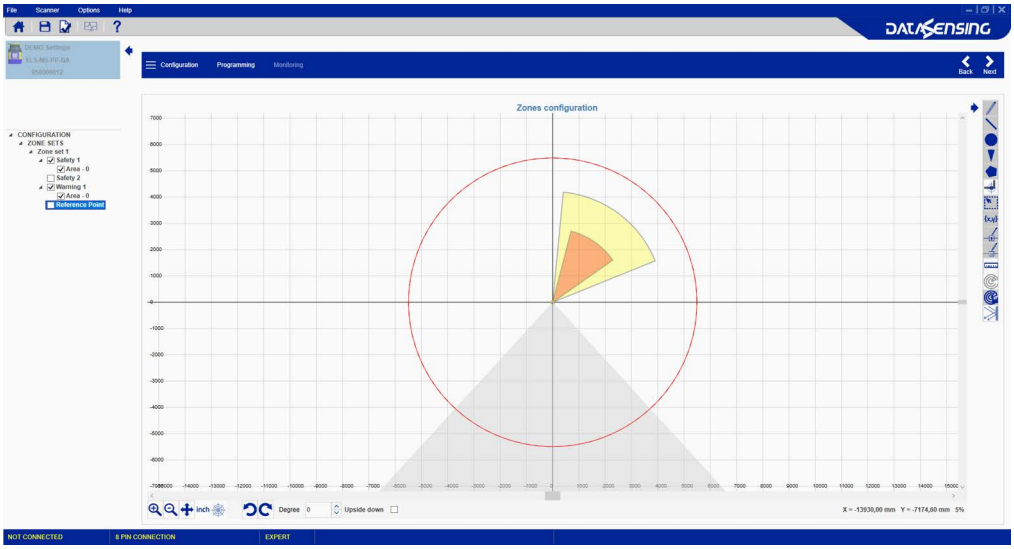
The panel on the left side allows selecting the areas to handle on the graph (Safety, Warning, Muting, or Reference Points) and managing them individually.



By clicking on the **label name** (outside the check box), it is possible to highlight a specific area, e.g. a Safety Zone or a Warning Zone.

By clicking on the **checkbox**, it is possible to select and edit a specific area.

The combination of these selections allows you to show/hide the areas together or individually.

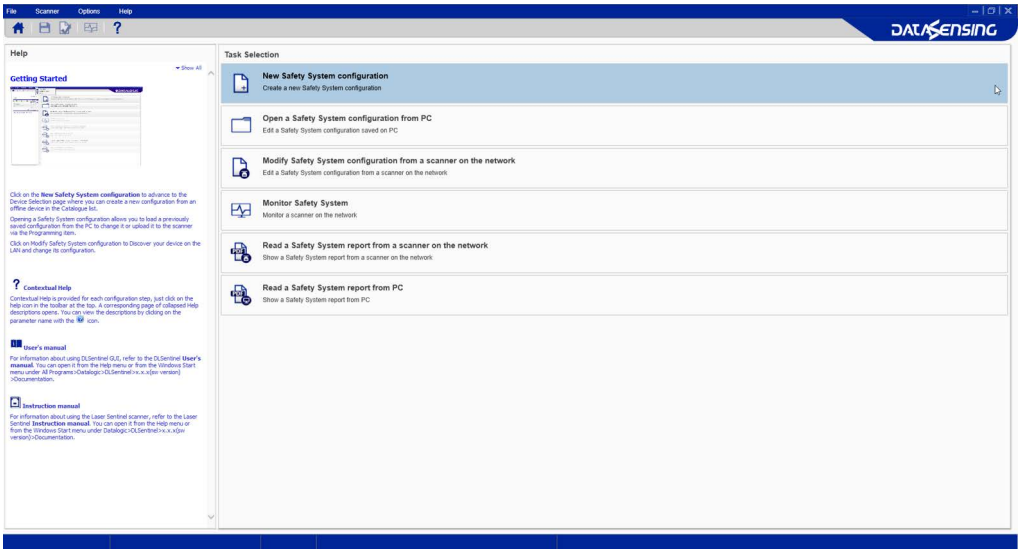


NOTE

This is the last step in defining the configuration. To complete configuration (load it onto the scanner, test it and Accept it), see Chapter 3, Programming and Monitoring Functions**.**

NEW CONFIGURATION SELECTION

1. Click on the New Configuration task to create a new configuration and save it on a local PC for upload to a device at a later time (Offline Configuration).



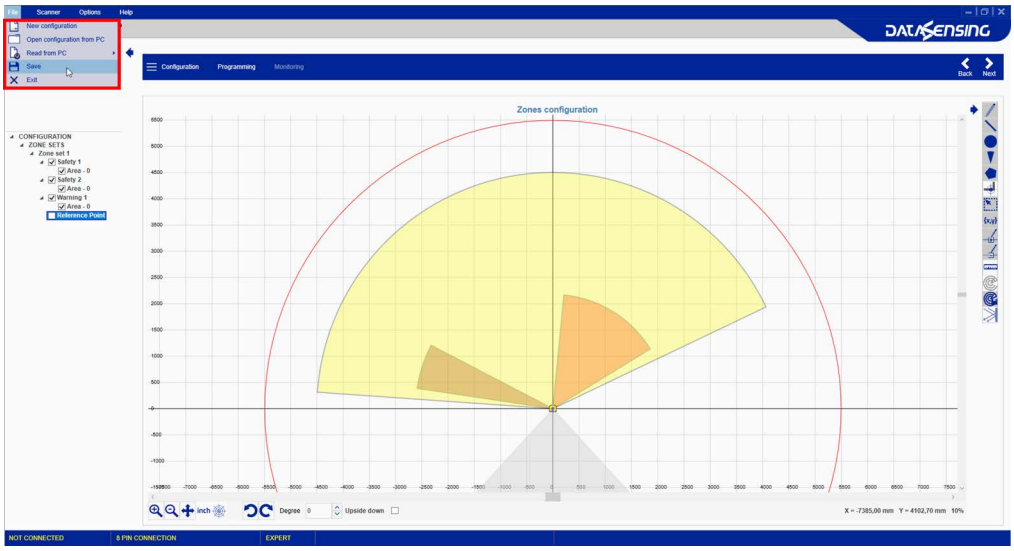
2. Click on the device in the catalogue list to load it into the task area.

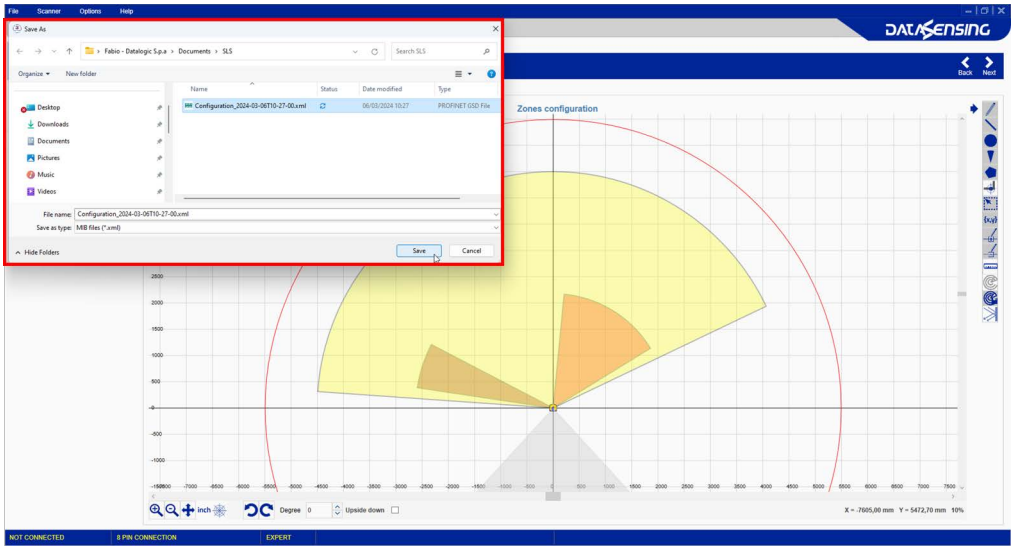
3. Click on the right-pointing arrow on the upper right side on the main panel to open the offline configuration. You can now create your configuration and save it on your PC. See the subparagraphs under "Modify Safety System Configuration from a Scanner on the Network" on page 14 for configuration details.

4. Save the configuration on a file on your PC. See "Save the Configuration" on page 41.

SAVE THE CONFIGURATION

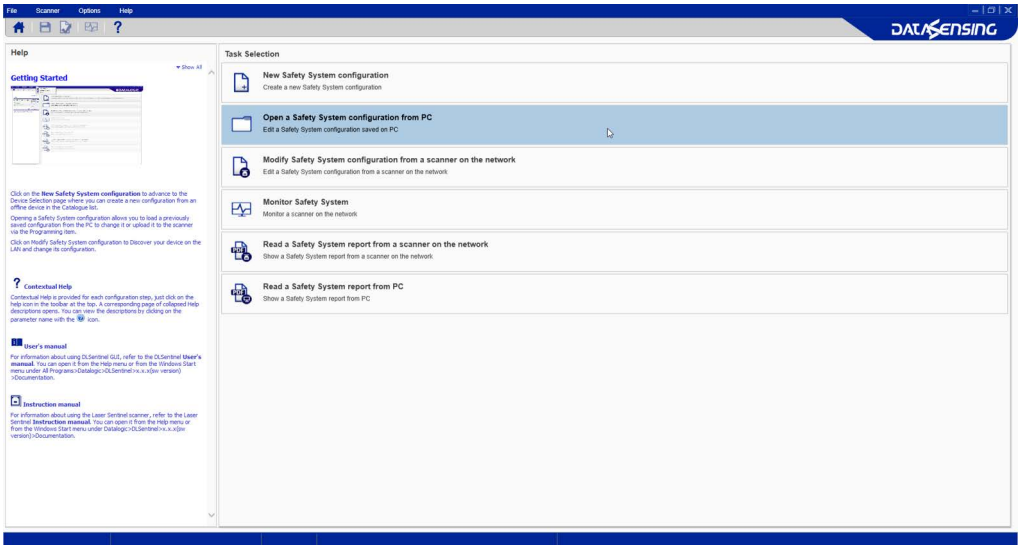
Once the configuration is done, it is possible to save it on the PC by clicking on File > Save.



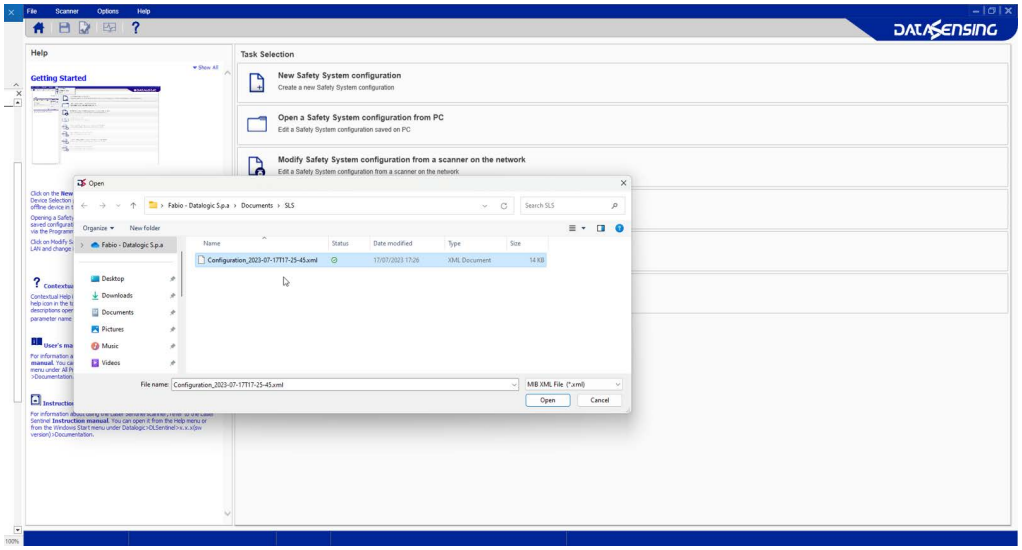


OPEN A PREVIOUSLY SAVED SAFETY SYSTEM CONFIGURATION FROM PC

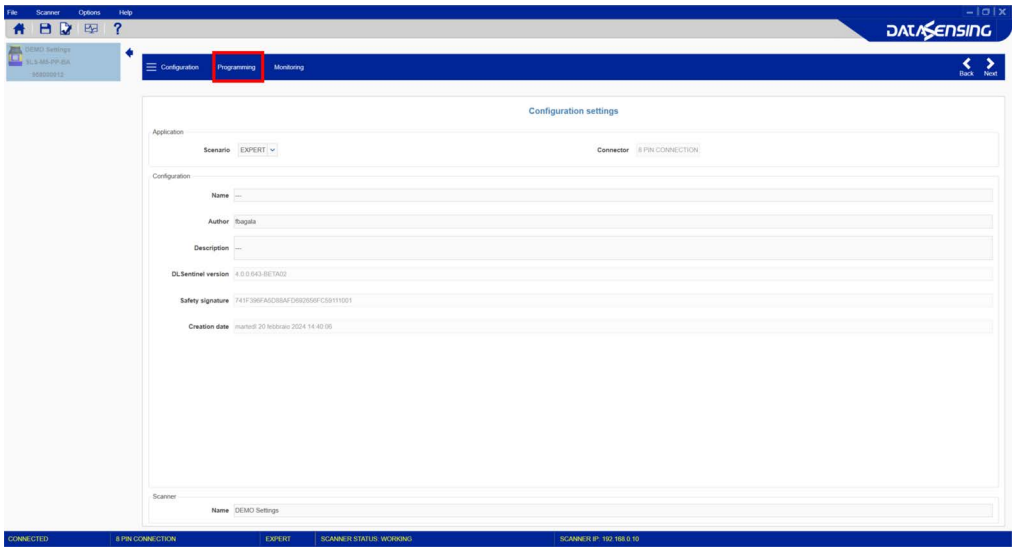
1. Click on the Open a Safety System Configuration from PC task to open and upload a previously saved configuration onto a device.



2. Select the Configuration File to open.

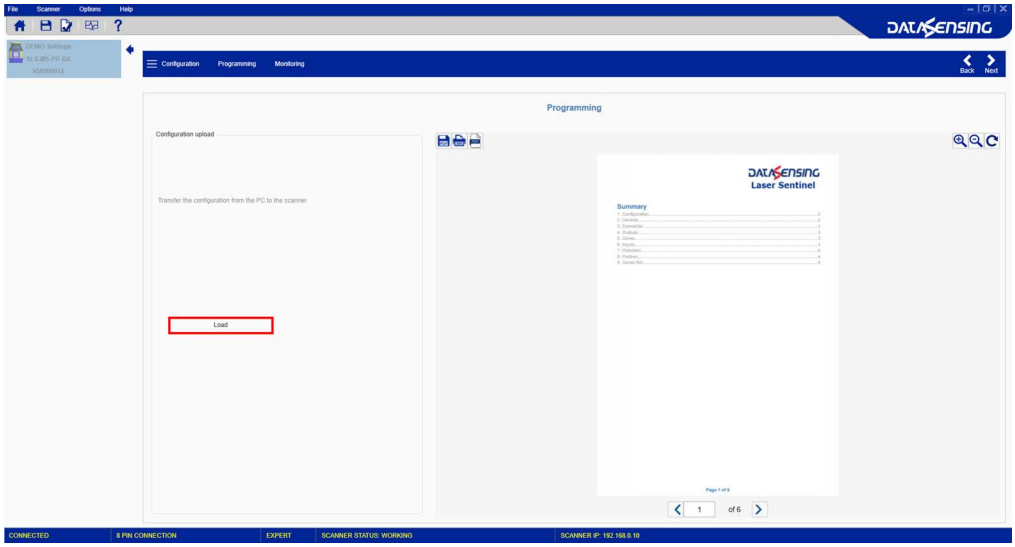


3. Once the configuration is open, click on the Programming item. The Discovery procedure will discover the connected device.



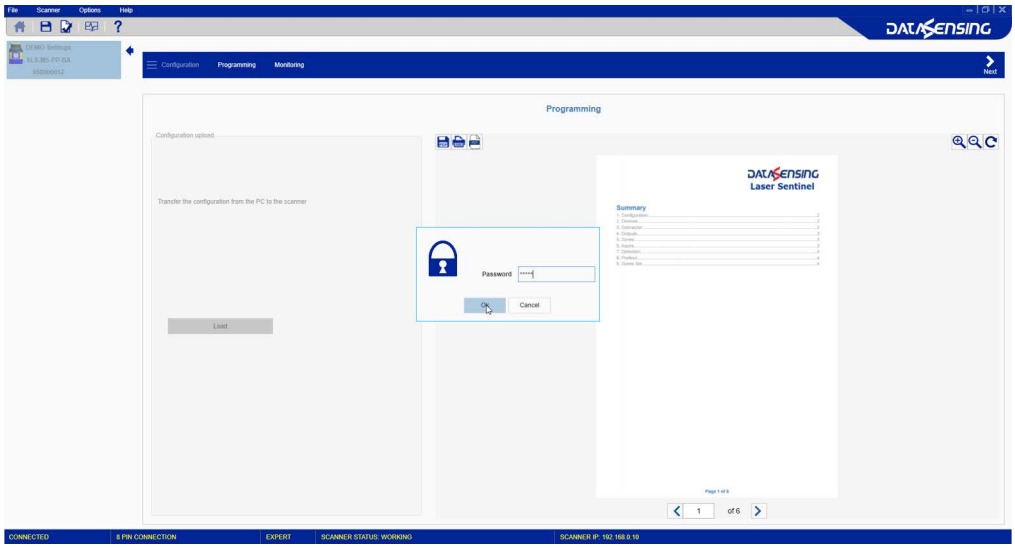
4. Click on the device to load it into the task area.

5. Click on the white right-pointing arrow on the upper right side on the main panel. The Programming page will appear. Here you can **Load** the selected configuration to the scanner.

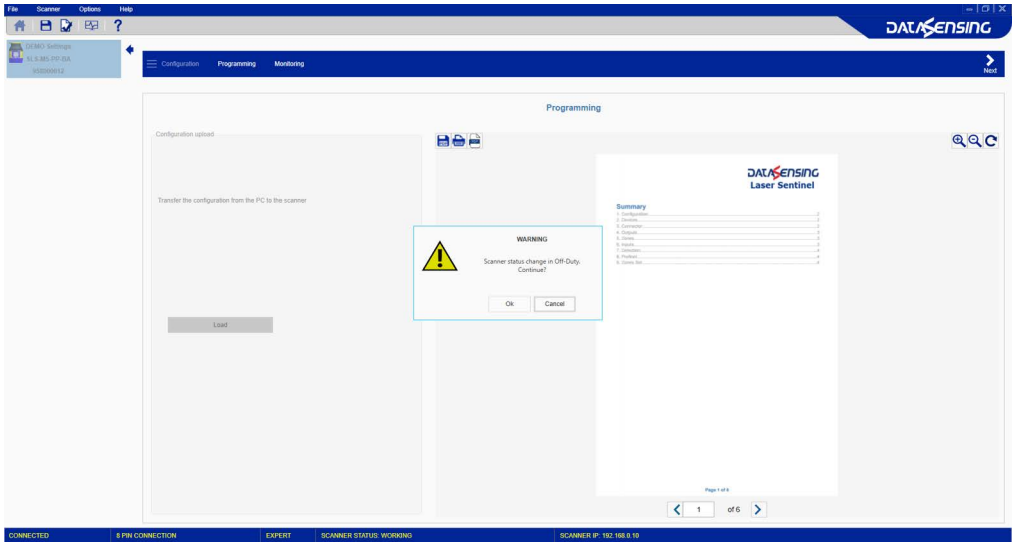


First the configuration will be validated and then you will be prompted to enter the password to change the current configuration to the new one.

6. Enter the password and click OK.



7. The scanner status will now switch to Off-Duty and the user is prompted to continue to load the new configuration onto the scanner.



8. Click on the **Monitoring** item to verify the configuration. See "Monitoring And Controller Simulator" on page 48.

9. Then click on Programming to **Accept** the new configuration and finalize it. See "Programming" on page 45.

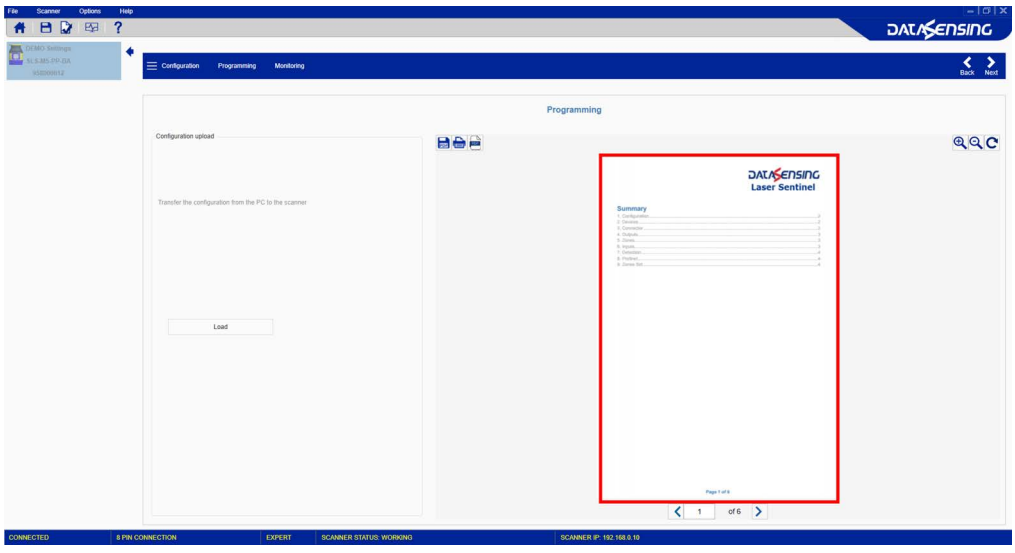
CHAPTER 3
PROGRAMMING AND MONITORING FUNCTIONS

PROGRAMMING

Programming is a DLSentinel function that allows uploading a configuration to the device, generating the Safety Report and validating the uploaded configuration (after testing it through the **Monitoring** function, refer to "Monitoring And Controller Simulator" on page 48.

The steps below show a proper Programming procedure:

1. Once the configuration has been created or loaded from the PC, enter the **Programming** function.
   A **Report** file is generated by DLSentinel.

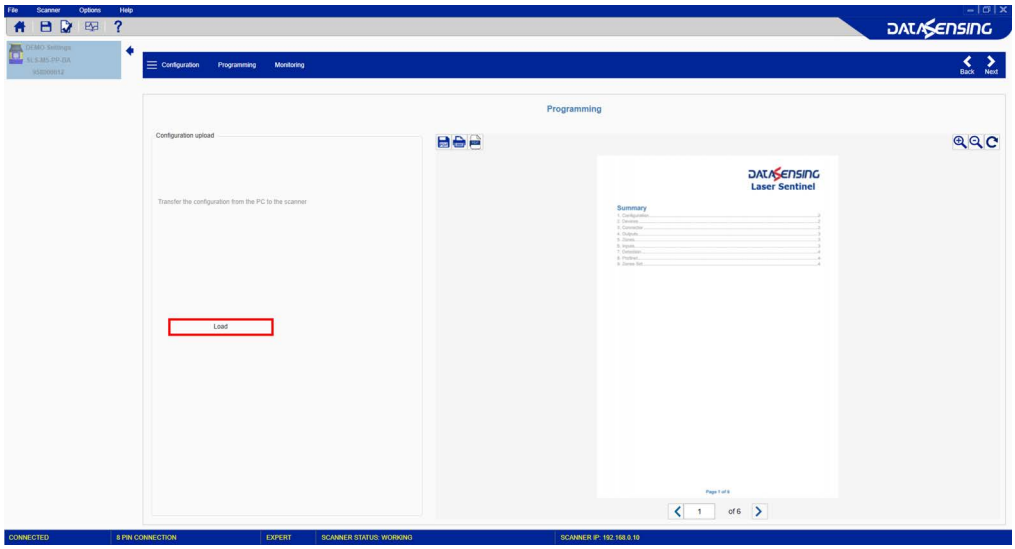


The Safety Report is a file that sums up all the parameters selected for a configuration and is generated by DLSentinel after uploading a configuration. The Report file is displayed on the right side of the panel. It is possible to save it as a PDF file and print it.
Make sure to read the Safety Report and check all the selected parameters.

NOTE

The Safety Report displays the new and the previously used parameters (marked in red).

2. In the **Configuration Upload** section, click on the **Load** button to upload the configuration from the PC to the device. First the configuration will be validated and then you will be prompted to enter the password to change the current configuration to the new one.



While uploading the configuration onto the device, Laser Sentinel will enter the Off status. In this status, the connection to the controller (e.g.PLC) is not guaranteed.

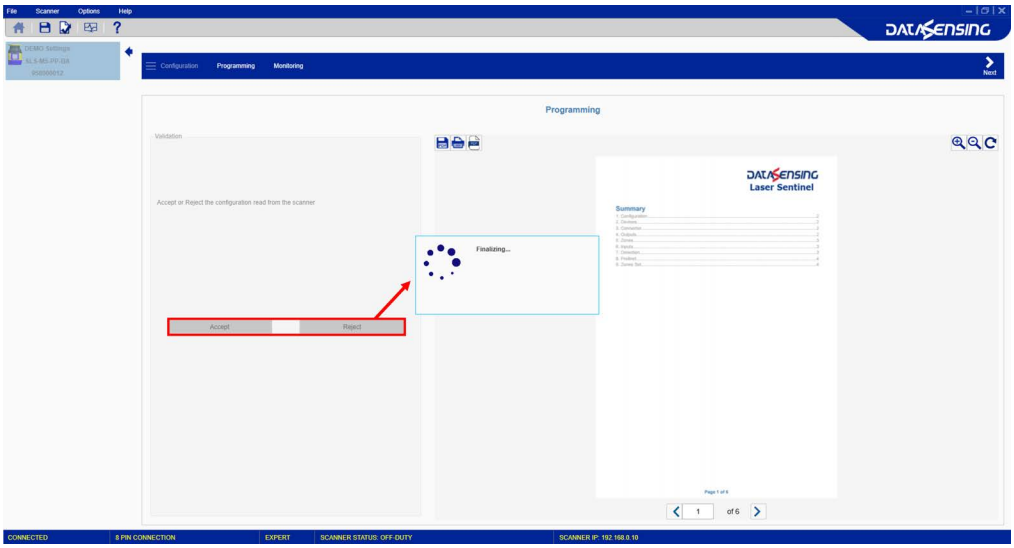
Once the new configuration is uploaded, Laser Sentinel will display an icon with a white background like the one below indicating that the configuration is pending acceptance by the user if the Process Image is set as only output (7 Bytes (SLS output) or 12 Bytes (SLS output)).

For Process Image Input/Output, the WAIT FOR INPUT icon is show on the display and the behaviour of the device can be tested by using the Controller Simulator in the “Monitoring” section.

Figure 1 - Example Pending Configuration Acceptance Icon displayed

3. Test the configuration functioning by entering **Monitoring**. See "Monitoring And Controller Simulator" on page 48.

4. After testing it and checking the Report, **Accept** or **Reject** the configuration in the **Validation** section.



After **Acceptance**, the configuration will be finalized on the device. Laser Sentinel will display an icon with a black background like the one below indicating that the configuration has been accepted by the user.

Figure 2 - Example of configuration accepted icon displayed.

WARNING

By validating the configuration, you take on responsibility for the created configuration and accept any hazards due to configuration errors.

NOTE

If you Reject the new configuration, the previous configuration will be finalized on the scanner.

MONITORING AND CONTROLLER SIMULATOR

Monitoring is a DLSentinel function that allows you to check the proper functioning of created configuration by monitoring the current working area.

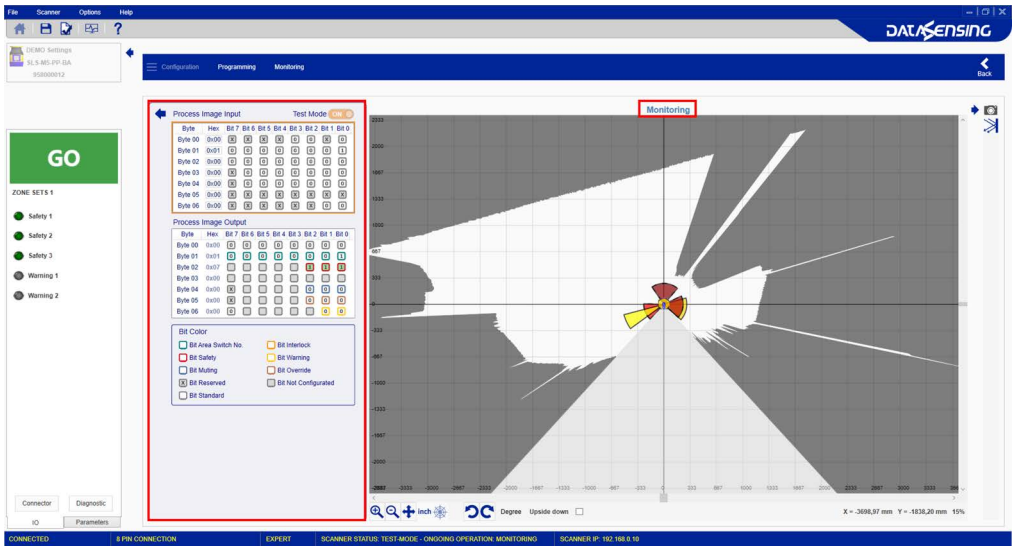
Controller Simulator is a DLSentinel function that allows to simulate the fieldbus protocol without the use of a controller (e.g. PLC). It is possible to monitor the cyclic data sent by the SLS and to send data to the SLS as if the DLSentinel were a fieldbus controller.

Functions activation (e.g. zone set switching, muting, etc..) by Controller Simulator, when enabled, excludes any interaction with the real controller. Any input received by the controller will be neglected as long as the Controller Simulator is enabled.

WARNING

The use of Controller Simulator is recommended for test and simulate the configuration only. It is not recommended while the Laser Sentinel is communicating with a real controller (e.g., PLC).

The access to these two functions is allowed only by selecting an online device.

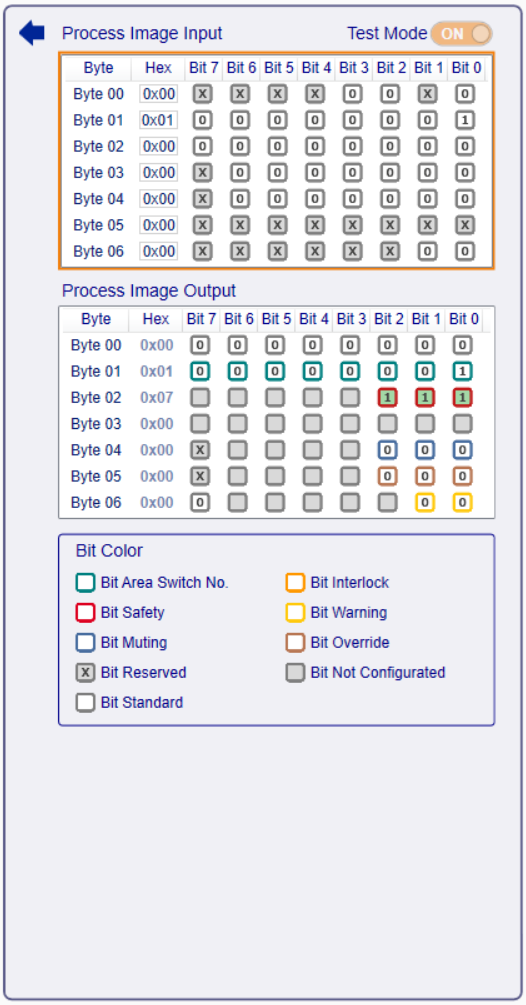


With the monitoring function, the following information can be checked:

- Status of Safety Zone (GO/STOP).
- The connector pin assignment, colors and functions.
- If the Laser Sentinel detects an object in the Safety and Warning zones.
- Any diagnostic errors.
- The surrounding space detected by the device in real time.
- The switching among the Zone Sets.
- The selected Parameters.

On the panel at the lower left corner, DLSentinel shows the device status (if it is correctly functioning). It is also possible to view some parameters, e.g., the pin assignment, the response time. The virtual LEDs of the configured zones (Safety, Warning) reply to the behavior of the virtual LEDs shown in the display of the device (for detailed information, please see the Instruction Manual).

The Controller Simulator on the left side of the detection area of the Laser Sentinel shows the following areas:



1. Test mode - The Controller Simulator can be activated by switching the slider button to On. During the Acceptance phase of a new configuration, the Test Mode is always On and cannot be deactivated.

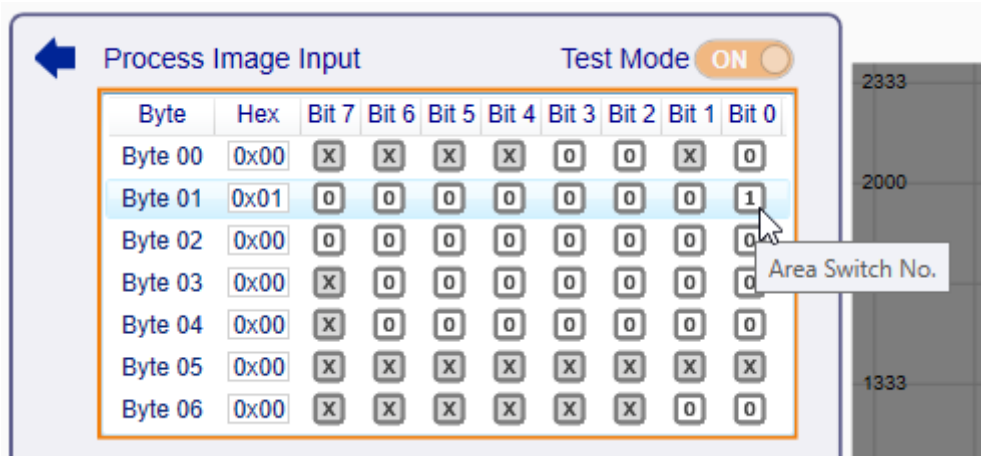
2. Process Image Input - Presents the bitmap of the process image input (sent by the Controller to Laser Sentinel) according to the configuration (e.g., 7 Bytes Input/ Output) defined in the Profinet/Profisafe section.

3. Process Image Output - Presents the bitmap of the process image output (sent by the Laser Sentinel to Controller) according to the configuration (e.g., 7 Bytes Input/Output) defined in the Profinet/Profisafe section.

4. Editable Input Bytes - Presents the editable fields (in hexadecimal format) of the process image input to simulate the controller data sent to the Laser Sentinel

5. Legend - A color legend of the Process Image bitmap

To facilitate the interpretation of the process image, the user can move the cursor to the interested bit and a tooltip will show the meaning of the selected bit.



By activating the test mode, the user can edit the Input Bytes to test some functions of the device before the integration in a fieldbus network with a real controller (e.g., a PLC).

The main functions that can be simulated are:

- Wink.
- Zone set activation (“Area Switch No.”).
- Restart of the safety zone configured with manual restart (“Restart Safety Zone X”).
- Muting activation for the safety zone configured with muting (“Muting Activation Zone X”).
- Override activation for the safety zone configured with override (“Override Activation Zone X”).

WARNING

Shut-off function, Reset With and Without Network cannot be activated when using the Controller Simulator.

NOTE

It is possible to write the reserved bits also, but this action has no effect on the Laser Sentinel.

NOTE

If Monitoring is selected before uploading a new configuration, it displays the previous configuration.

The table below shows the Monitoring menu.

ICON	DESCRIPTION
	Click this button to save the Monitoring info in a text file (.txt).
	Click this button to show reflective objects. These will be shown in purple.
	Click this button to zoom in on the graph. Clicking multiple times continues to zoom in.
	Click this button to zoom out on the graph. Clicking multiple times continues to zoom out.
	Click this button to move (drag) the graph in any direction. Once finished re-click on the button.
	Click this button to toggle the graph unit of measurement between inches and millimeters.
	Click this button to toggle the graph coordinates between Cartesian and Polar.
	Click one of these buttons to rotate the view 45 degrees to the left or to the right.
Upside down	Check this box to flip the view.

NOTE

If Errors are detected, the monitoring function displays a popup window with all the detected errors. The device will switch into a Lock status.

NOTE

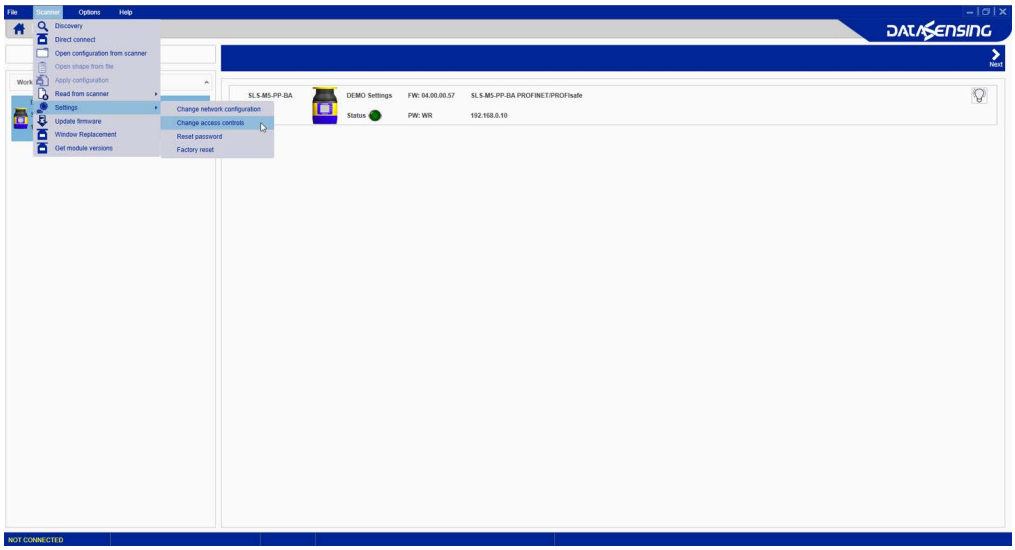
To go back to Programming, click on the Programming item or on the white left-pointing arrow.

APPENDIX A
ACCESS CONTROL

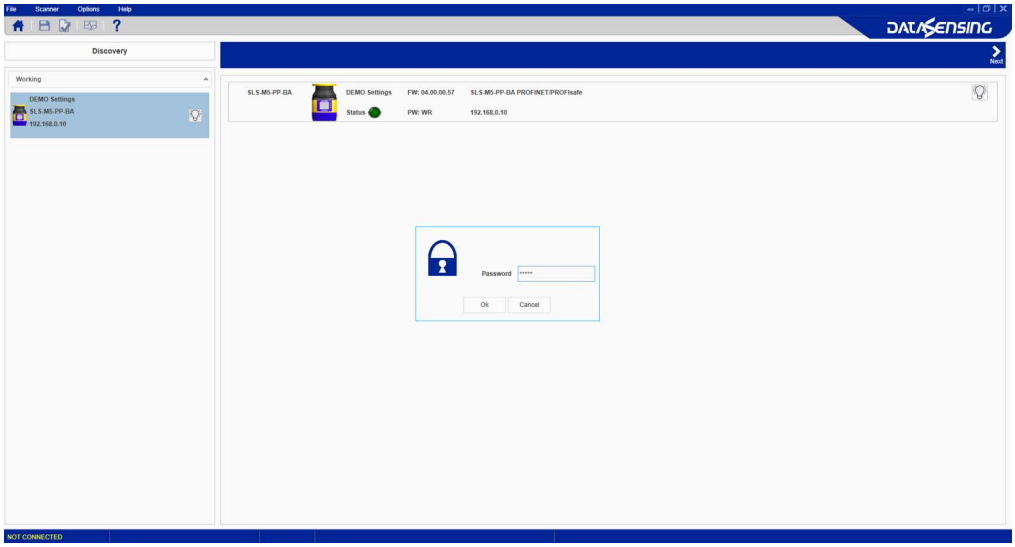
ASSIGN OR CHANGE PASSWORDS

To assign or change the password, the device must be connected (Online).

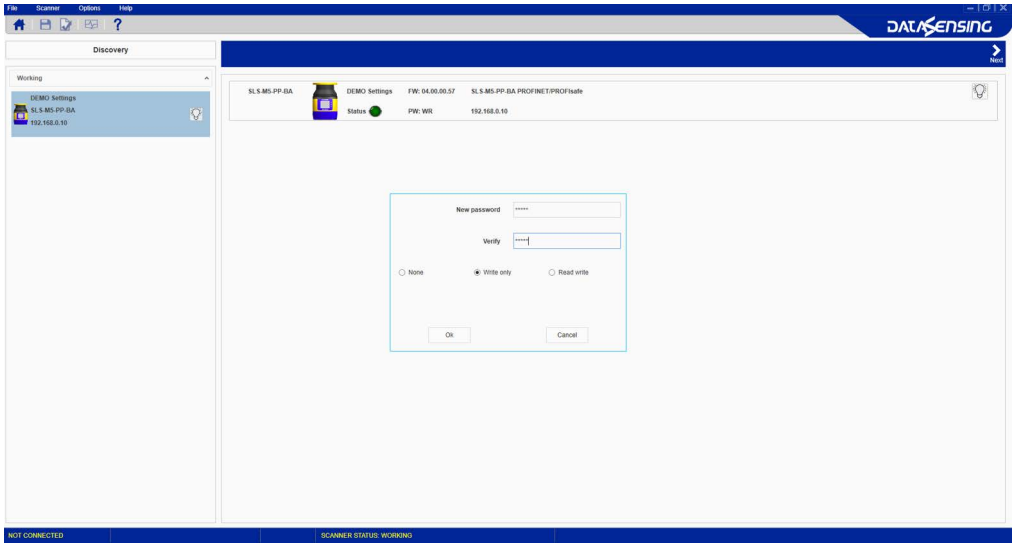
1. In the DLSentinel Device Selection, click on Scanner and select Settings > Change Access Controls.



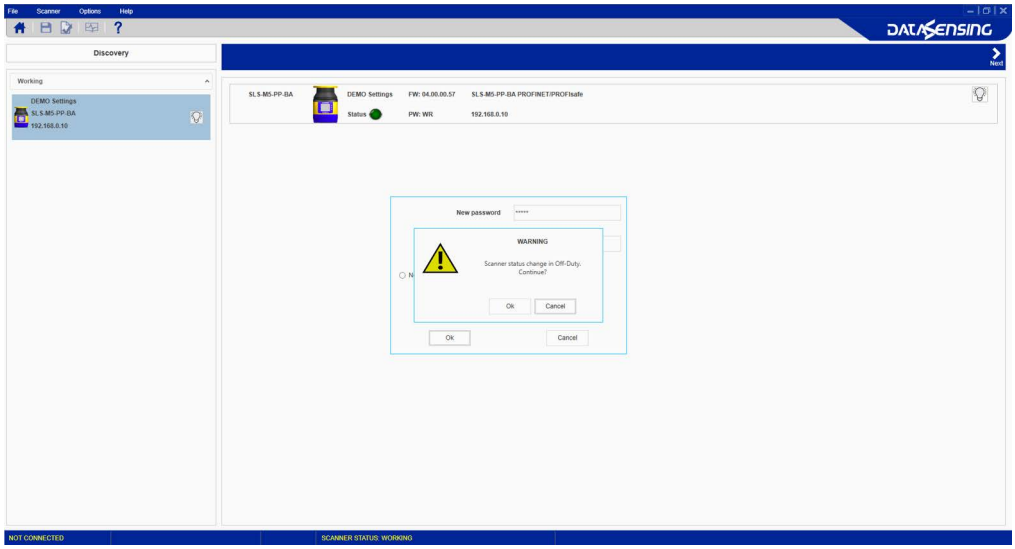
2. To change or assign the password or access type, you must enter the current one. Here the user must enter the DLSentinel password to proceed (default password “**admin**”, if not changed).



3. Enter the new password twice then choose the password type:
   - Write Only (required only when loading the configuration to the device),
   - Read / Write (required when connecting and when loading a configuration to the device),
   - None (no password required).



4. Click OK to proceed.

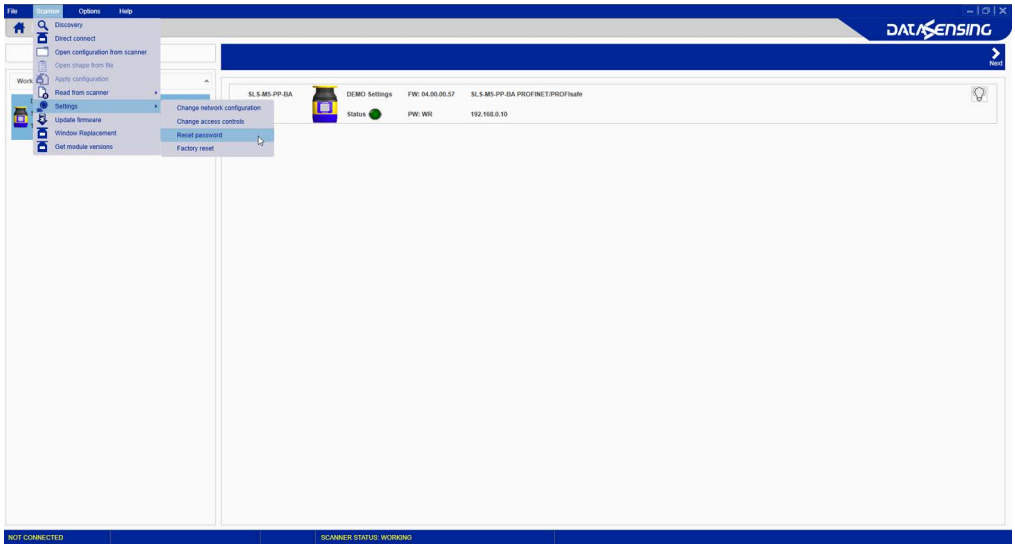


5. The scanner status will now switch to Off-Duty and restart itself.

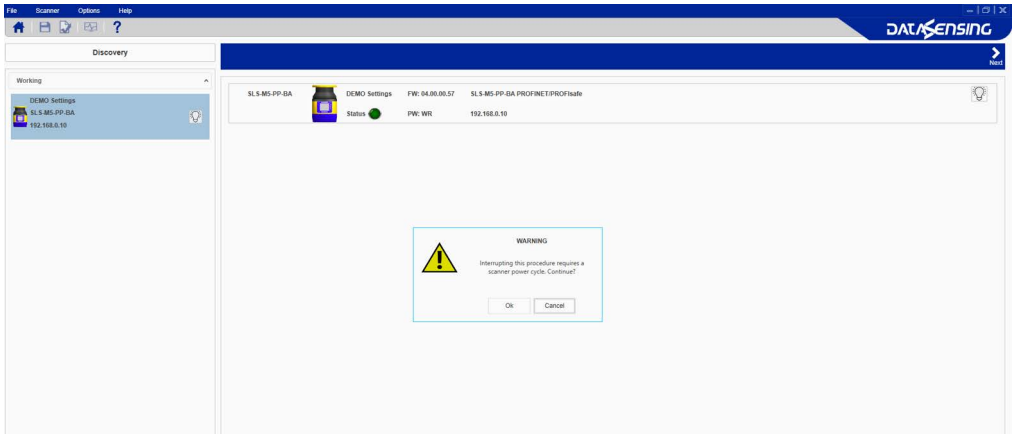
RESET A PASSWORD

To reset a password, the device must be connected (Online).

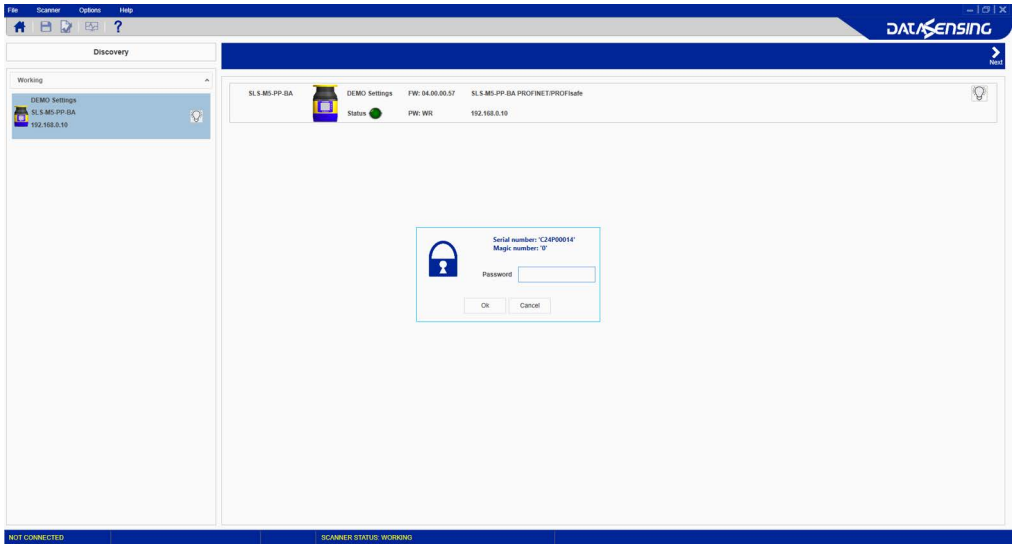
1. In the DLSentinel Device Selection window, click on Scanner and select Settings > Reset Password.



2. The DLSentinel inform that a scanner power cycle is needed.



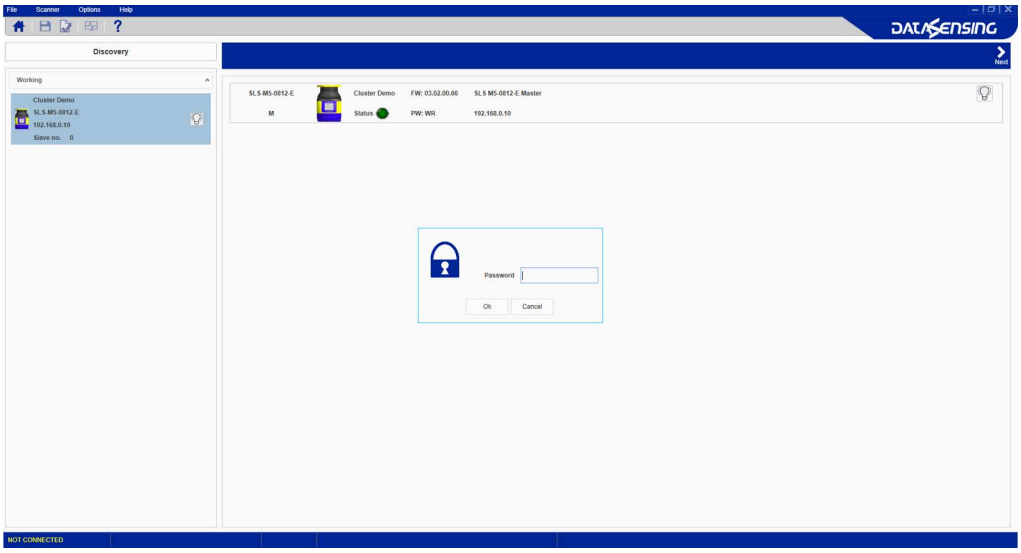
3. Contact our Technical Support and send the serial and the magic number shown. A new password will be communicated to the User.



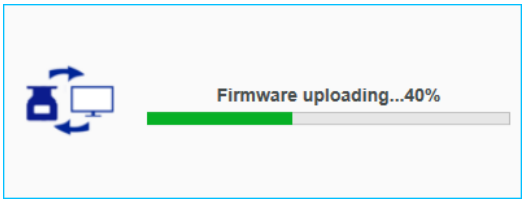
APPENDIX B
FIRMWARE UPDATE

To update the firmware, proceed as follows:

1. Start the DLSentinel GUI and select the new configuration task.
2. Enter the Discovery mode and select an online device.
3. Once the device is selected, click **Scanner** on the menu and choose the firmware update option.
4. Enter the device password (default password "**admin**", if not changed) to access the firmware update option.



5. In the Firmware update section (**Package section**), click on ZIP Archive to search and select a previously downloaded new firmware version (from the Datasensing website).
6. Once the new firmware version is selected, click on Load (**Configuration Upload**). During the Firmware Update the device will go offline.



7. When the firmware version is completely loaded, the user enters the Offline-Test mode to create a configuration and test the new firmware version according to the procedure released with the new firmware and validate it on field following the procedure described in "Checks after Firmware Update" on page 57.

8. If the firmware version is compatible with the device (i.e. the device configuration is correct and with no failures) click on Accept, otherwise click on Reject (**Validation**).

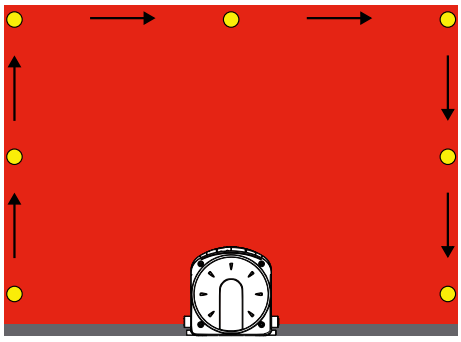
CHECKS AFTER FIRMWARE UPDATE

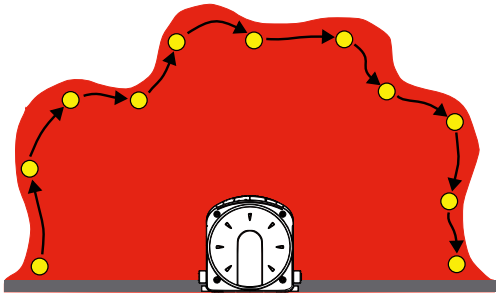
As with any configuration change, safety checks are also required after firmware update and device commissioning as well as before normal duty on field. The safety checks must be carried out by qualified personnel in charge of the machine safety or safety maintenance in general.

The minimum checks are listed below:

- To test the detection capability of the device(s), the user can use a suitable test piece, e.g. an optically dark, opaque cylinder. The effective diameter should match the configured resolution. Datasensing suggests adopting the following procedure:

  Place the test piece on several points at the edges of the safety area.
  Place the test piece on several points inside the area, radially from the edges to the center of the laser scanner.
  The safety laser scanner must detect the test piece at each position and go to STOP.
  Remove the test piece from the controlled area and check that:
  -the machine automatically restarts (in case of Automatic restart), OR
  -the machine restarts only after receiving the restart command (in case of Manual restart).
  The following pictures are examples of detection capability test (the red areas correspond to the configured Safety Areas).





- Power off the safety laser scanner(s). Check that safety outputs automatically switch to OFF status and make sure that the machine cannot start until power is re-applied.
- Together with the mentioned checks, it is recommended to perform a visual check of general functioning using the monitoring tool provided in the Graphic User Interface of the laser scanner.
- Check if the Laser Sentinel shows the interruption of the safety field through the LEDs and/or display.
- It is recommended to follow the same testing approach of detection capability mentioned before also for different safety areas, checking if the device reaction is as expected.

- Evaluate other specific tests to carry out based on the safety risk analysis of your own application.
- If in the end the check reveals a fault or an unexpected behavior, the machine must be shut down immediately. Try to update the software and test the device again following the aforementioned procedure. If the problem persists, contact our Technical Support.

APPENDIX C
FACTORY RESET

The Factory Reset procedure resets the default password (“admin”), the password type (see Appendix A, Access Control), the device IP address and any saved configuration.

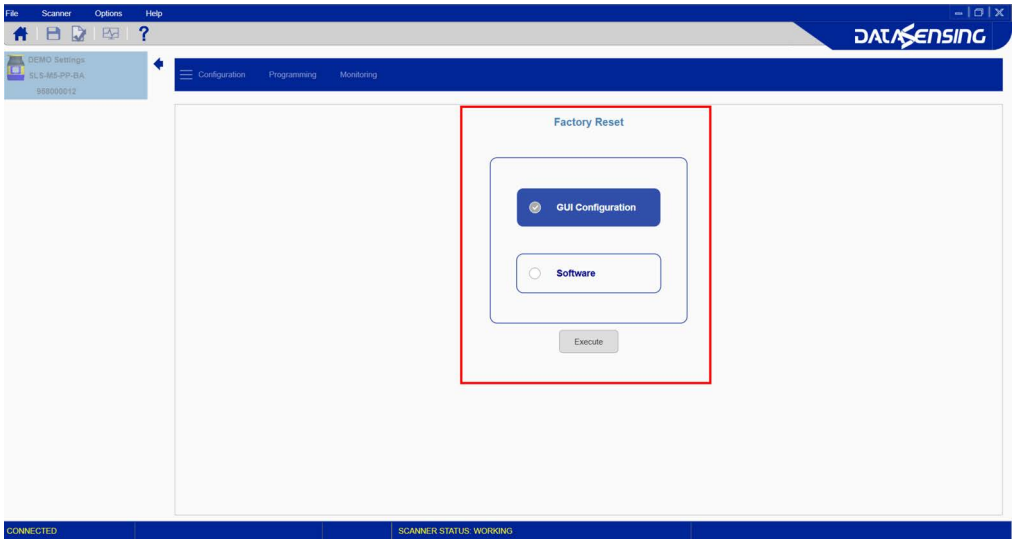
To perform a Factory Reset, proceed as follows:

1. In the DLSentinel Device Selection, click on Scanner and select Settings > Factory Reset.

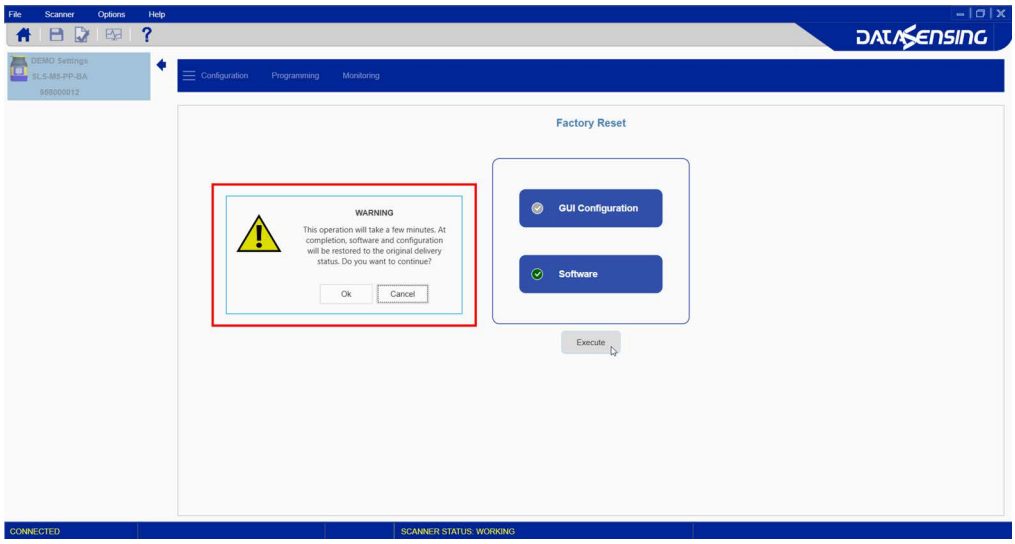
2. A new window will prompt the user to enter the device password (default password “**admin**”, if not changed).

3. A new window allows the user to select and execute the reset for:

- GUI Configuration (default, always selected): the configuration saved in the device is reset.
- Software: the software is restored to the original delivery state.



4. A message will appear informing the user that the operation will take a few minutes. Subsequently, the device will be restarted. Click OK to proceed.



5. At completion, the Getting Started page will appear, and the device will show a “Waiting Configuration” message (see icon below).

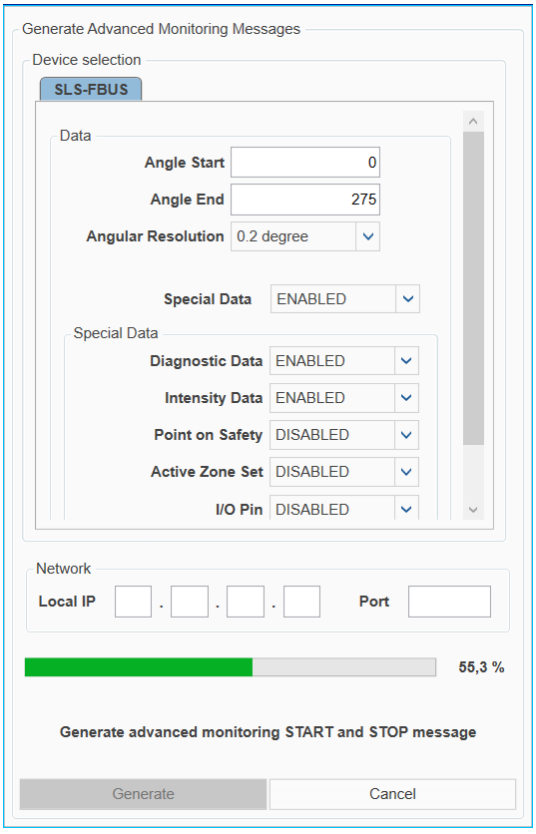
APPENDIX D
ADVANCED MONITORING

The Advanced Monitoring function is available for the following Laser Sentinel models:

- SLS-M5-PP-BA
- SLS-M5-PP-BO

Activating the Advanced Monitoring function makes it possible to receive measurement distance data and information about the status of the SLS.

To access this function, go to **Options > Advanced Monitoring** and the following window is displayed.



For the device to be monitored, indicate the angle start and end as well as the angular resolution, enable any special data among the available parameters, then enter the local IP and the port of the device to generate the START and STOP messages.

For more information, refer to the Laser Sentinel Advanced Monitoring document.

NOTES

© 2024 Datasensing • All rights reserved • Without limiting the rights under copyright, no part of this documentation may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means, or for any purpose, without the express written permission of Datasensing S.r.l. • Datasensing and the Datasensing logo are trademarks of Datasensing S.r.l.

Datasensing S.r.l.
Strada S. Caterina 235 | 41122 Modena | Italy
Tel. +39 059 420411 | Fax +39 059 253973

806001310 Rev. A September 2024