USER'S MANUAL

> DLSentinel

DATALOGIC

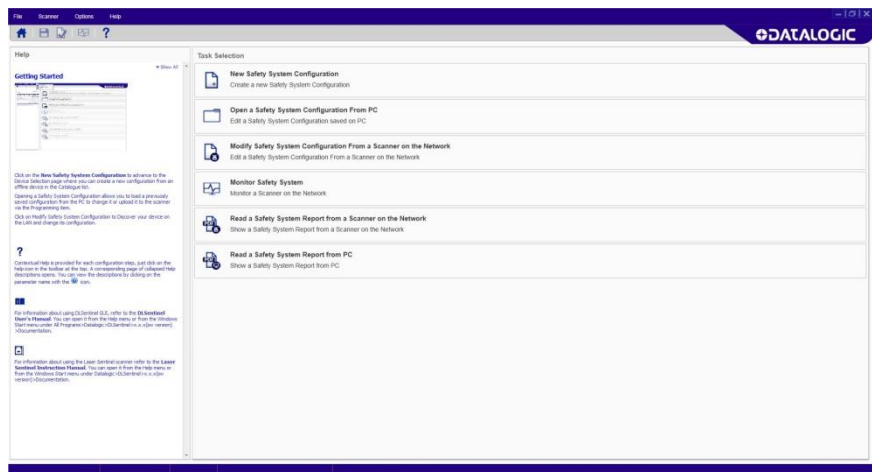# ❖DATALOGIC

ORIGINAL INSTRUCTIONS (ref. 2006/42/EC)
See www.patents.datalogic.com for patents list.

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DLSentinel User's Manual
Ed.: 03/2019

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Effective. November 10, 2017.

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REFERENCES

CONVENTIONS

This manual uses the following conventions:

"DLSentinel" refers to the Datalogic User Interface client application running on a PC.

"User" or "Installer" refers to anyone using DLSentinel.

"Device" refers to physical devices used in the safety application, i.e. Laser Sentinel.

"You" refers to the System Administrator or Technical Support person using this manual to install, configure, operate, maintain or troubleshoot a plant equipped with DLSentinel.

REFERENCE DOCUMENTATION

The documentation related to DLSentinel is listed below:

- Device specific Help On Line

- This User's Manual

- Laser Sentinel Instruction Manual

SUPPORT THROUGH THE WEBSITE

Datalogic provides several services as well as technical support through its website. Log on to **www.datalogic.com** and click on the **SUPPORT** link, which gives you access to:

- **Downloads** by selecting your product model from the dropdown list in the Search by Product field for specific Data Sheets, Manuals, Software & Utilities and Drawings;

- **Repair Program** for On-Line Return Material Authorizations (RMAs) plus Repair Center contact information;

- **Customer Service** containing details about Maintenance Agreements;

- **Technical Support** through email or phone.

1   DLSENTINEL GRAPHIC USER INTERFACE

1.1   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.
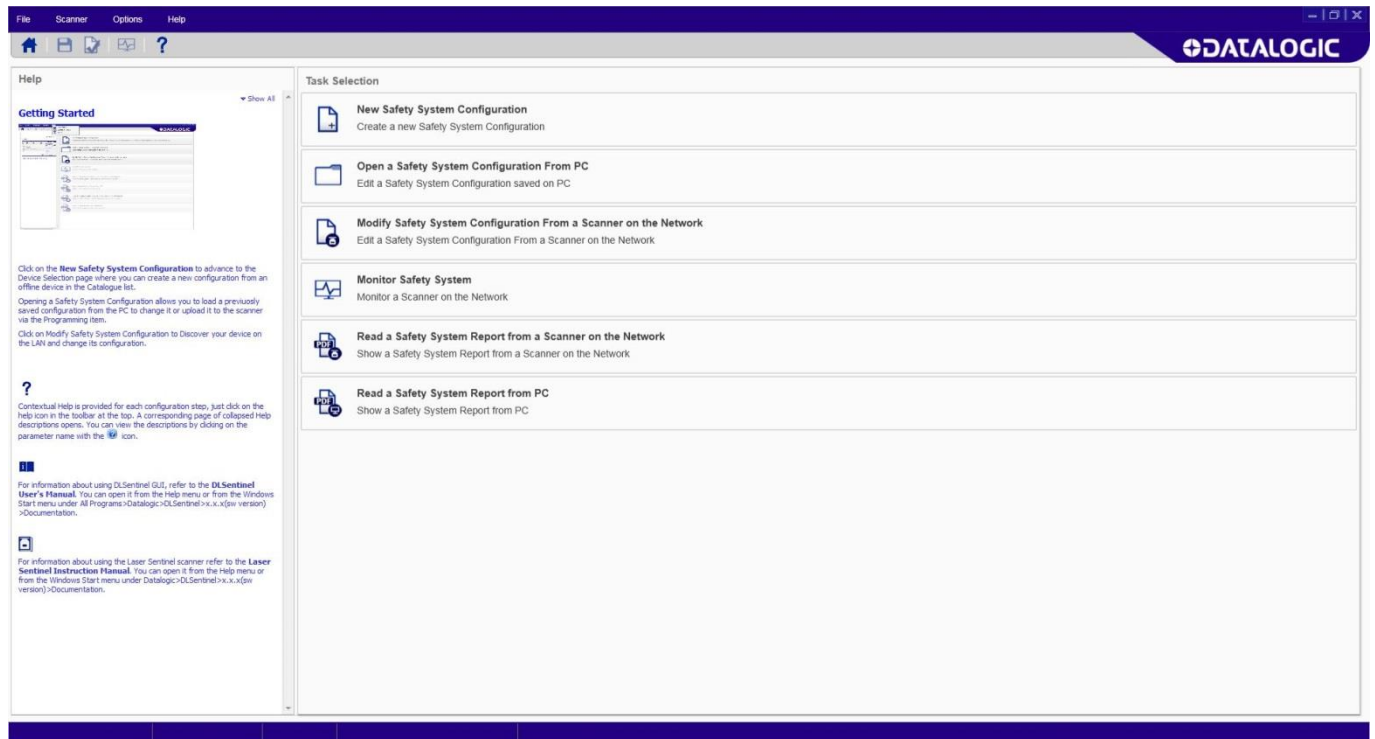
Main features

A summary of the DLSentinel main features is listed below:

- Settings for changing the device's password and to manage the network configuration

- User and Session Language configuration in real time

- System configuration

- Report

- Manual

1.2 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.

1.3 INSTALLING DLSENTINEL

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

1.3.1 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 XP, Windows 7, Windows 8, Windows 10	

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

1.3.2 Program installation

DLSentinel is a Datalogic 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

To install DLSentinel:

1. On the PC that will be used for configuration, download the free setup file from the Datalogic website (Laser Sentinel Download area > Software & Utilities): http://www.datalogic.com/eng/products/manufacturing/safety/laser-sentinel-pd-829.html#download
2. Unzip the file and run the installation program by double-clicking the **SetupDlSentinel.msi** file. The downloaded folder also contains Windows framework (dotNetFx40_x86_x63.exe) provided by Datalogic in case you need to update your operating system. Run the .msi setup file first, and only install the framework .exe file if requested.
3. Follow the setup procedure and accept all terms and conditions required for this software release.
4. When the installation is complete, the DLSentinel entry is created in the Start > All Programs menu under "Datalogic" along with a desktop icon.

5. Before launching DLSentinel, you have to create the network LAN with the same address as the new device. Follow the connection procedure described in par. 2.1.2.

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.

1.4 DLSENTINEL USER INTERFACE

After launching DLSentinel to configure devices or handle reports, the DLSentinel Task Selection shows the following main areas:
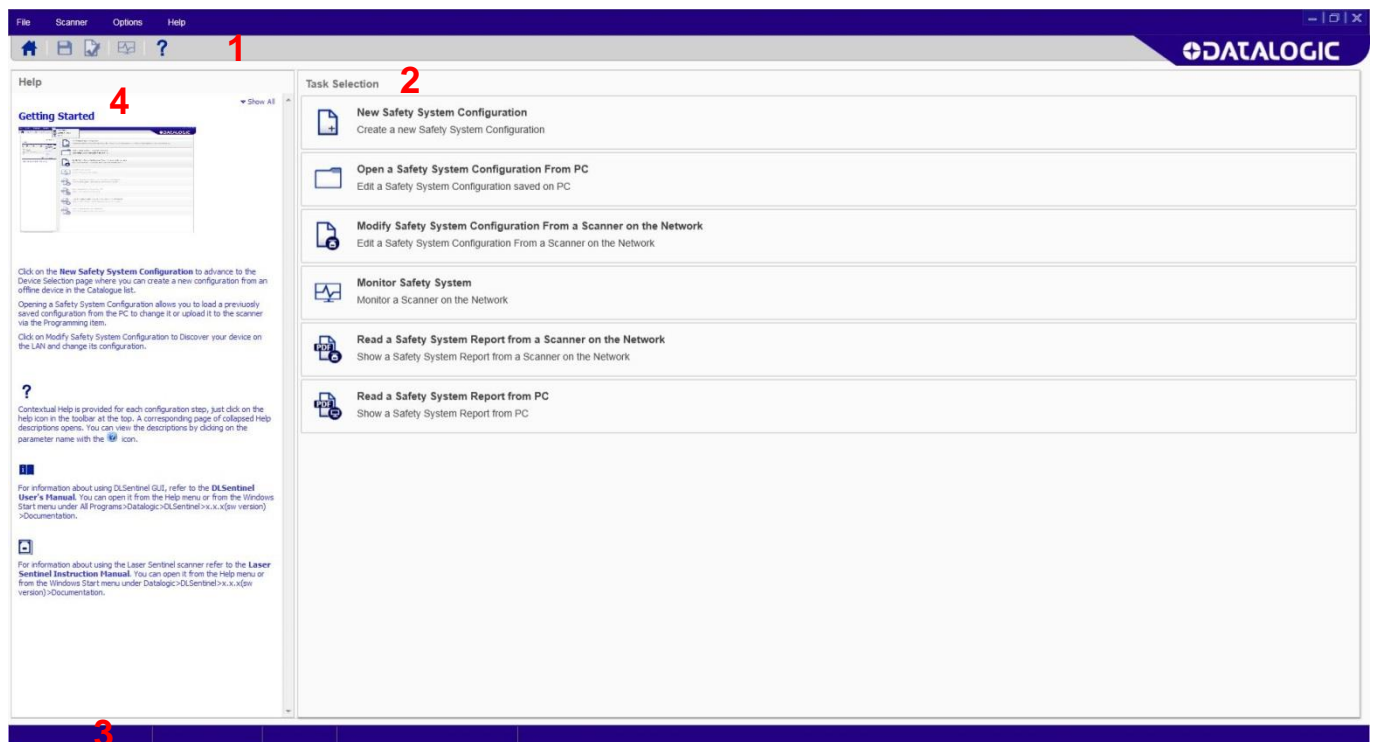
1. **Main Menu and Toolbar Area** – The DLSentinel main features.

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.

1.4.1   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 Master 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.
Settings:	
→	**Change Network Configuration**
→	**Change Access Controls**
→	**Reset Password**
→	**Factory Reset**
Update Firmware	To update the Firmware file.

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**	

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

1.4.2 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.
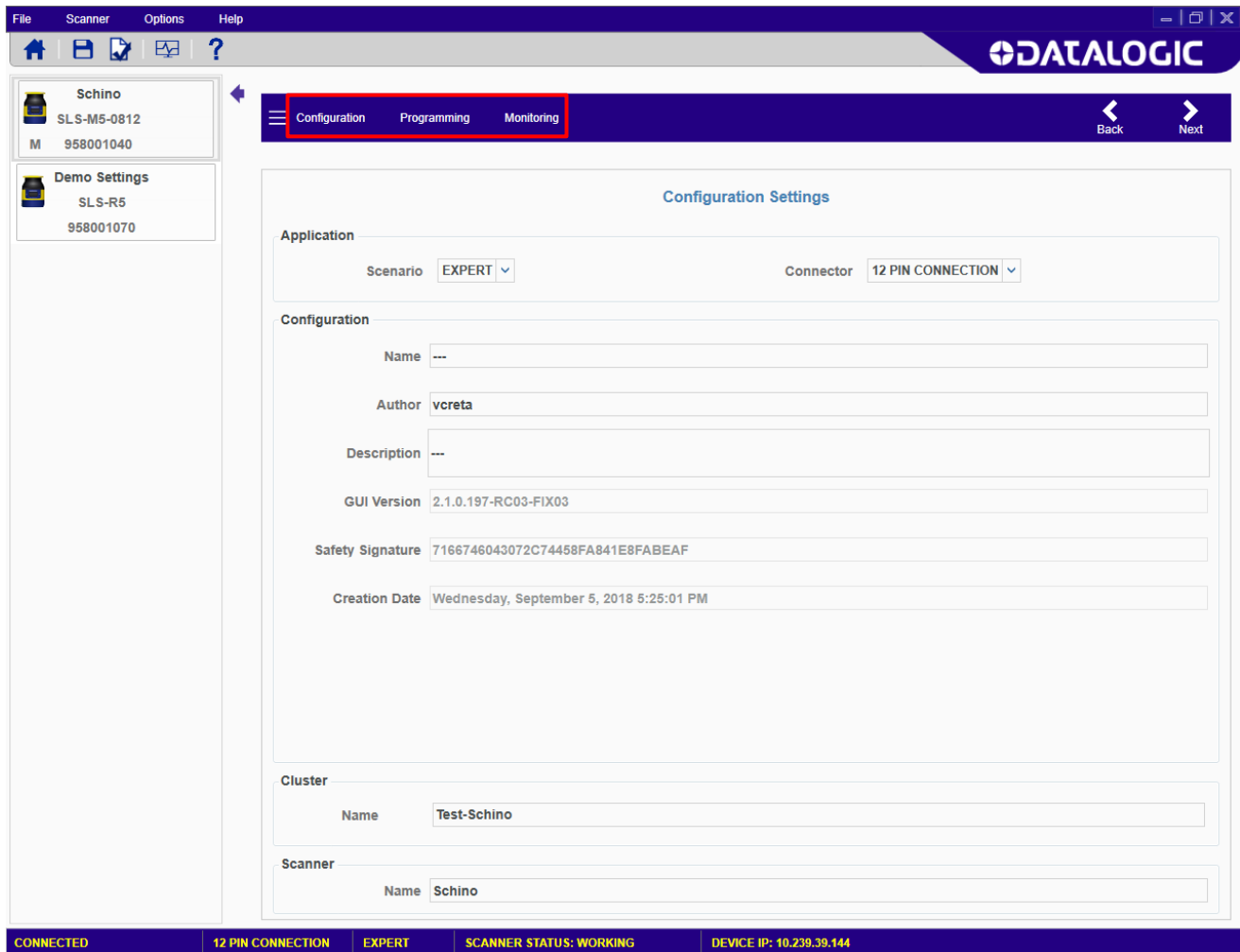
1.4.3 Task selection

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.

1.5 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, 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).

 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 chap. 2.

2 LASER SENTINEL CONFIGURATION

2.1 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 par. 2.1.1.

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 par. 2.1.2.

> ⚠️ 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 par. 2.1.2. This is to avoid any network conflicts in the Ethernet communication.

2.1.1 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.
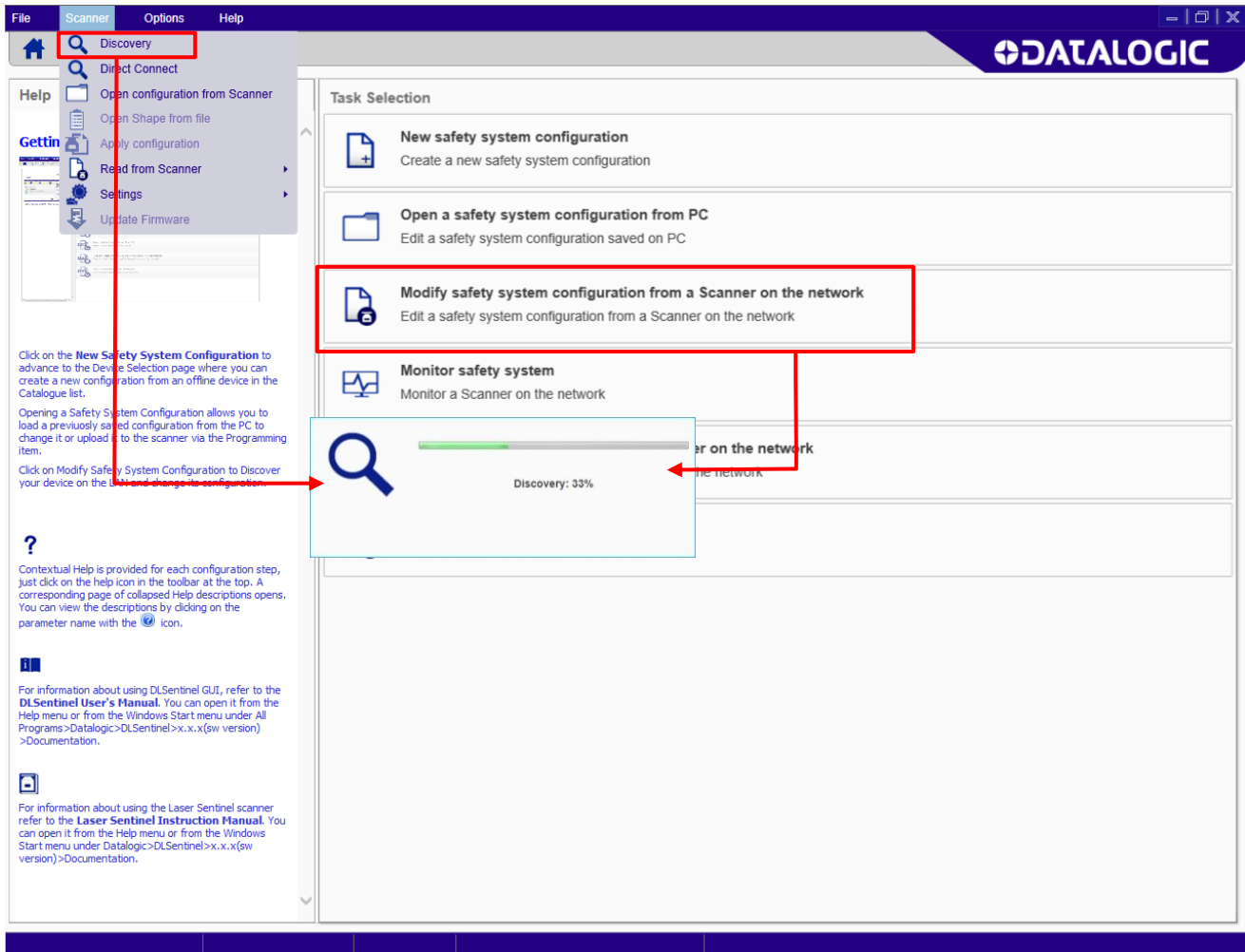
The User Interface opens and displays the device with its own default IP Address (192.168.0.10). Any other device on the network will also be discovered.

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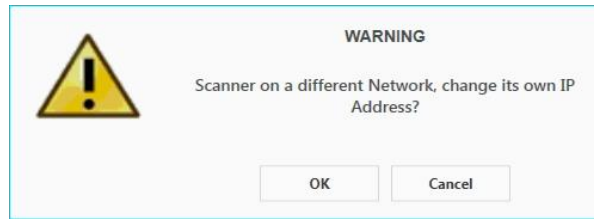
3. Click OK and then change the IP Address parameters in the Network Configuration window to align them with your network. Consult your network administrator for these parameters.

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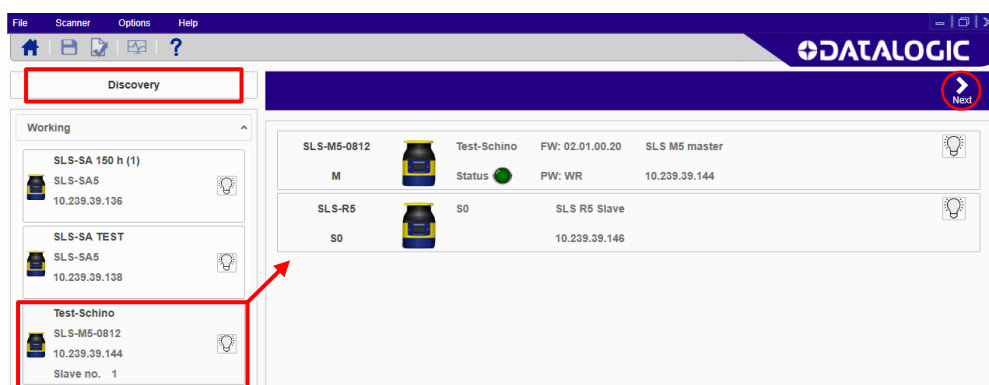
6. Click on the device to load it into the task area.

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 Factory Reset), the display will show a "NO CONF" message until a new configuration is loaded.

Note: See par. 0 for modifying the current configuration or par. 2.5 for downloading a previously saved configuration from the PC.

2.1.2   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).

> ⚠️ 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**.

> ⚠️ The successive IP Address (**192.168.0.11**) will also be reserved for internal functions**.**

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.
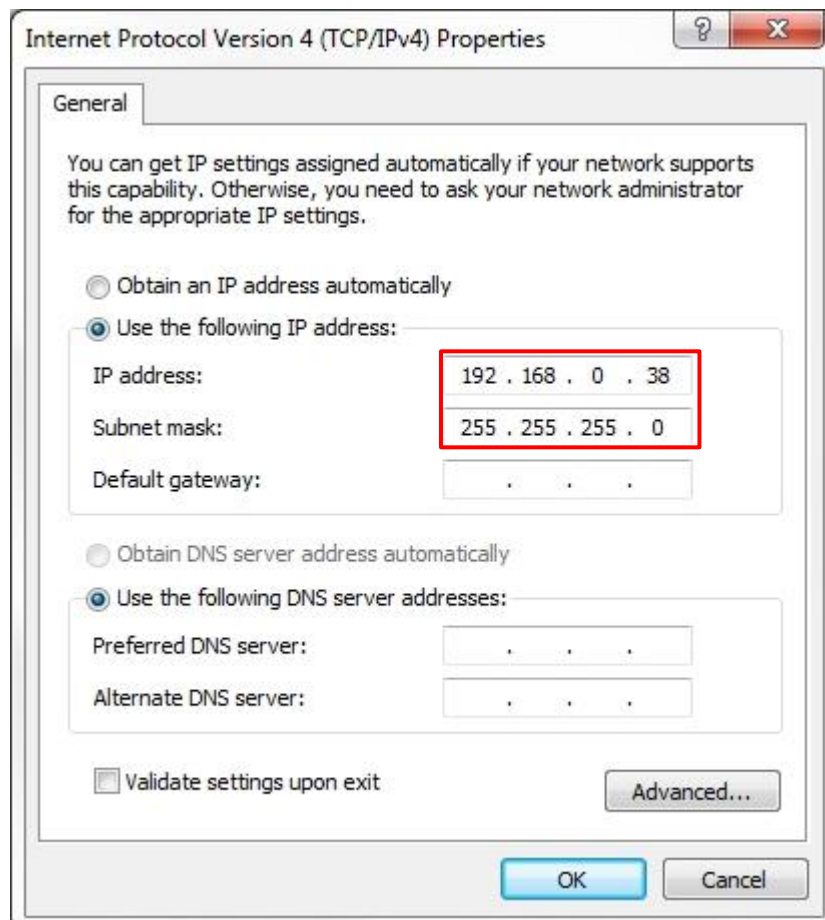
6. Launch DLSentinel from the configuration PC.

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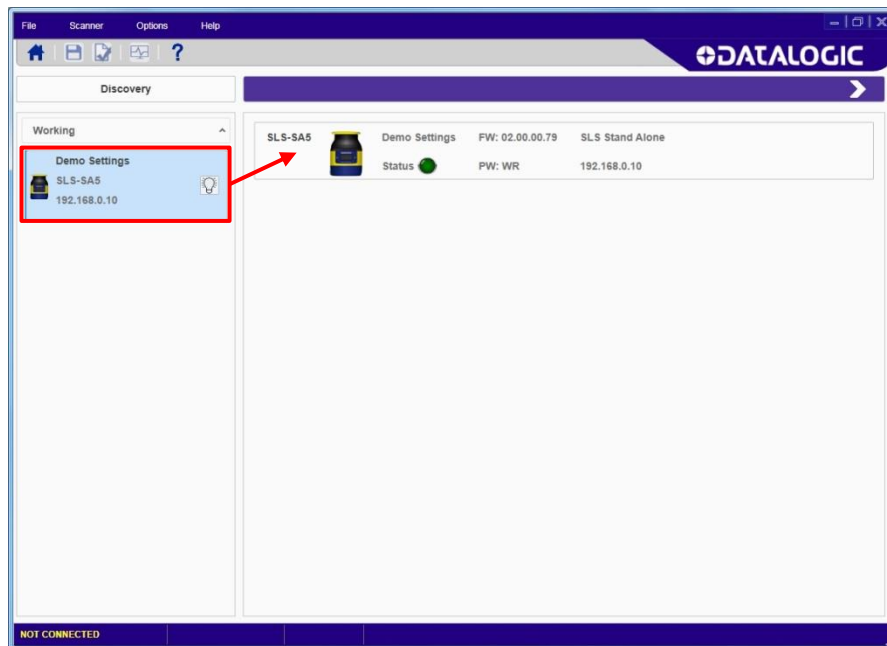
9. If **Windows Firewall** is active on the configuration PC, a pop-up window will appear after discovering the device.

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".
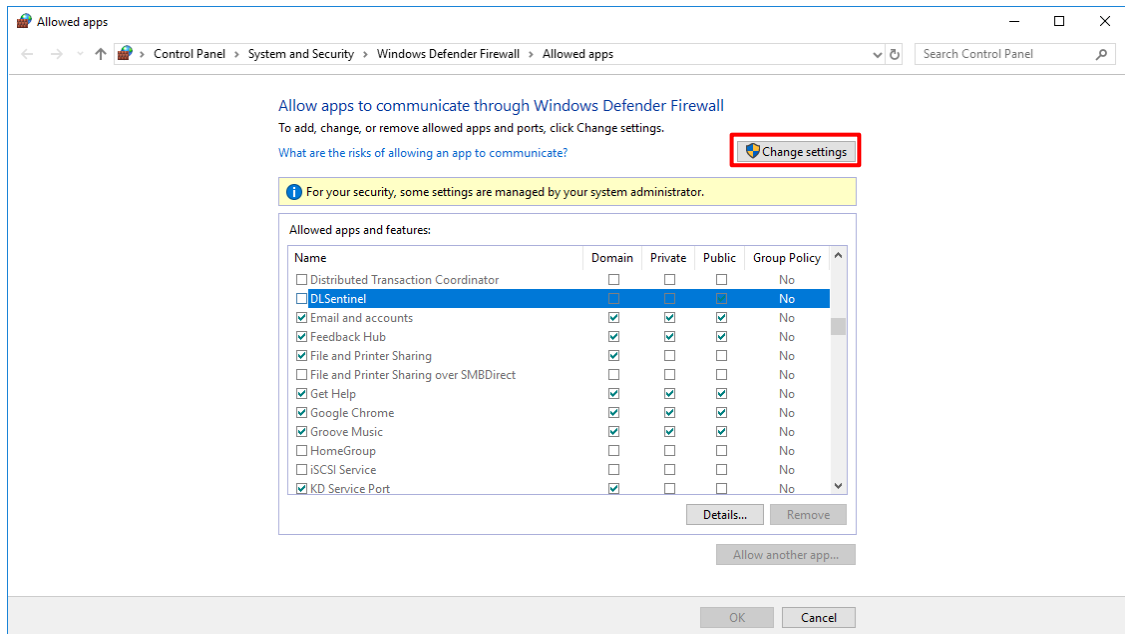
Scroll down the list and check the boxes on the DLSentinel row as shown in the figure below, then click *OK*. The Firewall is now disabled on DLSentinel.
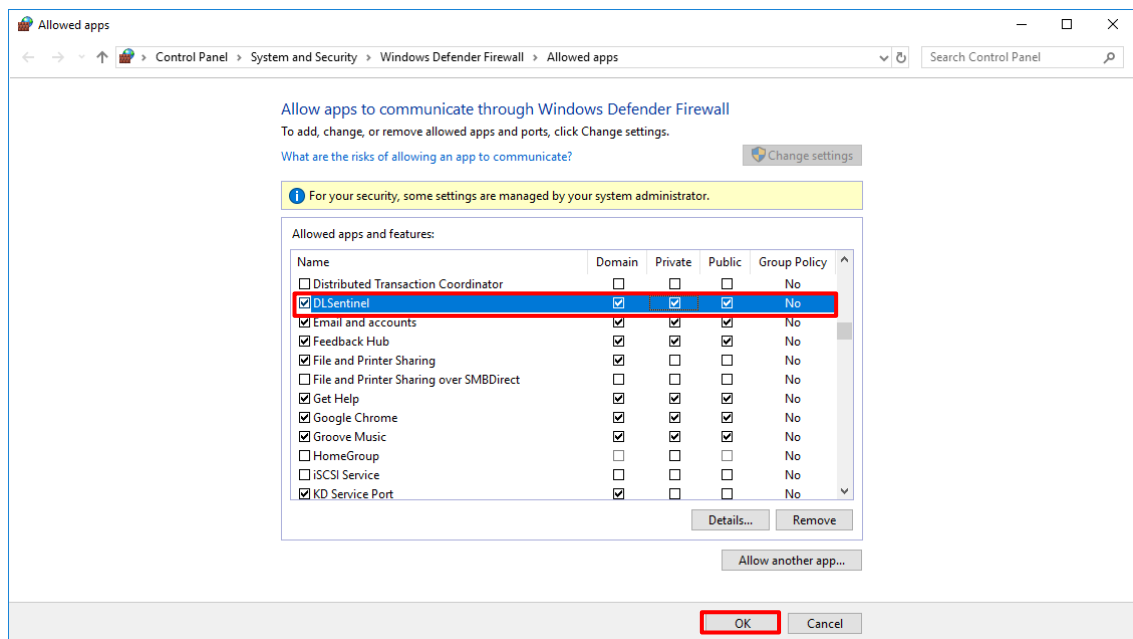
Note: If you cannot find DLSentinel on the program list, uninstall and reinstall the software and follow the procedure described in point 9.

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 Factory Reset), the display will show a "NO CONF" message until a new configuration is loaded.

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Note: See par. 0 for modifying the current configuration or par. 2.5 for downloading a previously saved configuration from the PC.

2.2 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).
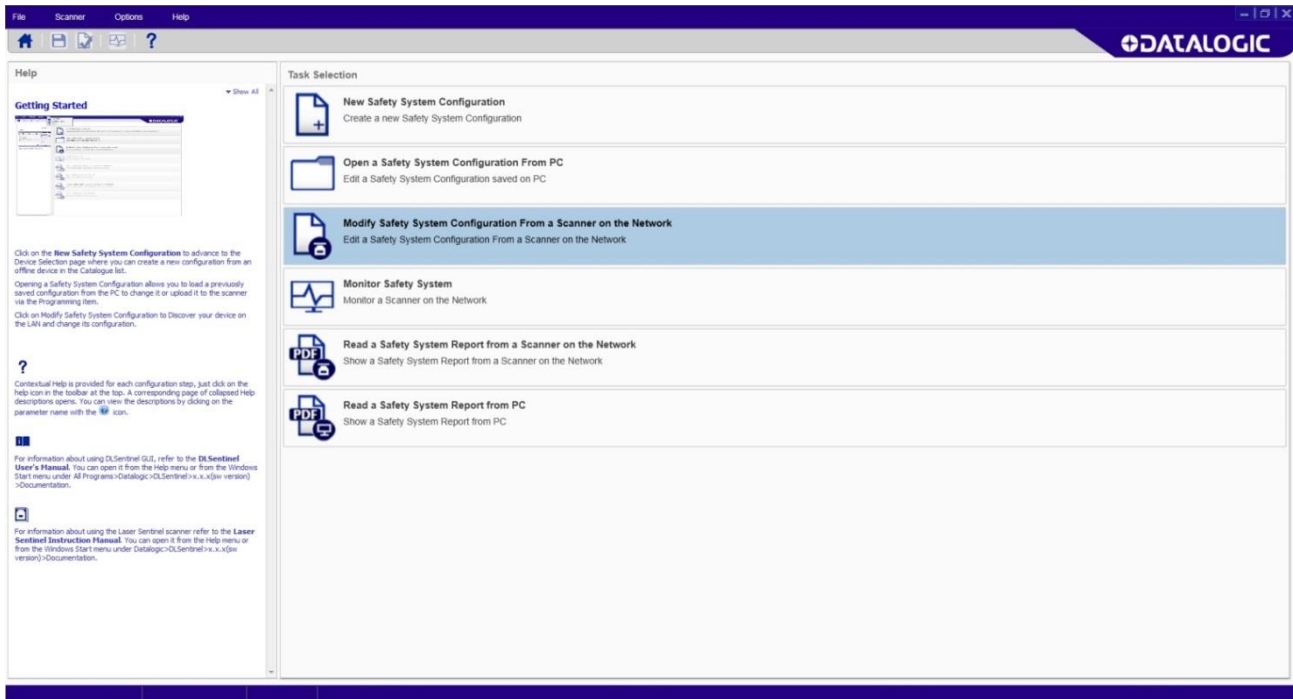
DLSentinel will enter Discovery mode to search for a connected device.
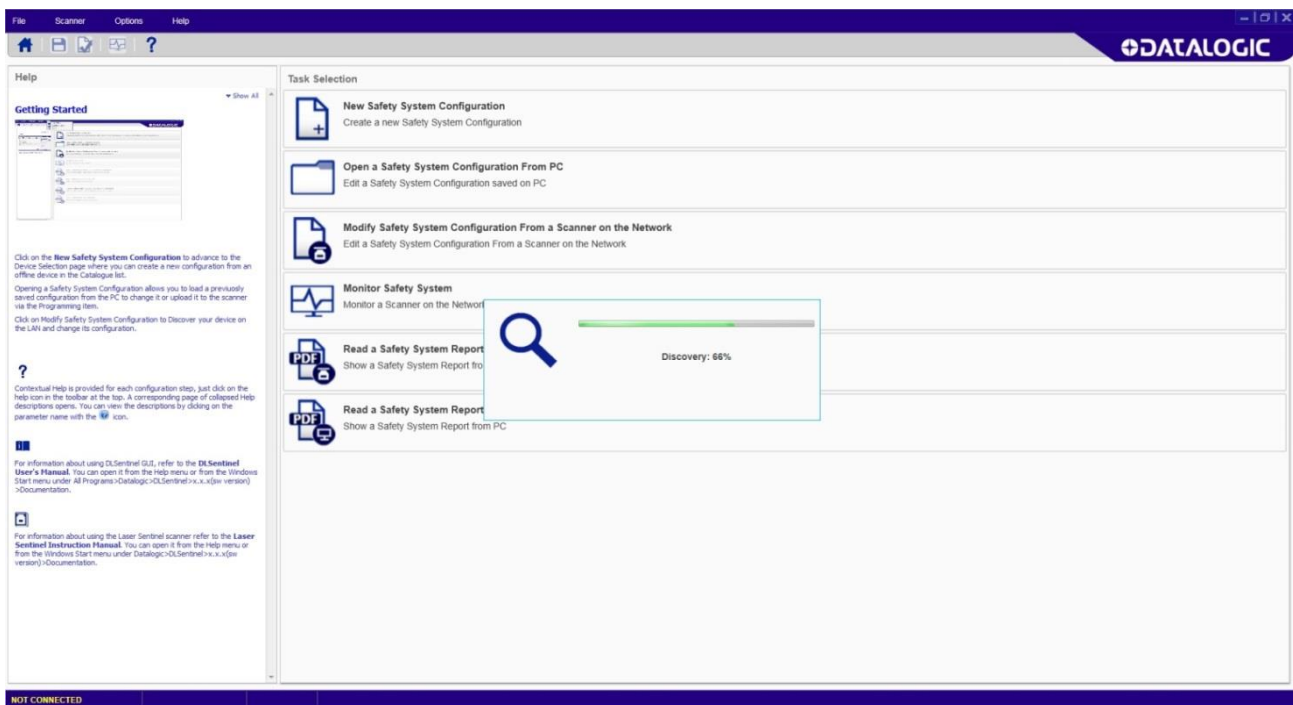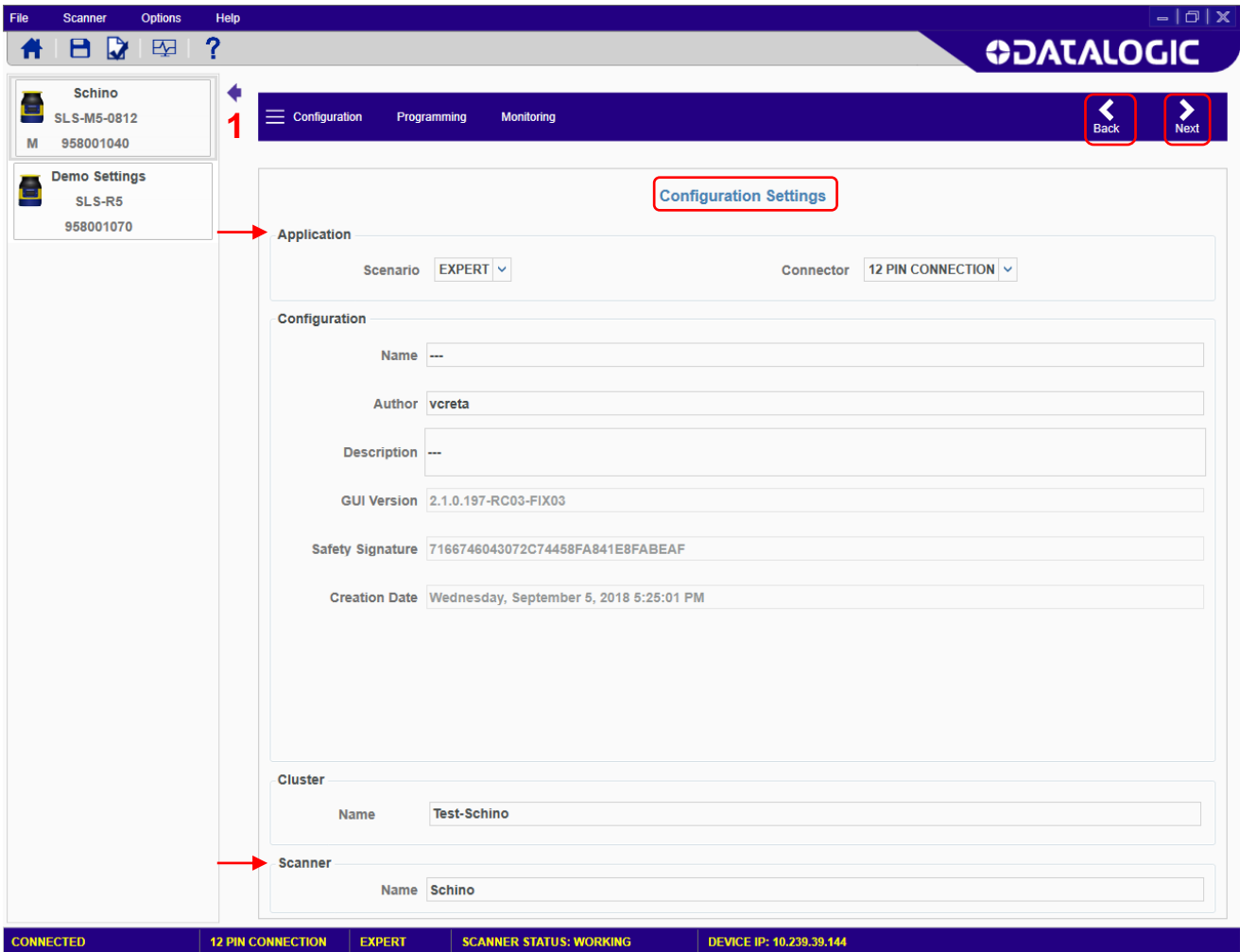
> ⚠️ If the Laser Sentinel and the PC LAN are not aligned, it will be necessary to set the network configuration settings. See par. 2.1.

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.
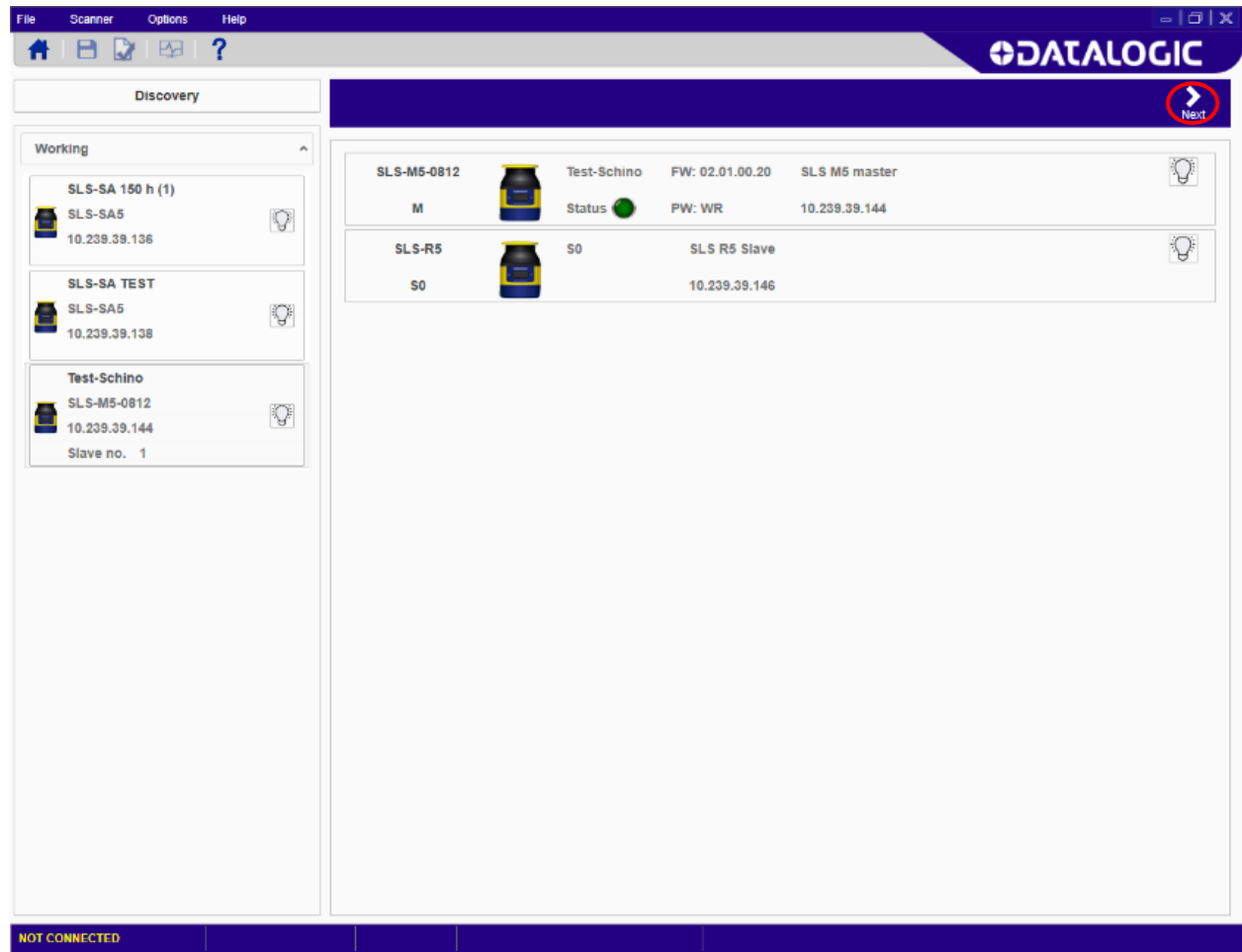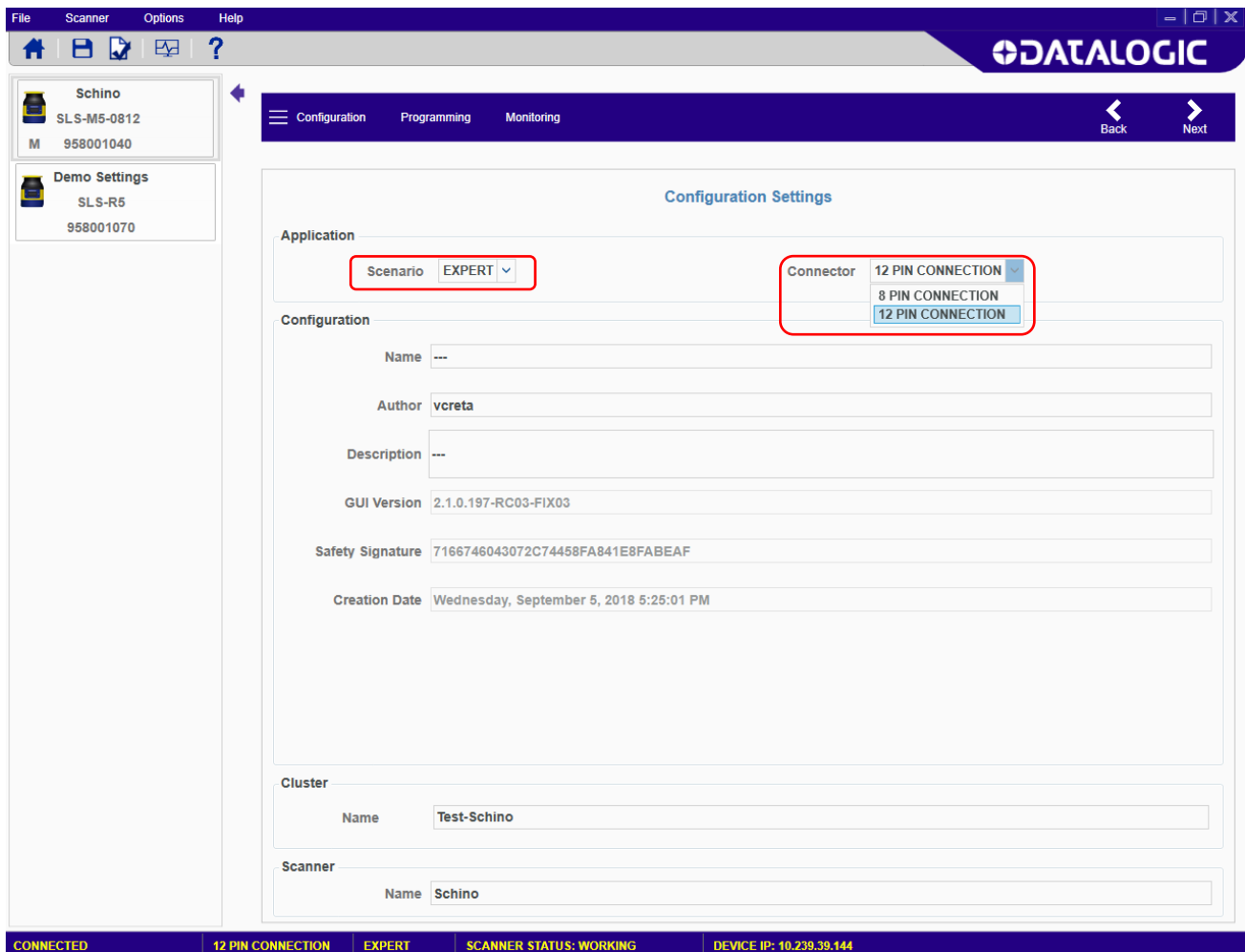
2.2.1   Configuration Settings

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.

- **Connector** to select the connector type (depending on the device model and application).
  - → **8-pin connection**: The configuration will manage the pins relative to this connector.
  - → **12-pin connection**: The configuration will manage the pins relative to this connector (Master only).

⚠️ If you switch from 8 to 12-pin connection or vice versa after completing a configuration, the following warning message will appear:
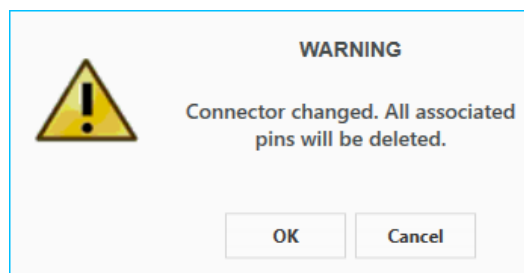
In particular:

- If one single Zone was configured, its areas will be preserved, while all associated pins will be deleted;

- If more than one Zone were configured, just the area of Zone 1 will be preserved, while all other areas and associated pins will be deleted.

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.

- **GUI Version**: (Read-only). The software version of DLSentinel.

- **Safety Signature**: (Read-only). This is automatically generated to be a unique identifier that includes the scanner, configuration, creation date and time.

- **Creation Date**: (Read-only). The date and time the configuration was created.

- **Cluster**: A name to identify the cluster.

- **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.

2.2.2   Output Configuration

The **Output Configuration** displays the following parameters:
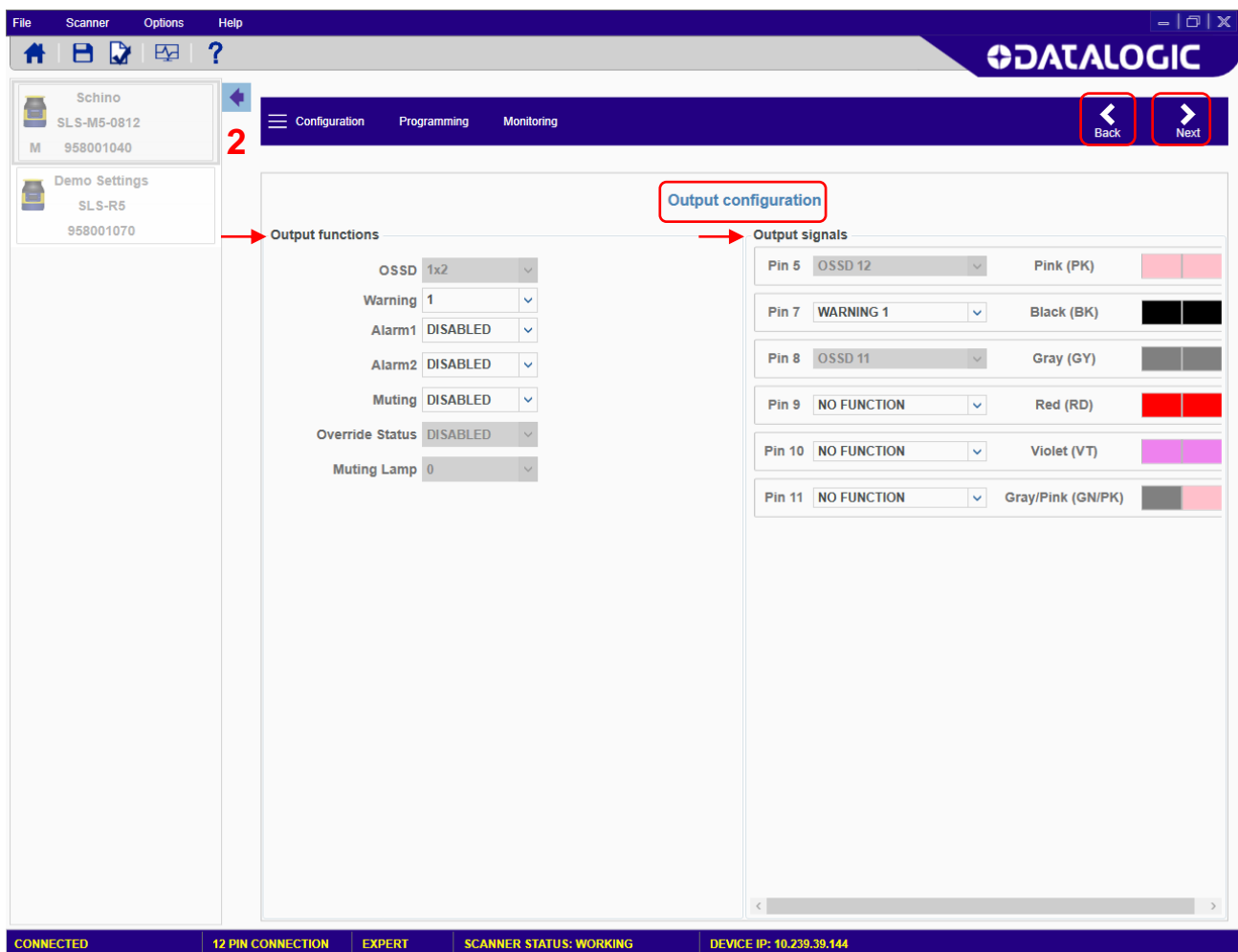
Output Functions

- **OSSD:** to select the number of OSSD pairs to use for the configuration. This component is connected to the machine control system and associated with the Safety Zone. If an object is detected in the Safety Zone, the OSSD pair switches to the Off-State effectively shutting down the machine.
    - **1x2** (**One Pair)** All OSSD outputs are managed in pairs, two pins (x2). OSSD 1/1 and 1/2 are assigned Pin 5 and Pin 6 (8-pole model) or Pin 5 and Pin 8 (12-pole model).

- **Warning:** to select the number of Warning Zones to use for the configuration. This is the area outside the Safety Zone where an object can be detected but the device will not switch to the Off-State. It can be used to light a warning lamp or sound a siren.

- **Alarm 1:** Enabling Alarm 1 activates the "*Clean Window*" device error warning.

- **Alarm 2:** Enabling Alarm 2 activates the "*Device Error*" warning.

- **Muting:** Enabling the Muting function allows the scanner to operate under controlled conditions where an object can pass through the Safety Zone without the scanner switching to the Off-State. See the Laser Sentinel Instruction Manual for more details on this feature. Dedicated devices must be connected to the scanner input signals to control this function. An optional lamp can be connected to signal this condition.

- **Override Status:** 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.

- **Muting Lamp:** If the Muting function is enabled, 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).

Note: Alarm 1 and **2** are only available when the M/S configuration is selected.

Output Signals
This parameter group assigns the signals of the output 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 for the **8-pin configuration**:

- **Pin 1 (White Wire)**
  If a Warning Zone function is selected, this pin can be assigned as the Warning output. If a Muting Lamp is selected (Muting function enabled), this pin can be assigned as the Muting Lamp output. If an Alarm is enabled, this pin can be assigned to the Alarm 1 or Alarm 2 output (M/S configuration only). Otherwise, it must be assigned here as No Function in order to be used as a Reset, Restart, Area Switch, Muting, Muting Enable or Override input. See the Zone Set and Input configuration steps.

- **Pin 5 (Gray Wire)**
  This pin is automatically assigned to the safety output OSSD 1/1 (pair 1, output 1).

- **Pin 6 (Pink Wire)**
  This pin is automatically assigned to the safety output OSSD 1/2 (pair 1, output 2).

The following pins are available for the **12-pin configuration** (M/S only):

- **Pin 5 (Pink Wire)**
  This pin is automatically assigned to the safety output OSSD 1/2 (pair 1, output 2).

- **Pin 7 (Black Wire)**
  If a Warning Zone function is selected, this pin can be assigned as the Warning output. If a Muting Lamp is selected (Muting function enabled), this pin can be assigned as the Muting Lamp output. If an Alarm is enabled, this pin can be assigned to the Alarm 1 or Alarm 2 output. If the Override status in enabled, this pin can be assigned to the Override output. Otherwise, it must be assigned here as No Function in order to be used as a Reset, Restart, Area Switch, Muting, Muting Enable or Override input. See the Zone Set and Input configuration steps.

- **Pin 8 (Gray Wire)**
  This pin is automatically assigned to the safety output OSSD 1/1 (pair 1, output 1).

- **Pin 9 (Red Wire)**
  If a Warning Zone function is selected, this pin can be assigned as the Warning output. If a Muting Lamp is selected (Muting function enabled), this pin can be assigned as the Muting Lamp output. If an Alarm is enabled, this pin can be assigned to the Alarm 1 or Alarm 2 output. If the Override status in enabled, this pin can be assigned to the Override output. Otherwise, it must be assigned here as No Function in order to be used as a Reset, Restart, Area Switch, Muting, Muting Enable or Override input. See the Zone Set and Input configuration steps.

- **Pin 10 (Violet Wire)**
  If a Warning Zone function is selected, this pin can be assigned as the Warning output. If a Muting Lamp is selected (Muting function enabled), this pin can be assigned as the Muting Lamp output. If an Alarm is enabled, this pin can be assigned to the Alarm 1 or Alarm 2 output. If the Override status in enabled, this pin can be assigned to the Override output. Otherwise, it must be assigned here as No Function in order to be used as a Reset, Restart, Area Switch, Muting, Muting Enable or Override input. See the Zone Set and Input configuration steps.

- **Pin 11 (Gray/Pink Wire)**
  If a Warning Zone function is selected, this pin can be assigned as the Warning output. If a Muting Lamp is selected (Muting function enabled), this pin can be assigned as the Muting Lamp output. If an Alarm is enabled, this pin can be assigned to the Alarm 1 or Alarm 2 output. If the Override status in enabled, this pin can be assigned to the Override output. Otherwise, it must be assigned here as No Function in order to be used as a Reset, Restart, Area Switch, Muting, Muting Enable or Override input. See the Zone Set and Input configuration steps.

2.2.3 Zone Set Configuration

Zone Set Configuration displays the following parameters:
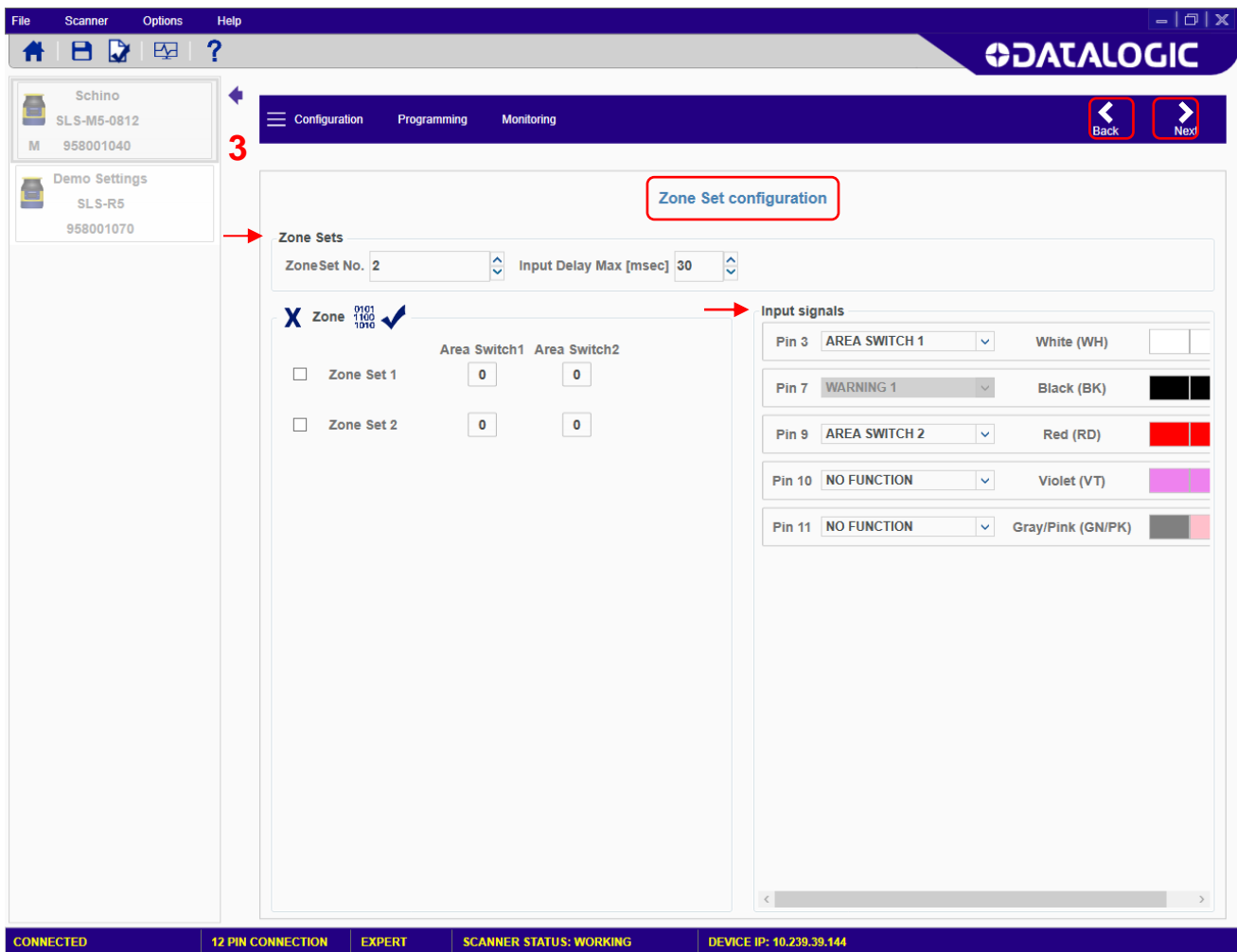
A Zone Set defines the area within the Laser Sentinel operating range to be monitored (Safety Zone, and if present, Warning Zone). More than one Zone Set can be configured to define either separate or overlapping areas and these can be switched alternatively using combinations of input signal states.

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. 10 Zone Sets with the 12-pole Master Slave model, max. 3 Zone Sets with the 8-pole Master Slave model, and max. 6 Zone Sets with the Stand Alone model.

- **Input Delay Max [msec]**
  This parameter is valid when there are at least two Zone Sets. It determines the delay to apply between switching from one Zone Set to the next. The input delay allows waiting for the Area Switching inputs to stabilize from their transient states before accepting the Zone Set. Otherwise the activation and deactivation of the inputs could put the device in undesired or invalid and temporary switching zone input combinations and therefore cause the device to enter the fault state.
  The minimum input delay (default) value is 30 msec. It can be increased in 30 msec increments.

- **Zone**
  This parameter group allows editing the Area Switch input combinations depending on the number of selected Zone Sets.

By selecting more than one Zone Set in the Zone Set No. parameter, a number of Area Switches (AS#) equal to the number of unassigned inputs will appear in the graphic.

It is possible to set the input switch coding with specific buttons. See the table below:

X	By selecting a Zone Set through the checkbox and clicking on this button, the Zone Set will be removed.
0101 1100 1010	By clicking on this button, the Zone Set Combination will be automatically set.
✔	By clicking this button, the created combination will be verified.

Alternatively, you can click inside the AS box to manually change its state. All Area Switching must differ by two input bit states to be valid.

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 for the **8-pin configuration**:

- **Pin 1 (White Wire)**
  If this pin has been assigned as a Warning, Alarm or Muting Lamp output, it is not available (shown in gray). If it hasn't been assigned to any output, it can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 3 (Green Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input. See the Input configuration step. If this input is not used, select No Function.

- **Pin 4 (Yellow Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input. See the Input configuration step. If this input is not used, select No Function.

The following pins are available for the **12-pin configuration**:

- **Pin 3 (White Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 7 (Black Wire)**
  If this pin has been assigned as a Warning, Alarm or Muting Lamp output, it is not available (shown in gray). If it hasn't been assigned to any output, it can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 9 (Red Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 10 (Violet Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 11 (Gray/Pink Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

Zone Sets configuration example:

- If the configuration includes only one Zone Set, there is no area switching, so it is not necessary to assign any input to an area switch.
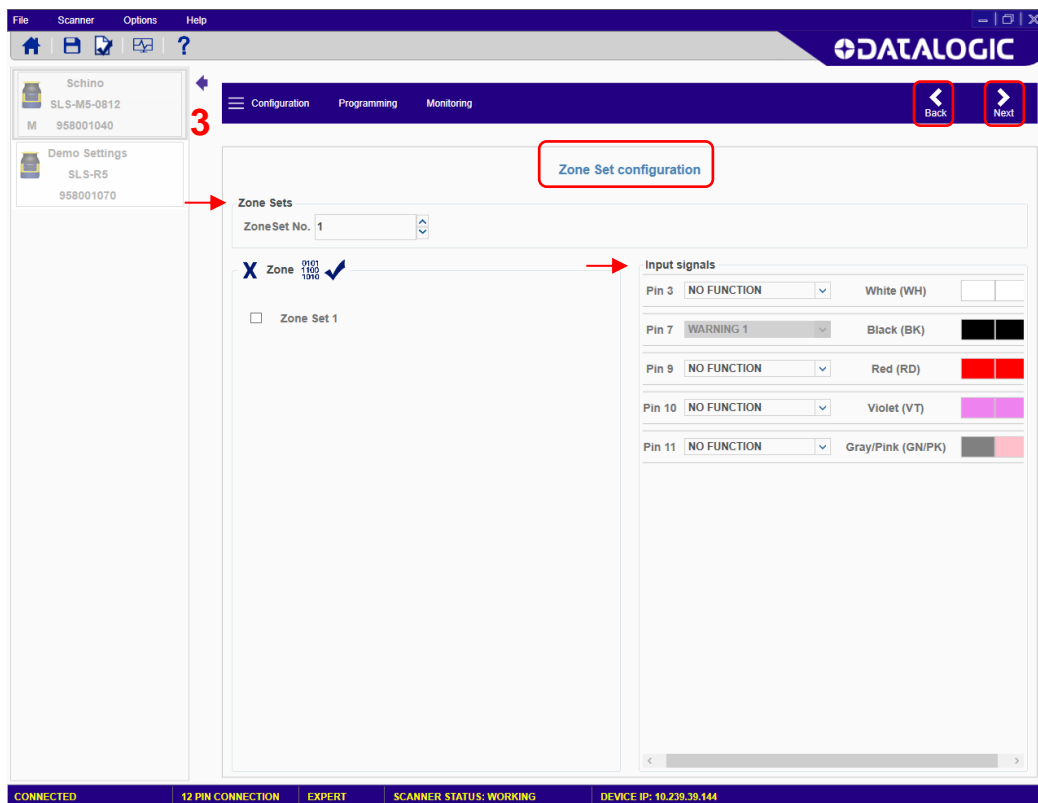
- If two Zone Sets are selected, **Area Switching** is required, and so two inputs must be assigned to the area switch functions (AREA SWITCH 1, AREA SWITCH 2).
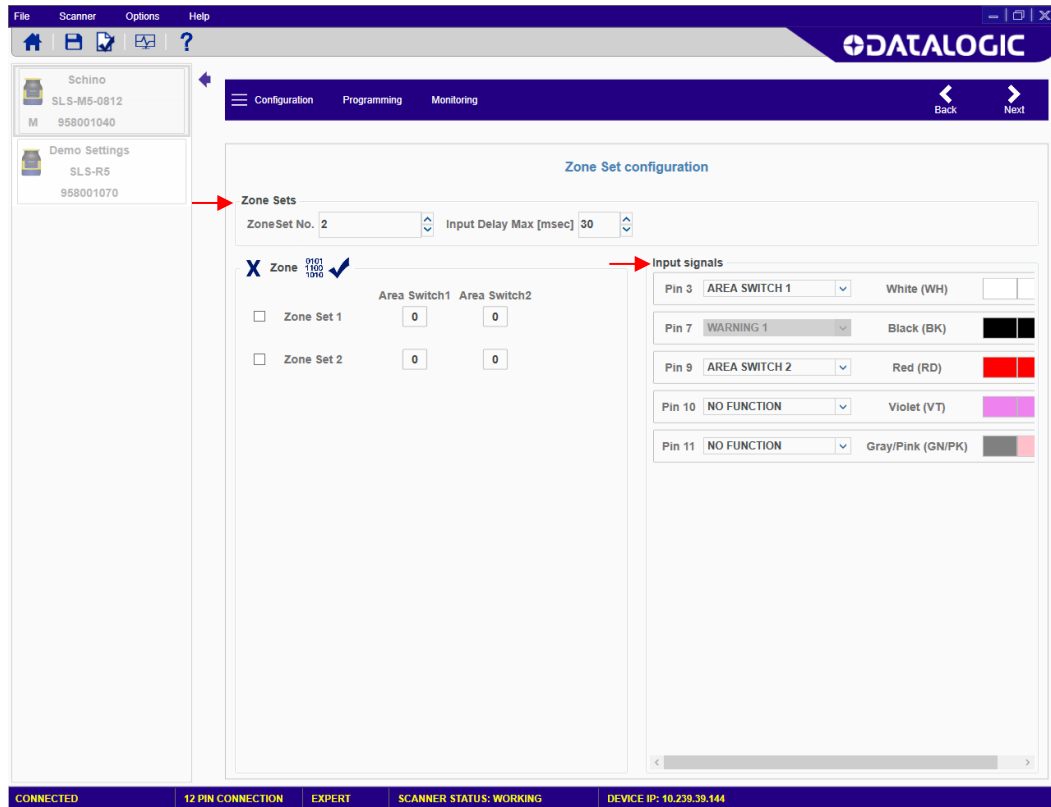
- If six Zone Sets are selected (in this case the Warning function is not available):

  - for the **8-pin configuration**, Pins 1, 3 and 4 must all be assigned to the **Area Switch** functions (AREA SWITCH 1, AREA SWITCH 2 and AREA SWITCH 3).
  - for the **12-pin configuration**, three pins must be assigned to the **Area Switch** functions (AREA SWITCH 1, AREA SWITCH 2 and AREA SWITCH 3).
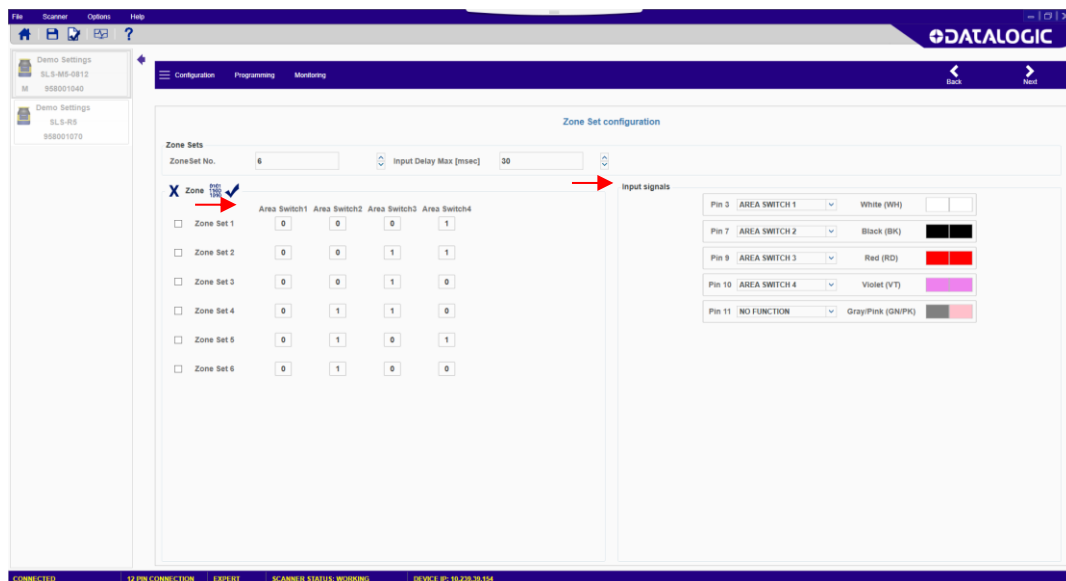
- If ten Zone Sets are selected (12-pin configuration only, the Warning function is not available), Pins 3, 7, 9, 10 and 11 must all be assigned to the **Area Switch** functions (AREA SWITCH 1, AREA SWITCH 2, AREA SWITCH 3, AREA SWITCH 4 and AREA SWITCH 5).
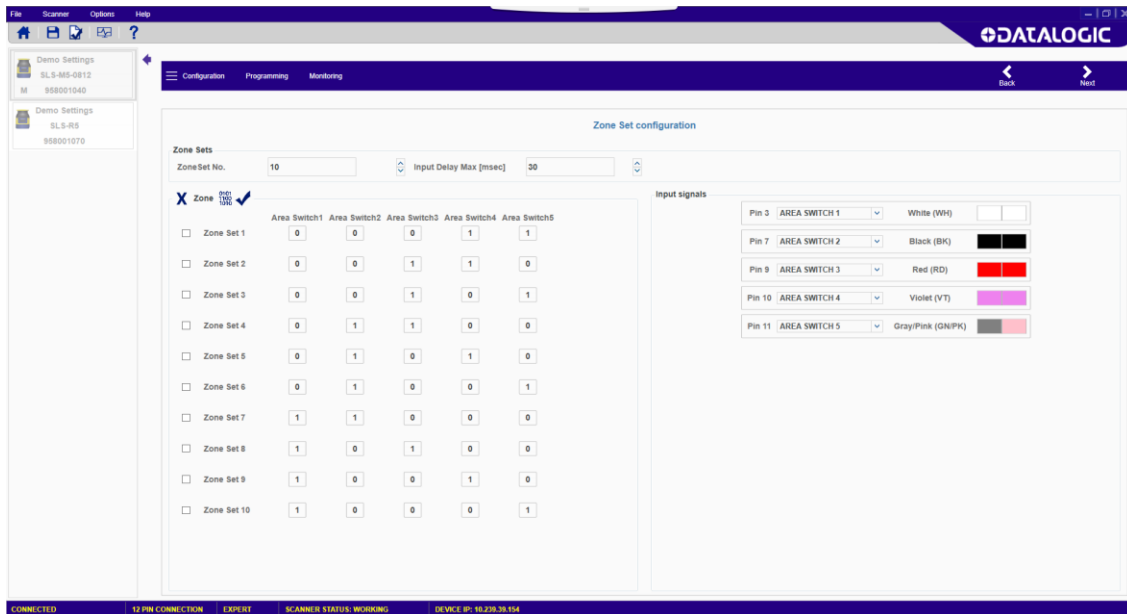
> If more Zone Sets are selected, make sure to create a valid input coding combination: the Zone Sets must differ by two input bit states with respect to any other Zone Set. Otherwise, by clicking on the validation button a pop-up window that shows the coding validation error will be displayed.
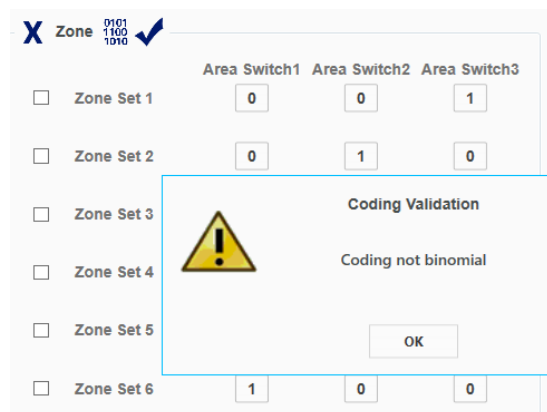
2.2.4   Input Configuration

The **Input Configuration** displays the following parameters:
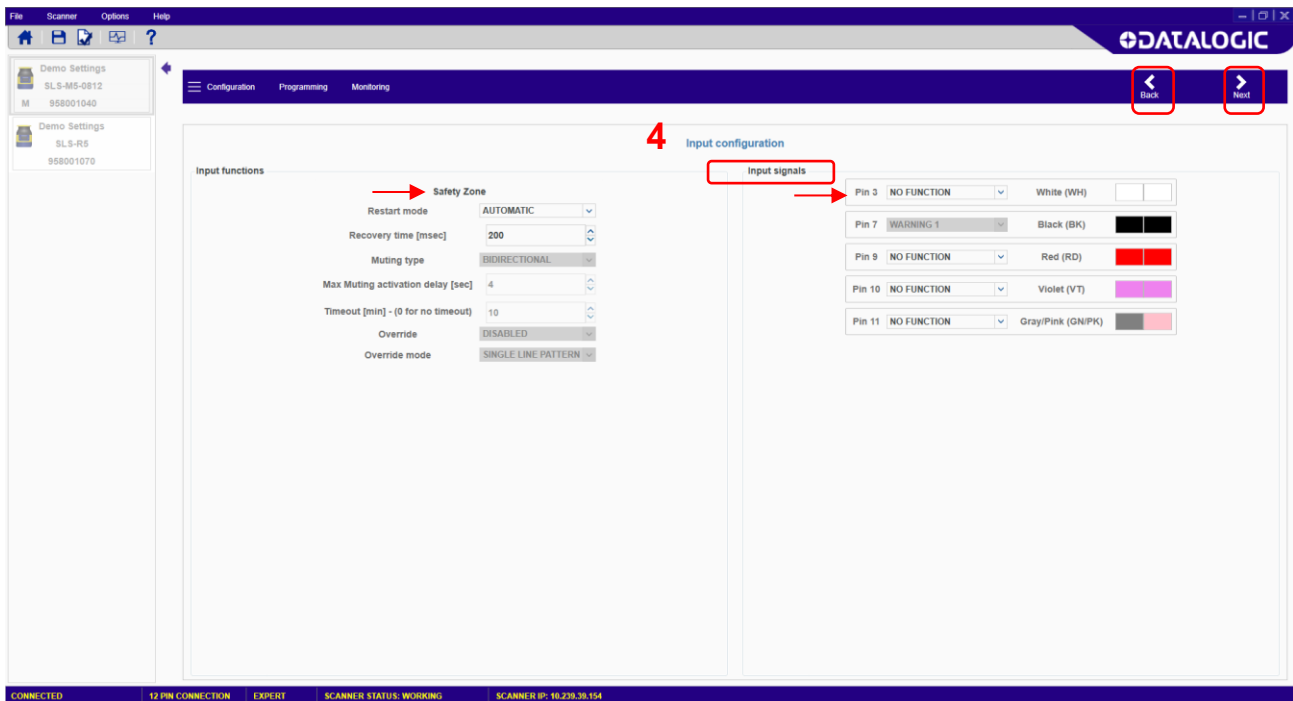
Input Functions

- **Restart Mode:** For each Safety Zone you can select the restart mode.

  → **Automatic**: The Laser Sentinel automatically returns the OSSD pair to the On-State after all detected objects are removed from the Safety Zone and the configured Recovery Time elapses.

  → **Manual**: The Laser Sentinel returns the OSSD pair to the On-State after all detected objects are removed from the Safety Zone and a manual Restart switch (push-button) is 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 OSSDs achieving the On-State. Select the time to elapse before the OSSD pair returns to the On-State. The minimum Recovery Time is 200 msec. This can be increased to 60000 msec in 1 msec increments.

- **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 for the **8-pin configuration**:

- **Pin 1 (White Wire)**
  If this pin has been assigned as a Warning, Alarm or Muting Lamp output, it is not available (shown in gray). If it hasn't been assigned to any output, it can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 3 (Green Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input. See the Input configuration step. If this input is not used, select No Function.

- **Pin 4 (Yellow Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input. See the Input configuration step. If this input is not used, select No Function.

The following pins are available for the **12-pin configuration**:

- **Pin 3 (White Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 7 (Black Wire)**
  If this pin has been assigned as a Warning, Alarm or Muting Lamp output, it is not available (shown in gray). If it hasn't been assigned to any output, it can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 9 (Red Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 10 (Violet Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a

manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

- **Pin 11 (Gray/Pink Wire)**
  This pin can be assigned here as an Area Switch input. Selecting No Function here allows it to be assigned to one of the Muting input signals or the Muting Enable signal, the Muting Override input signal or as a manual Restart and/or Reset input (see the Input configuration step in par. 2.2.4). If this input is not used, select No Function.

2.2.5   Detection Configuration

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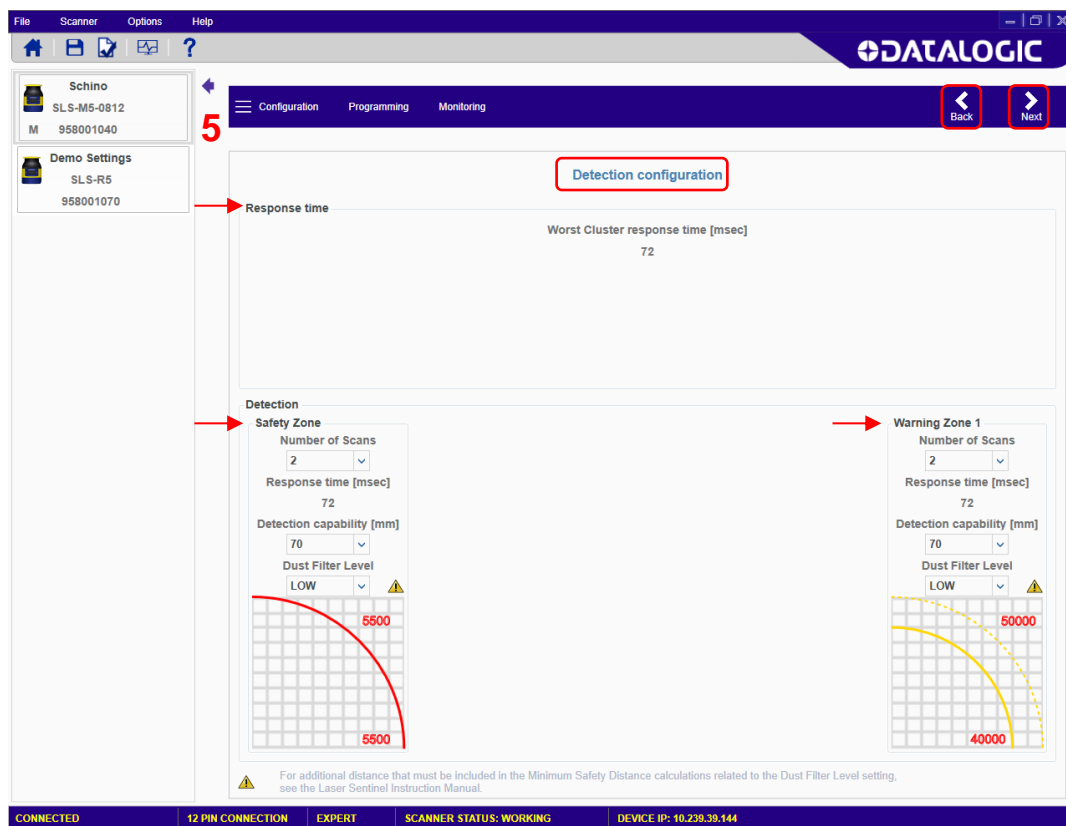
Detection Parameters

- **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 OSSD switches to the OFF-State.
  The Number of Scans determines the Response Time, which ranges from 62 to 482 ms in 30 ms increments.

- **Detection Capability:** The ability to detect an object of given dimensions within the detection zone. The detection capability for these models is either 40 mm or 70 mm. Objects greater than or equal to the selected value can be detected both for the Safety and Warning Zones.

- **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.

See the graphs in the Laser Sentinel Instruction Manual for these additional distances.
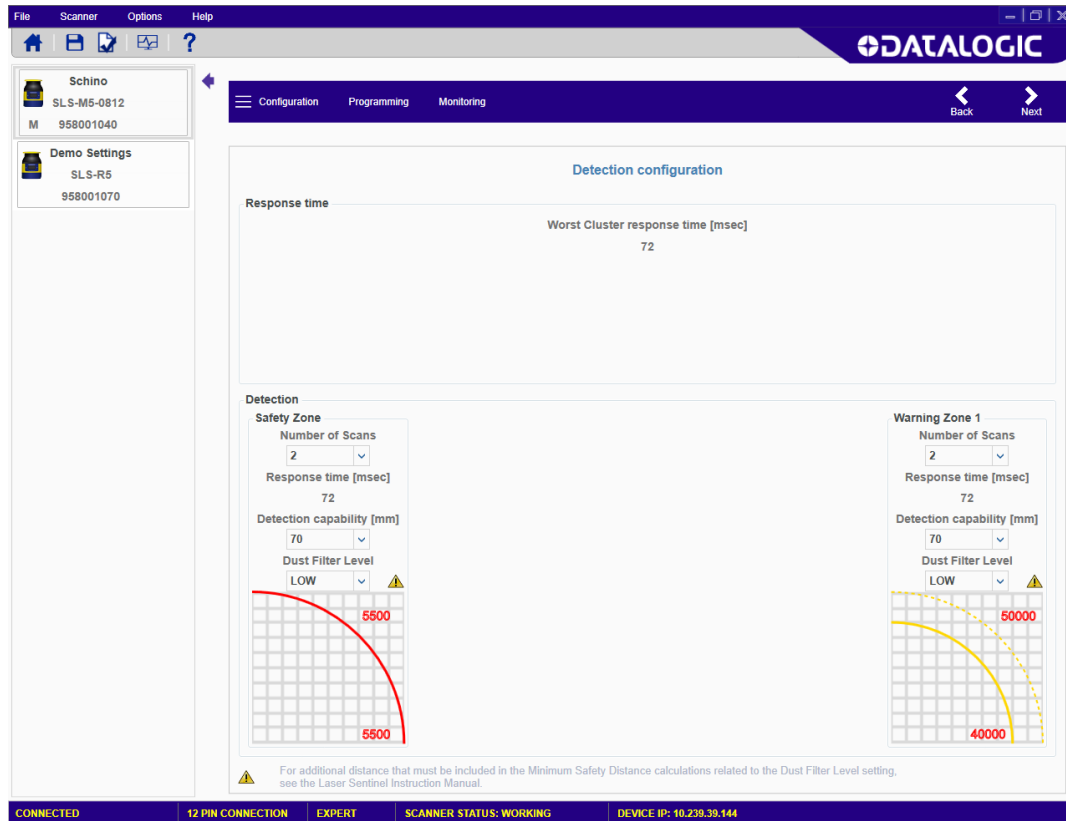
Note: The response time of the Cluster corresponds to the response time of the safety output of the device that goes into STOP and the network latency time. If the device in STOP is the master, no latency must be added; if the slaves are in STOP, then the latency time must be added to each device response time.

2.2.6 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.
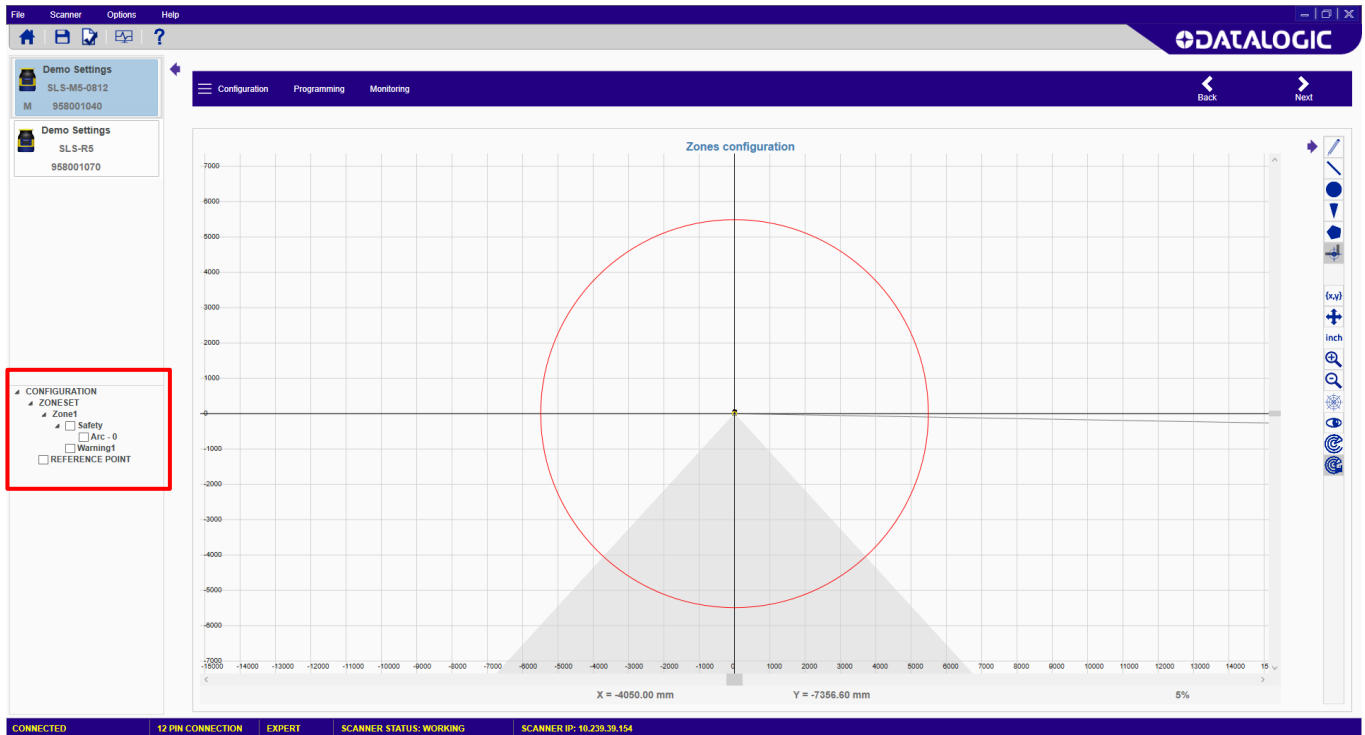
Note: This is the last step in defining the configuration. To complete configuration (load it onto the scanner, test it and **Accept** it), see Programming and Monitoring in chapter Programming and Monitoring Functions.

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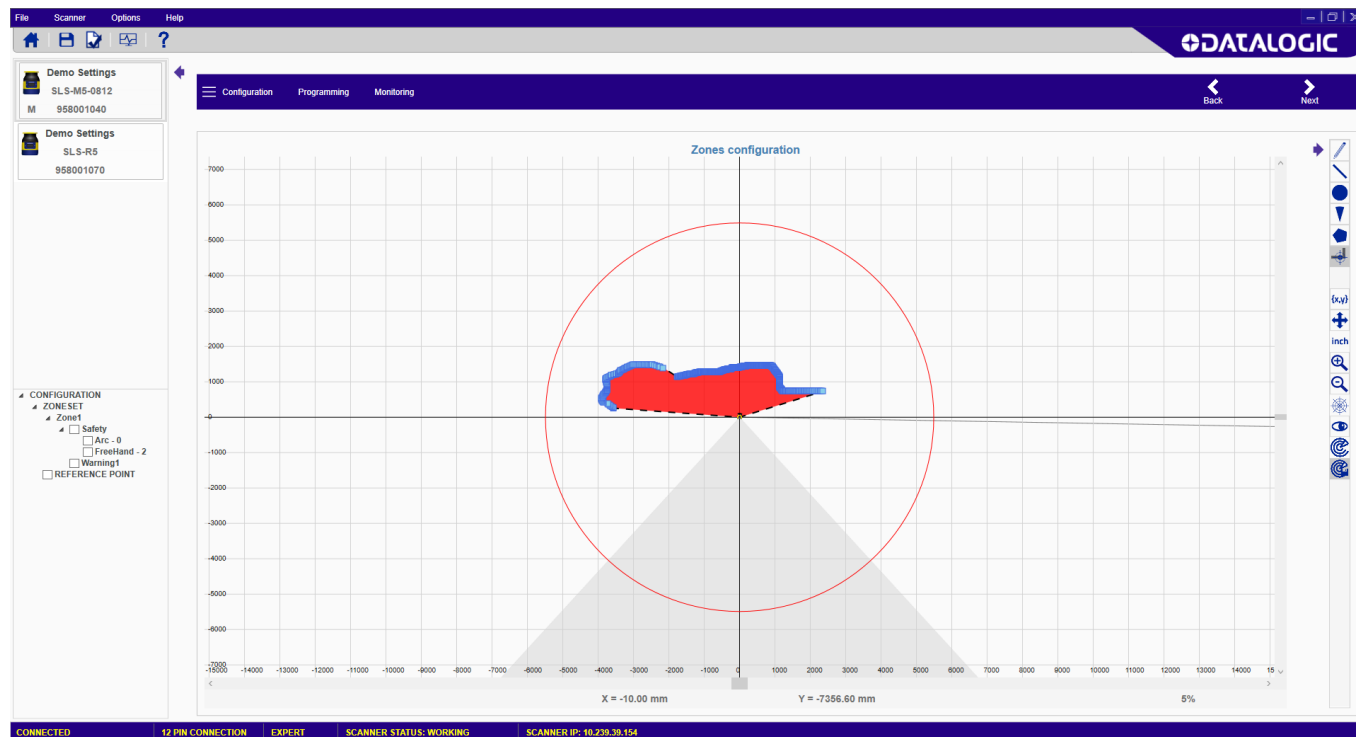
ICON	DESCRIPTION
	Click this button to draw a straight-edged area by holding pressed the left button of the mouse and dragging it across the graph. Once finished, release the left button.
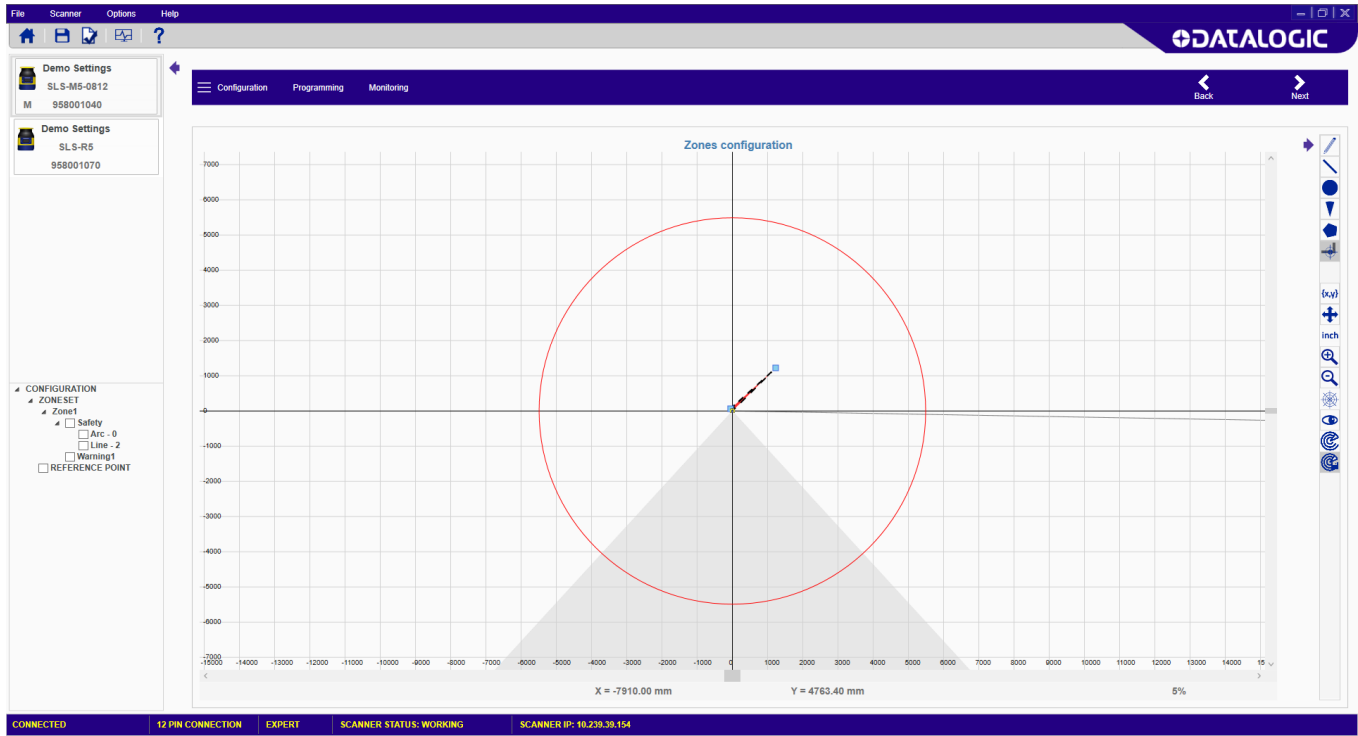
ICON	DESCRIPTION
	Click this button to draw a circle shaped area with its center at the scanner by holding pressed the left button of the mouse and dragging it across the graph. Once finished, release the left button.
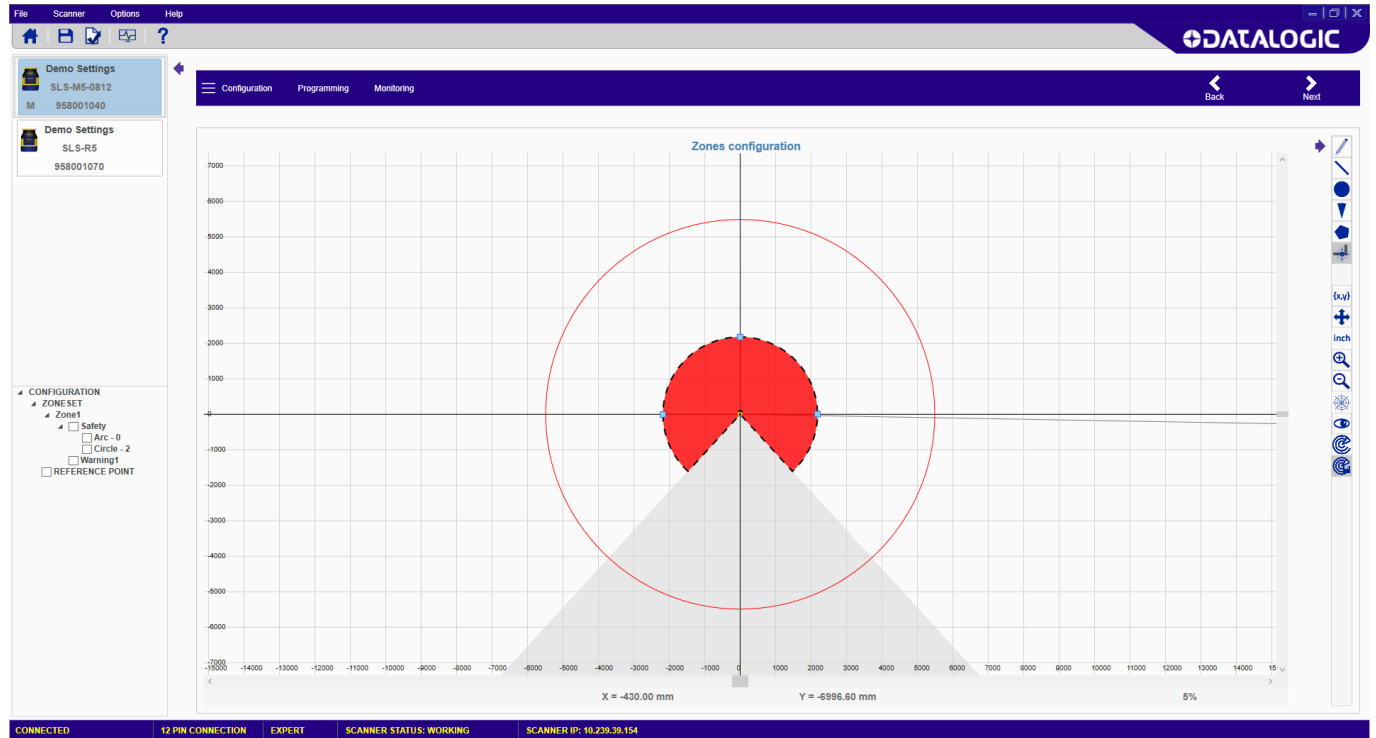
ICON	DESCRIPTION
	Click this button to draw an arc shaped area by holding pressed the left button of the mouse and dragging it across the graph. Once finished, release the left button.

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.
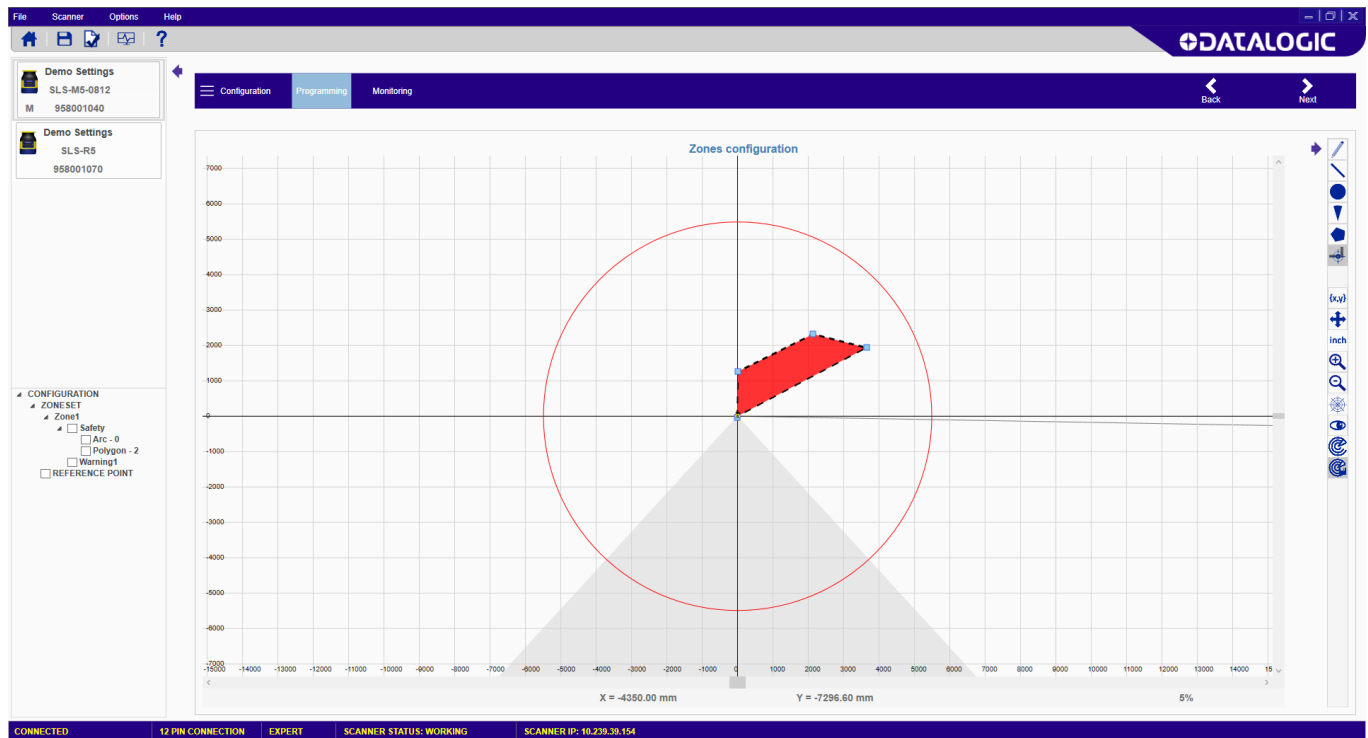
ICON	DESCRIPTION
	Click this button to draw Reference Points.
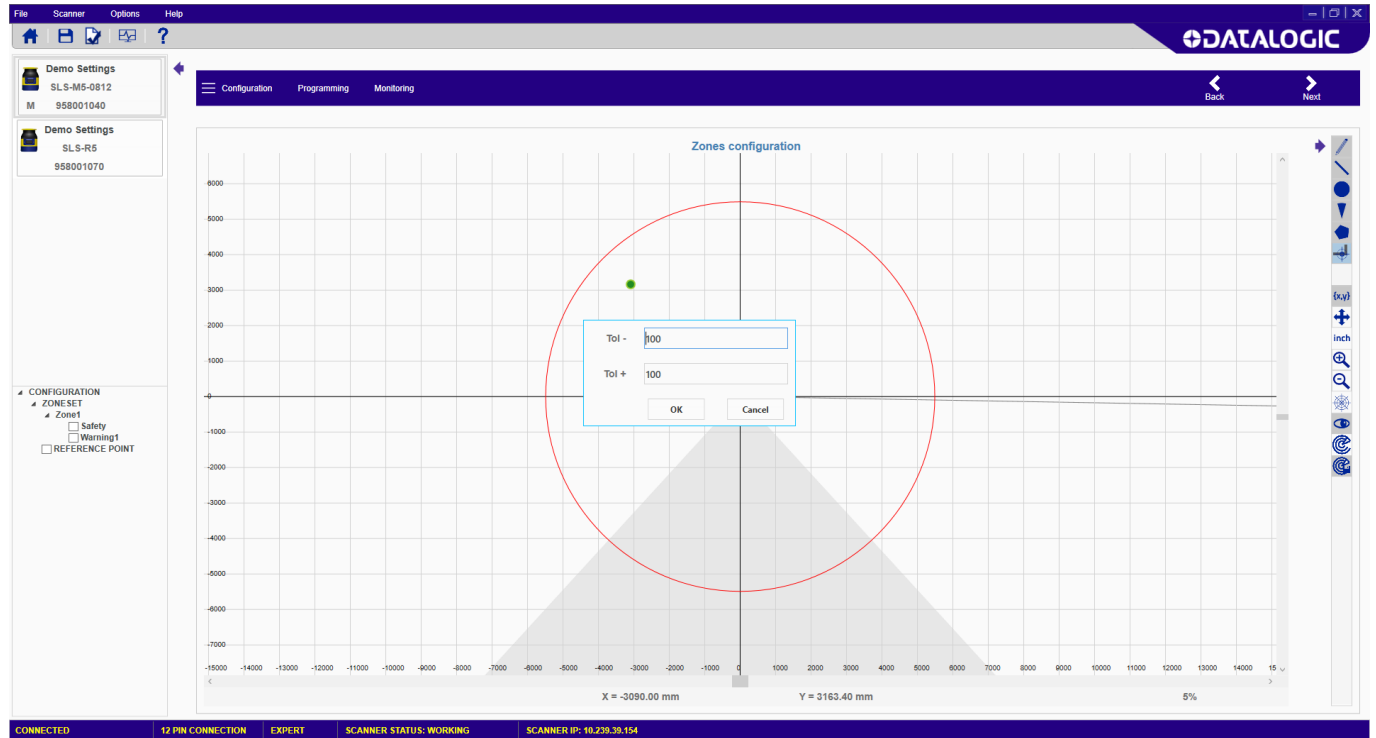
Note: To activate this function, select the REFERENCE POINT area on the left pane.

Specify the distance tolerance of the reference point from the scanner along the ray (+= farther from the scanner, - = 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 OSSD goes to the OFF-state. This function is required for Vertical applications. See the Laser Sentinel manual for more details.

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

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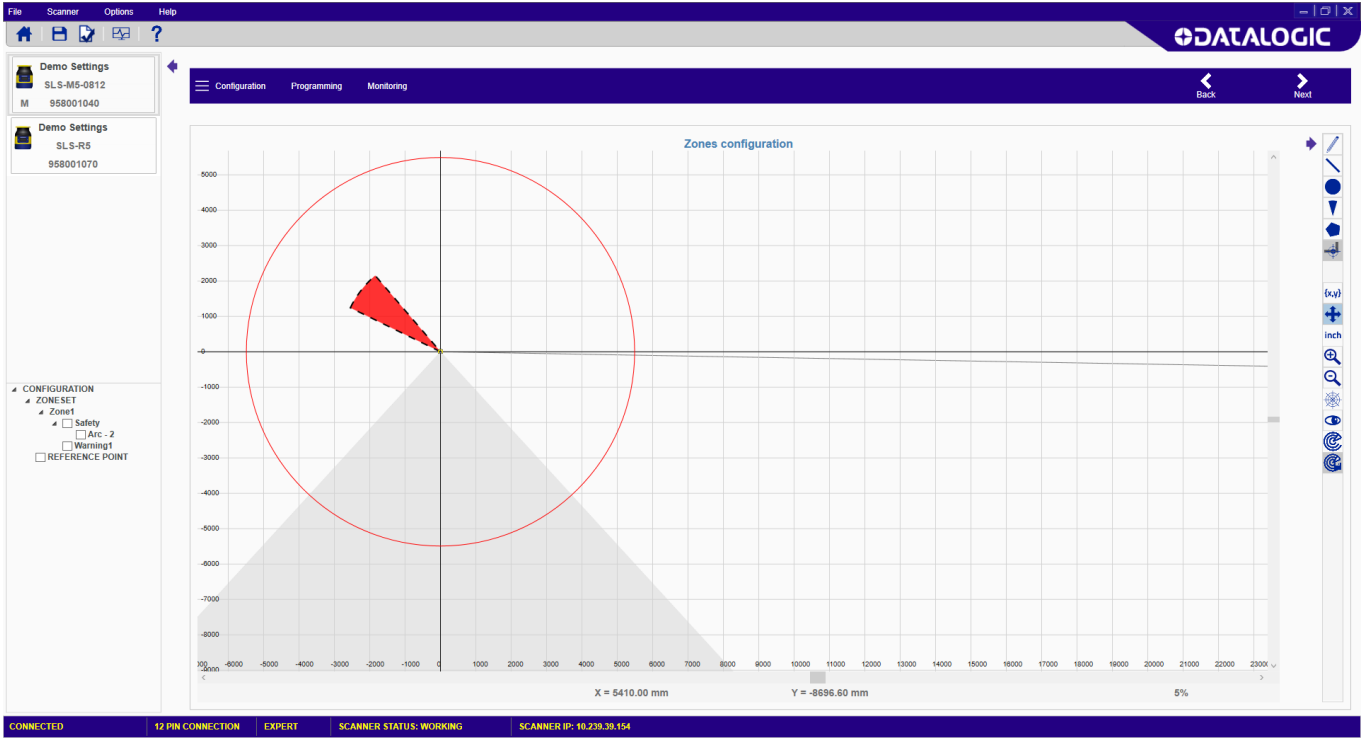
ICON	DESCRIPTION
inch	Click this button to toggle the graph unit of measurement between inches and millimeters.

ICON	DESCRIPTION
	Click this button to zoom in on the graph. Clicking multiple times continues to zoom in.
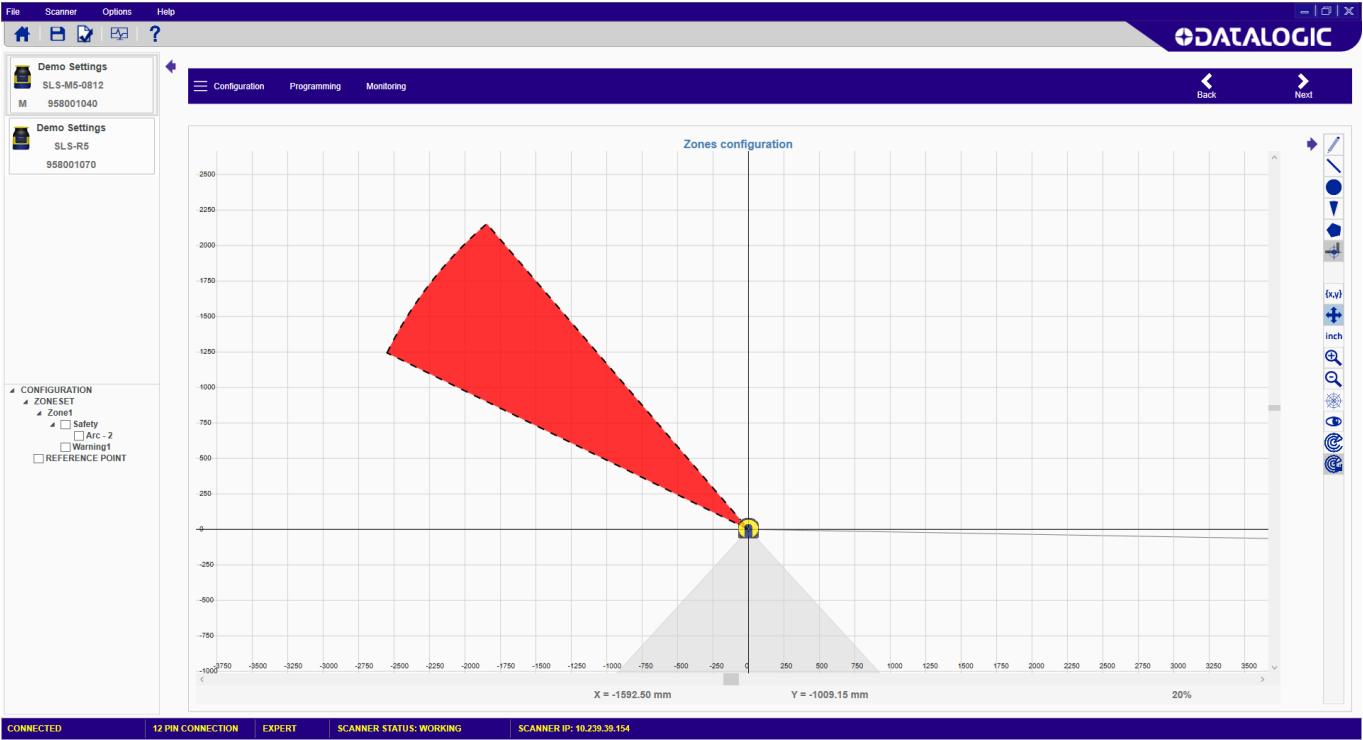
ICON	DESCRIPTION
	Click this button to zoom out on the graph. Clicking multiple times continues to zoom out.
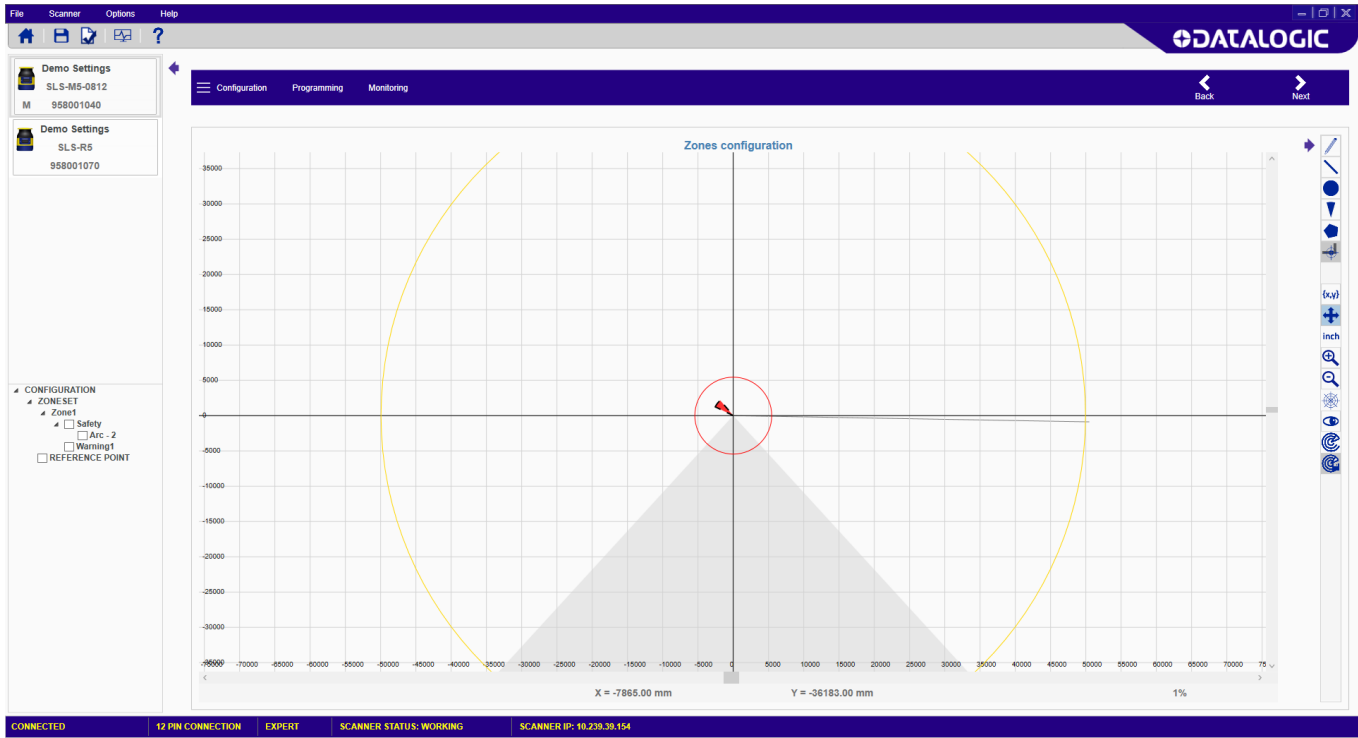
ICON	DESCRIPTION
	Click this button to toggle the graph coordinates between Cartesian and Polar.
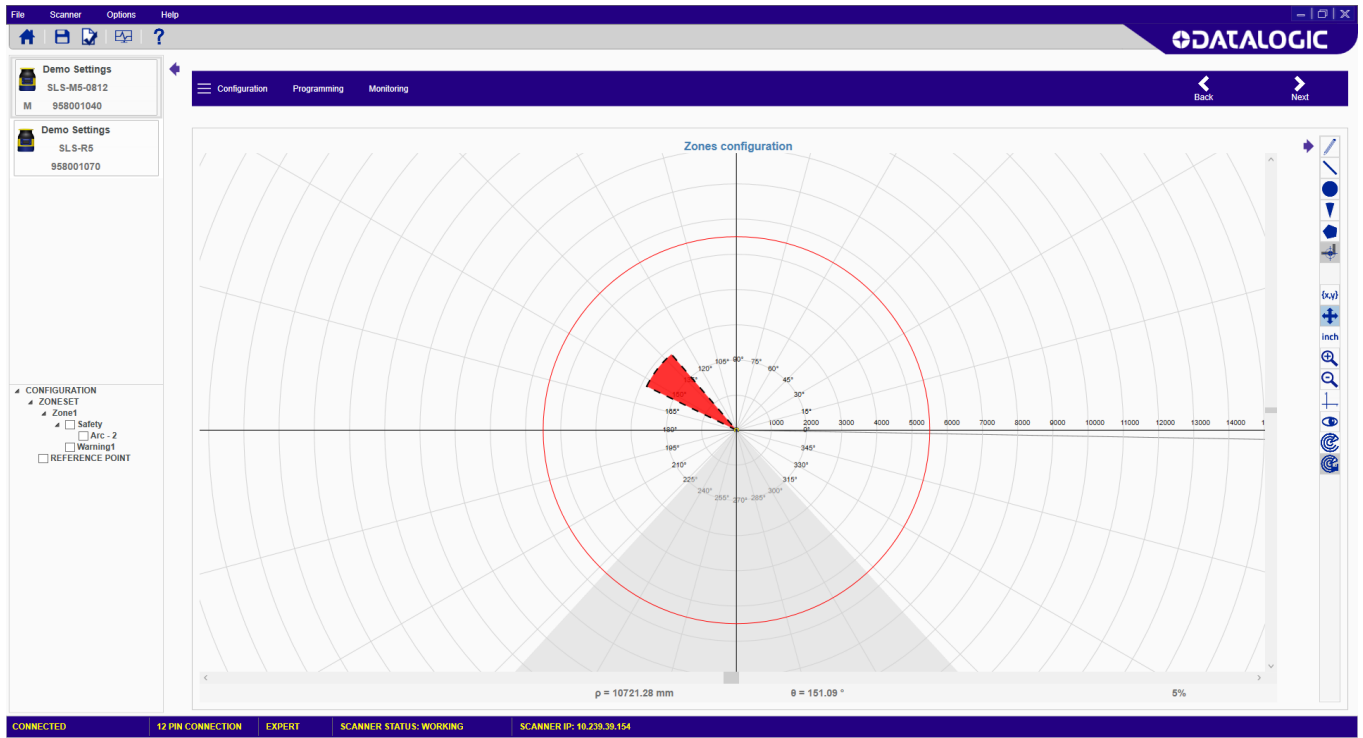
ICON	DESCRIPTION
	Click this button to show the area points and edit them. Once finished, re-click on the button.

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.
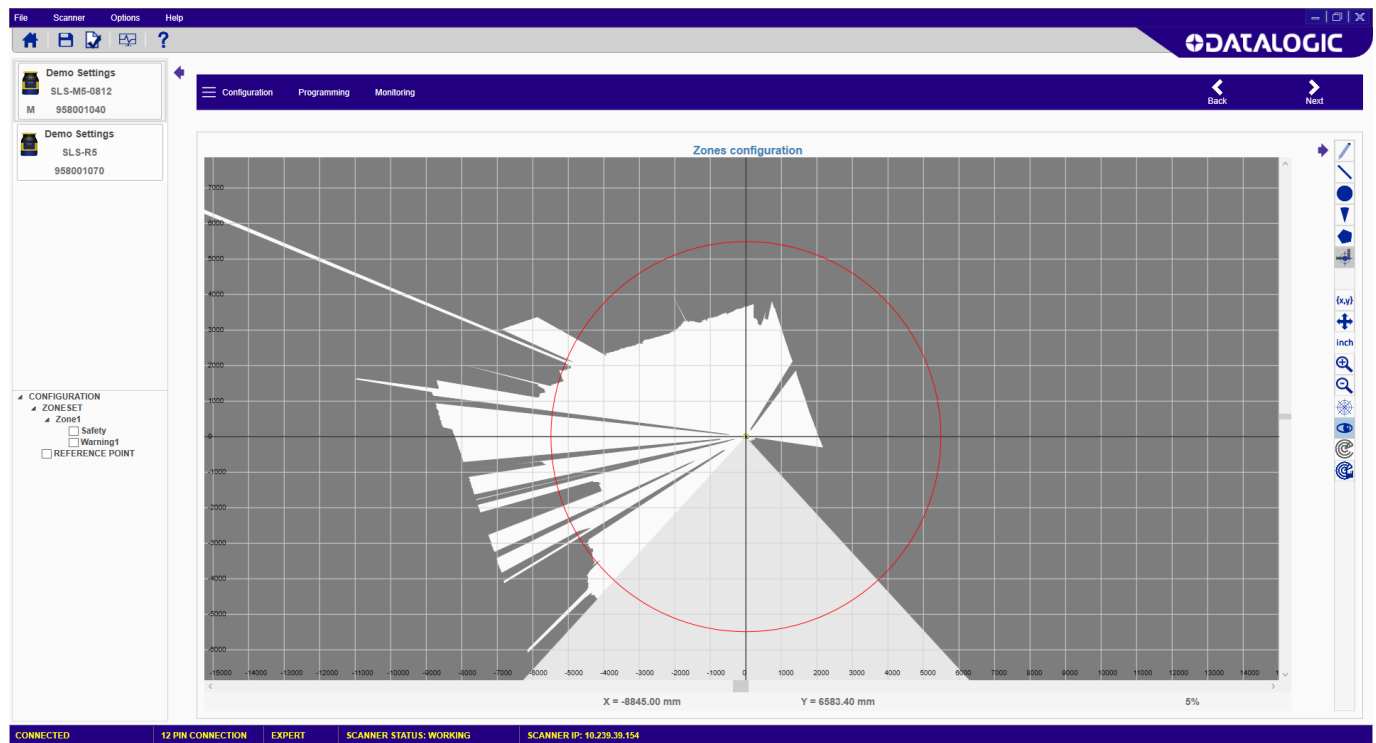
ICON	DESCRIPTION
	This function is the Teach In Area Assignment, to assign a zone type to the detected white area. After choosing Teach In, select the checkbox of either the safety zone or warning zone in the left pane and then click this button to assign it.
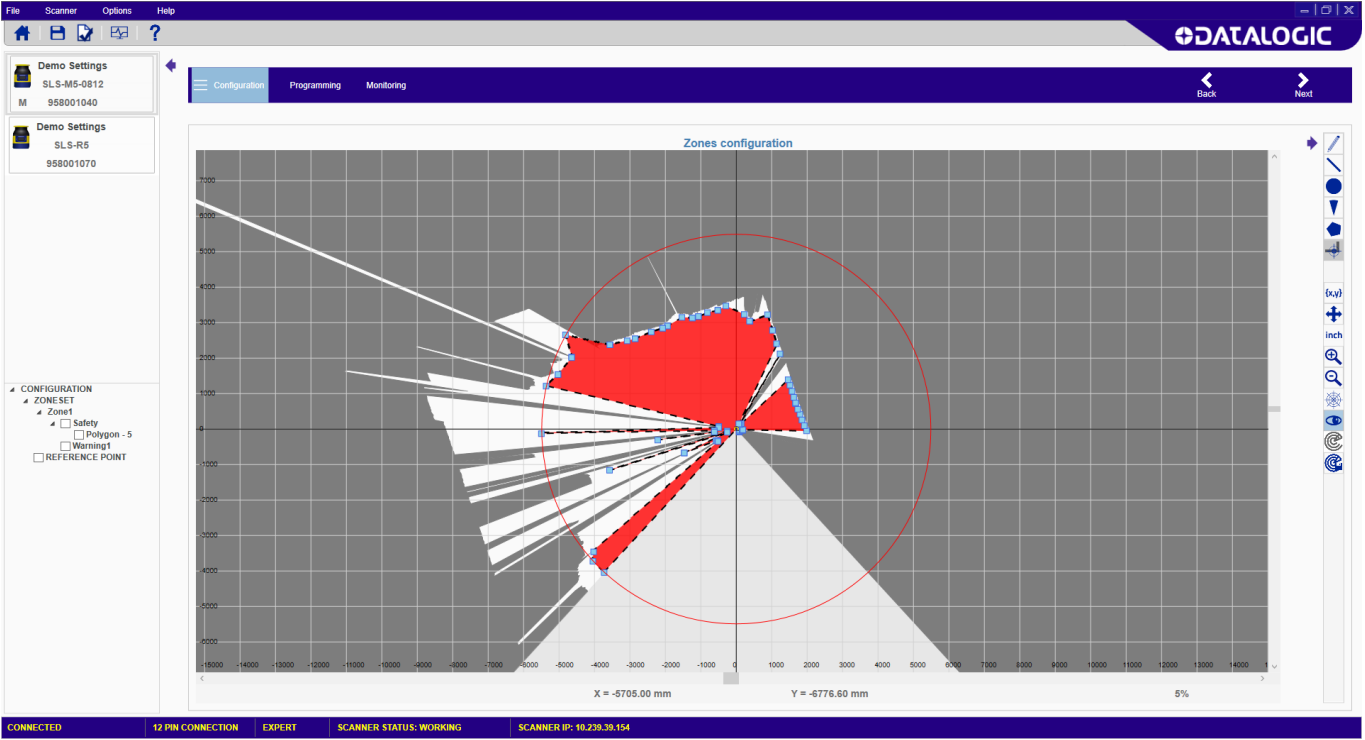
⚠ **Teach In and Draw Teach in Zone are only available if the device is online.**

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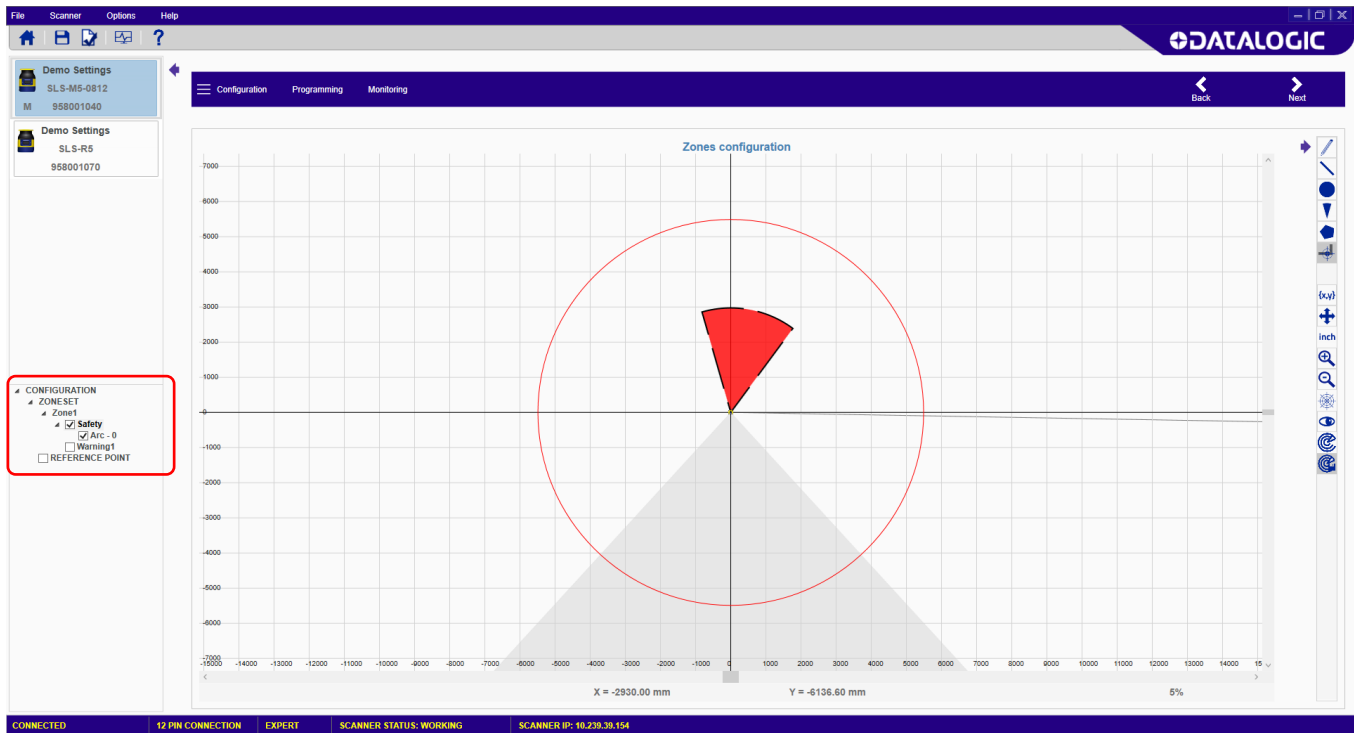
By clicking on the **label name** (outside the check box), it is possible to highlight a specific area, e.g. a Safety Zone or a Warning Zone.

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.
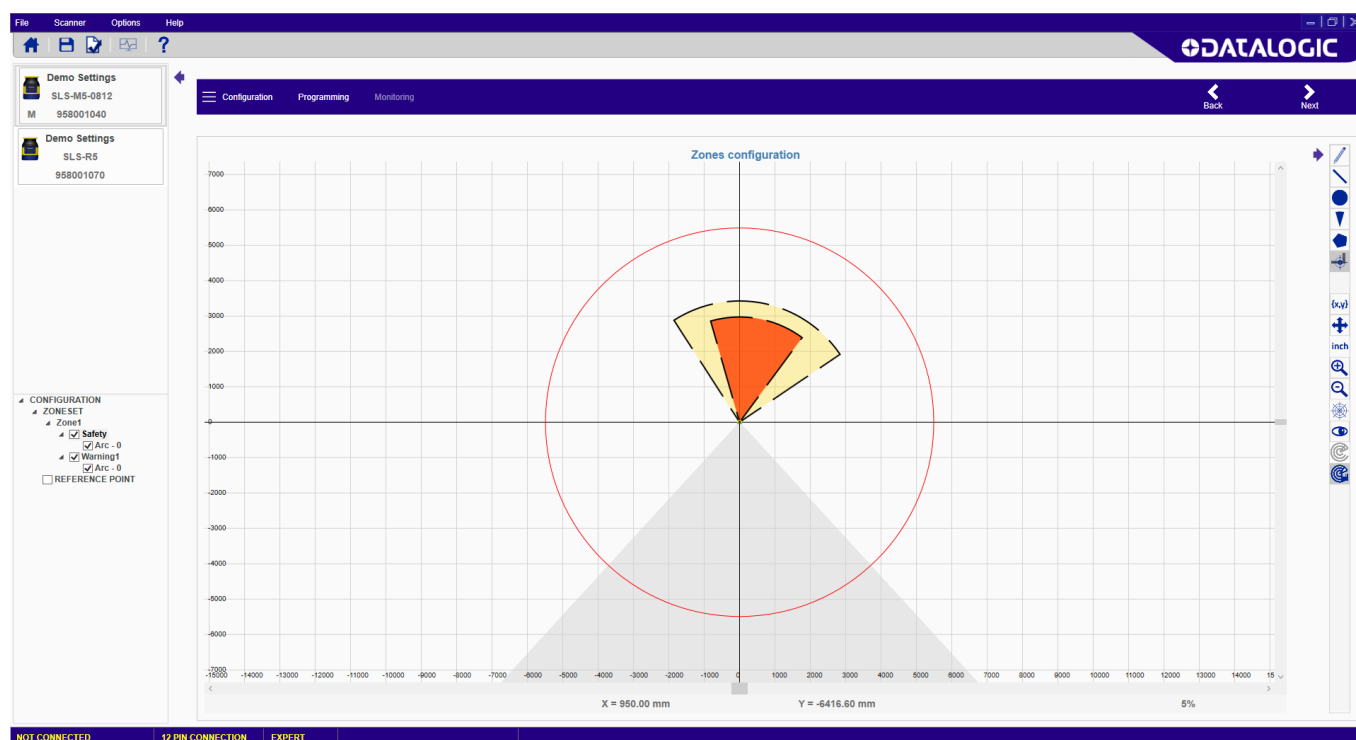
Note: This is the last step in defining the configuration. To complete configuration (load it onto the scanner, test it and **Accept** it), see Programming and Monitoring in chapter 4.

2.3 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).
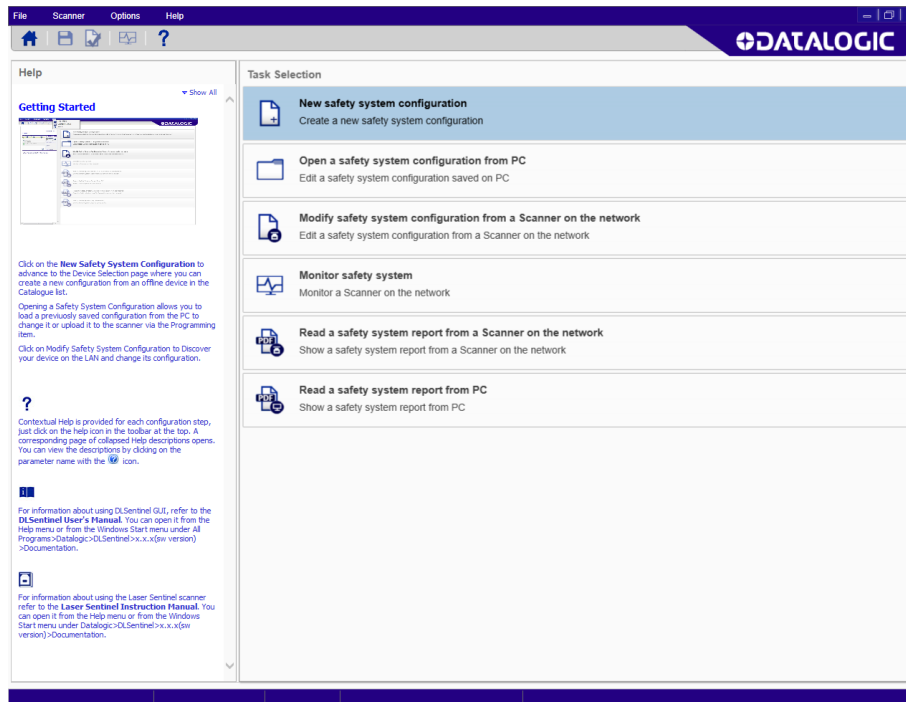
2. Click on the device in the catalogue list to load it into the task area.
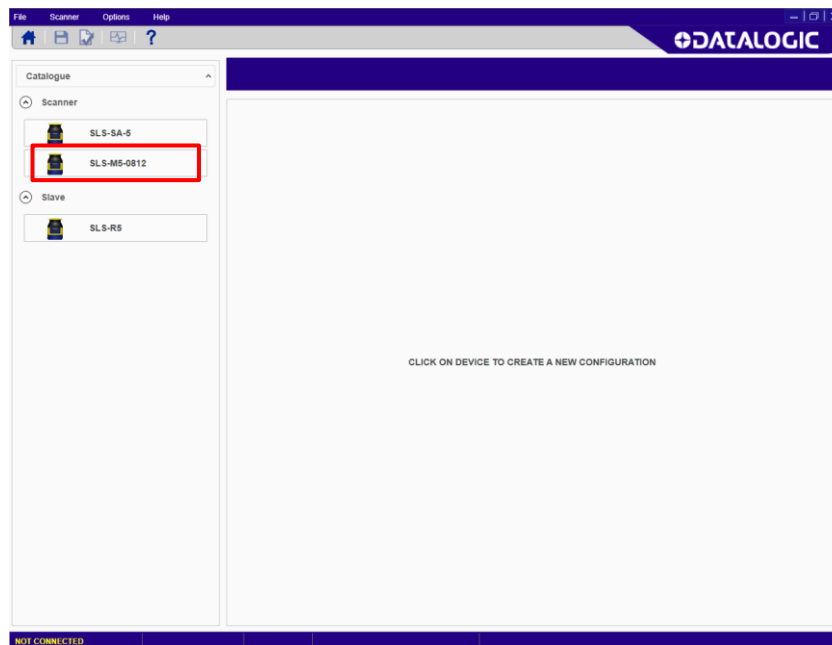
3. Click on the white right-pointing arrow on the upper right side on the main panel to open the offline configuration. You can now create your configuration and save it on your PC. See the subparagraphs under par. 0 for configuration details.

4. Save the configuration on a file on your PC. See par. 2.4.

2.4 SAVE THE CONFIGURATION

Once the configuration is done, it is possible to save it on the PC by clicking on File > Save.
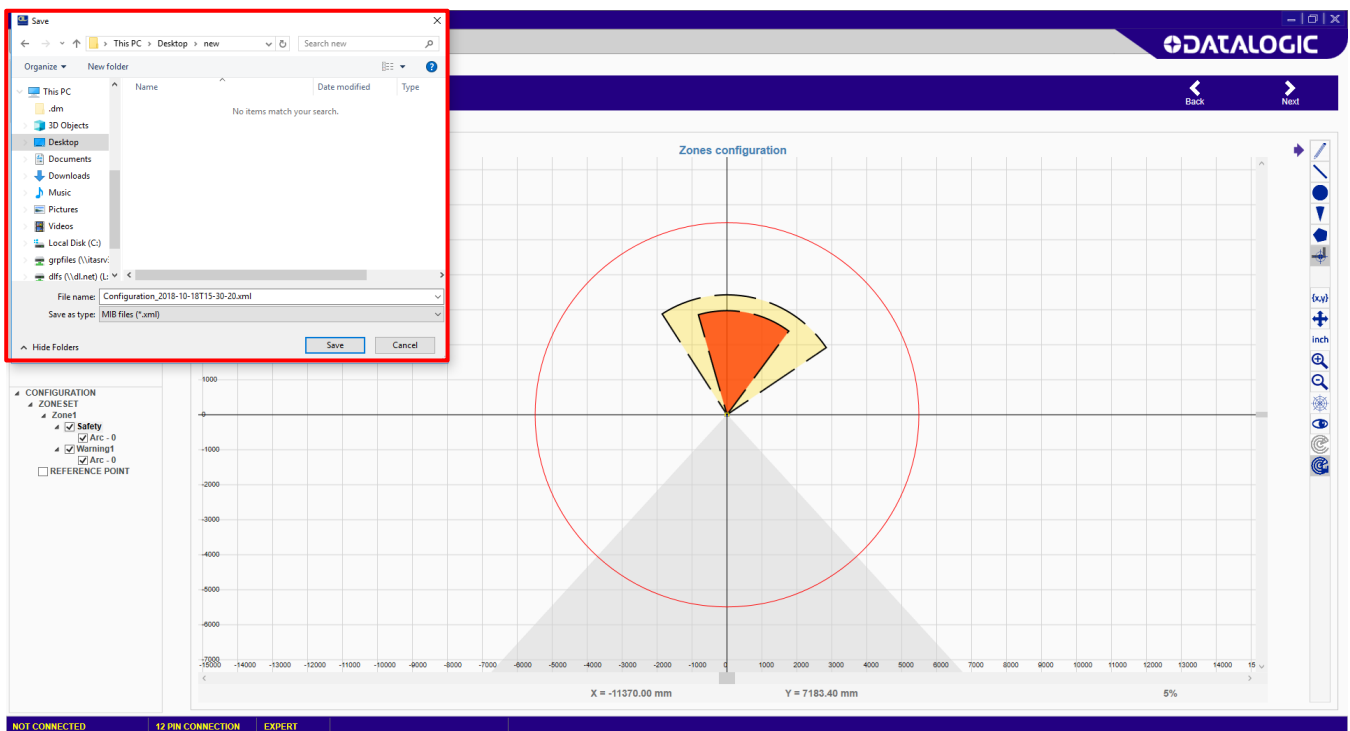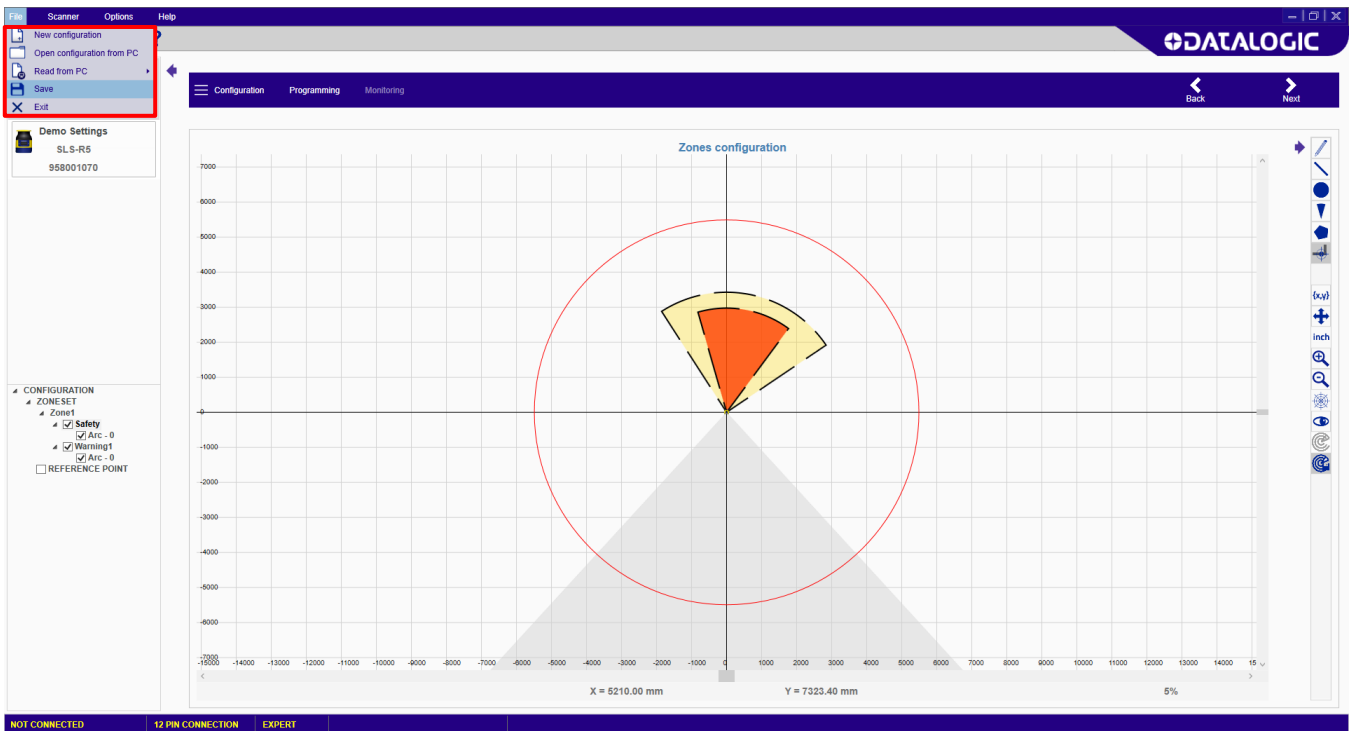
2.5 OPEN A PREVIOUSLY SAVED SAFETY SYSTEM CONFIGURATION FROM PC

1. Click on the Open a Safety System Configuration from PC task to open and upload a previously saved configuration onto a device.
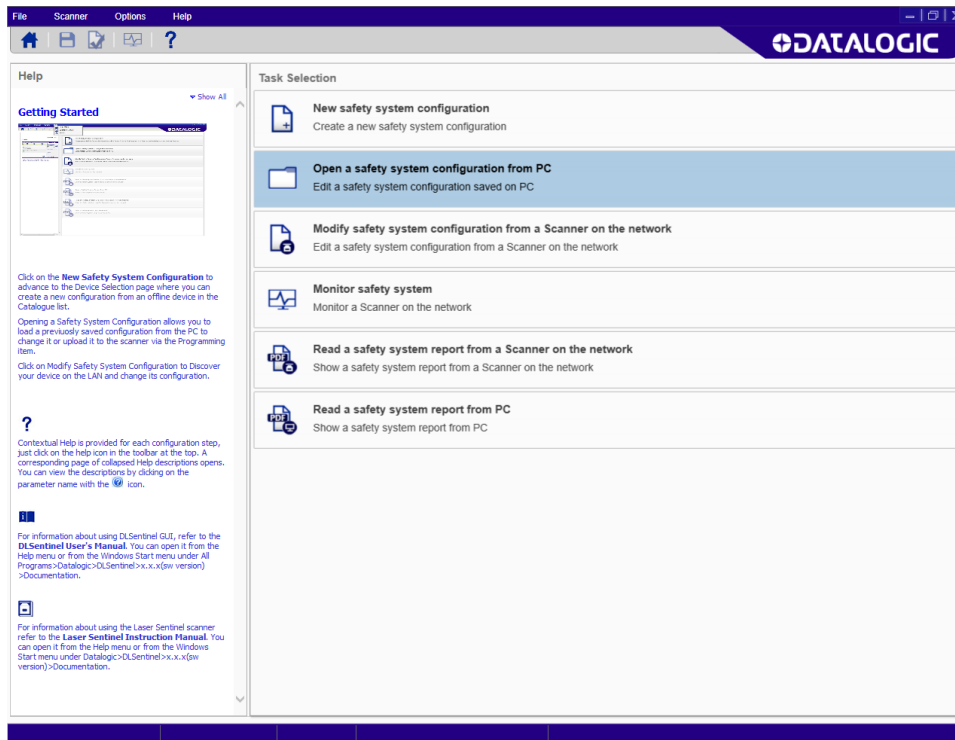
2. Select the Configuration File to open.
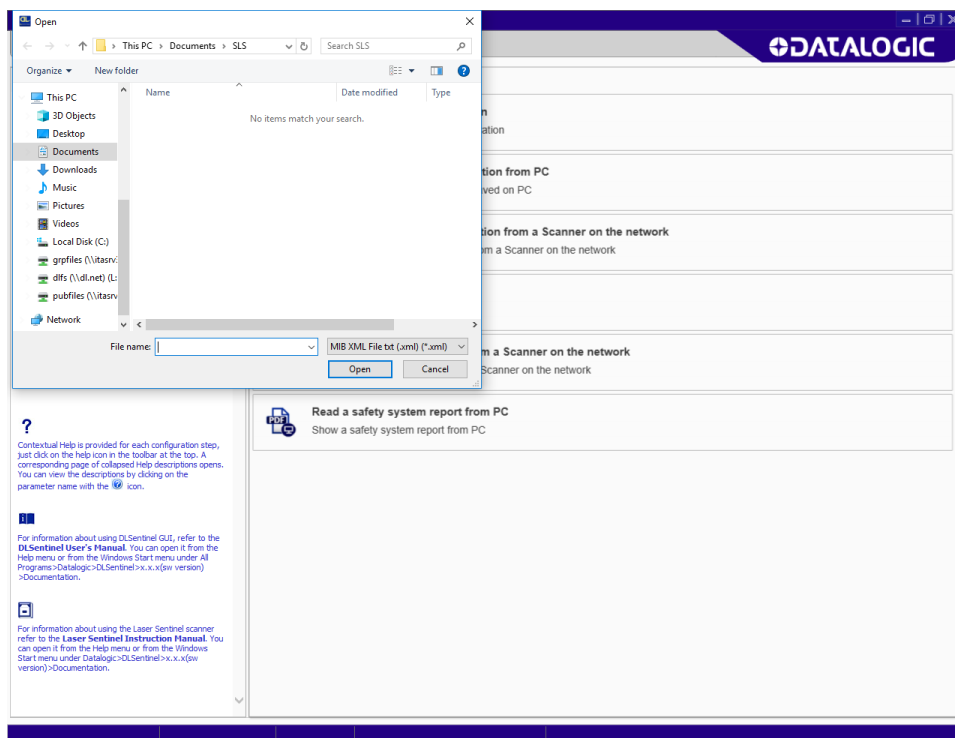
3. Once the configuration is open, click on the Programming item. The Discovery procedure will discover the connected device.
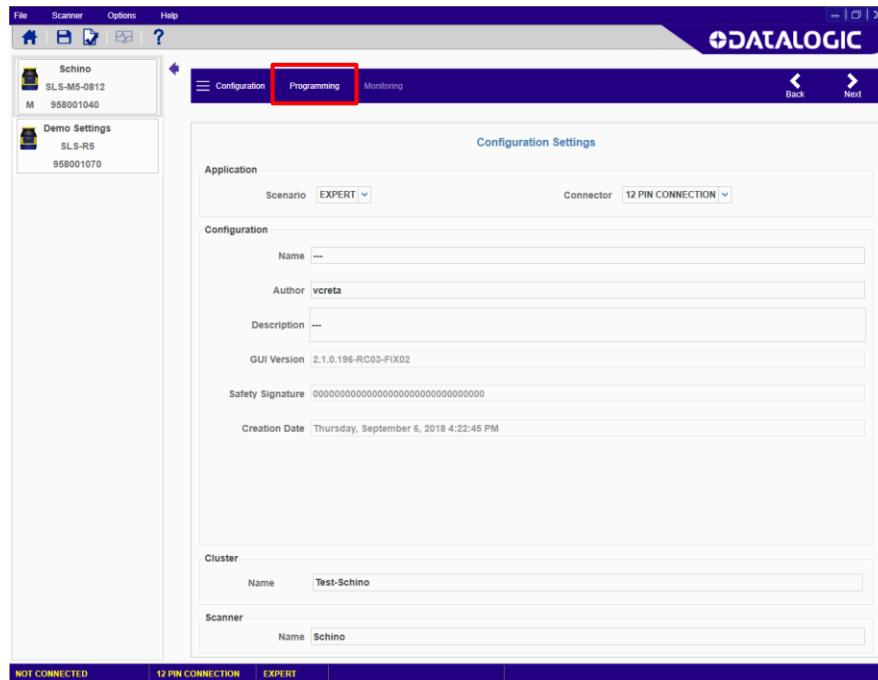
4. Click on the device to load it into the task area.
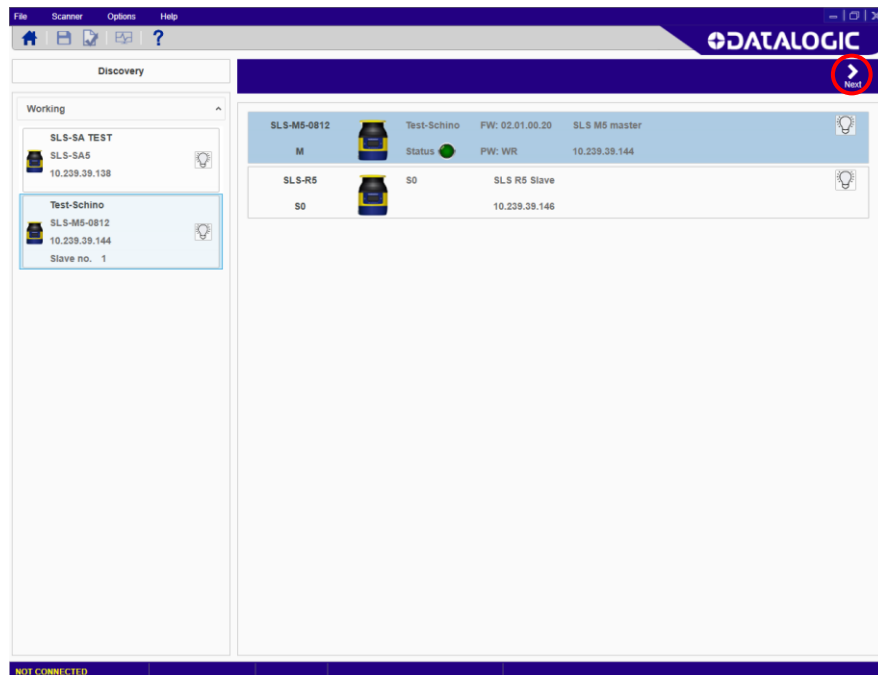
5. Click on the white right-pointing arrow on the upper right side on the main panel. The Programming page will appear. Here you can **Load** the selected configuration to the scanner.
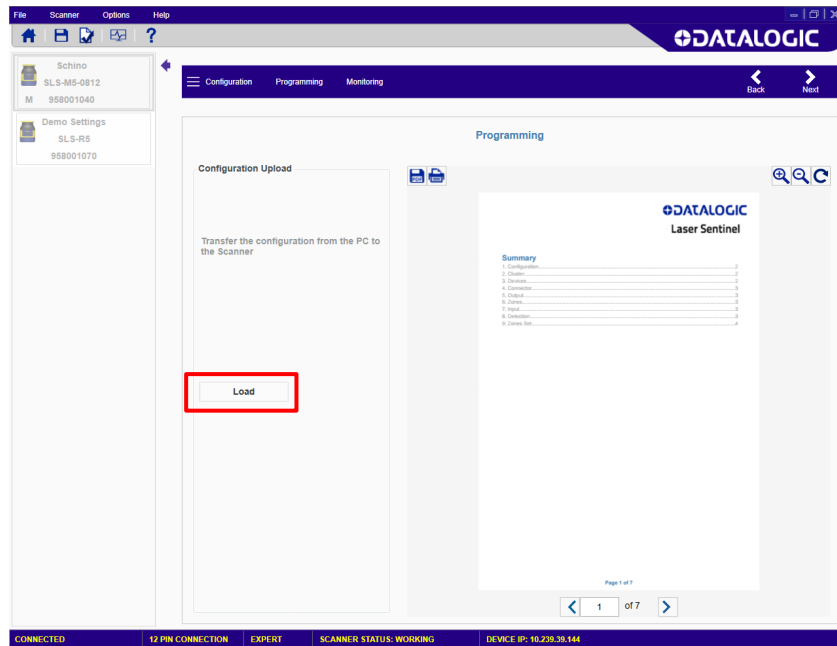
First the configuration will be validated and then you will be prompted to enter the password to change the current configuration to the new one.

6. Enter the password and click OK.
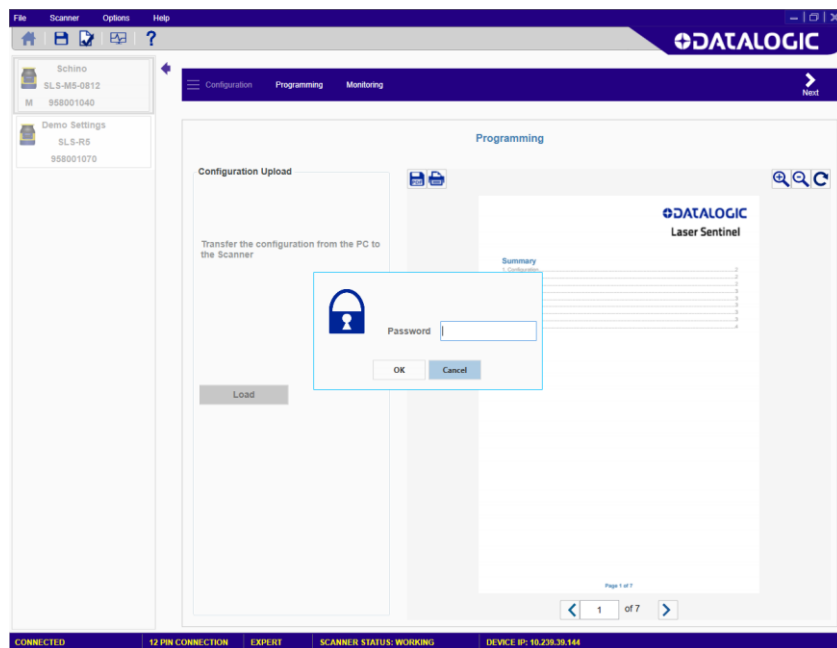
7. The scanner status will now switch to Off-Duty and the user is prompted to continue to load the new configuration onto the scanner.
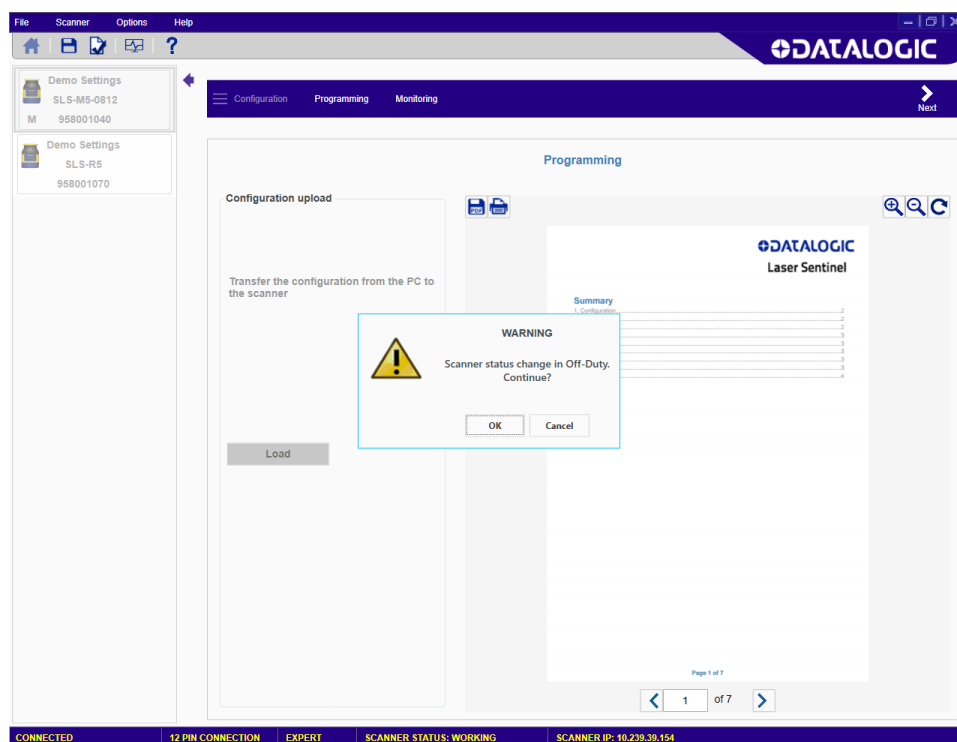
8.   Click on the **Monitoring** item to verify the configuration. See par. 3.2.

9.   Then click on Programming to **Accept** the new configuration and finalize it. See par. 3.1.

3   PROGRAMMING AND MONITORING FUNCTIONS

3.1   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 par. 3.2).

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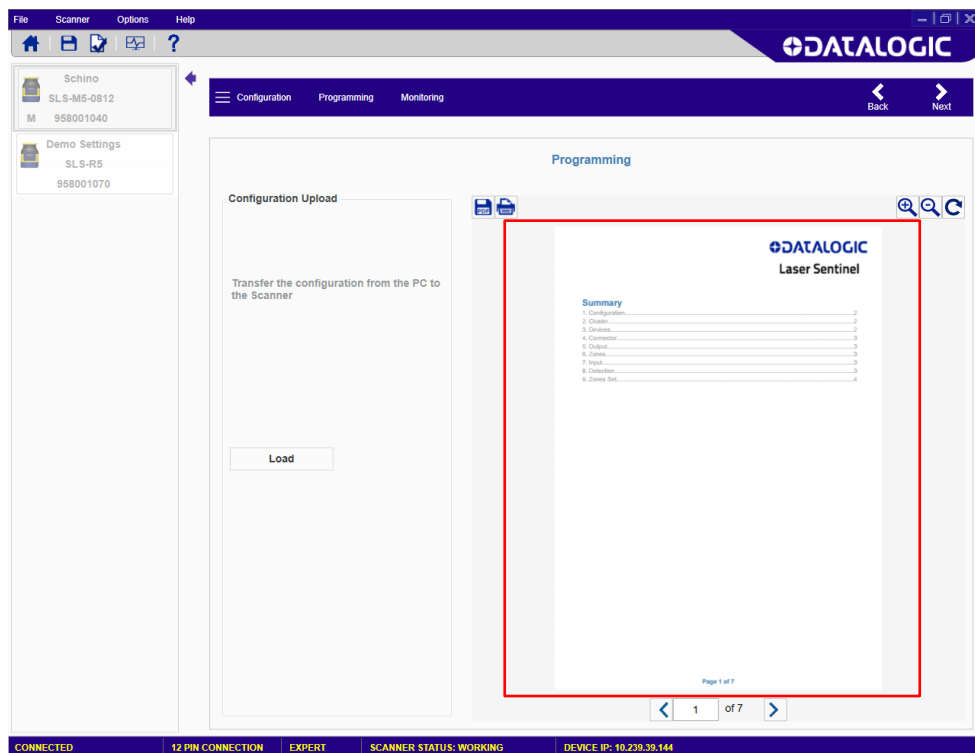
The Safety Report is a file that sums up all the parameters selected for a configuration and is generated by DLSentinel after uploading a configuration. The Report file is displayed on the right side of the panel. It is possible to save it as a PDF file and print it.

Make sure to read the Safety Report and check all the selected parameters.
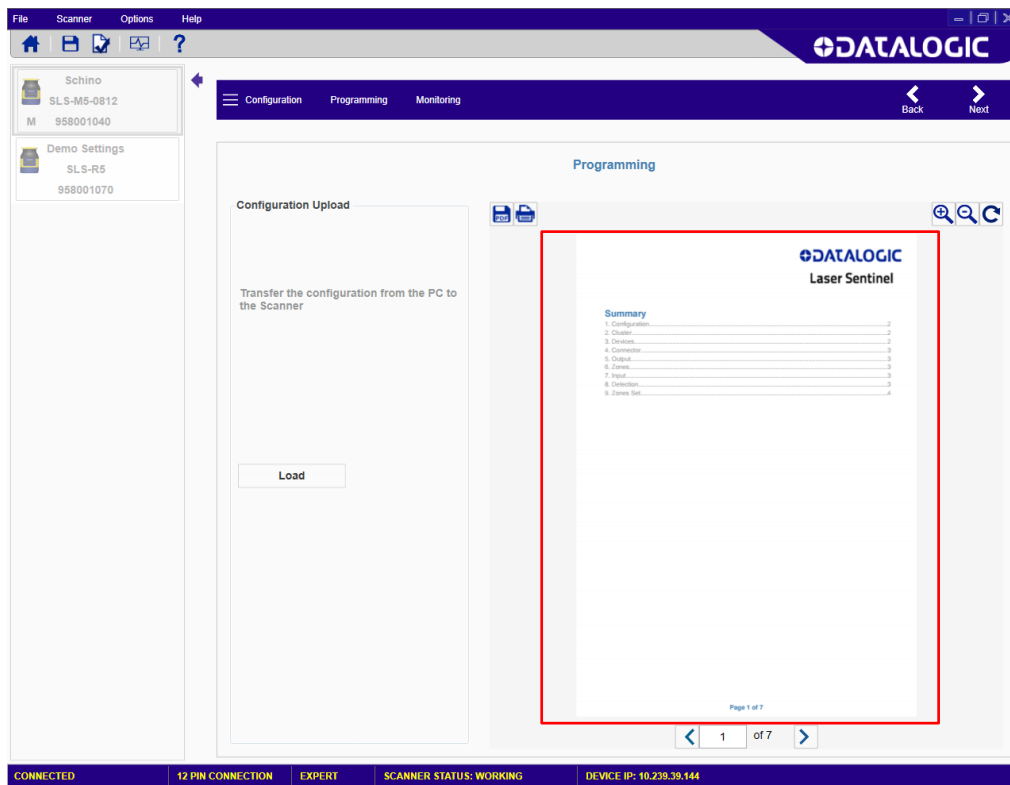
Note: The Safety Report displays the new and the previously used parameters (marked in red).

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.
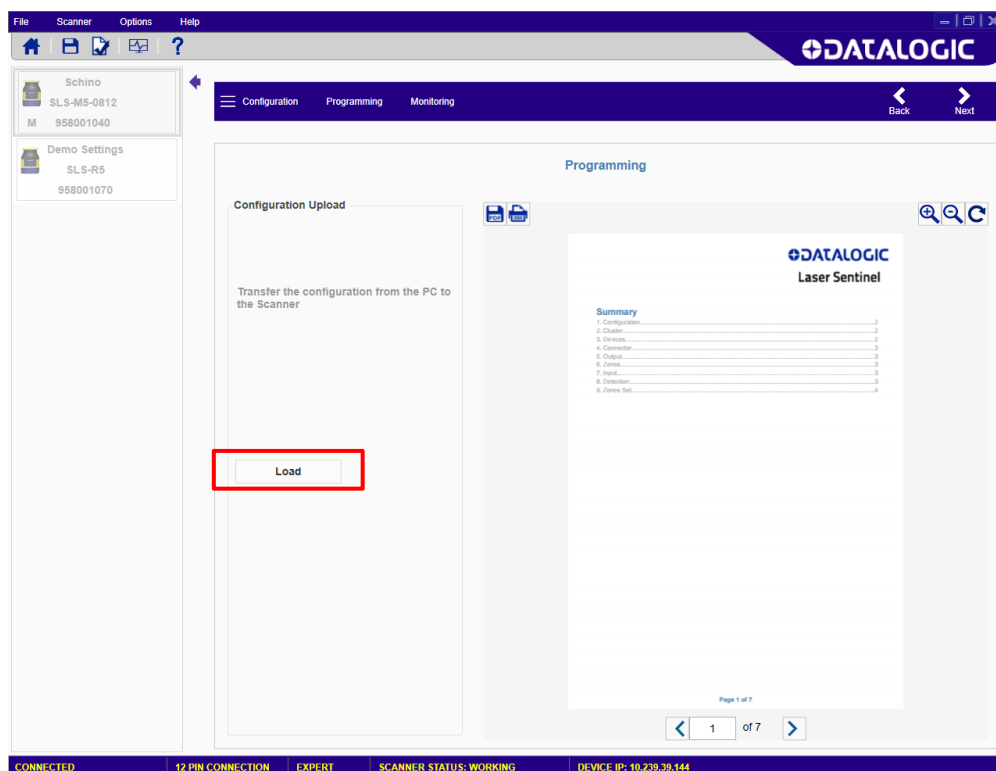
While uploading the configuration onto the device, Laser Sentinel will enter the Off status.

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.
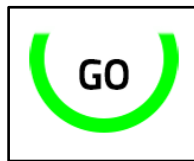
Example Pending Configuration Acceptance Icon displayed

3. Test the configuration functioning by entering **Monitoring**. See par. 3.2.

4. After testing it and checking the **Report**, **Accept** or **Reject** the configuration in the **Validation** section.
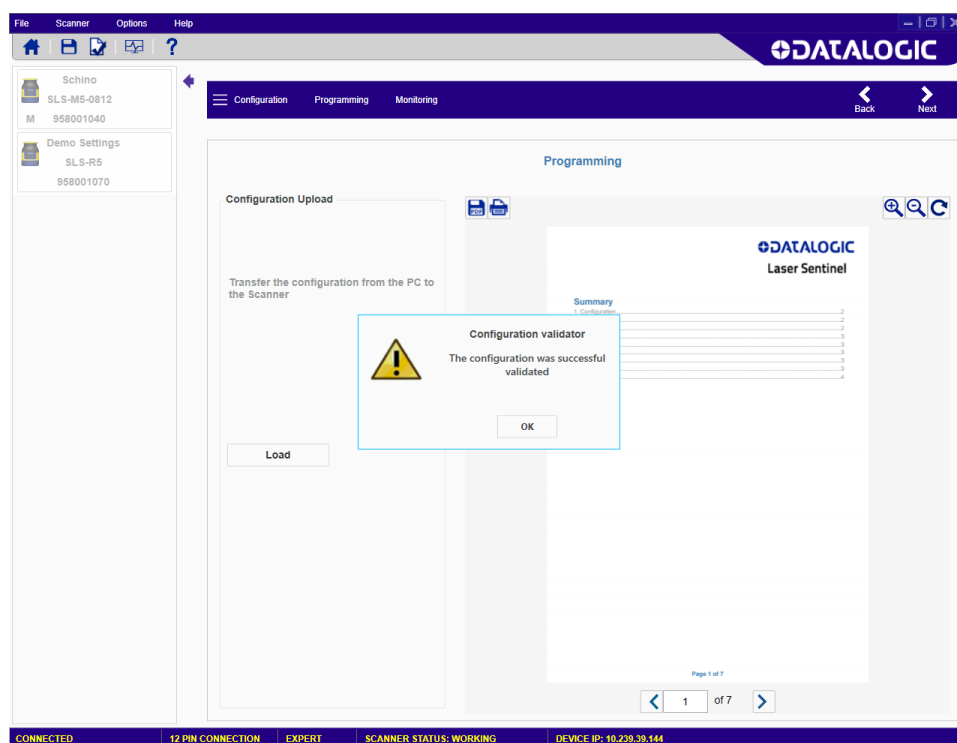
After **Acceptance**, the configuration will be finalized on the device. Laser Sentinel will display an icon with a black background like the one below indicating that the configuration has been accepted by the user.

Configuration Accepted Icon displayed

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

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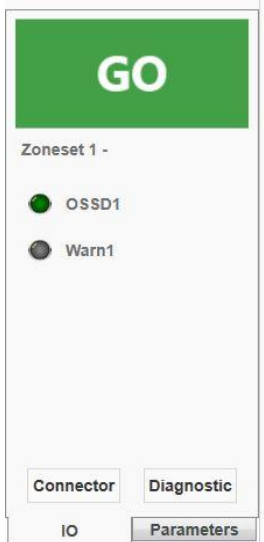
3.2 MONITORING

Monitoring is a DLSentinel function that allows you to check the proper functioning of the created configuration by monitoring the current working area. You have access to this function only by selecting an online device.
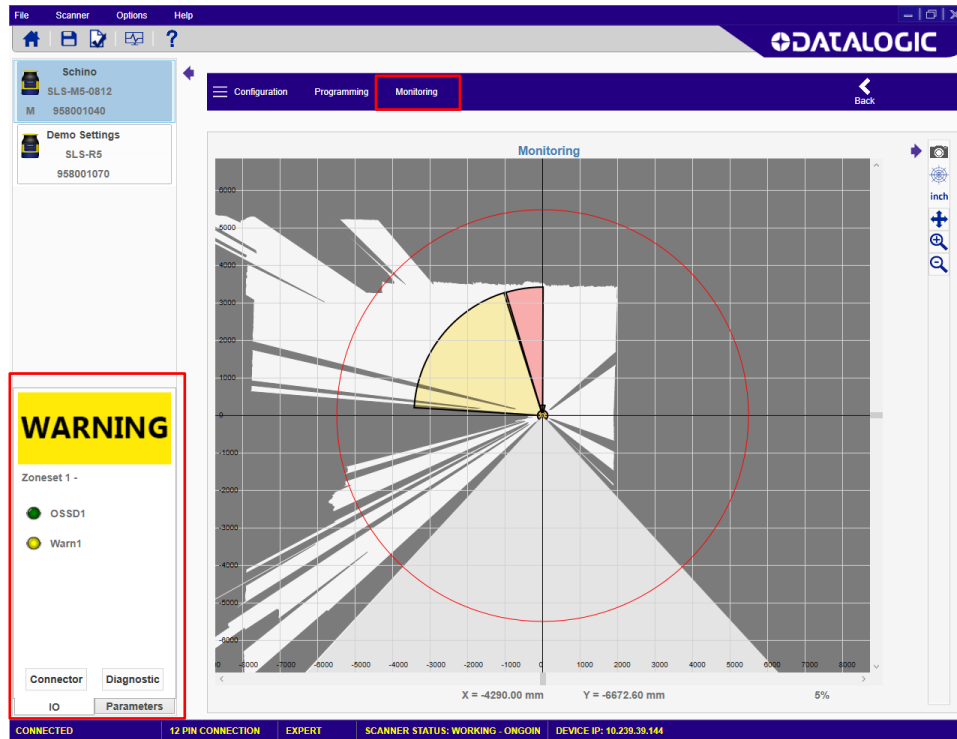
With the Monitoring function, the following information can be checked:

- The OSSDs GO/STOP status.
- The connector pin assignment, colors and functions.
- If the Laser Sentinel detects an object in the Safety and Warning zones.
- Any diagnostic errors that caused the OSSDs Off status.
- 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 and the response time.

GO

Zoneset 1 -

● OSSD1

● Warn1

| Connector | Diagnostic |
| IO | Parameters |

Note: If Monitoring is selected before uploading a new configuration, it displays the previous configuration and the present OSSDs and Warning status.

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 toggle the graph coordinates between Cartesian and Polar.
inch	Click this button to toggle the graph unit of measurement between inches and millimeters.
✛	Click this button to move (drag) the graph in any direction. Once finished re-click on the button.
🔍+	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.

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.

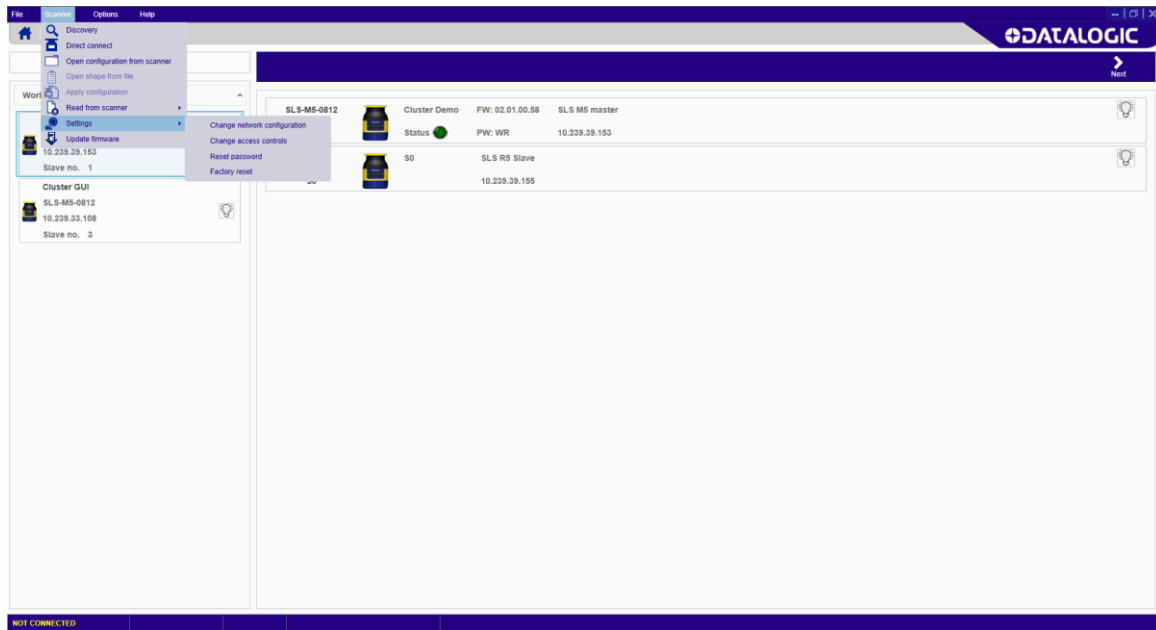**Note:** To go back to Programming, click on the Programming item or on the white left-pointing arrow.

APPENDIX

ACCESS CONTROL

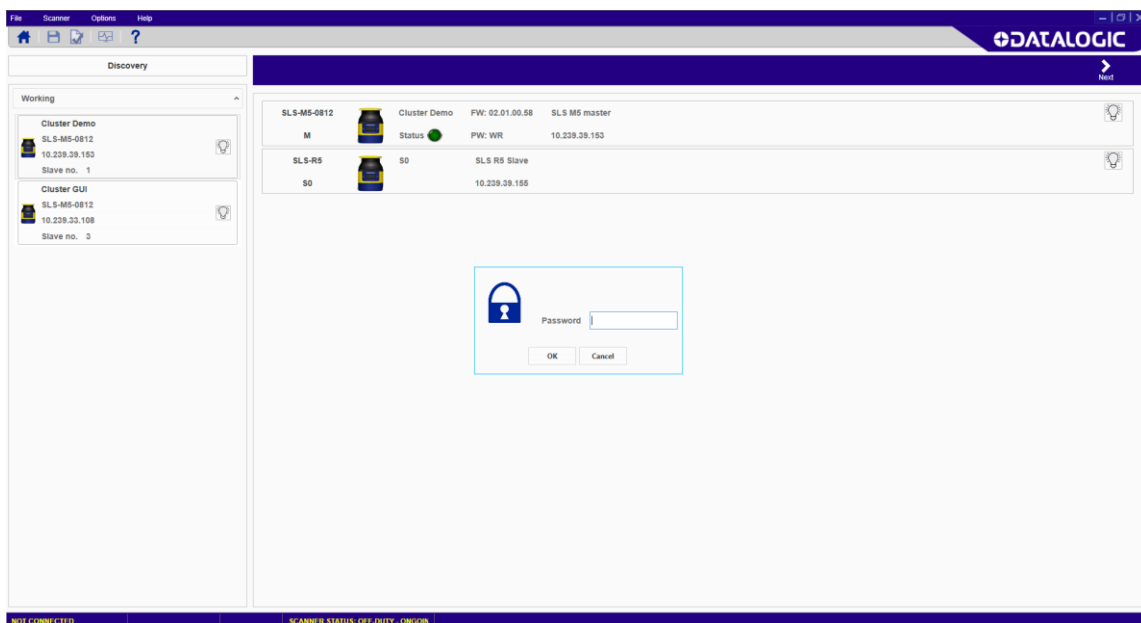**Assign or change passwords**

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),
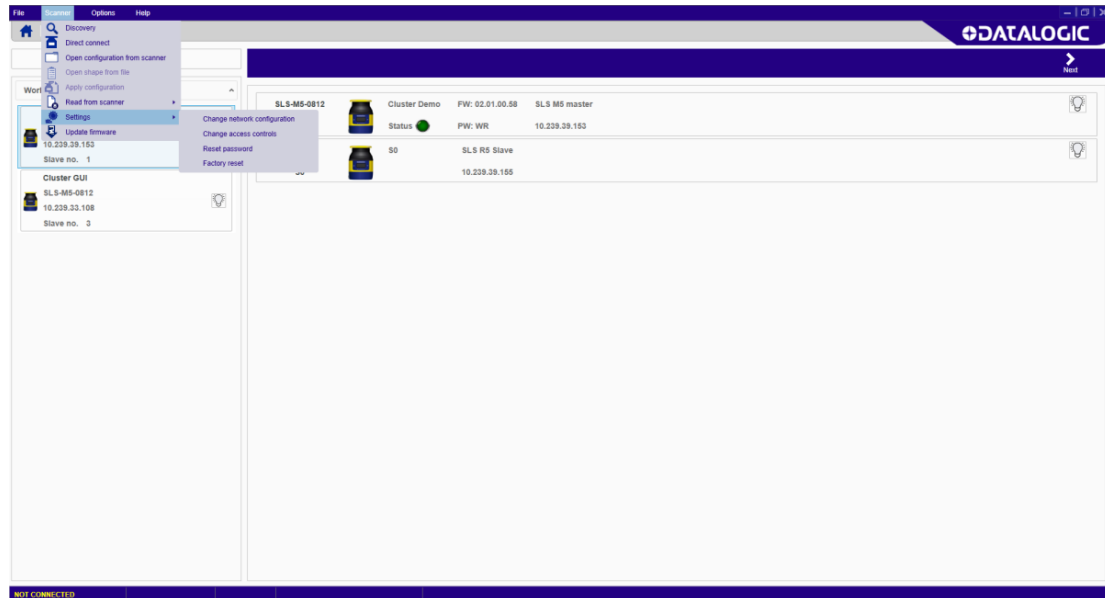- None (no password required).
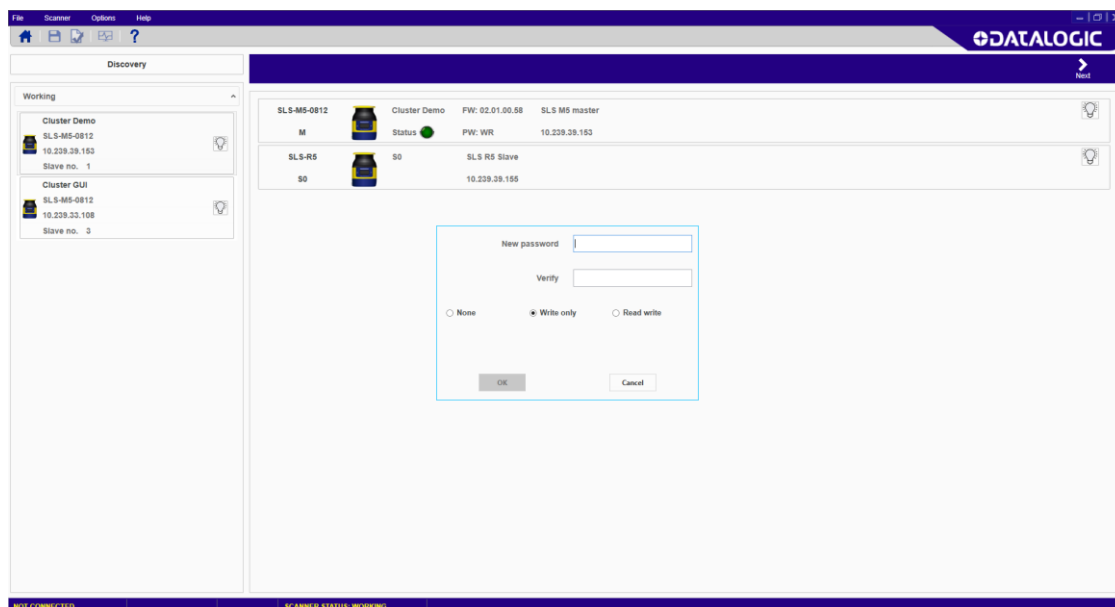
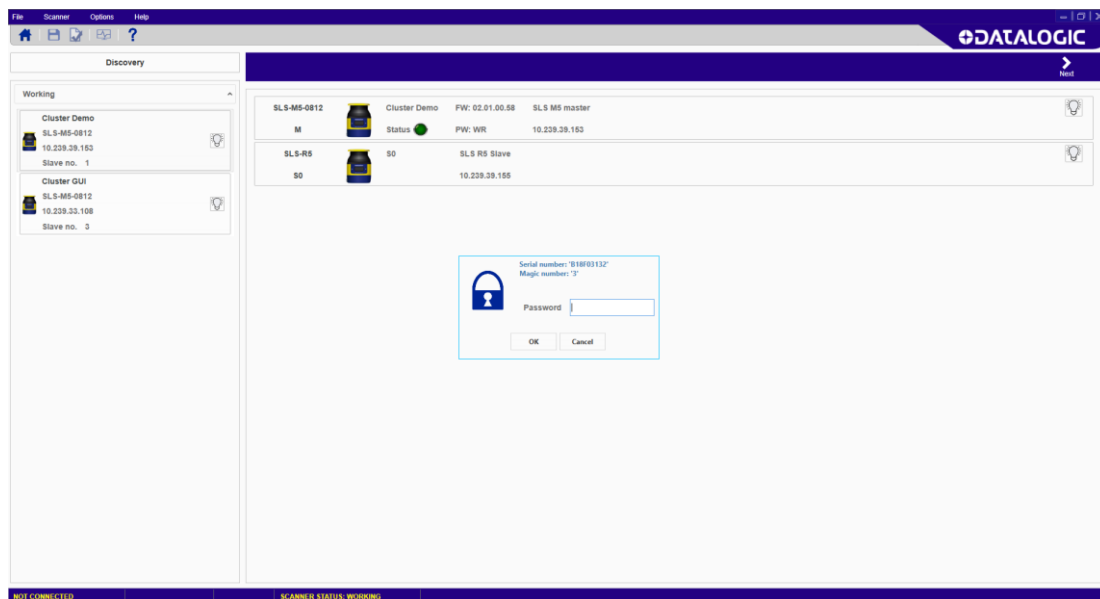

4. Then click OK to proceed.

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

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.
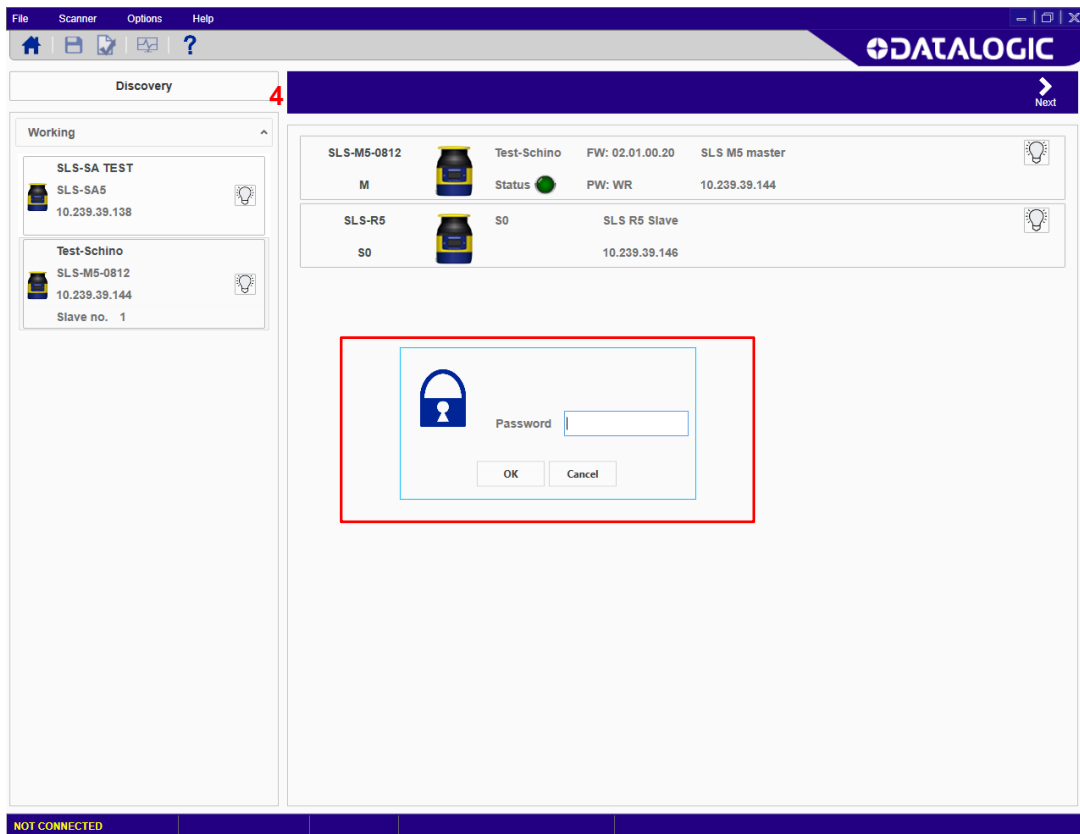
5. In the Firmware update section (**Package section**), click on ZIP Archive to search and select a previously downloaded new firmware version (from the Datalogic website).

6. Once the new firmware version is selected, click on Load (**Configuration Upload**). During the Firmware Update the device will go offline.
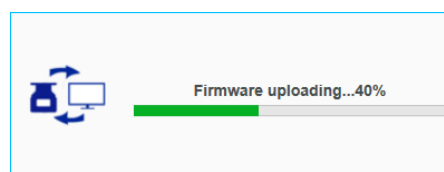

7. When the firmware version is completely loaded, the user enters the Offline-Test mode to create a configuration and test the new firmware version.

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**).

FACTORY RESET

The Factory Reset procedure resets the default password ("admin"), the password type (see 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 message will appear informing the user that all devices of the cluster will be restored to factory configuration and the current configuration will be lost. Click OK to proceed.
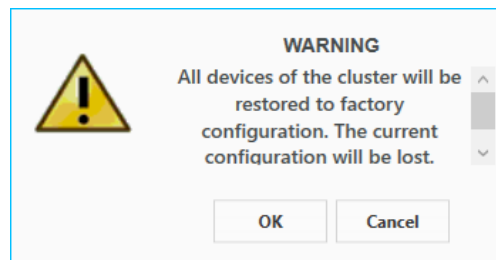
3. A new window will prompt the user to enter the device password (default password "**admin**", if not changed).

4. A message will appear informing the user that the operation will take a few minutes. Subsequently, all devices will be restarted. Click OK to proceed.
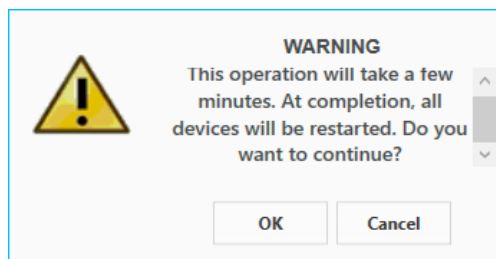
5. At completion, the Getting Started page will appear and the device will show a "Waiting Configuration" message (see icon below).

DATALOGIC

www.datalogic.com