

## **Safety laser scanner PSENscan**

Productive area monitoring and dynamic navigation



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2. Product description
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## ► For every requirement – Safe sensors



## ► Product description PSENscan



### **Productive area monitoring – including in series**

- 2D area monitoring
- Suitable for applications up to
  - PL d (EN ISO 13849-1)
  - Type 3 (EN 61496-1)
  - SIL 2 (IEC 61508)
- Base, light, master and slave versions
- Operating range: 3 / 5.5 m safety zone, 40 m warning zone
- Opening angle: 275 degrees
- Resolution: 40/70 mm
- Monitors 3 separate zones (warning-, protection-, reference zone)
- Simultaneously monitored protection fields: 1 (3\*)
- Switchable configurations: up to 10 (70\*)
- Reaction time: 62 ms
- Protection type: IP65
- Dimensions (HxWxD): 152 x 102 x 112.5 mm
- Complete solution with PNOZmulti, PSSu

\*With our new 17-pin type, available soon

## ► Product description PSENscan



### **Additional functions of the light, master and slave versions**

- Muting
- EDM
- Override
- Reference Point Monitoring
- Vertical applications

### **Additional functions of the master and slave versions**

- Restart in accordance with EN ISO 61496-3

## ► Product in detail

### Technical data: Base version



#### **Mechanical data:**

- Opening angle: 275 degrees
- Resolution: 70mm
- Reaction time: 62 ms
- Connection type: M12, 8-pin
- Protection type: IP65
- Ambient temperature: 0 up to +50°C

#### **Electrical data:**

- Supply voltage: 24V
- Outputs:
  - 2 x OSSDs: Each 250 mA
  - 1 signal output: 100 mA
- Inputs: (2) safe inputs
- Configurable Input/Output: (1) configurable as an output / safe input

## ► Product in detail

### Technical data: light, master, slave versions



#### **Mechanical data:**

- Opening angle: 275 degrees
- Resolution: 40/70 mm (30/50/150mm\*)
- Reaction time: 62 ms
- Connection type: M12, 12-pin or 8 pin (17-pin\*), depending on type
- Protection type: IP65
- Ambient temperature: 0 – 50°C and (-10°C – +50°C\*)

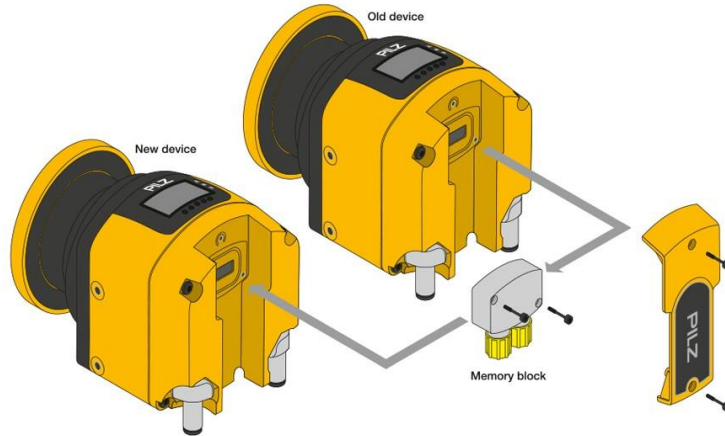
#### **Electrical data:**

- Supply voltage: 24V
- Inputs and outputs: depending on type and application
- 7 Outputs Light-, Master-, Slave-type

\*With our new 17-pin type, available soon

## ► Product in detail

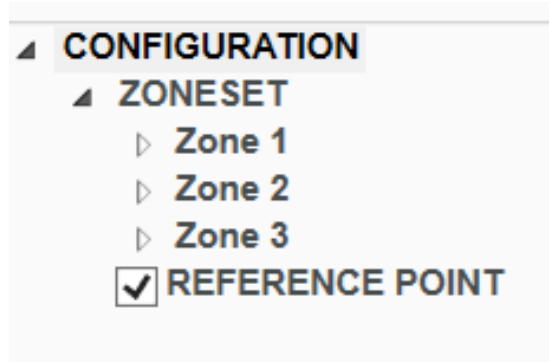
### PSENscan with fast replacement module



#### **Save time and effort thanks to the fast replacement module:**

- The configuration is saved and stored in the scanner and can be easily duplicated and transferred to other scanners of the same model when replacing PSENscan, e.g. In case of damage
- After restart, the scanner performs a self-test and can then be used immediately
- Can also be used for duplication of the configuration



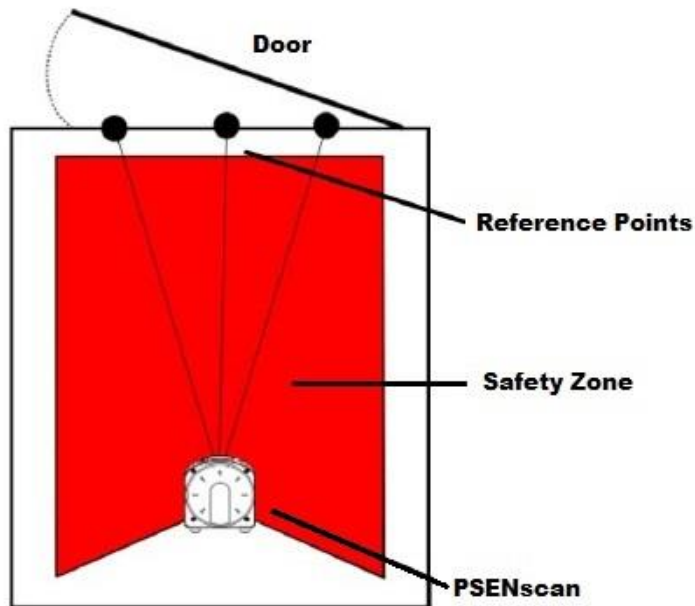


### Reference point monitoring

- A safety function used to monitor any change in position of the scanner, or a structure.
- Reference Points must be located outside of the Safety Zone
- Structures can either allow or prevent access to the danger zone
- National and International standards recommend reference points for all vertical applications
- Quick and easy configuration with the PSENscan Configurator

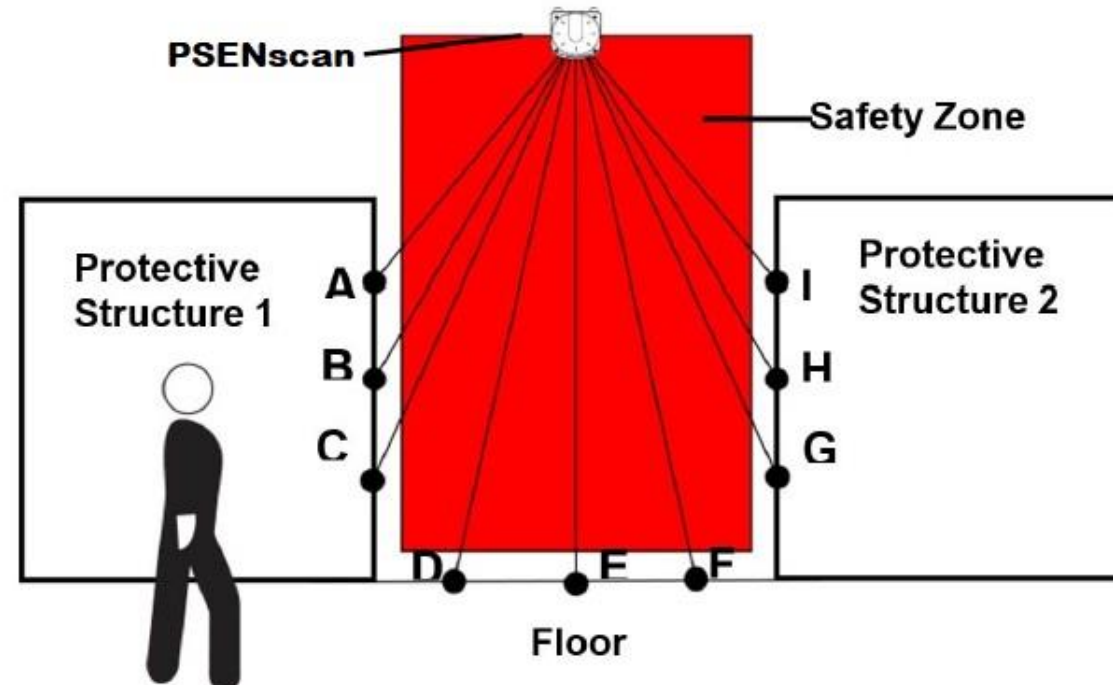
### Reference point monitoring on a movable structure

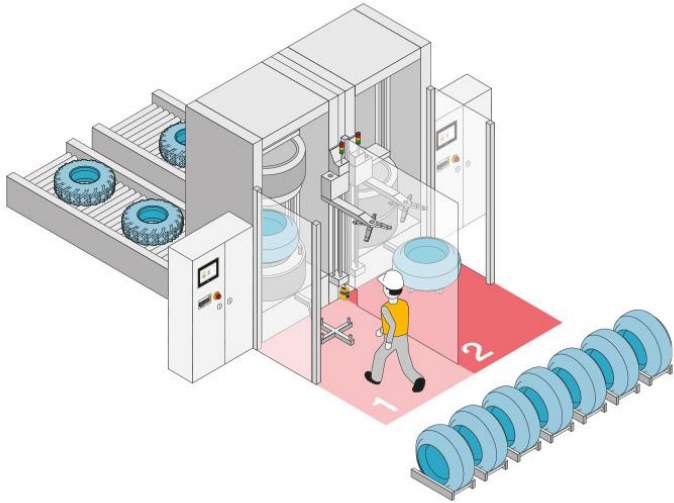
When the reference points (minimum of 3) are set on a door, the scanner monitors for any change in position. If a change is detected outside the specified tolerance, the OSSD outputs go to the OFF-state.



### Reference point monitoring on a fixed structure

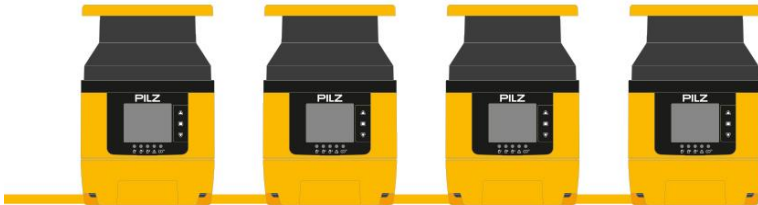
When a fixed structure or guard is used in conjunction with a safety scanner, undetected access to the dangerous area could occur if the position of the structure is moved. To avoid this, a minimum of 3 reference points are used on each structure to monitor their position. If a change is detected outside the specified tolerance, the OSSD outputs go to the OFF-state.





### **Simultaneous monitoring of up to 3 safety zones\***

With PSENscan, up to 3 safety zones can be monitored simultaneously and independently. Only the plant section that a person is accessing is stopped. As a result, safety distances in your plant can be optimized. This increases productivity and improves the ergonomics of your plant – while enjoying optimum safety.



### **Simple configuration thanks to series connection**

Up to 4 safety laser scanners, PSENscan can be connected in accordance with the master-slave principle. The configuration is made centrally on the master scanner and is transferred to the slaves. The slaves are also supplied with power via the master.

\*With our new 17-pin type, available soon

## ► Product description

# PSENScan: ROS packages for FTS (Fleet Tracking System) navigation

NEW



For productive area monitoring and dynamic navigation of AGVs (automated guided vehicles)

### PSENScan has ROS package (Robot Operation System)

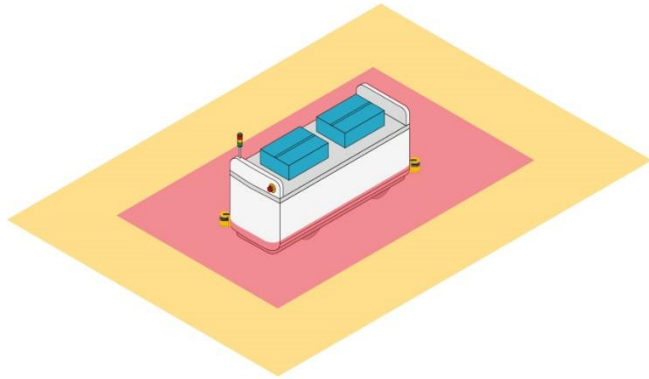
The scanner provides raw data, which is ROS-compliant, in order for it to be used for AVG navigation, e.g. with SLAM (Simultaneous Localization and Mapping) or for other applications in the robot environment.

- ROS packages are currently available for the master versions
- Installation via ROS or source code available on GitHub:

[https://github.com/pilzde/psen\\_scan](https://github.com/pilzde/psen_scan)

## ► Benefits at a glance PSENscan

NEW



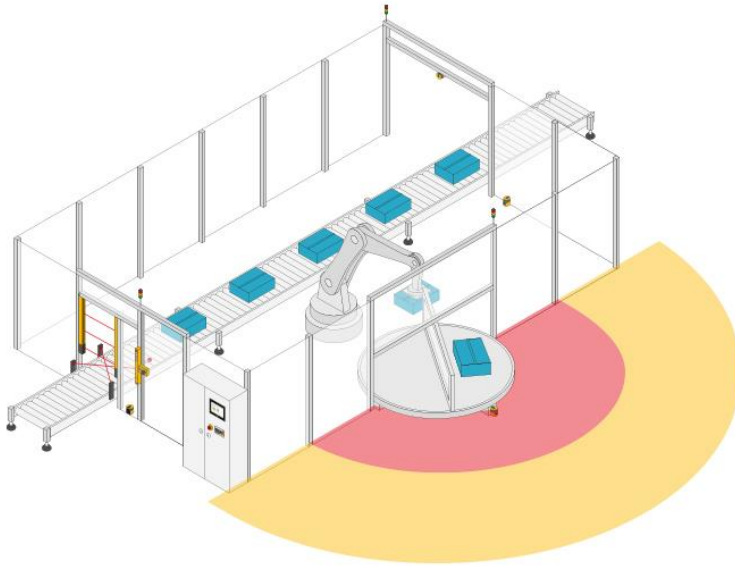
ROS

### ROS packages for FTS (Fleet Tracking System) navigation

- Easy to integrate safety laser scanners into an existing ROS environment
- Possible to use multiple safety laser scanners
- AGV navigation e.g. with SLAM (Simultaneous Localization and Mapping)
- Can be used for a wide range of applications in a robot environment thanks to simple data exchange via standard ROS messages (LaserScan)
- Compliance with Pilz software development standards and those of the ROS-Industrial Consortium
- Rapid development and implementation of new software features thanks to worldwide Pilz support
- Fast, free installation via ROS or available as source code on GitHub  
[https://github.com/pilzde/psen\\_scan](https://github.com/pilzde/psen_scan)

## ► Application examples

### Optimum protection for danger zones



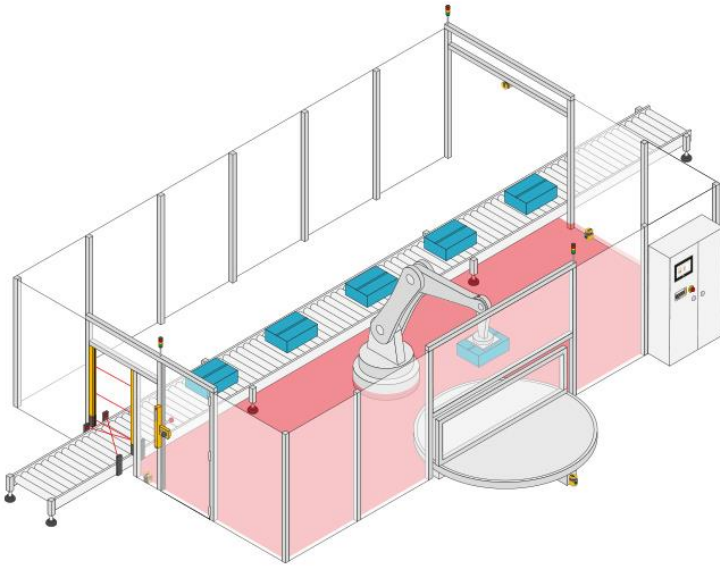
### Stationary safeguarding of danger zone

Applications in which there is interaction between human and machine present a significant challenge to the safety solution. Safety laser scanners, PSENscan, detect when someone is approaching a hazardous movement. If the warning field is accessed, the hazardous movement is braked in a controlled manner; if the protected field is accessed, it is stopped.

- Safe detection of persons in the danger zone for controlled braking of the hazardous movement

## ► Application examples

### Optimum protection for danger zones



#### **Encroachment from behind**

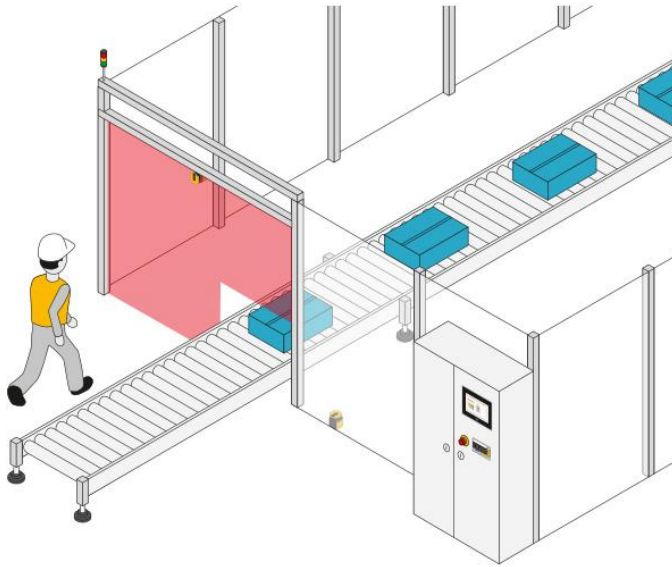
In danger zones with poor visibility and robot applications in particular, a reliable safety concept is an absolute must. Safety laser scanners, PSENscan, detect the presence of a person in the danger zone and prevent the hazardous movement from restarting.

- Simultaneously addresses two challenges: Safeguarding of the danger zone and restart monitoring



## ► Application examples

### Optimum protection for danger zones



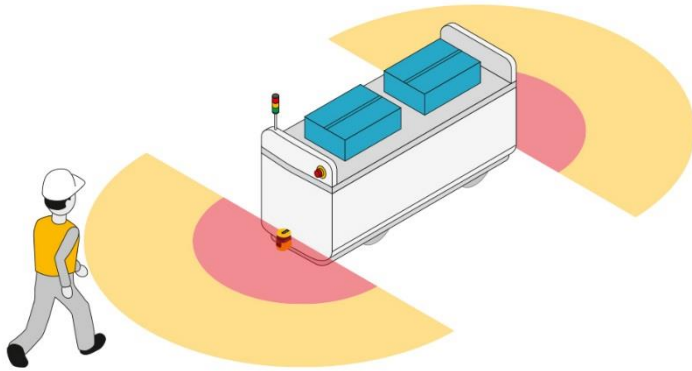
### Access guarding

A flexible solution is required in order to safeguard access to danger zones in the most diverse applications. Safety laser scanners, PSENscan, provide optimum protection against access of persons, but that's not all; thanks to integrated muting inputs they are also suitable for applications in which material is transported in and out simultaneously.

- Distinguishes between human and material, so transports materials in and out safely

## ► Application examples Optimum protection for danger zones

NEW



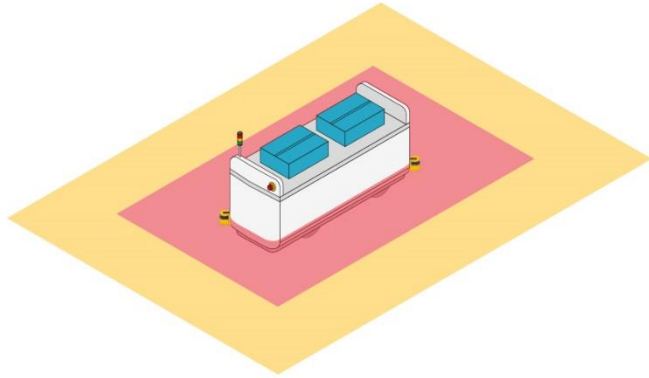
ROS

### Safeguarding and dynamic navigation of automated guided vehicles (FTS)

Thanks to the ROS package (Robot Operation System), PSENscan also supports dynamic navigation of AGVs - all the data needed for navigation is available in a ROS-compliant format, without the need for additional programming. As a result, a SLAM algorithm (Simultaneous Localization and Mapping) can be fed in, for example. So maps of the environment are produced for dynamic navigation and the AGV avoids obstacles, for example. You benefit from a more dynamic and, therefore, safe implementation of mobile applications in production environments.

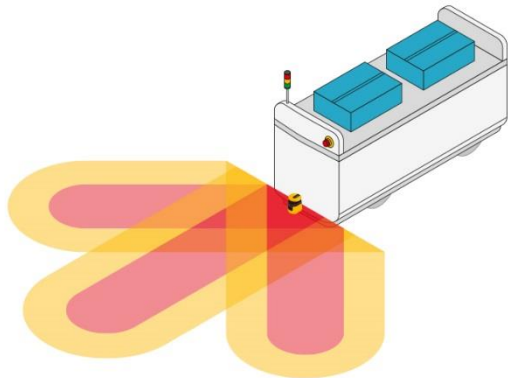
## ► Application examples

### Benefits when safeguarding automated guided vehicles



#### **All-around protection of AGV with just two safety laser scanners**

AGVs can enjoy all-around protection with just two safety laser scanners. They detect objects on the vehicle's route and ensure that the AGV brakes in time.

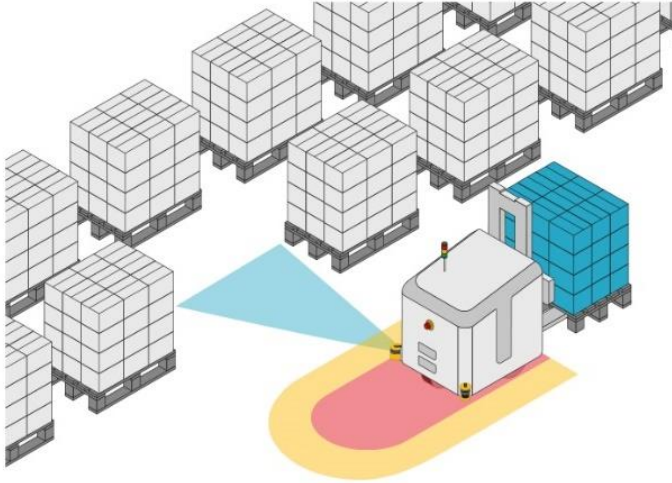


#### **Switching protected field and warning field to the current route**

To guarantee a safe route even when negotiating bends, various protected fields and warning fields can be configured. So it is possible to switch to the appropriate protected field and warning field, based on the current route.

## ► Application examples

### Benefits when safeguarding automated guided vehicles



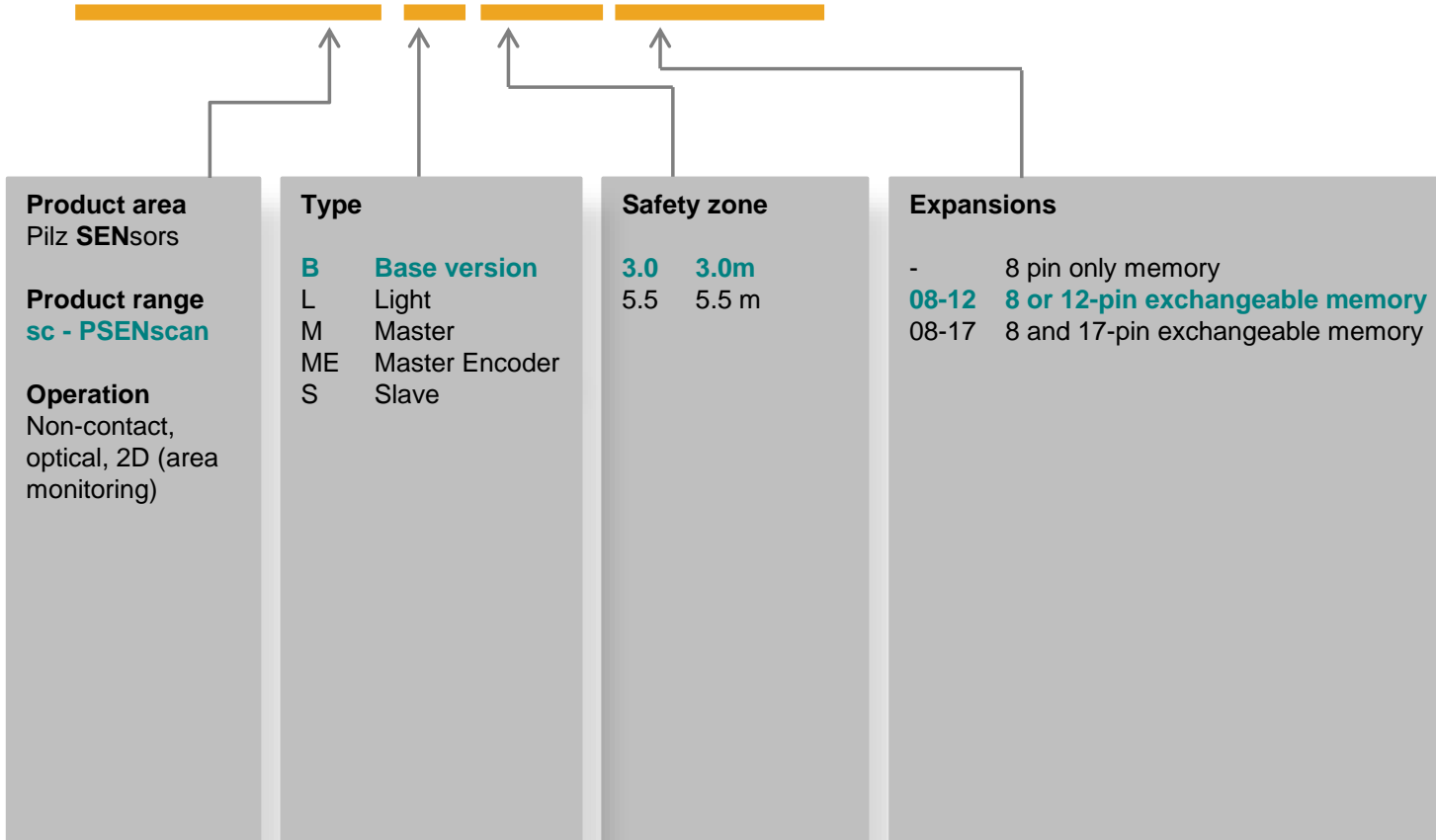
#### **Direct navigation of AGV thanks to monitoring of the environment**

Safety laser scanners, PSENscan, measure the distance of objects in their environment. This information can be used for direct navigation of the automated guided vehicles.

## ► Product in detail

### Type code for base version

#### PSEN sc B 3.0 08-12



## ► Product in detail

### Accessories



PSEN sc bracket P



PSEN sc bracket PR



PSEN sc bracket C



PSEN sc cleaner



PSEN sc bracket H



PSEN sc bracket F



PSEN sc cloth



PSEN sc memory

## ► Product in detail

### Item numbers accessories

Type description	Description	Item number
PSEN sc B 5.5	Scanner base version, 5.5 m safety zone	6D000001
PSEN sc L 3.0 08-12	Light version, 3.0 m safety zone, 8/12-pin exchangeable memory	6D000012
PSEN sc L 5.5 08-12	Light version, 5.5 m safety zone, 8/12-pin exchangeable memory	6D000013
PSEN sc M 3.0 08-12	Master, 3.0 m safety zone, 8/12-pin exchangeable memory	6D000016
PSEN sc M 5.5 08-12	Master, 5.5 m safety zone, 8/12-pin exchangeable memory	6D000017
PSEN sc ME 5.5 08-17*	Master Encoder, 5.5 m safety zone, 8/17-pin exchangeable memory	6D000019
PSEN sc S 3.0 08-12	Slave, 3.0 m safety zone, 8/12-pin exchangeable memory	6D000020
PSEN sc S 5.5 08-12	Slave, 5.5 m safety zone, 8/17-pin exchangeable memory	6D000021

\* Available soon

## ► Product in detail

### Item numbers accessories

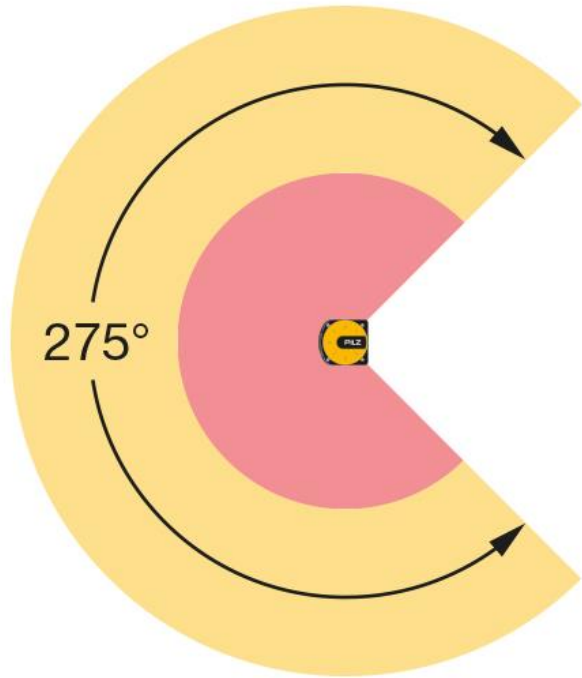
Type description	Description	Item number
PSEN sc bracket PR	Bracket for pitch and roll regulation	6D000002
PSEN sc bracket P	Bracket for pitch regulation	6D000003
PSEN sc bracket H	Head protective bracket	6D000004
PSEN sc memory 08-17*	Exchangeable memory 8 and 17-pin, M12	6D000005
PSEN sc memory 08-12	Exchangeable memory 8 or 12-pin, M12	6D000006
PSEN sc cleaner	Cleaner	6D000008
PSEN sc cloth	Cleaning cloth	6D000009
PSEN sc bracket F	Mounting bracket for floor attachment	6D000010
PSEN sc bracket C	Mounting bracket for corner attachment	6D000011

\* Available soon



## ► Benefits at a glance

### PSENScan general overview

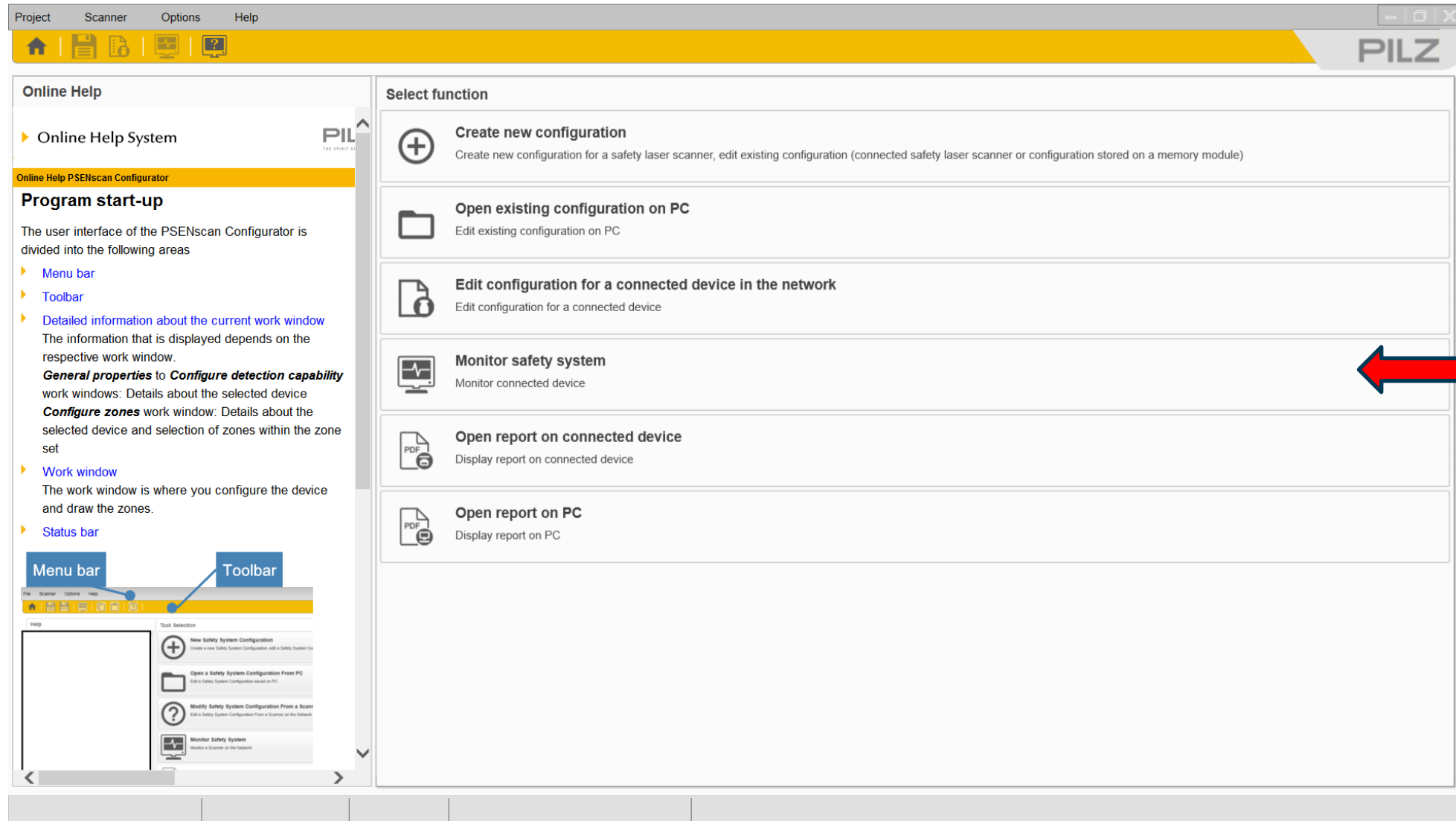


- Large opening angle of 275 degrees
- Always the right operating range: Device types with protected field ranges of 3 and 5.5 meters
- Easy to integrate into the application: Compact housing and free configuration of detection and warning zones, including the ability to adapt to structural conditions
- High productivity: Simultaneous monitoring of up to 3 separate zones with just one scanner and set up of up to 70 selectable configurations\*
- Cabling and setup work reduced: Series connection of up to 4 scanners in accordance with the master-slave principle
- Integrated operating display for receiving information directly
- High availability as it is robust to dust
- Simple assembly and alignment of scanner with the appropriate accessories
- Exchangeable memory for transferring the configuration
- Quick and easy configuration with the PSENScan Configurator

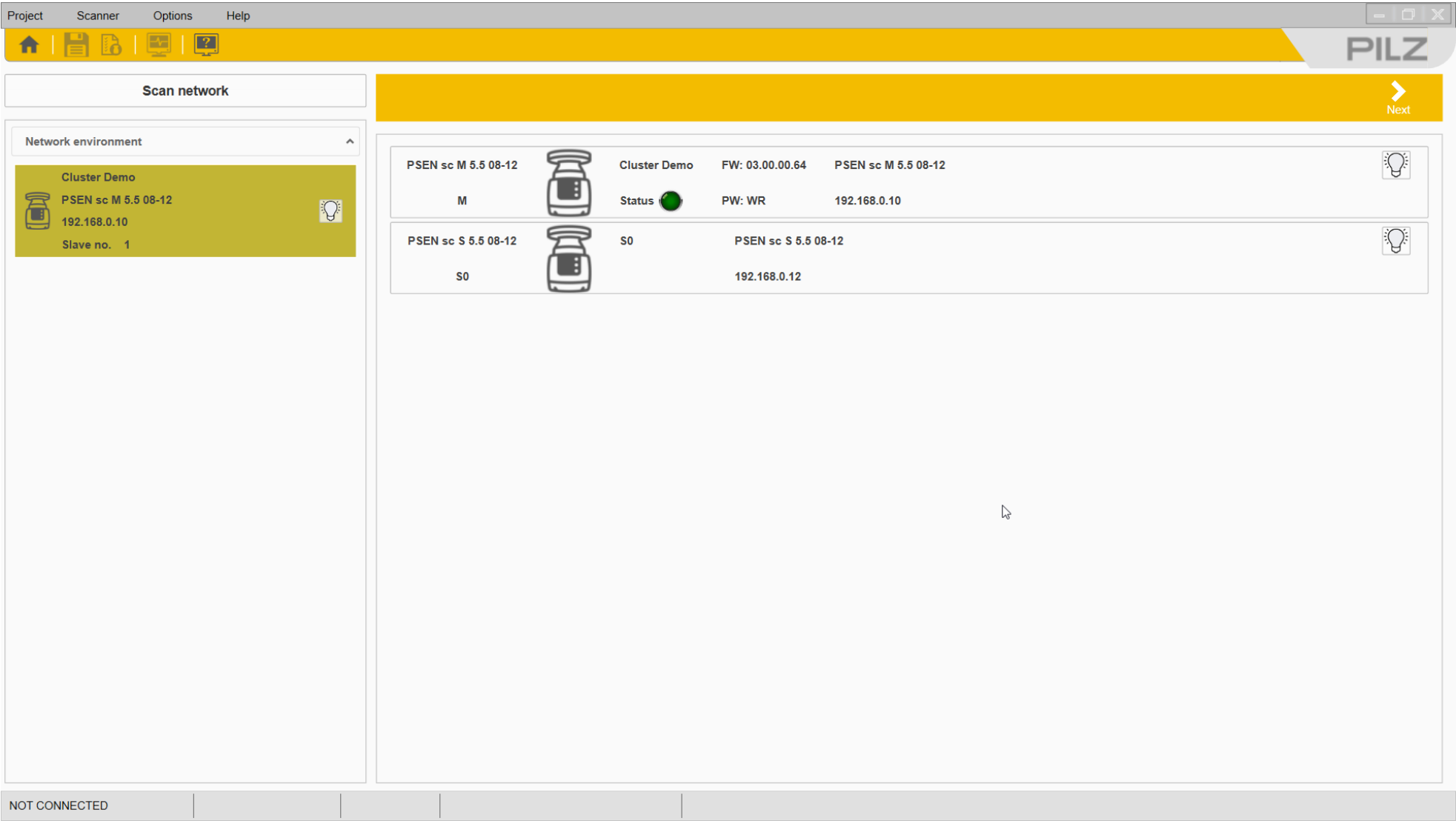
\*With our new 17-pin type, available soon

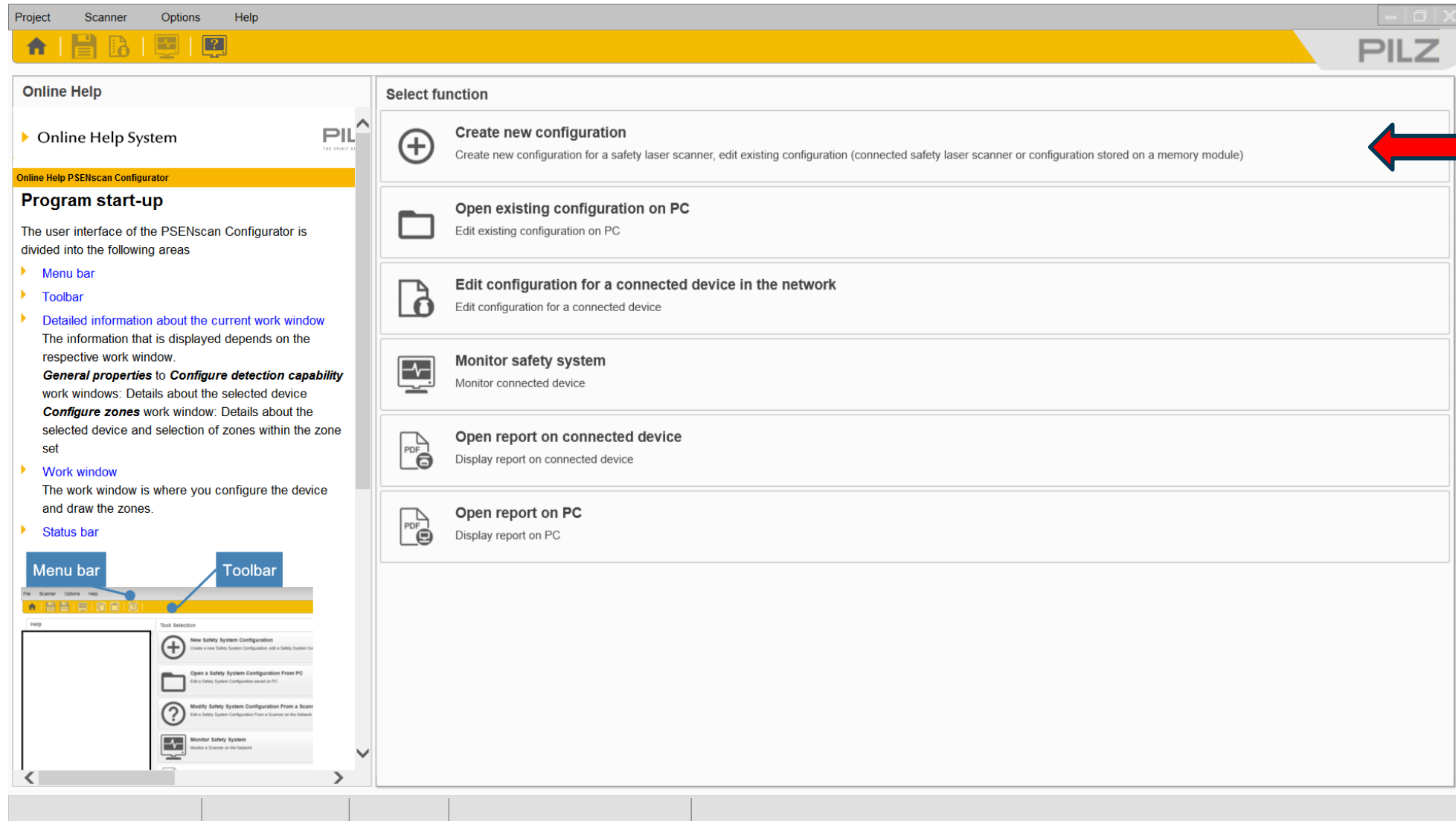


**PILZ**  
THE SPIRIT OF SAFETY  
**PSEN SCAN Configurator**

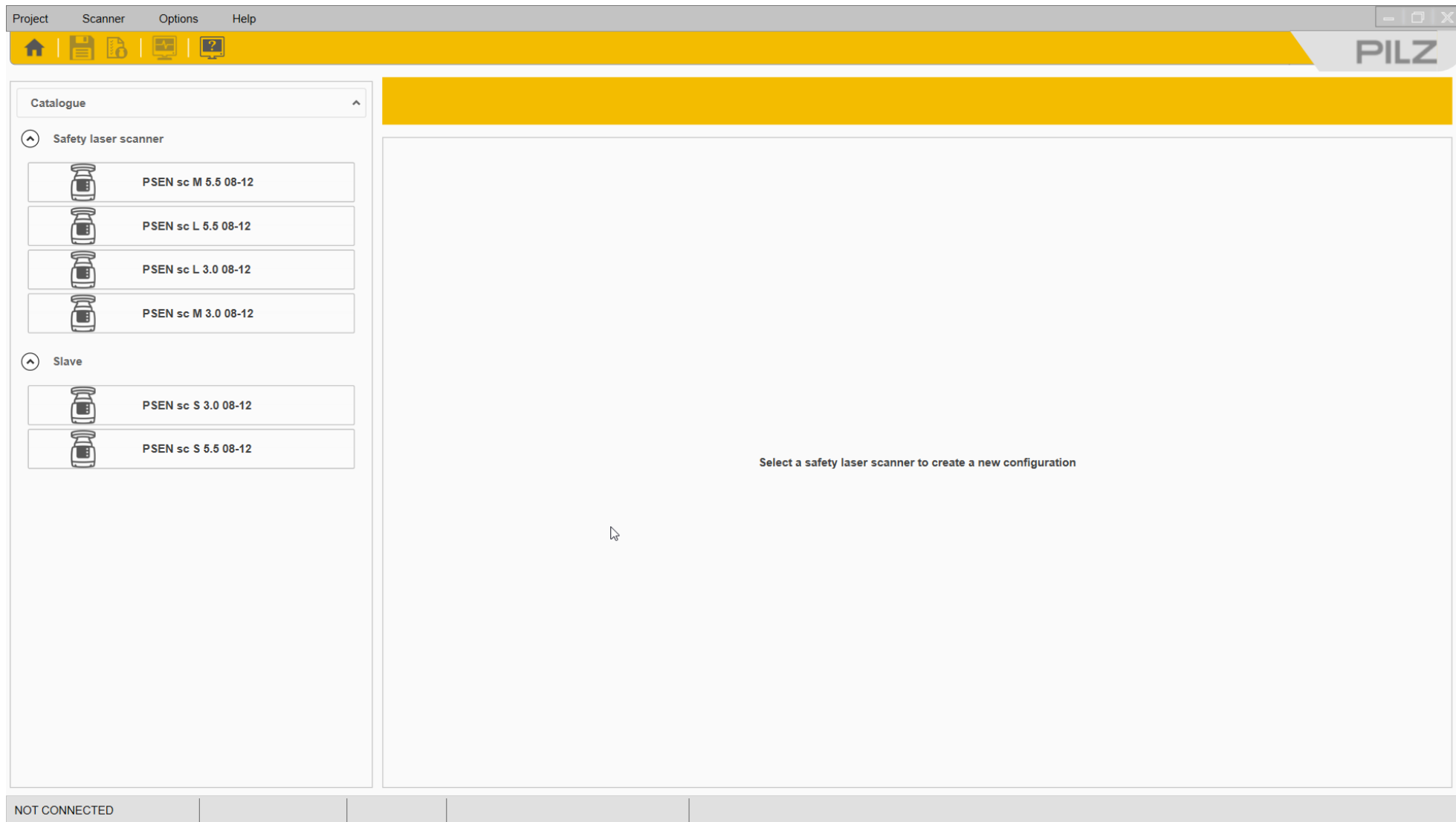


# ► PSENscan software





## ► PSEnscan software



ProjectScannerOptionsHelp

Demo Settings  
PSEN sc L 5.5 08-12  
6D000013

ConfigurationDownload configuration to deviceMonitoring

BackNext

General properties

Application

Application Type

EXPERT

EXPERT

VERTICAL

Connection

8 PIN CONNECTION

8 PIN CONNECTION

12 PIN CONNECTION

Configuration

Name Configuration

Scanner Demo

Author

d.burkmire

Description

---

Configurator version

3.0.0.364-RTM

Check sum

00000000000000000000000000000000

Creation date

Wednesday, May 20, 2020 11:00:17 AM

Cluster

Name safety laser scanner arrangement

Cluster Demo

Safety laser scanner arrangement

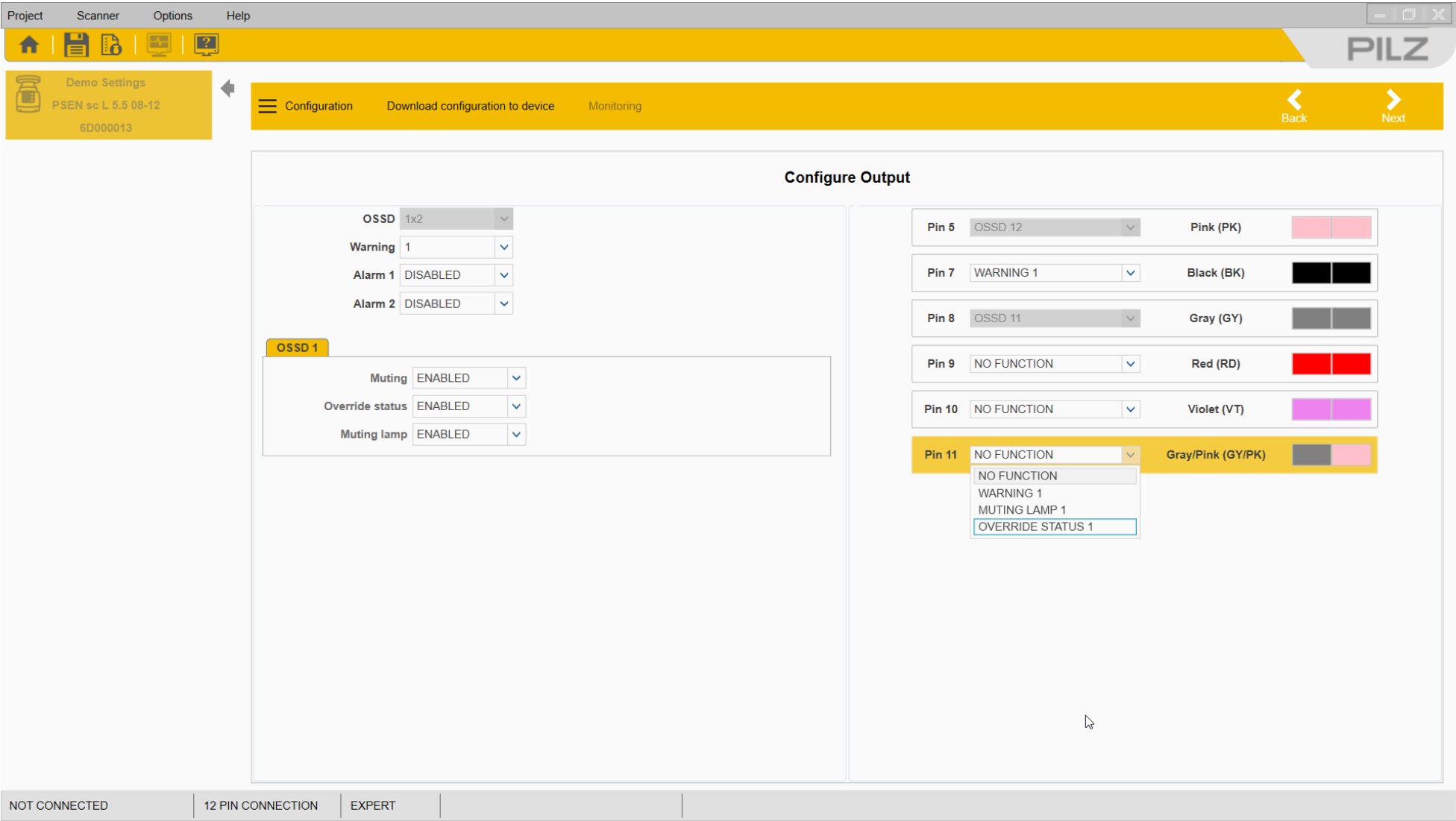
Device name

Demo Settings

NOT CONNECTED

8 PIN CONNECTION

EXPERT





ProjectScannerOptionsHelp

Demo Settings  
PSEN sc L 5.5 08-12  
6D000013

ConfigurationDownload configuration to deviceMonitoring

BackNext

Configure Zone Set

Parameter

Zone set No.2Input delay max [ms]30

Zone { } ✓

Zone switching1Zone switching2

Zone Set 110

Zone Set 201

Input wiring

Pin 3AREA SWITCH 1White (WH)

Pin 7WARNING 1Black (BK)

Pin 9AREA SWITCH 2Red (RD)

Pin 10NO FUNCTIONViolet (VT)

Pin 11NO FUNCTIONGray/Pink (GY/PK)

NOT CONNECTED

12 PIN CONNECTION

EXPERT

June, 2020

Safety Laser Scanner PSEnscan

33

The screenshot displays the PSEnscan software interface. At the top, there is a menu bar with 'Project', 'Scanner', 'Options', and 'Help'. Below this is a yellow toolbar with icons for home, save, load, and help. A sidebar on the left shows 'Demo Settings' for 'PSEN sc L 5.5 08-12' with ID '6D000013'. The main area is titled 'Configure Input' and is divided into two sections: 'Input function' and 'Input wiring'.

**Input function (Safety zone 1):**

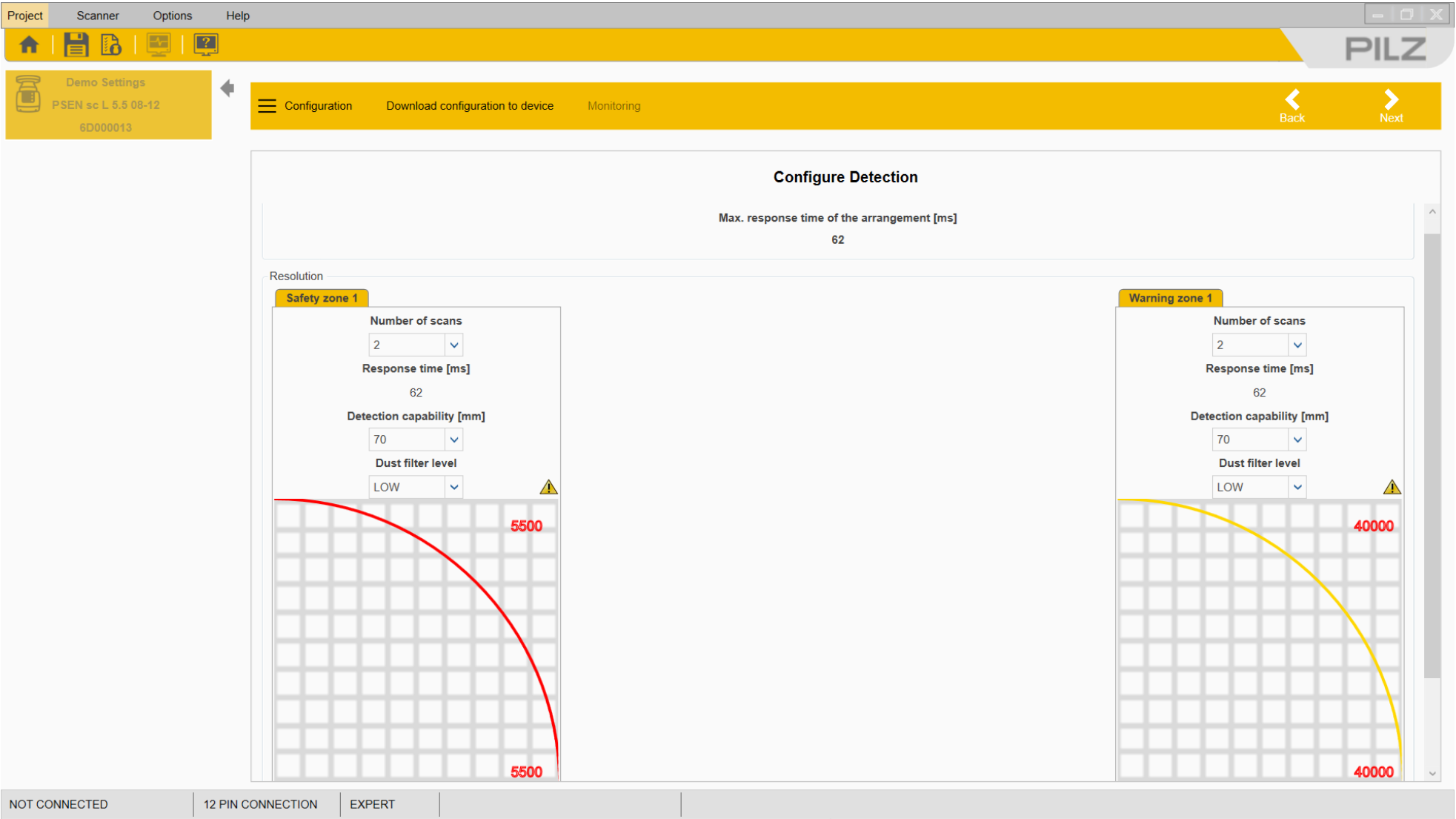
- Type of restart: MANUAL
- Recovery time: 200
- EDM: OFF
- EDM Delay time [msec]: 200
- Muting type: BIDIRECTIONAL
- Muting activation delay [ms]: 4
- Time exceeded [min] (0): 10
- Override: DISABLED
- Override mode: SINGLE LINE PATTERN

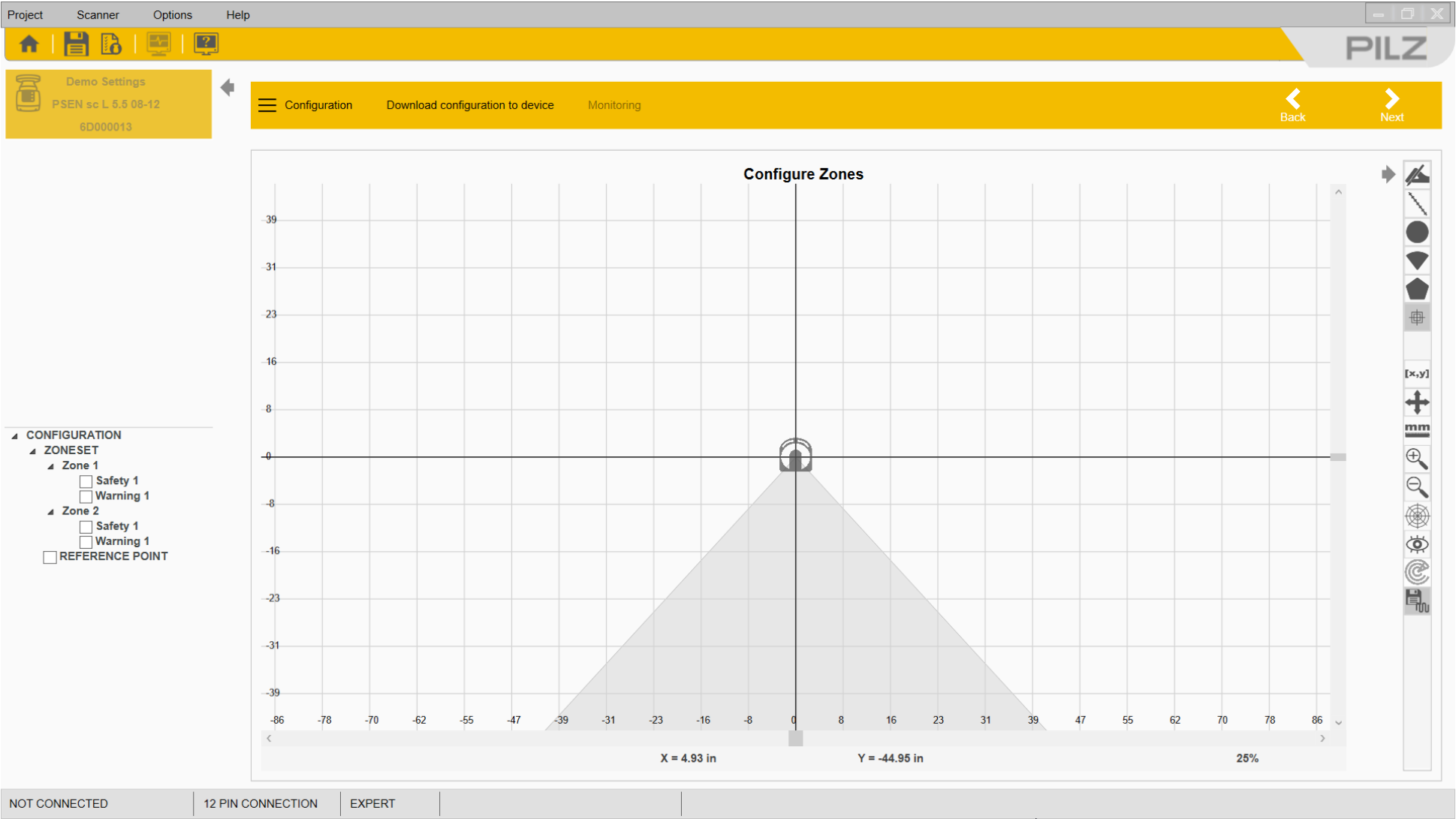
**Input wiring:**

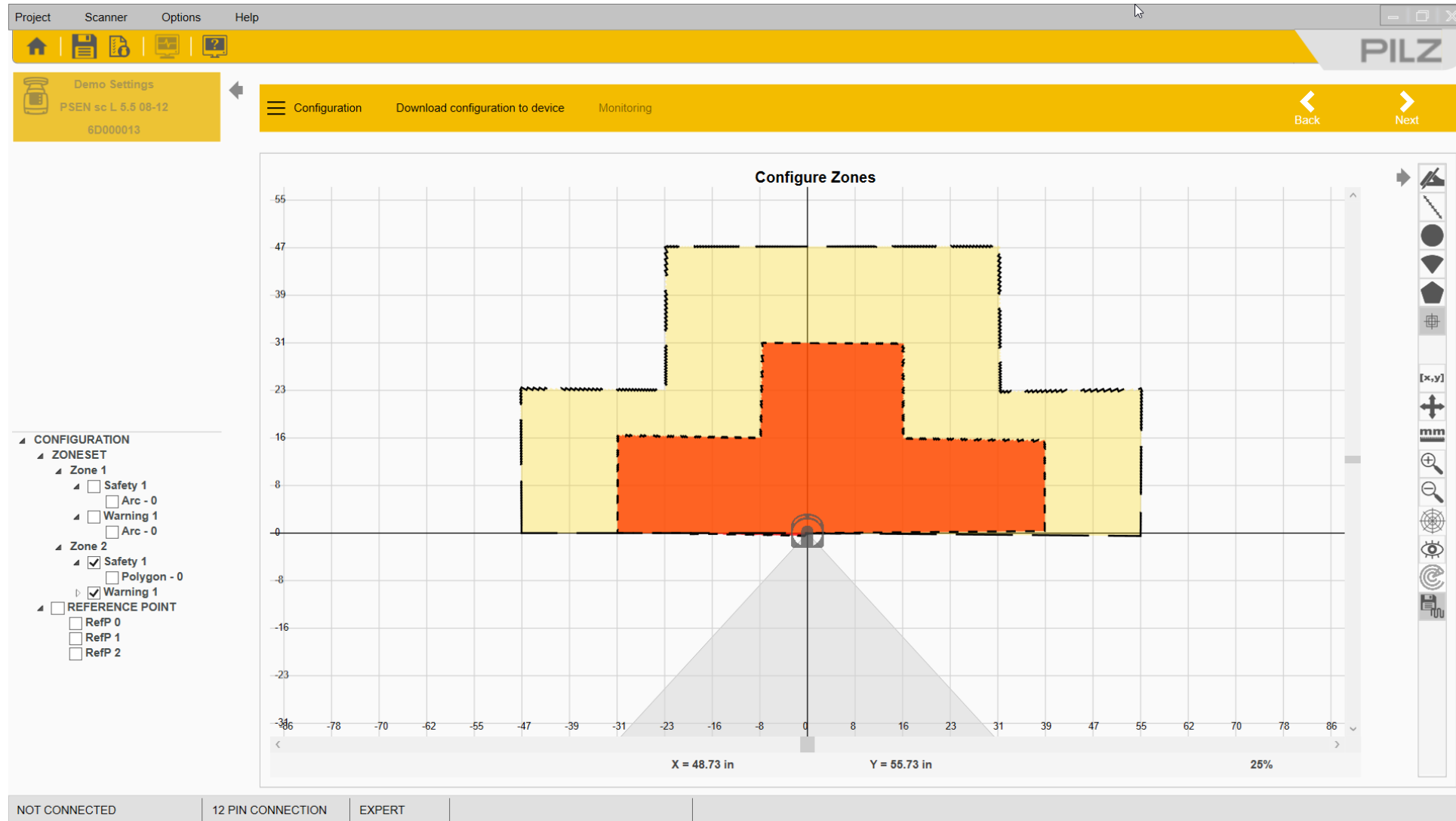
Pin	Function	Color	Wiring Diagram
Pin 3	AREA SWITCH 1	White (WH)	[Diagram]
Pin 7	WARNING 1	Black (BK)	[Diagram]
Pin 9	AREA SWITCH 2	Red (RD)	[Diagram]
Pin 10	NO FUNCTION	Violet (VT)	[Diagram]
Pin 11	MUTING 1 2	Gray/Pink (GY/PK)	[Diagram]

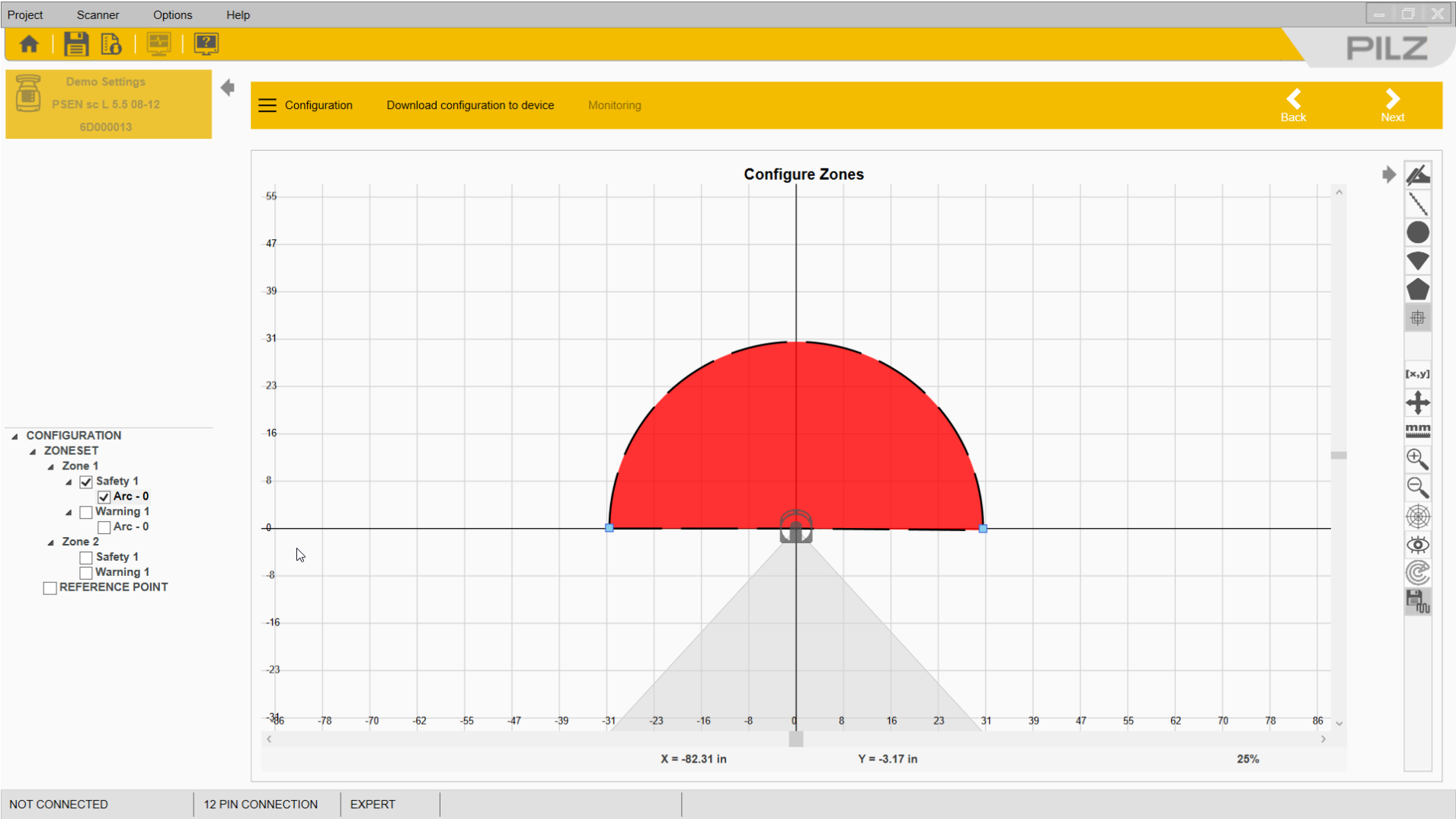
A dropdown menu is open for Pin 11, showing the following options: NO FUNCTION, RESET, RESTART 1, RESTART 1 RESET, MUTING ENABLE 1, MUTING 1 1, and MUTING 1 2.

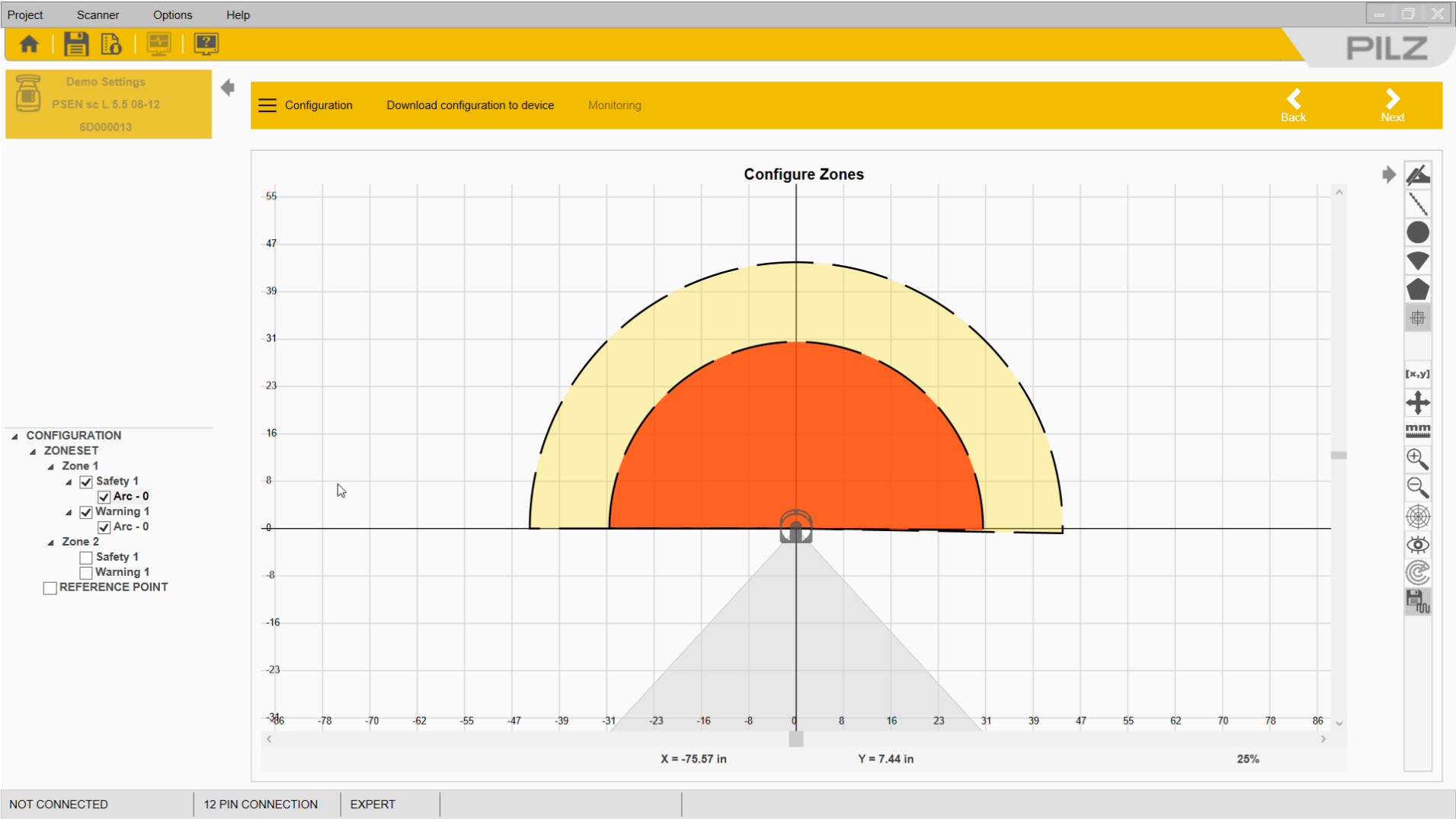
At the bottom, a status bar shows 'NOT CONNECTED', '12 PIN CONNECTION', 'EXPERT', and a progress indicator.

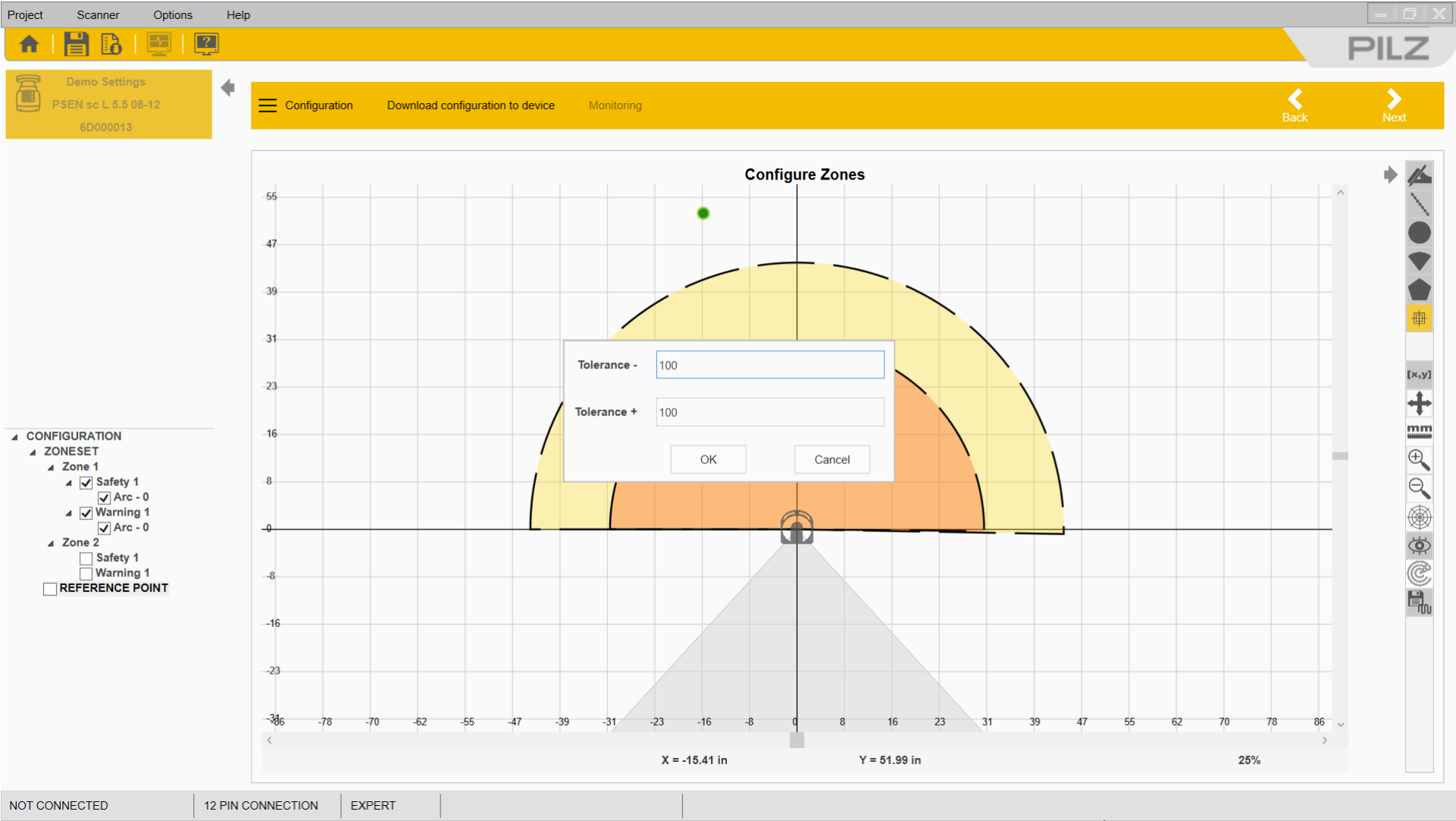




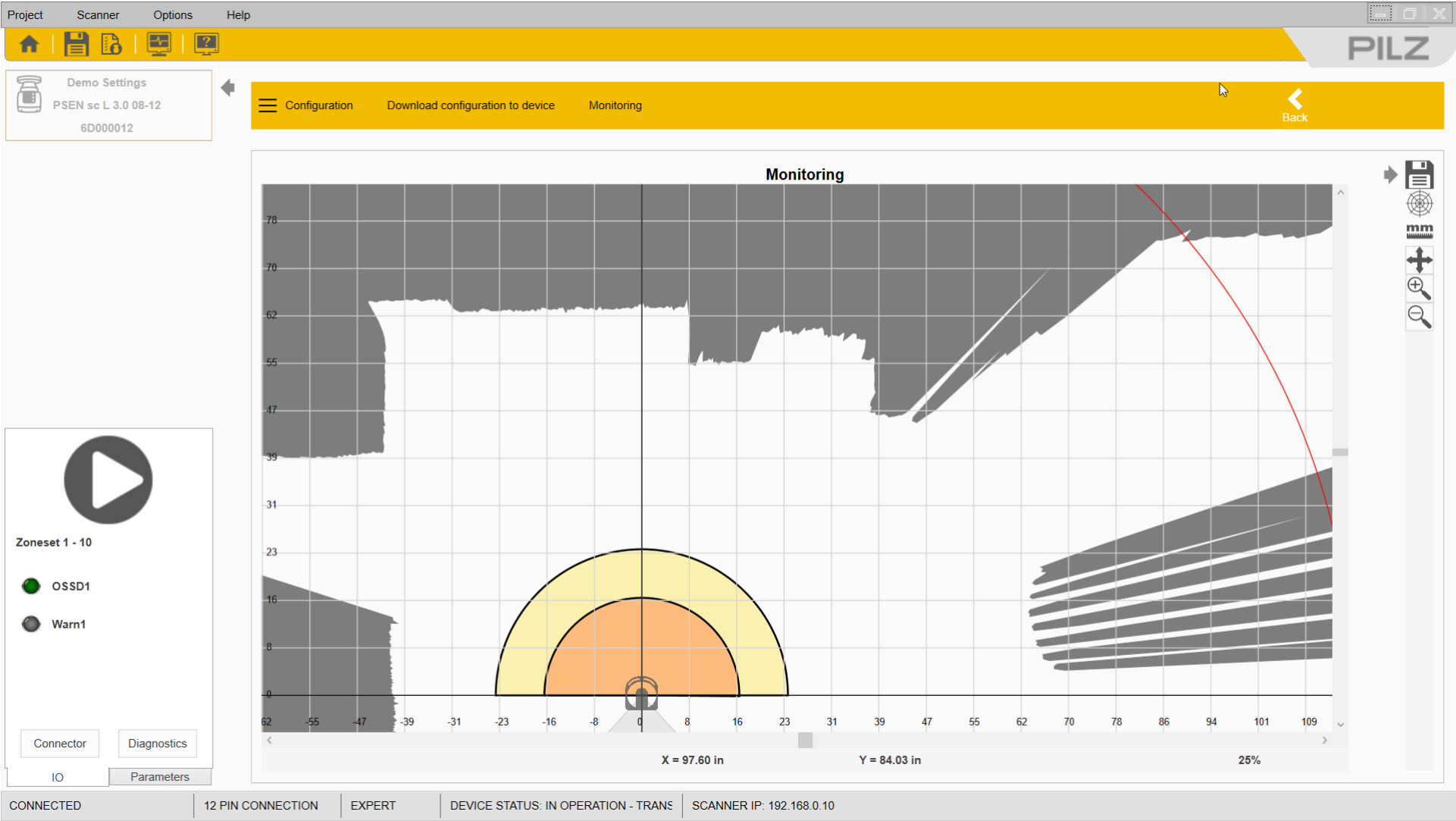


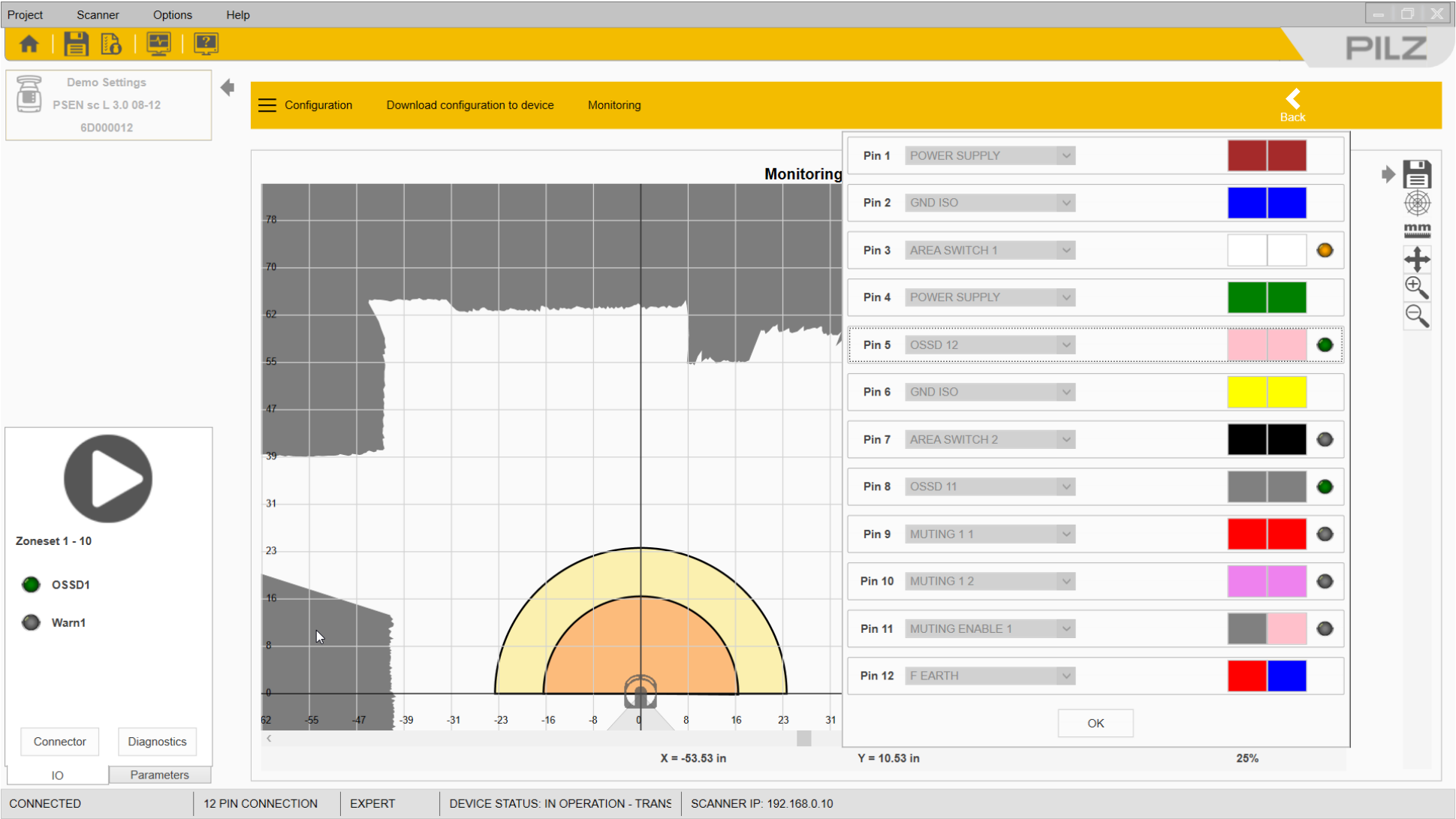


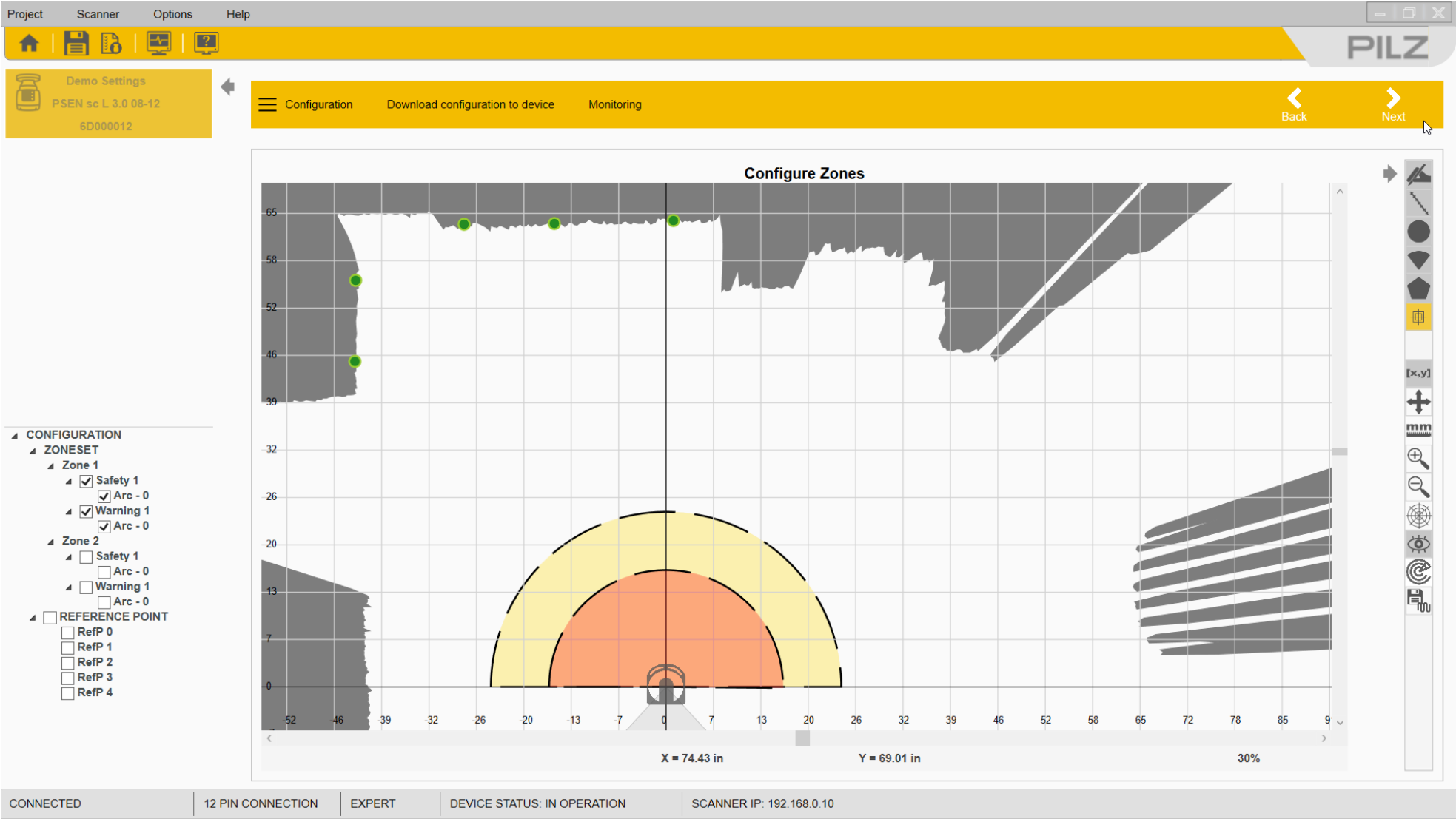


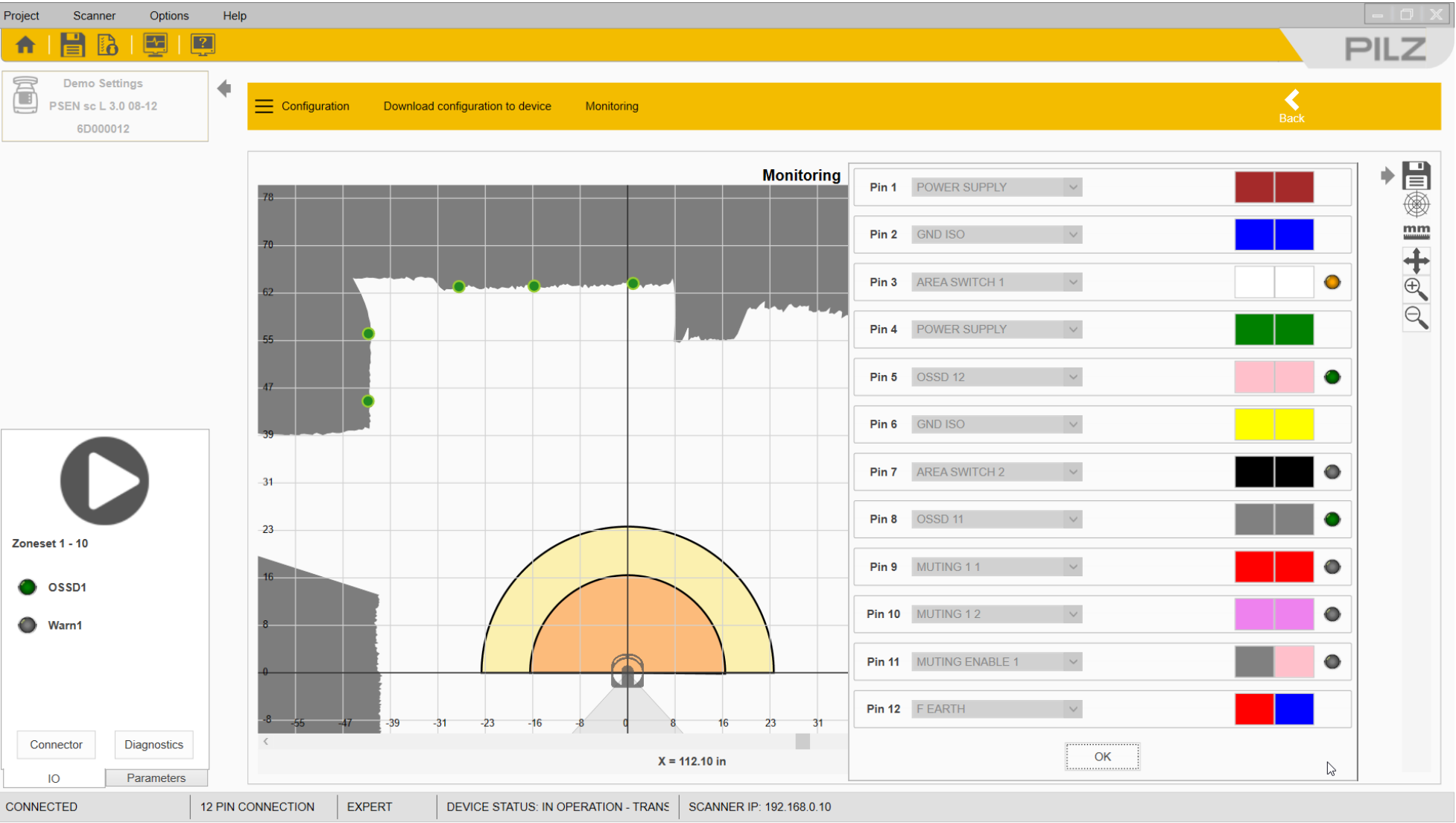


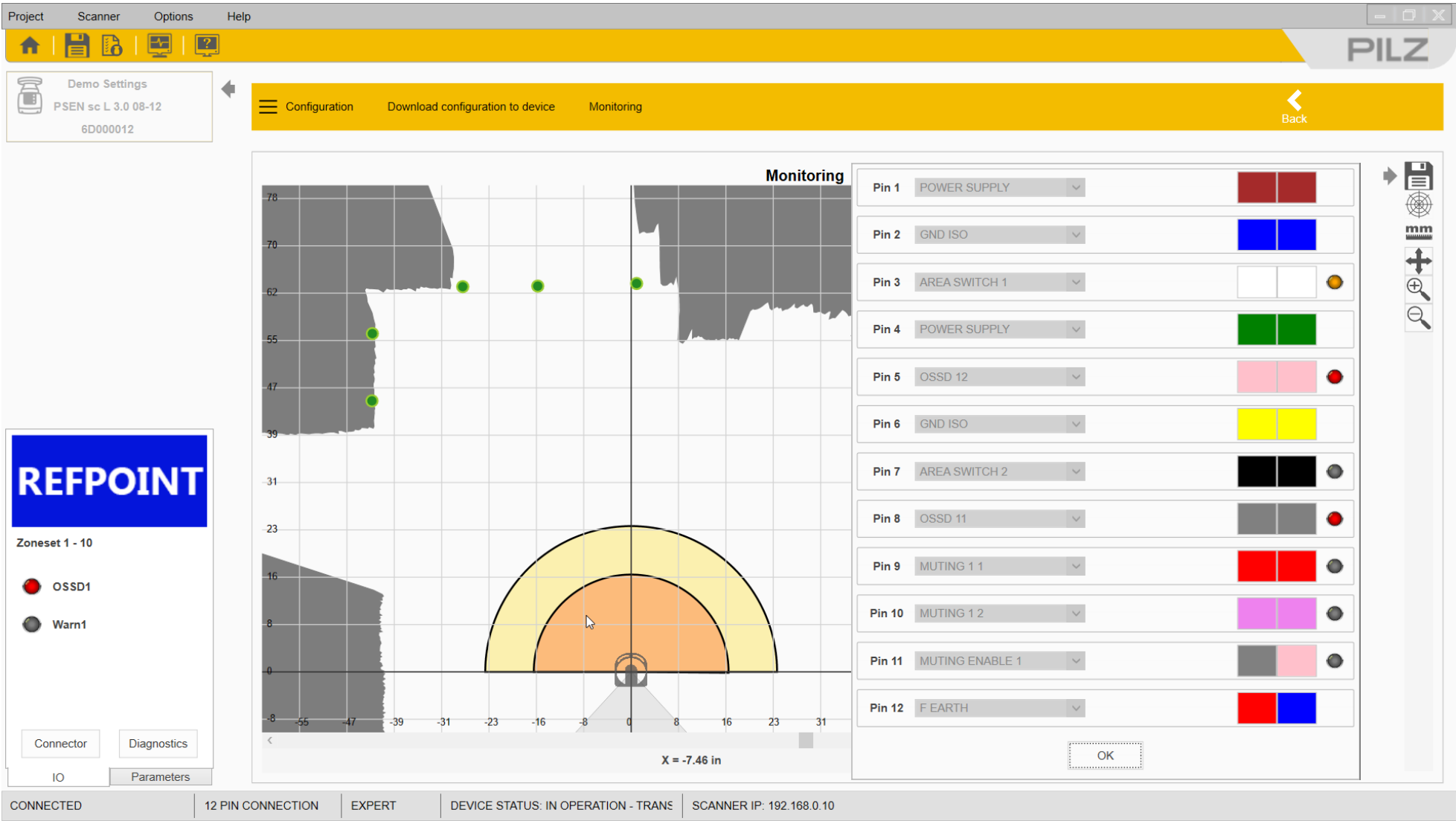












## PILZ PSENScan Configurator

### 1. Configuration

A. Scenario.....Expert  
B. Name.....Lite Demo w/muting  
C. Author.....d.burkmire  
D. Description.....  
E. Version.....3.0.0.364-RTM  
F. Check sum.....C8B0D1666A46536BBF58086298B63FE2  
G. Creation date.....Wed, 29 Apr 2020 16:19:20 GMT

### 2. Master-Slave arrangement

A. Name.....Cluster Demo

### 3. Device

A. Device type.....Master unit  
B. Name.....Demo Settings  
C. Part number.....6D000012  
D. Model.....PSEN sc L 3.0 08-12

### 4. Connection

A. Order number.....6D000006  
B. Connection.....12

#### GUI

Pin 1	PSEN sc L 3.0 08-12	Green (GR)	Red
Pin 2	0V (0V)	Blue (BL)	Blue
Pin 3	PSEN sc L 3.0 08-12	White (WH)	White
Pin 4	PSEN sc L 3.0 08-12	Green (GR)	Green
Pin 5	0V (0V)	Pink (PK)	Pink
Pin 6	0V (0V)	Yellow (YE)	Yellow
Pin 7	PSEN sc L 3.0 08-12	Black (BK)	Black
Pin 8	0V (0V)	Grey (GY)	Grey
Pin 9	PSEN sc L 3.0 08-12	Red (RD)	Red
Pin 10	PSEN sc L 3.0 08-12	Violet (VT)	Violet
Pin 11	PSEN sc L 3.0 08-12	Grey (GY)	Grey
Pin 12	PSEN sc L 3.0 08-12	Blue (BL)	Blue

## PILZ PSENscan Configurator

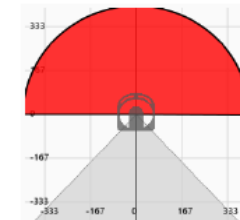
A. Device type.....	Master unit
B. Number of scans safety zone 1.....	2
C. Detection capability safety zone 1.....	70
D. Dust filter level safety zone 1.....	3
E. Operating range safety zone 1.....	70
F. Number of scans warning zone 1.....	2
G. Detection capability warning zone 1.....	70
H. Dust filter level warning zone 1.....	LOW
I. Operating range warning zone 1.....	40000 (40000)

### 9. Zone set

Zone: 1	
A. Settings.....	10

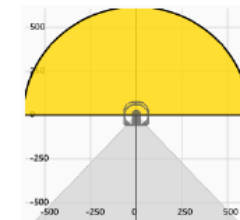
#### Master unit -- Zone 1 - Safety zone 1

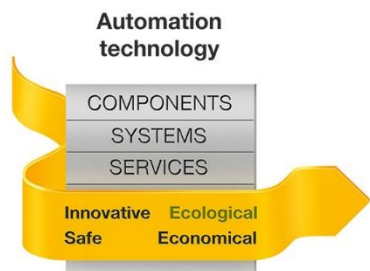
GUI



#### Master unit -- Zone 1 - Warning zone 1

GUI





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