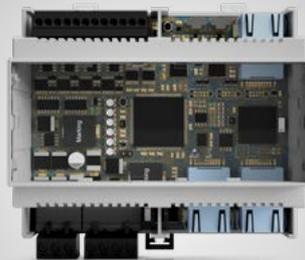


3D SAFETY RADAR SYSTEMS

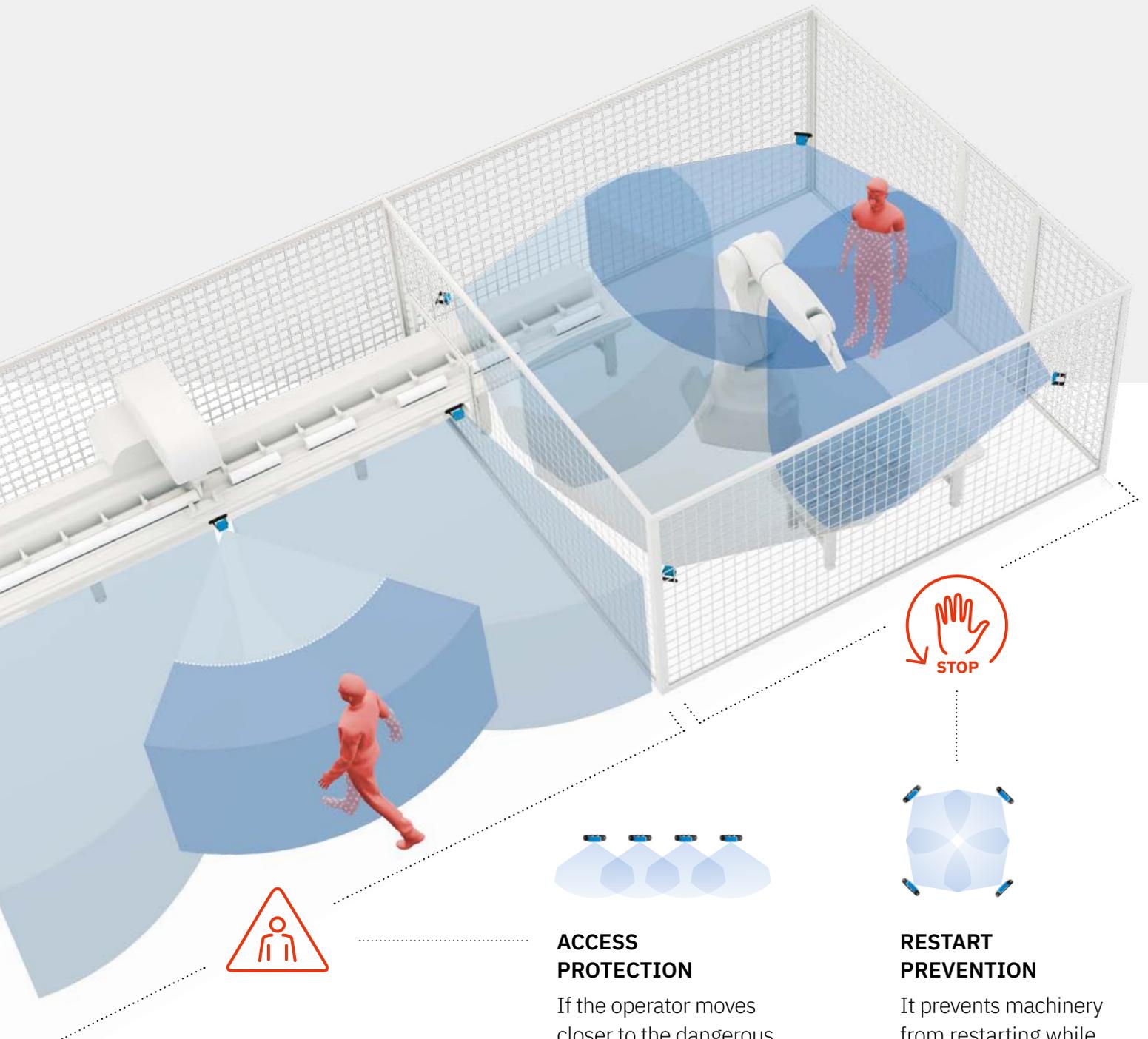
Product catalogue



3D SAFETY RADAR SYSTEMS

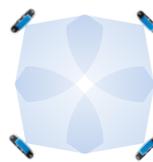
Smart Safety

Industrial safety at its best: Inxpect safety radars detect access or presence of operators in dangerous areas, allowing real-time dynamic setting of the detection and warning zones.



ACCESS PROTECTION

If the operator moves closer to the dangerous area, it places machinery in a safe state.



RESTART PREVENTION

It prevents machinery from restarting while operators are in the dangerous area.

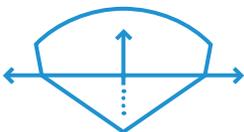
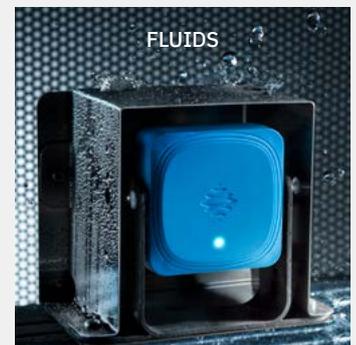
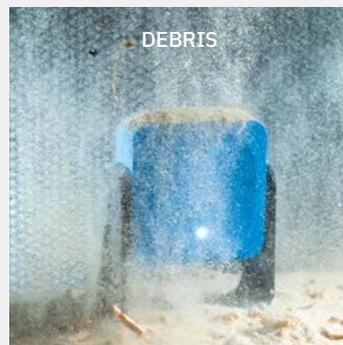
**World's first
SIL2/PLd and UL Listed
safety radar systems**



LBK System: the very first industrial safety radar to be listed by UL.

**It works where optical sensors stop.
High safety without compromising productivity**

Optical devices often fail due to dust, smoke, water or waste generated by the production process. The Inxpect team, highly specialized in radar technology, has developed a sophisticated long range radar algorithm that filters out those disturbances, reducing false alarms and increasing productivity.



DYNAMIC MODIFICATION OF THE DETECTION ZONE

The sensor parameters can be configured in real-time, allowing a dynamic modification of the detection zone. This feature makes them perfect solutions for mobile robotic applications.



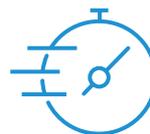
IMPROVE THE COMMUNICATION WITH THE MACHINERY

The modular fieldbus in Inxpect Systems allows Inxpect sensors to exchange safety data, such as the position of the target, in real time with the machinery's PLC. This allows an effective integration with the machinery's control system.



SECURE CONFIGURATION

Whether you chose USB or Ethernet for configuring Inxpect Safety Radar Systems, we got you covered. In all cases, Inxpect control units and the Inxpect Safety Application cooperate in full security.



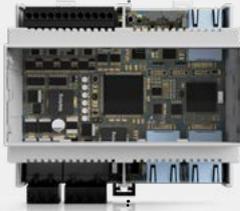
RESPONSE TIME < 100 ms

With response times lower than 100 ms, you can save space and reduce the area required to stop the machinery.

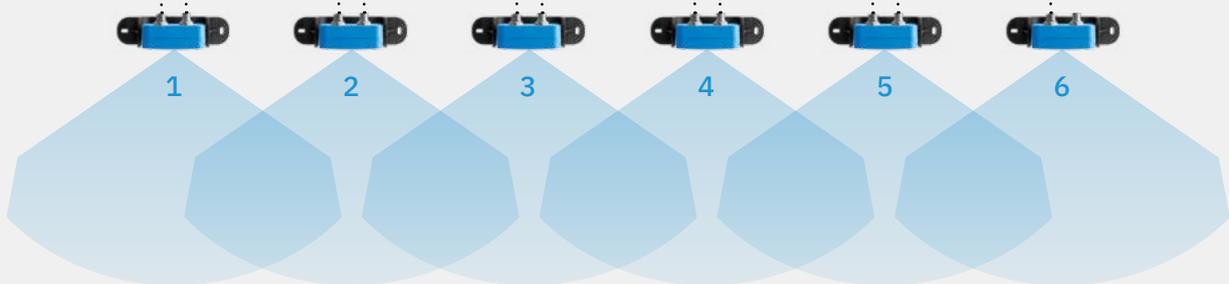
INXPECT
SAFETY APPLICATION



INXPECT
CONTROL UNIT



INXPECT
SMART RADAR
SENSORS



Flexible, modular, scalable

Inxpect Safety Radar systems are composed of a **control unit** and up to six **smart radar** sensors: high flexibility, from simple to complex scenarios.

Configuring the system is quick and easy, thanks to the user friendly **Inxpect Safety Application**.

Guided validation procedures and the simple generation of the configuration report complete each installation.



A perfect alignment between sensors is not required.



The provided Inxpect Safety Application allows to manually set up to 32 different configurations to be selected dynamically in real time.



Programmable Muting function: the configuration of sensor groups that can be temporarily muted allows operators to safely access parts of the dangerous area, according to production needs.

Two families of sensors

Each sensor in an Inxpect System can be field-programmed, independently from the others, to adapt the coverage area depending on the requirements of the specific installation. With our systems, the parameters can be switched on the fly.



LBK-S01
The world's first
SIL-rated and UL listed
safety radar sensor

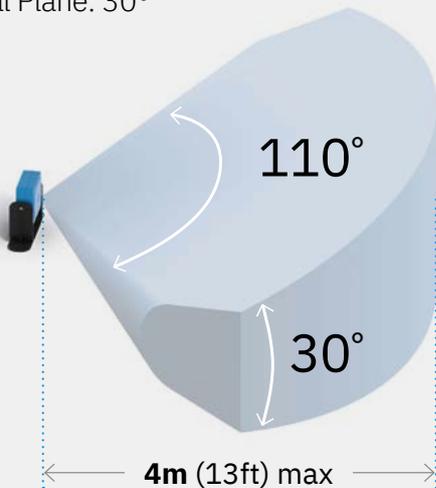


SBV-01
The answer to the
demands of complex
applications

TWO CONFIGURABLE FIELDS OF VIEW (FOV)

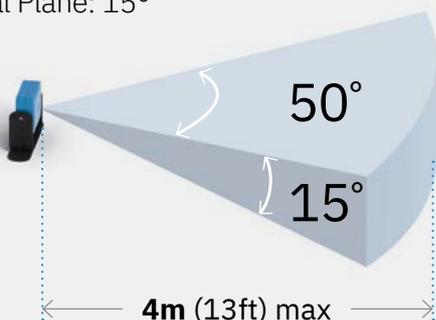
1. Wide

Horizontal Plane: 110°
Vertical Plane: 30°



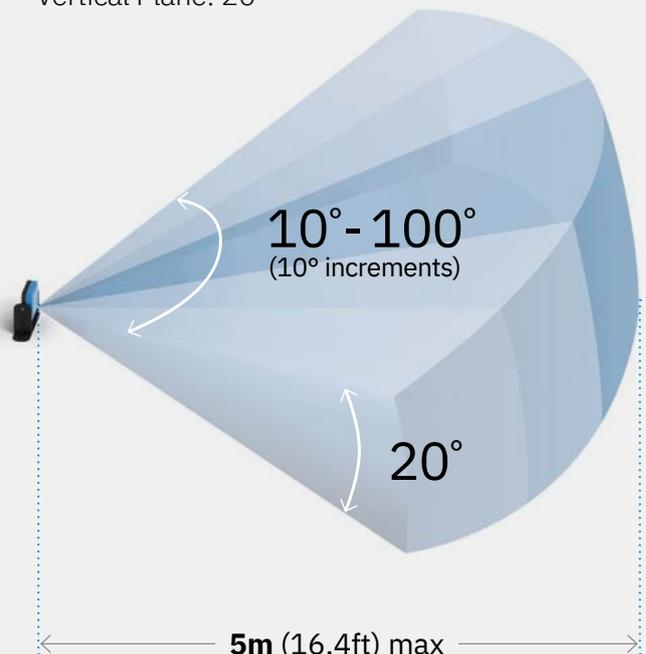
2. Narrow

Horizontal Plane: 50°
Vertical Plane: 15°



THE FIRST MULTI-AREA, DYNAMIC-FIELD 3D SAFETY RADAR

Horizontal Plane: 10-100°
Vertical Plane: 20°



Aperture is field selectable, and dynamically adjustable in 10° increments.

Up to four different (safe) alarm areas, with ranges between 0.5m and 5m.

The Inxpect radar systems

**Next generation safety:
modern technology, superior safety, increased productivity**

LBK System

The safety radar solution that is easy to integrate

The first SIL-rated radar system. With universal digital I/Os, a cost-effective solution to combining safety with productivity.



**SENSOR
LBK-S01**



**CONTROL UNIT
LBK-C22**

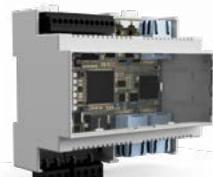
LBK System Bus

All the power and flexibility of a Fieldbus

Take radar safety to the next level with the power and flexibility of Inxpect's modular safety bus architecture.



**SENSOR
LBK-S01**



**CONTROL UNIT
ISC-B01**

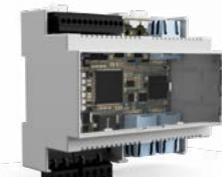
SBV System Bus

The first multi-area, dynamic 3D safety radar system

The Inxpect answer to the demands of complex safety applications. From mobile robotics to advanced industrial automation.



**SENSOR
SBV-01**



**CONTROL UNIT
ISC-B01**

Systems comparison table

| FEATURE | LBK System | LBK System Bus | SBV System Bus |
|--|--|--|--|
| <i>Safety certification</i> | IEC/EN 62061, SIL2 | IEC/EN 62061, SIL2 | IEC/EN 62061, SIL2 |
| | EN ISO 13849, PLd, Cat. 2 | EN ISO 13849, PLd, Cat. 2 (sensor 1oo1) | EN ISO 13849, PLd, Cat. 3 |
| | Type 3 ESPE (IEC 61496-1, CRD IEC 61496-3) UL 61010-1 | EN ISO 13849, PLd, Cat. 3 (sensor 1oo2) | IEC/TS 62998-1, Performance Class D |
| <i>Radar frequency</i> | 24GHz | 24GHz | 60GHz |
| <i>Max power consumption (controller + 6 sensors)</i> | 11W | 12,2W (no OSSD) | 21,8W (no OSSD) |
| <i>Number of safe fields per sensor</i> | 1 | 2 | 4 |
| <i>Max range (m)</i> | 4 | 4 | 5 |
| <i>Restart time (s)</i> | 10 (automatic) | 10 (automatic) | 4 (automatic) |
| <i>FOV access (horizontal/vertical)</i> | 110°/30° - 50°/15° | 110°/30° - 50°/15° | from 10° to 100°/20° (10° step) |
| <i>FOV restart (deg)</i> | 110°/30° | 110°/30° | from 10° to 100°/20° (10° step) |
| <i>Tolerance zone (cm)</i> | 30 | 30 | 20 |
| <i>Response time (ms)</i> | < 100 | < 100 | < 100 |
| <i>Operating temperature</i> | From -30 to +60 °C (-22 to +140 °F) | From -30 to +60 °C (-22 to +140 °F) | From -30 to +60 °C (-22 to +140 °F) |
| <i>System configuration</i> | USB | USB, Ethernet | USB, Ethernet |
| <i>Safety inputs</i> | 3 | 2 | 2 |
| <i>Safety outputs</i> | 1 | up to 2 (depending on the configuration) | up to 2 (depending on the configuration) |
| <i>Non-safety outputs</i> | 2 | up to 4 (depending on the configuration) | up to 4 (depending on the configuration) |
| <i>Max number of configurations</i> | 1 | 32 | 32 |
| <i>Number of configurations that can be selected using digital inputs</i> | - | 2 (1 digital input) | 2 (1 digital input) |
| | | 4 (2 digital input) | 4 (2 digital input) |
| <i>Number of configurations that can be selected using safety fieldbus</i> | - | 32 | 32 |
| <i>Muting</i> | 3 groups | 2 group using inputs, single sensor using safety fieldbus | 2 group using inputs, single sensor using safety fieldbus |
| <i>Input readable via safety fieldbus</i> | - | 2 | 2 |
| <i>Output settable via safety fieldbus</i> | - | 4 | 4 |
| <i>System status via safety fieldbus</i> | - | yes | yes |
| <i>System error via safety fieldbus</i> | - | yes | yes |

Cod. **90202011**

LBK-S01

24GHz Smart Radar Sensor



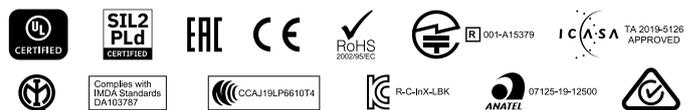
The **LBK-S01** sensor is a smart FMCW (Frequency Modulated Continuous Wave) radar device based on proprietary Inxpect detection algorithms. The sensor sends 24 GHz radio waves and recovers motion information, analyzing the returned signals reflected by both static and moving objects in the operative range.

The sensors perform the following primary functions:

- **Motion and scenario analysis.**
- **Communication via CAN bus to the controller of the motion detection signal.**
- **Fault reporting and communication of diagnostic information via CAN bus to the controller.**



Certification



Technical details

| | |
|---------------------------------------|--|
| <i>Frequency</i> | 24 GHz ISM license-free (see technical annex for worldwide use) |
| <i>Connectors</i> | Two 5-pin M12 connectors (1 male and 1 female) |
| <i>CAN bus termination resistance</i> | 120 Ω (not supplied, to be installed with termination connector) |
| <i>Power supply</i> | 12 V dc ± 20%, through controller |
| <i>Power consumption</i> | 1,2 W |
| <i>Degree of protection</i> | IP67 |
| <i>Case material</i> | Sensor: PA66 Bracket: PA66 and glass fiber (GF) |

Cod. **90302010**

SBV-01

60GHz Smart Radar Sensor

The **SBV-01** sensor is a smart FMCW (Frequency Modulated Continuous Wave) radar device based on proprietary Inxpect detection algorithms. Operating in the millimeter waves V band (60 GHz), it can detect complex scenes by analyzing the returned signals reflected by both static and moving objects in the operative range.

With dynamically selectable horizontal field of view and up to four alarm areas, it is ideal for complex application scenarios, including mobile use cases.

The sensors perform the following primary functions:

- **Motion and scenario analysis.**
- **Communication via CAN bus to the controller of the motion detection signal.**
- **Fault reporting and communication of diagnostic information via CAN bus to the controller.**

2 axes
bracket



Certification



Technical details

| | |
|--------------------------------|---|
| Frequency | Millimeter waves V-band: 60 GHz (see technical annex for worldwide use) |
| Connectors | Two 5-pin M12 connectors (1 male and 1 female) |
| CAN bus termination resistance | 120 Ω (not supplied, to be installed with termination connector) |
| Power supply | 12 V dc ± 20%, through controller |
| Power consumption | 2,8 W |
| Degree of protection | IP67 |
| Case material | Sensor: PA66 (front) + Aluminum (back) Bracket: PA66 and glass fiber (GF) |

SBV-01 on 3 axes bracket

The advanced bracket system makes the installation and positioning of Inxpect's sensors easy and quick. The rotation around X and Z axes allows to optimise the coverage of the dangerous area by the FOV of the sensor, while the rotation around Y axis allows to take advantage of both horizontal and vertical angular coverage. The bracket system is perfect for the installation of the sensor on both horizontal and vertical surfaces.

3 axes
bracket



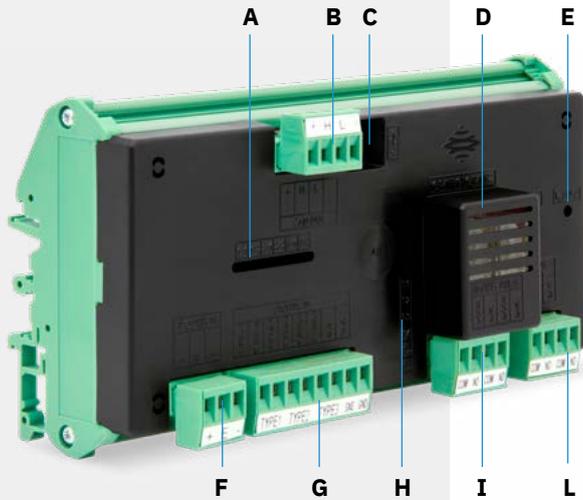
vertical wall
mounting



Cod. **90201011**

LBK-C22

Relay Control Unit



- A** - Digital inputs status LED
- B** - Sensors CAN bus terminal block
- C** - Micro USB port for the communication with the Inxpect Safety App
- D** - Safety outputs status LED
- E** - Auxiliary outputs status LED
- F** - Power supply terminal block
- G** - Digital inputs terminal block
- H** - System status LED
- I** - Safety outputs terminal block
- L** - Auxiliary outputs terminal block

The Inxpect **LBK-C22** can connect up to six LBK-S01 smart sensors. Intervention of any single sensor results in the deactivation of the safety outputs of the controller. It can be configured with the Inxpect Safety PC application through USB cable connection, which allows the configuration of sensitivity levels, safety functions, size of warning and dangerous areas, and the functionality of the I/O ports of the controller.

Digital inputs

The controller has three dual-channel digital inputs and common reference potential for:

- muting (high logic level (1) = muting enabled)
- machinery emergency button (low logic level (0) = stopping enabled)
- machinery restart button enabled

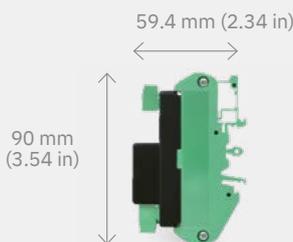
The digital inputs can be configured through the Inxpect Safety application software.

Safety outputs

The controller has one dual-channel, force-guided safety relay output for alarms and direct or indirect safety of the machinery.

Auxiliary outputs

The controller has two auxiliary relay outputs, which can be configured to signal: pre-alarm, fault, muting status.



Certification



Technical details

| | |
|--------------------------------|---|
| <i>Outputs</i> | 4 relay outputs: 1 dual channel safety output 2 auxiliary outputs |
| <i>Safety outputs</i> | Forced guided relays Max voltage: 30 V dc Max current: 8 A dc Max power: 240W |
| <i>Auxiliary relay outputs</i> | Electromechanical relays Max voltage: 30 V dc Max current: 2 A dc Max power: 60W |
| <i>Inputs</i> | 3 dual channel digital inputs with common GND: 1 type 1 1 type 2 1 type 3 |
| <i>Power supply</i> | 24 V dc (20–28 V dc) Max current: 1A |
| <i>Max power consumption</i> | 3,8 W |
| <i>Assembly</i> | DIN guide |
| <i>Degree of protection</i> | IP20 |
| <i>Terminals</i> | Section: 2.5 mm ² Max Current: 12A with 2.5 mm ² cables |

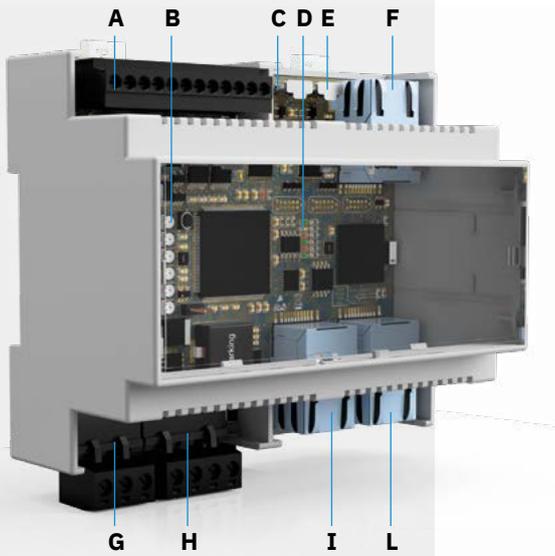
Cod. **90301010**

ISC-B01

Fieldbus Control Unit

ISC-B01 is the new control unit for the Inxpect radar detection system, which improves the performance of the system providing advanced functionality through the ethernet connection:

- **ISC-B01 can be remotely configured using the Inxpect Safety Application: the security is guaranteed by the adoption of the highest security standards.**
- **all detection zones can be dynamically modified in real-time (two detection zones for LBK System Bus and four detection zones for SBV System Bus).**
- **it supports different fieldbus protocols (e.g. PROFI-safe, CIP Safety).**



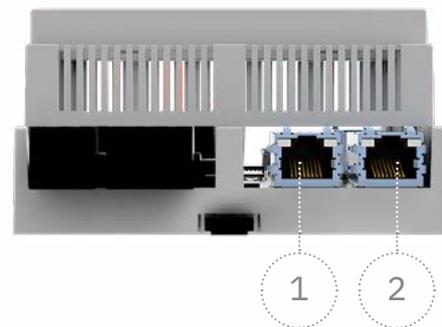
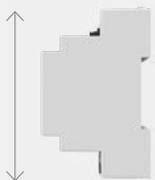
- A** - I/O Connector
- B** - Sensor status LED
- C** - Micro USB port for the communication with the Inxpect Safety App
- D** - Ethernet fieldbus status LED
- E** - Micro USB port (reserved)
- F** - Ethernet port for the communication with the Inxpect Safety App
- G** - Power supply connector
- H** - CAN bus and sensor power supply connector
- I** - Ethernet fieldbus port n. 1
- L** - Ethernet fieldbus port n. 2

106 mm (4.17 in)



58 mm (2.28 in)

90 mm (3.54 in)



Certification

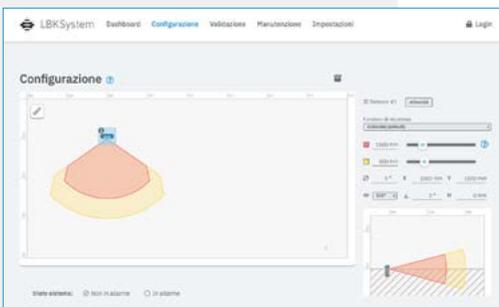


Technical details

| | |
|------------------------------|--|
| <i>Outputs</i> | 4 Outputs Signal Switching Devices (OSSDs) or 2 dual channel safety outputs |
| <i>Safety outputs</i> | High-side outputs (with extended protection function) Max voltage: 30 V dc Max current: 0,4 A Max power: 12 W |
| <i>Inputs</i> | 2 dual channel TYPE3 digital inputs with common GND |
| <i>Fieldbus interface</i> | Ethernet based interface with different standard fieldbus (e.g. PROFI-safe) |
| <i>Power supply</i> | 24 V dc (20–28 V dc) Max current: 1A (no OSSD) |
| <i>Max power consumption</i> | 5 W (no OSSD) |
| <i>Assembly</i> | DIN guide |
| <i>Degree of protection</i> | IP20 |
| <i>Terminals</i> | Section: 1 mm ² Max Current: 4A with 1 mm ² cables |

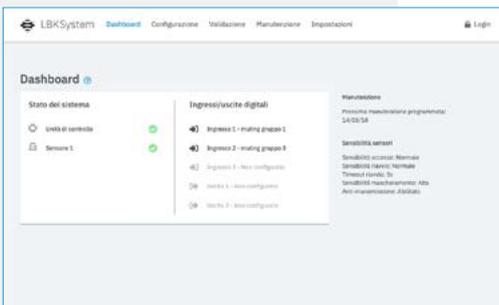
Inxpect Safety Application

The software allows simple and intuitive configuration and subsequent validation of the coverage area. The Inxpect Safety App is a software that can be installed on any PC or Mac, used for easily configuring the volumetric coverage areas of Inxpect safety radar systems, setting I/O interfaces configuration and system parameters, and run the validation. It is a fundamental support for installing any Inxpect safety system.


1

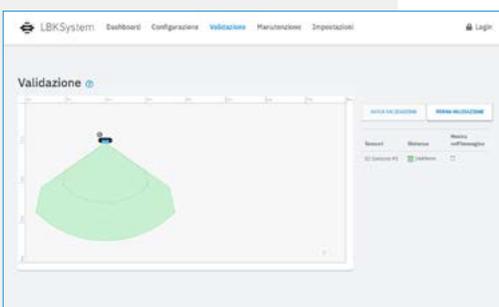
SYSTEM CONFIGURATION

It is easy to set all sensor and controller parameters, as well as to import machinery layouts in different formats.


2

SYSTEM STATUS CHECK

The status of the controller and single sensors, outputs and inputs can be checked through the application.


3

SYSTEM VALIDATION

The software can be used to validate system function and draft validation reports.

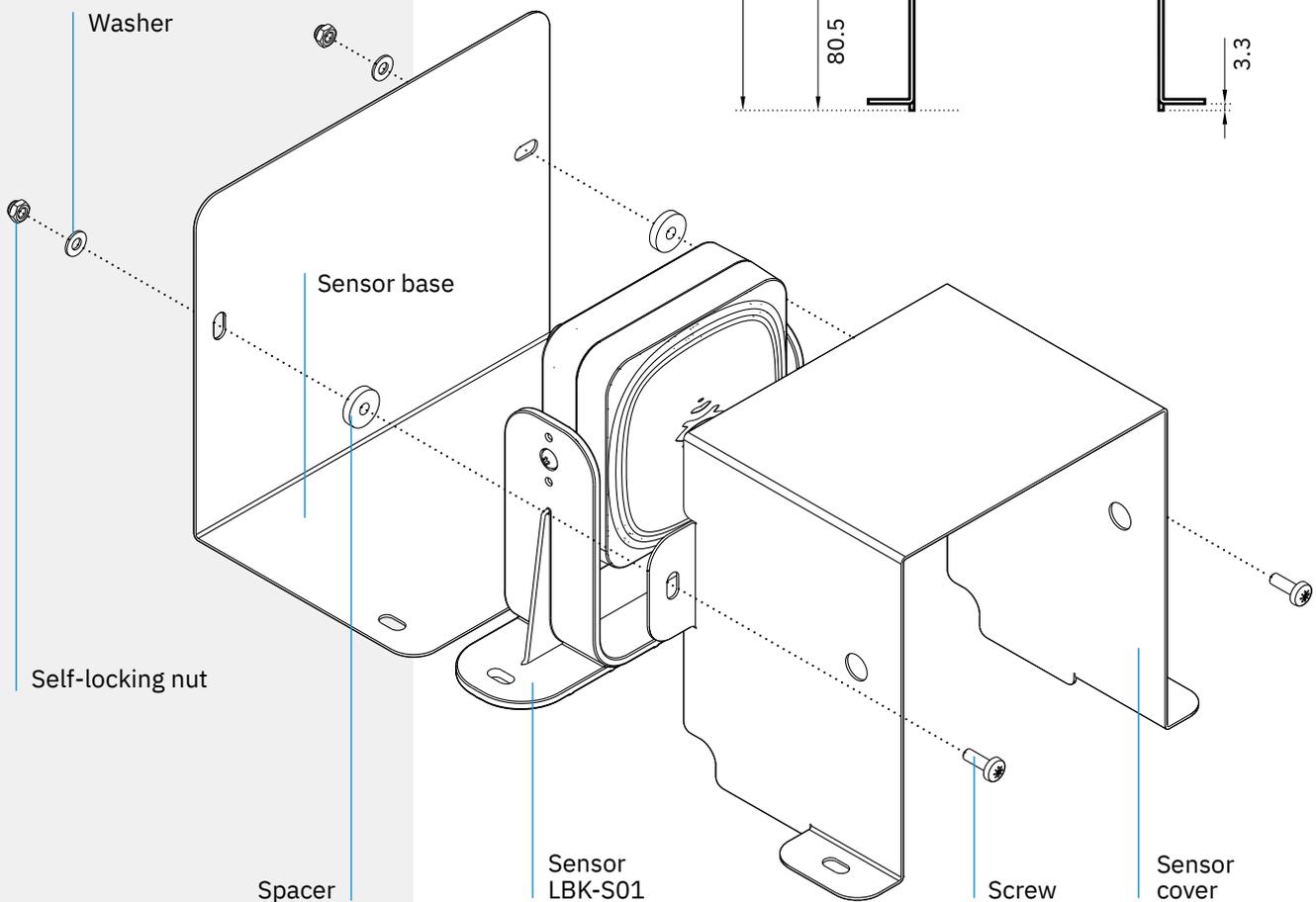
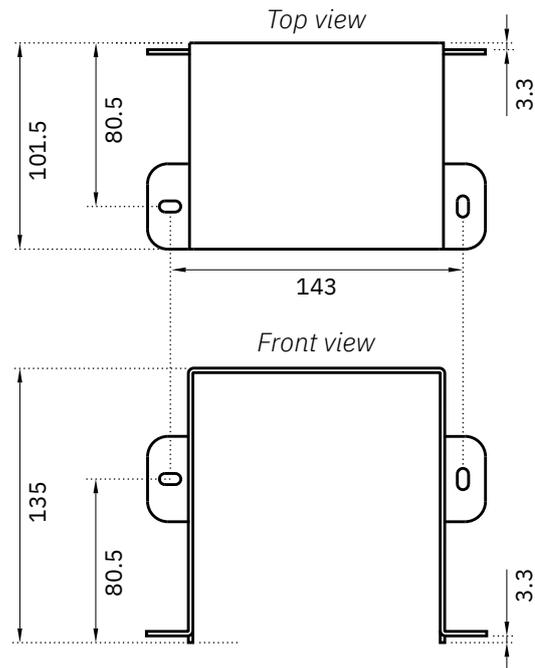
AISI 304 Stainless steel

Cod. **90202ZAA**

Metal protector

For LBK sensors

The metal protector ensures that Inxpect sensors perform at their best even in the most challenging environmental conditions, increasing their immunity to spurious detections while reducing the possibility of damage caused by accidental impact.



Cables



Control unit to sensor

Control unit/sensor cable:
CAN bus, totally shielded.

Controller side: free wires

Sensor side: connector M12, female, 5 poles,
A-coded, angled 90°

| | LBK System LBK System Bus | SBV System Bus |
|------|------------------------------|----------------------|
| 5 m | Cod. 08000003 | Cod. 08000110 |
| 10 m | Cod. 08000004 | Cod. 08000111 |
| 15 m | Cod. 08000006 | Cod. 08000112 |



Sensor to sensor

Sensor/sensor cable:
CAN bus, totally shielded.

IN side: connector M12, female, 5 poles,
A-coded, angled 90°

OUT side: connector M12, male, 5 poles,
A-coded, angled 90°

| | LBK System LBK System Bus | SBV System Bus |
|------|------------------------------|----------------------|
| 3 m | Cod. 08000007 | Cod. 08000120 |
| 5 m | Cod. 08000013 | Cod. 08000121 |
| 10 m | Cod. 08000014 | Cod. 08000122 |
| 15 m | Cod. 08000016 | Cod. 08000123 |



Bus terminator

Bus terminator: M12, male, 5 poles,
A-coded, straight 180°, resistance 120 Ω

Cod. **07000003**

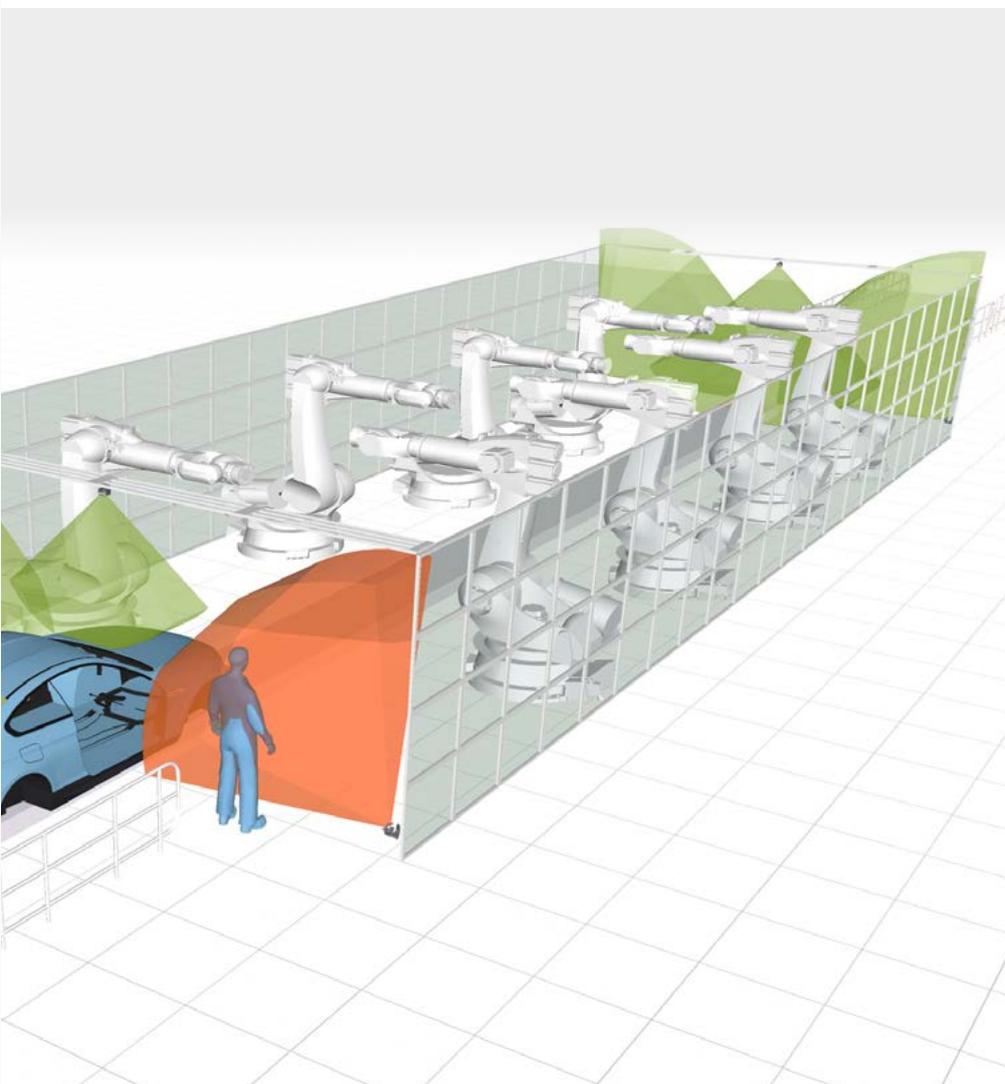


Inxpect S.p.A.
Via Serpente, 91
25131 Brescia
T +390305785105
safety@inxpect.com
www.inxpect.com



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3D Safety Radar Systems **USE CASES**



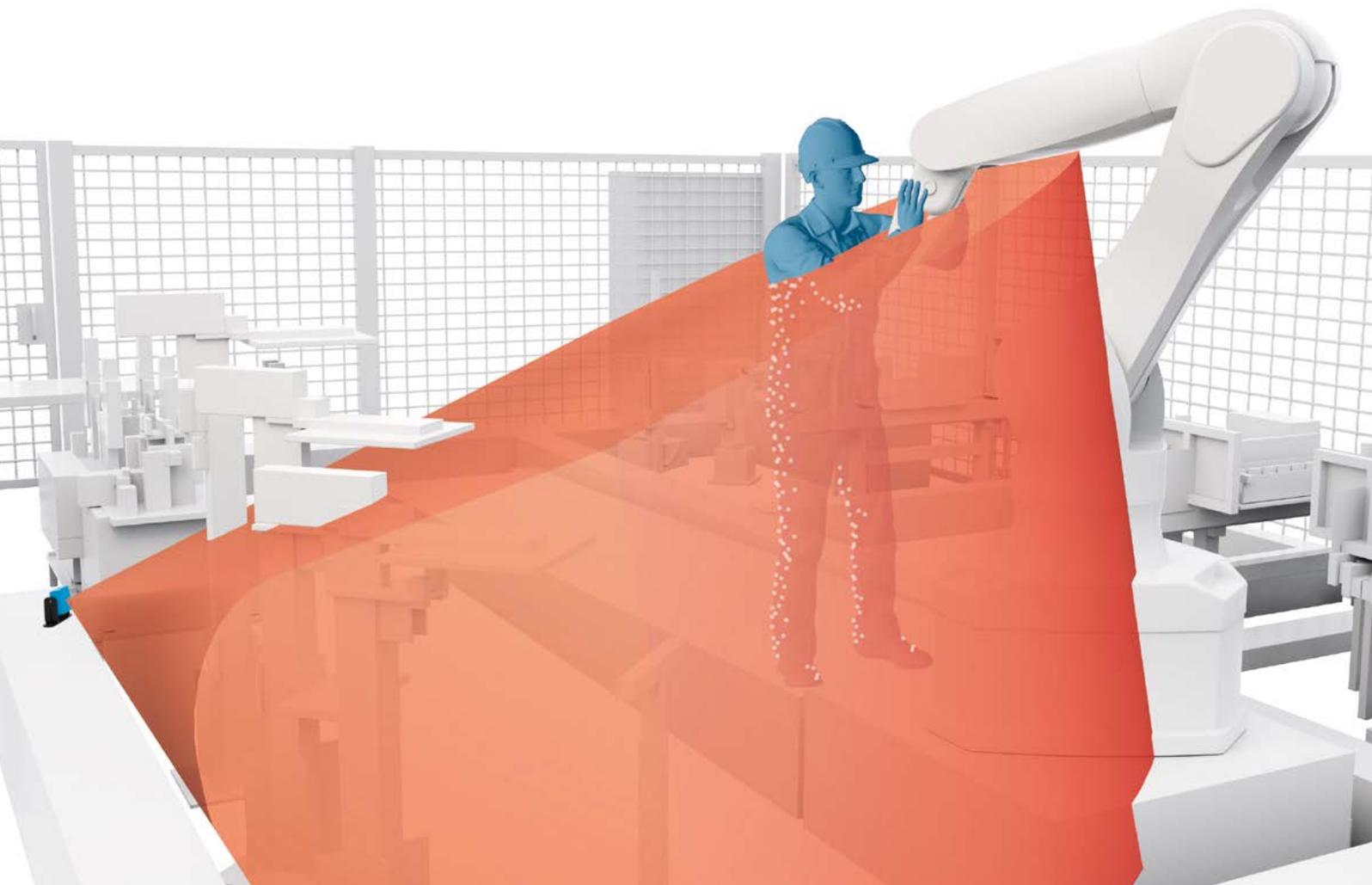
Restart prevention

Higher safety in robotic cells

Inxpect refines the state of art of robotics cell and the world of industrial safety in general. Inxpect 3D radars ensure maximum safety within dangerous areas by preventing unintentional restart while operator is in the dangerous area.

Main features:

- Natively 3D: volumetric coverage
- Adaptive to changing scenarios
- Prevent unintentional restarts
- Simplify access procedures
- Remove human error
- Improve productivity



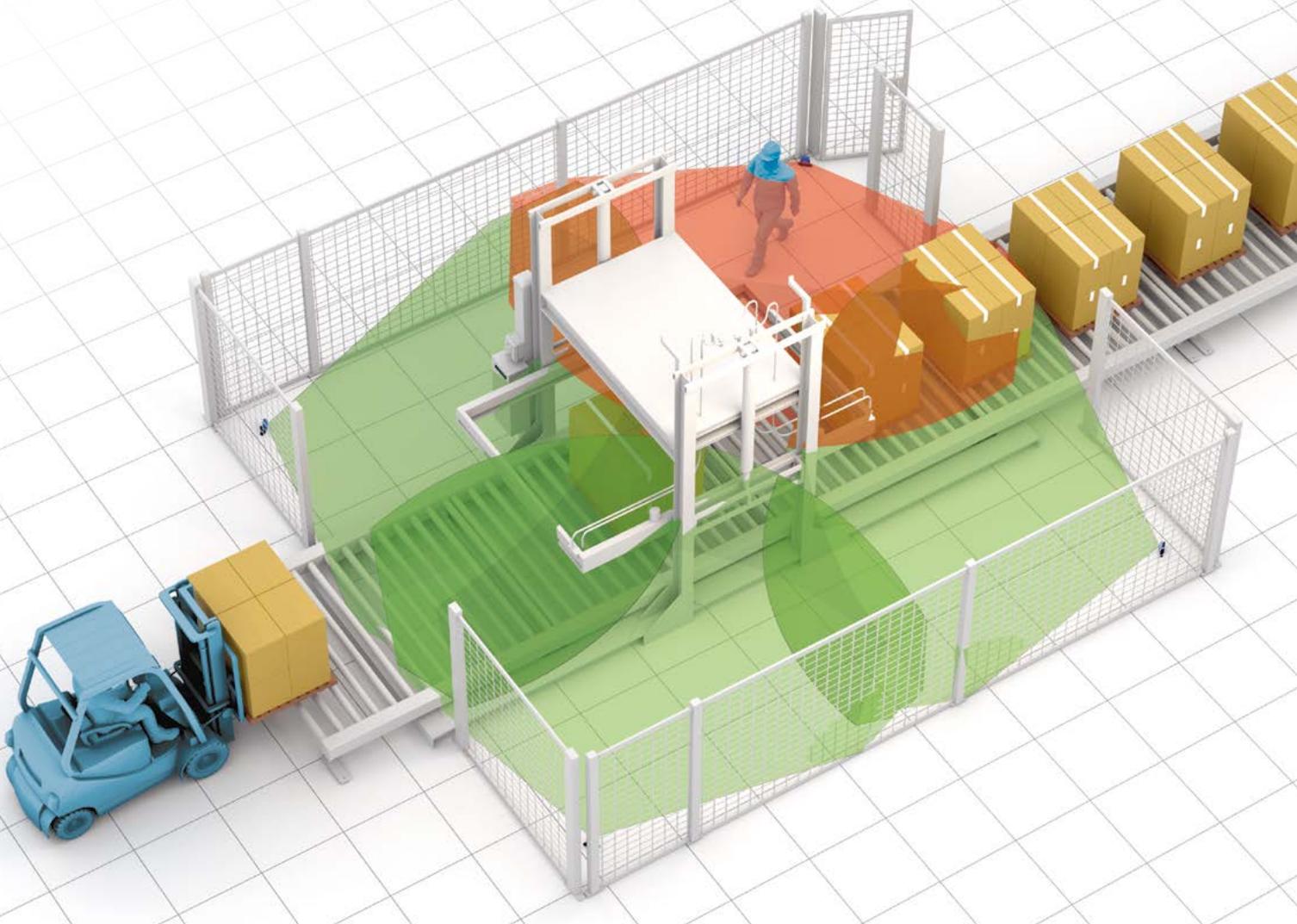
Restart prevention

Higher safety in wrapping stations

Inxpect redefines the state of the art of automatic wrapping and strapping stations. Inxpect 3D radars simplify human/machine interaction, prevent unintentional restarts and reduce residual risks, increasing efficiency and productivity.

Main features:

- Natively 3D: volumetric coverage
- Adaptive to changing scenarios
- Prevent accidental restart
- Simplify access procedures
- Improve human/machine interaction
- Remove human error
- Improve productivity



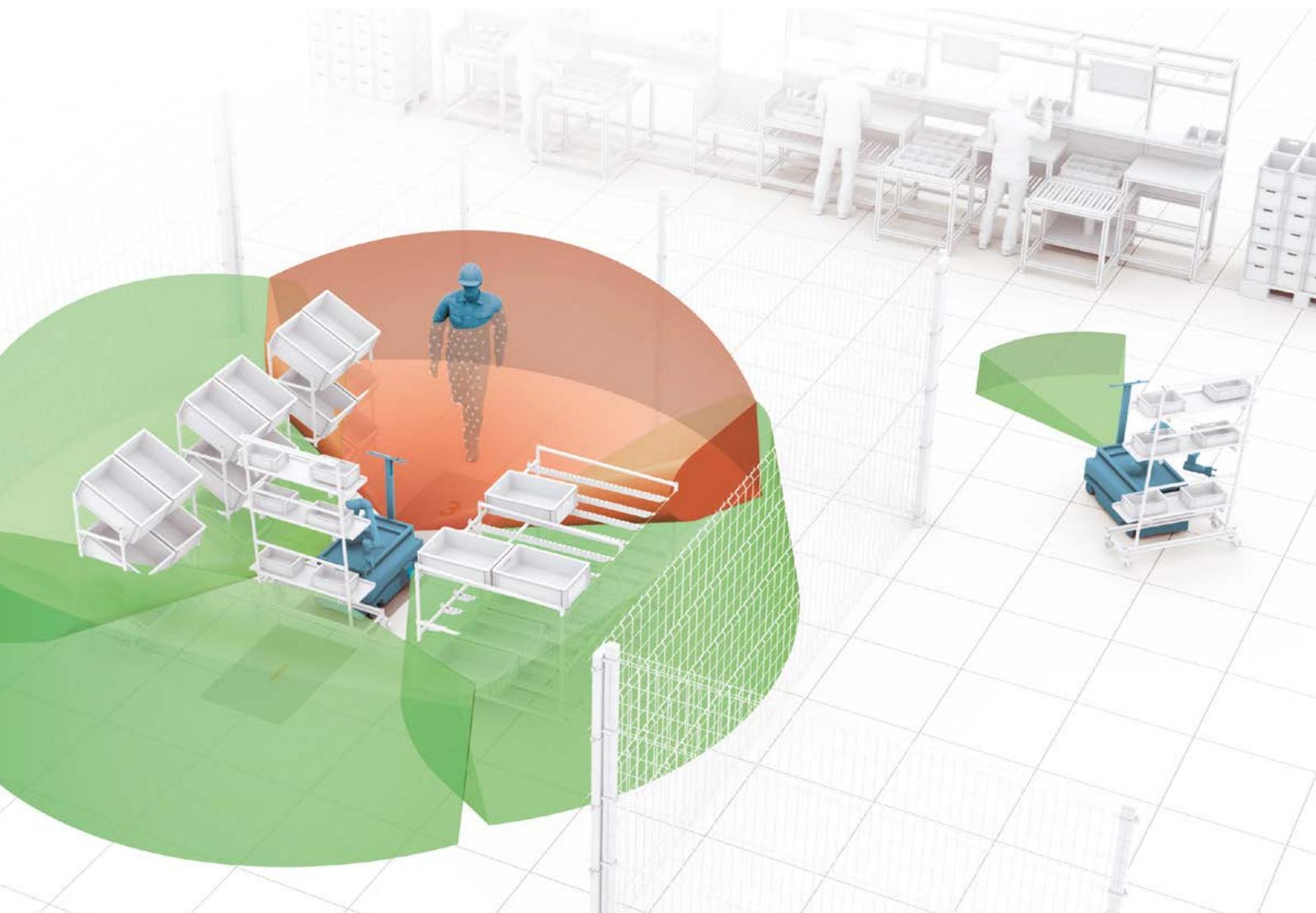
Smart collision avoidance

Indoor application: Pick and Place

Inxpect brings dynamic safety to pick and place applications. Inxpect 3D radar simplifies human/machine interaction, provides highly dynamic protection and allows for simple programming. Being adaptive to changing scenarios, Inxpect 3D radar increases efficiency and productivity.

Main features:

- Natively 3D: volumetric coverage
- Adaptive to changing scenarios
- Highly dynamic protection
- Simple programming



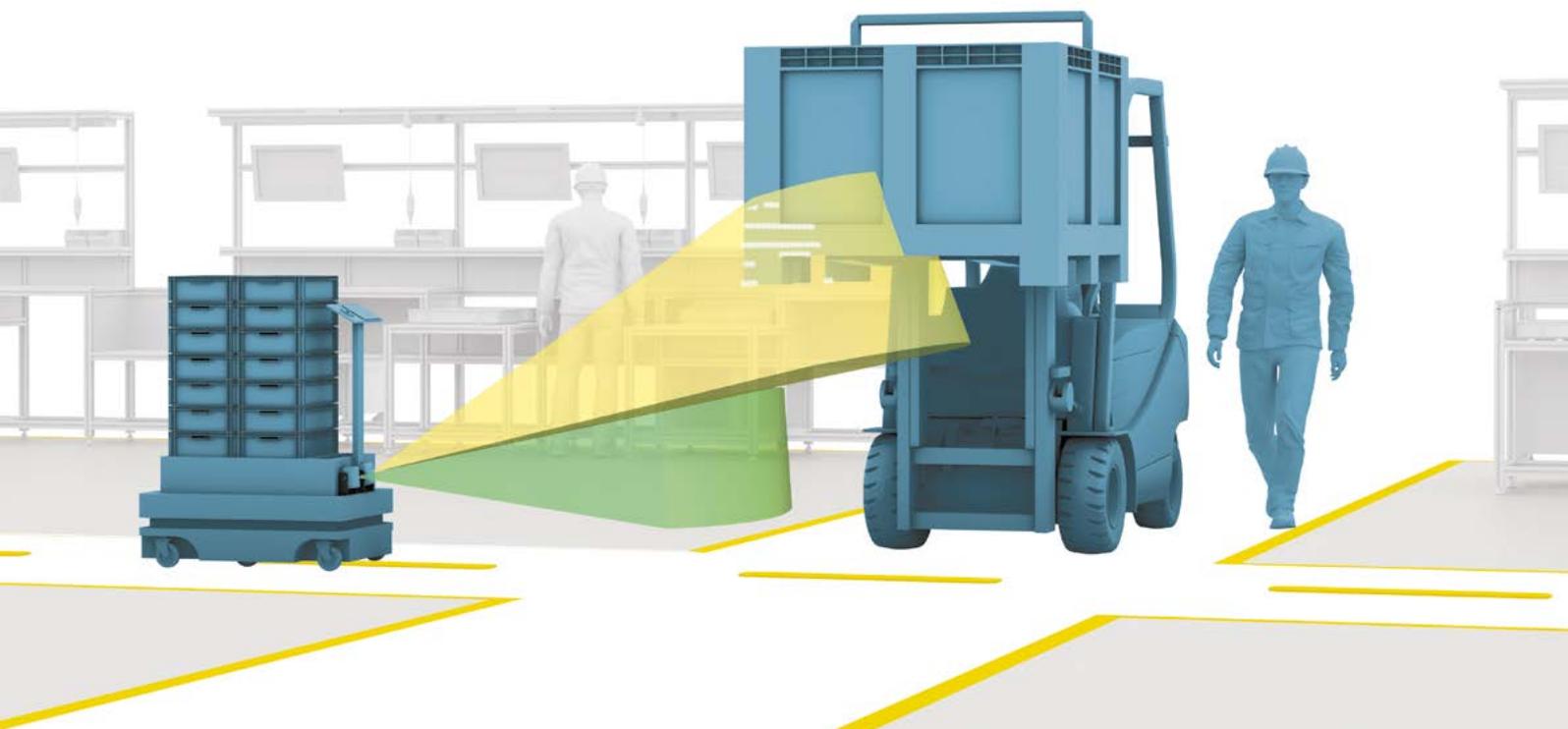
Smart collision avoidance

Indoor application: Automated Guided Vehicle

Inxpect brings dynamic safety to AGV. Inxpect 3D radars are ideal anti-collision sensor: they're robust to dust, debris, smoke, rain and light reflections. They are effective at detecting suspending loads, provide volumetric coverage and fit perfectly for indoor and outdoor applications.

Main features:

- Natively 3D: volumetric coverage
- Effective at detecting suspended loads
- Robust to smoke, dust, debris, rain, fog, snow and light reflections
- Indoor and outdoor applications



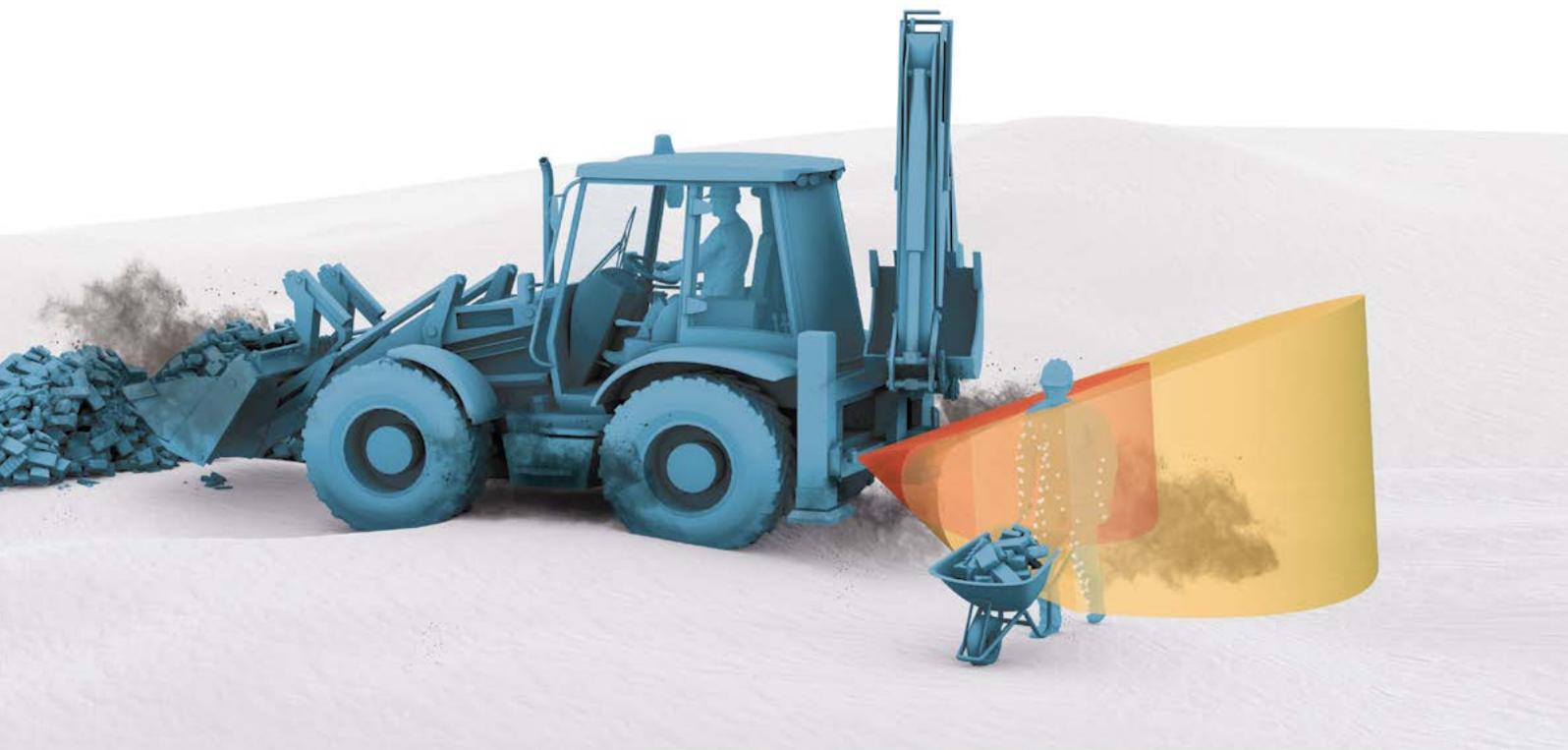
Smart collision avoidance

Outdoor application: Construction Site

Inxpect ensures maximum safety even in harsh environmental conditions. Inxpect 3D radars are an excellent aid to monitoring of the movement areas of operating machines because they allow to have a complete analysis of the area, even on multiple levels.

Main features:

- Robust to smoke, dust, debris, rain, fog, snow and light reflections
- Reduce false alarms
- Indoor and outdoor applications
- 3D radar: volumetric protection
- Operating temperature -30° $+60^{\circ}$



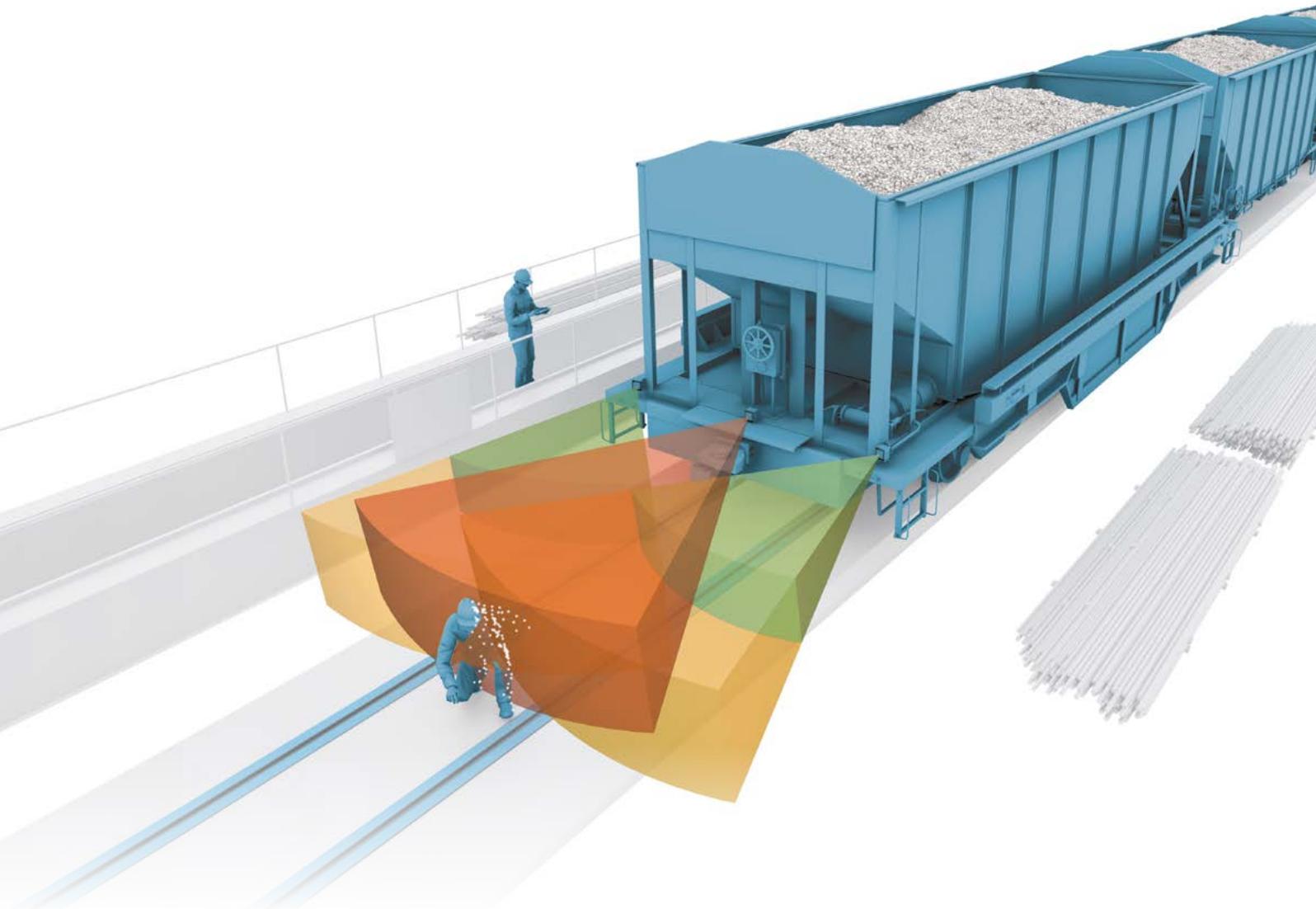
Smart collision avoidance

Outdoor application: Construction Site

Inxpect ensures maximum safety even in harsh environmental conditions. Dust, fog, rain and swarf generated by production processes do not cause false alarms. The volumetric coverage of Inxpect 3D radars prevents collision with suspended loads or airborne elements.

Main features:

- Robust to smoke, dust, debris, rain, fog, snow and light reflections
- Reduce false alarms
- 3D radar: volumetric protection
- Operating temperature -30° $+60^{\circ}$



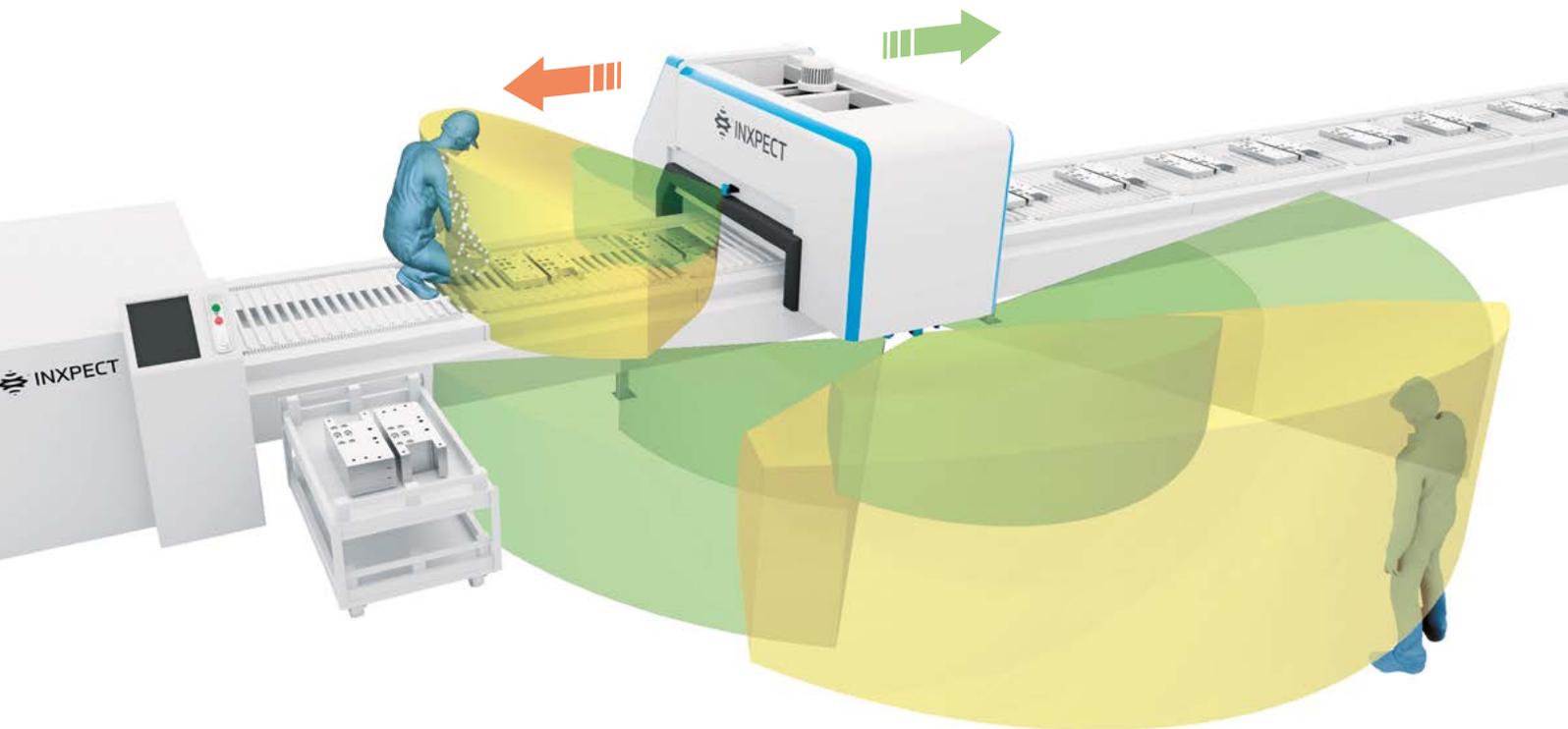
Access protection

Dynamic safety for mobile gantry machining

Inxpect redefines safety for mobile gantry machining. Thanks to the volumetric coverage, Inxpect 3D radars secure both the floor and the work surface, always ensuring maximum safety for operators.

Main features:

- Robust to debris: no more false alarms
- Natively 3D: volumetric coverage (for both floor and work surface areas)
- Prevent unintentional restarts while operator is in the dangerous area
- Remove human error



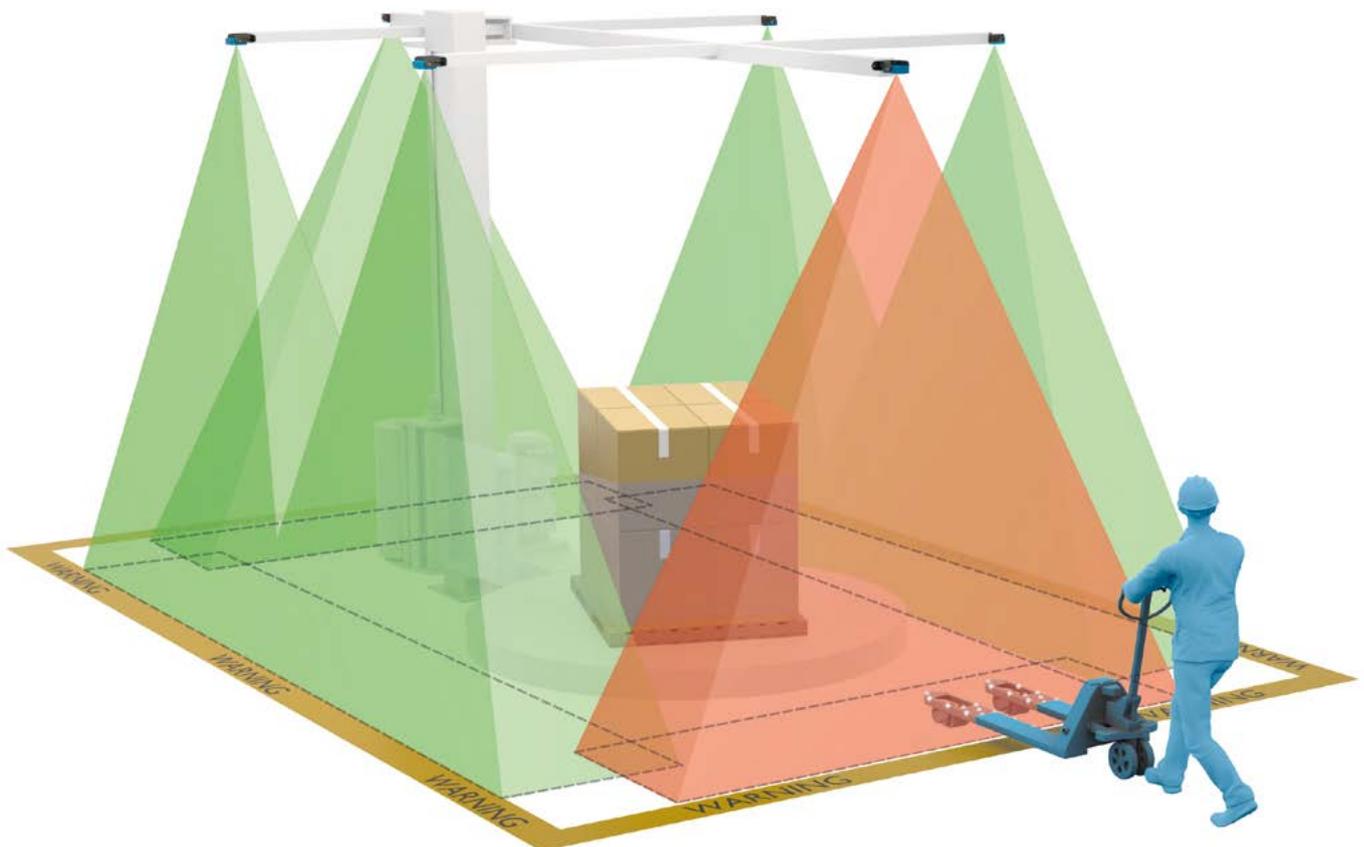
Access protection

Higher safety in wrapping stations

Inxpect redefines safety for wrapping stations. Inxpect 3D radars can be positioned overhead to create a volumetric barrier for access protection: this configuration makes a better and safer human/machine interaction.

Main features:

- Robust to smoke, dust, debris, rain, fog, snow and light reflections
- Dramatic reduction of floor occupancy
- Simplify human/machine interaction
- Improve productivity



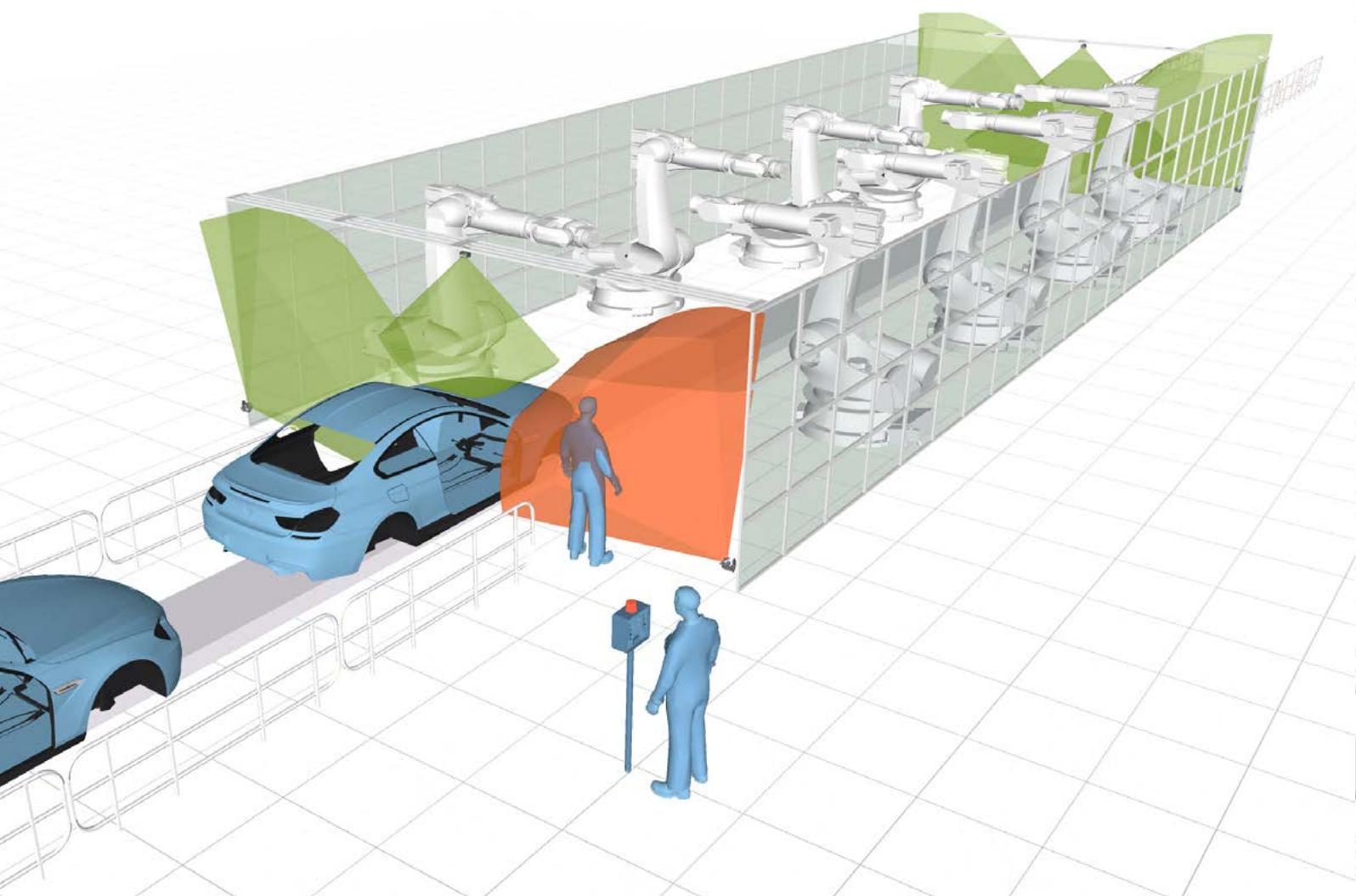
Access protection

Dynamic safety for robotic cells

Inxpect redefines safety for robotic cells. Thanks to the dynamic configurations, Inxpect's 3D radar sensors monitor the entrance to the dangerous area, always guaranteeing maximum safety for operators and at the same time without ever stopping the operating cycle of the machinery.

Main features:

- Dynamic configurations
- 3D radar: volumetric protection
- Simplify human/machine interaction
- Improve productivity



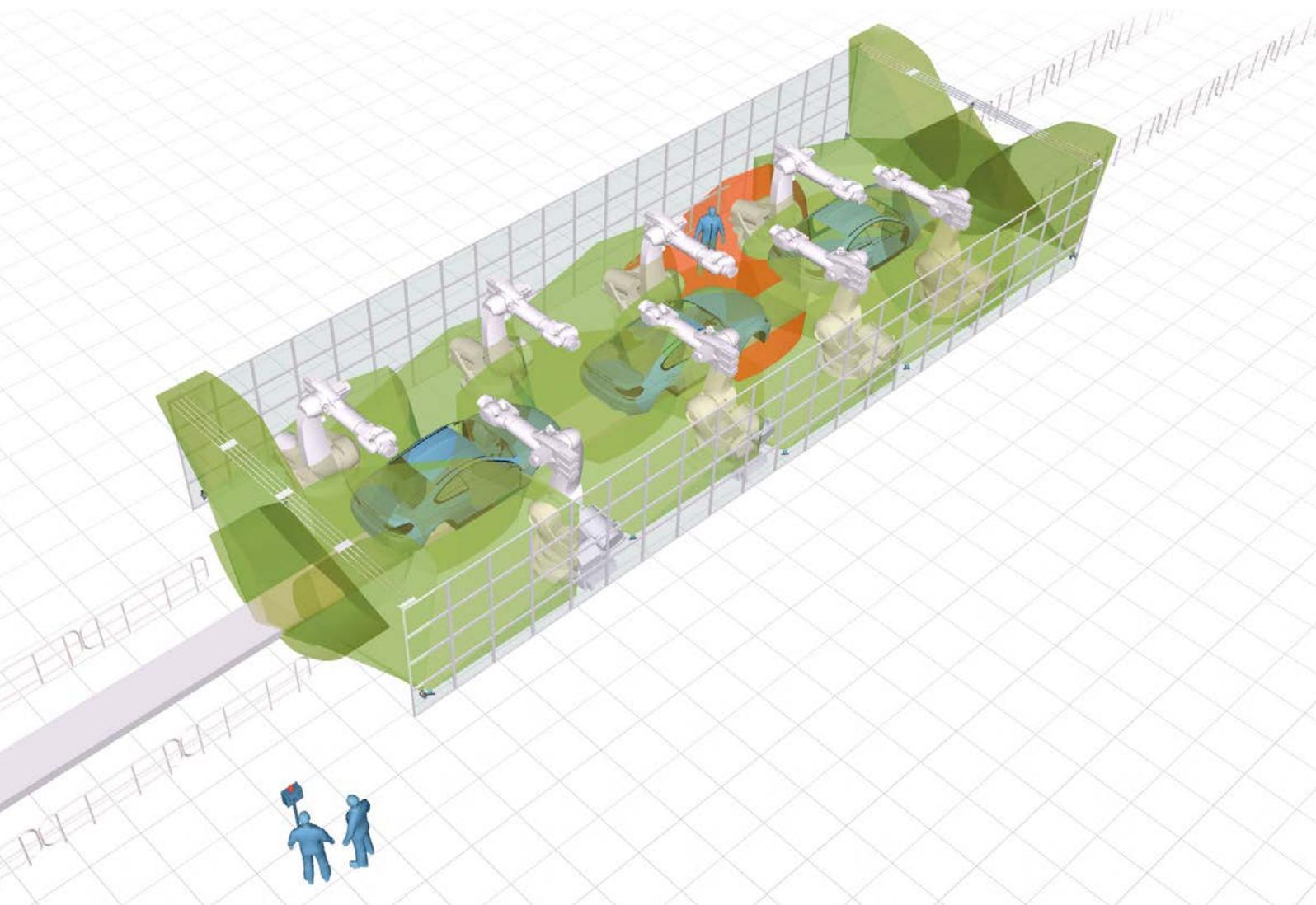
Restart prevention

Higher safety in automation robotic cells

Inxpect removes the human error for robotic cells. Inxpect 3D radars thanks to proprietary algorithms prevent unintentional restarts while operator is in the dangerous area and reduce residual risks, increasing efficiency and productivity.

Main features:

- Natively 3D: volumetric coverage
- Adaptive to changing scenarios
- Prevent unintentional restarts
- Improve human/machine interaction
- Remove human error
- Improve productivity





Inxpect S.p.A.
Via Serpente, 91
25131 Brescia
T +390305785105
safety@inxpect.com
www.inxpect.com



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