

# 3D SAFETY RADAR SYSTEMS

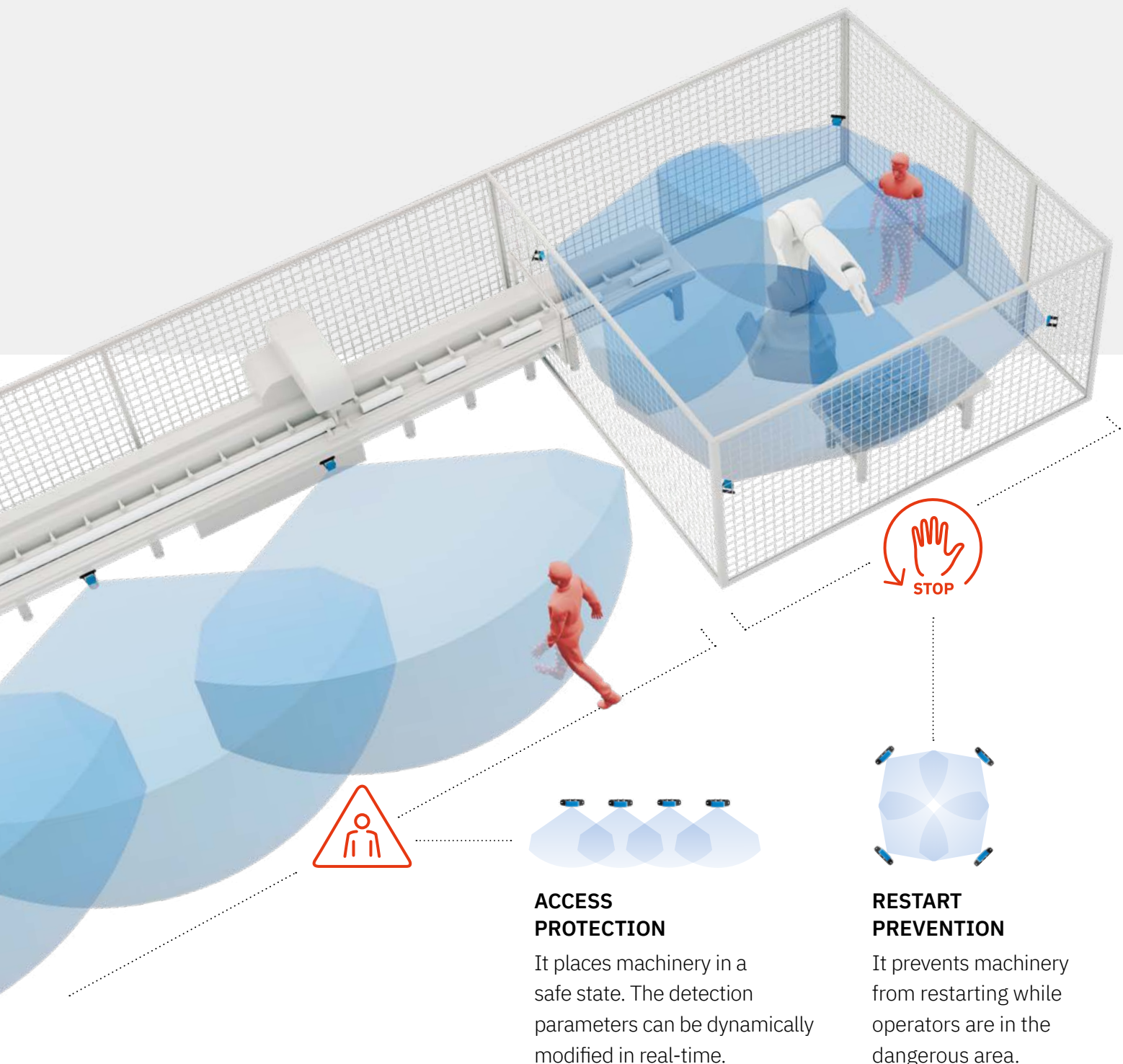
Product catalogue



# 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, the sensitivity of the system and programmable I/Os.



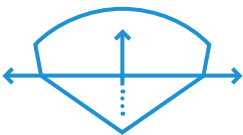
## World's first SIL2/PLd and UL Listed safety radar systems



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 24 GHz radar algorithm that filters out those disturbances, reducing false alarms and increasing productivity.



### DYNAMIC MODIFICATION OF THE DETECTION ZONE

With Inxpect bus systems, 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.



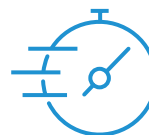
### IMPROVE THE COMMUNICATION WITH THE MACHINERY

The modular fieldbus in Inxpect bus 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 < 100ms

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

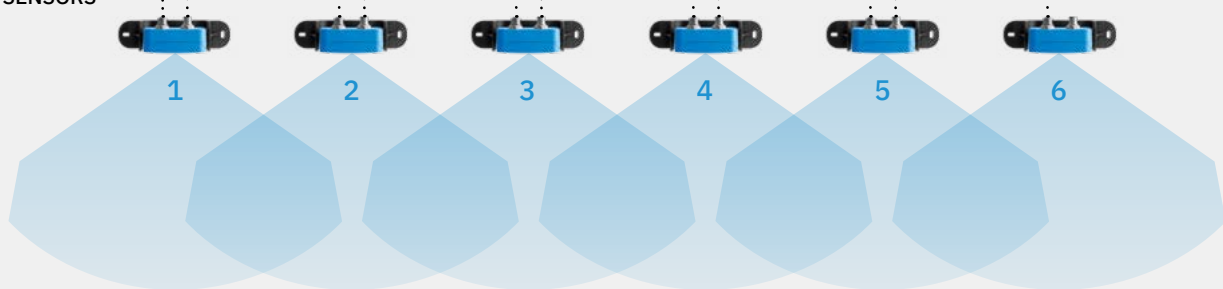
## INXPECT SAFETY APPLICATION



## 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 multiple configuration modes: automatic for regular-shaped areas, manual for the monitoring of more complex areas.

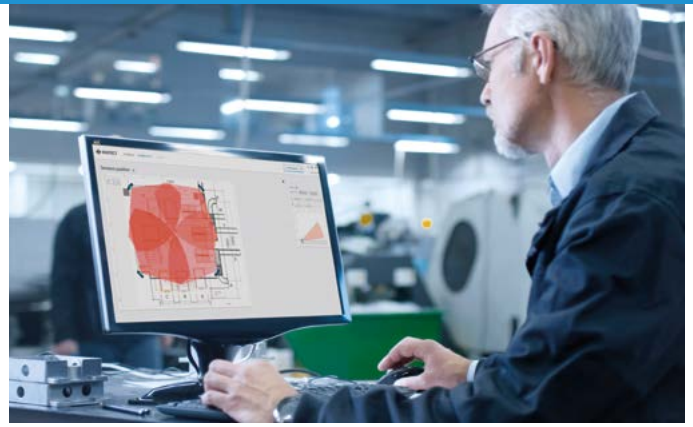


Programmable Muting function: the configuration of sensor groups that can be temporarily muted allows operators to safely access parts of the dangerous area, according to production needs.



## 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 bus 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

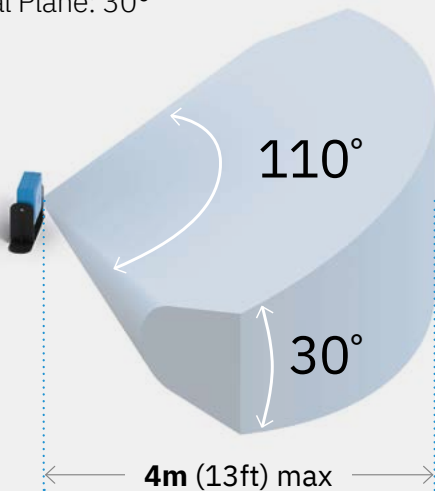
The answer to the demands of complex applications

#### TWO CONFIGURABLE FIELDS OF VIEW (FOV)

##### 1. Wide

Horizontal Plane: 110°

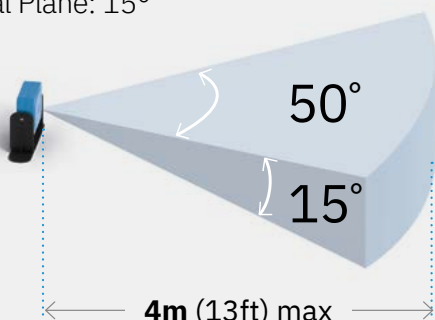
Vertical Plane: 30°



##### 2. Narrow

Horizontal Plane: 50°

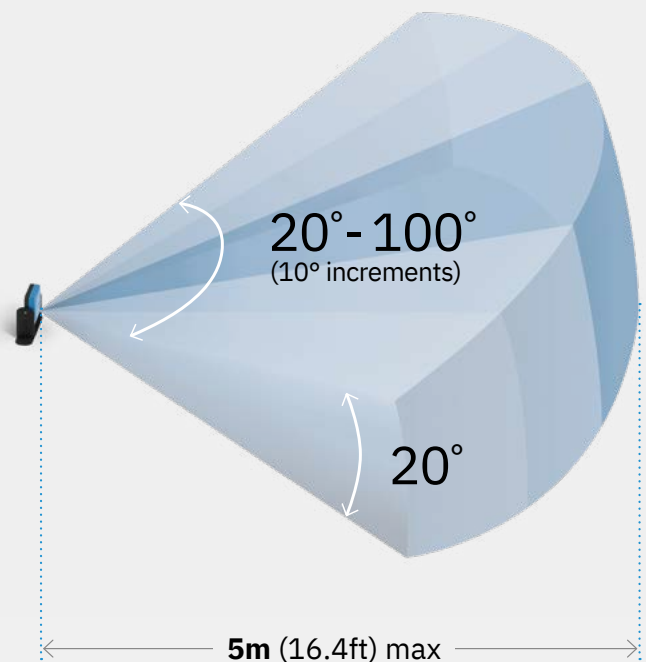
Vertical Plane: 15°



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

Horizontal Plane: 20-100°

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.

A longer field version is coming in 2021.

# 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.

[Worldwide certification is coming in 2021]



SENSOR  
SBV-01



CONTROL UNIT  
ISC-B01

## Systems comparison table

FEATURE	LBK System	LBK System Bus	SBV System Bus
Safety certification	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 1001)	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 1002)	IEC 62998, Class D *
Radar frequency	24GHz	24GHz	60GHz
Max power consumption (controller + 6 sensors)	11W	12,2W (no OSSD)	21,8W (no OSSD)
Number of safe fields per sensor	1	2	4
Max range (m)	4	4	5
Restart time (s)	10 (automatic)	10 (automatic)	4 (automatic)
FOV access (horizontal/vertical)	110°/30° - 50°/15°	110°/30° - 50°/15°	from 20° to 100°/20° (10° step)
FOV restart (deg)	110°/30°	110°/30°	from 20° to 100°/20° (10° step)
Tolerance zone (cm)	30	30	15
Response time (ms)	< 100	< 100	< 100
Operating temperature	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)
System configuration	USB	USB, Ethernet	USB, Ethernet
Safety input	3	2	2
Safety outputs	1	up to 2 (depending on the configuration)	up to 2 (depending on the configuration)
Non-safety outputs	2	up to 4 (depending on the configuration)	up to 4 (depending on the configuration)
Max number of configurations	1	32	32
Number of configurations that can be selected using digital inputs	-	2 (1 digital input)	2 (1 digital input)
		4 (2 digital input)	4 (2 digital input)
Number of configurations that can be selected using safety fieldbus	-	32	32
Muting	3 groups	2 group using inputs, single sensor using safety fieldbus	2 group using inputs, single sensor using safety fieldbus
Input readable via safety fieldbus	-	2	2
Output settable via safety fieldbus	-	4	4
System status via safety fieldbus	-	yes	yes
System error via safety fieldbus	-	yes	yes

\* Worldwide certification is coming in 2021

Cod. **90202011**

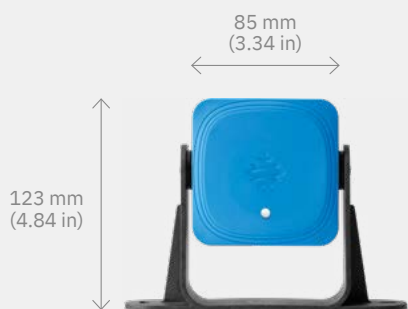
# LBK-S01

## 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

Frequency	24 GHz ISM license-free (see technical annex for worldwide use)
Connectors	Two 5-pin M12 connectors (1 male and 1 female)
CAN bus termination resistor	120 $\Omega$ (not supplied, to be installed with termination connector)
Power supply	12 V dc $\pm$ 20%, through controller
Power consumption	1,2 W
Degree of protection	IP67
Case material	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 ISM 60 GHz frequency band, 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

Worldwide certification is coming in 2021.

### Technical details

Frequency	60 GHz ISM license-free (see technical annex for worldwide use)
Connectors	Two 5-pin M12 connectors (1 male and 1 female)
CAN bus termination resistance	120 $\Omega$ (not supplied, to be installed with termination connector)
Power supply	12 V dc $\pm$ 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



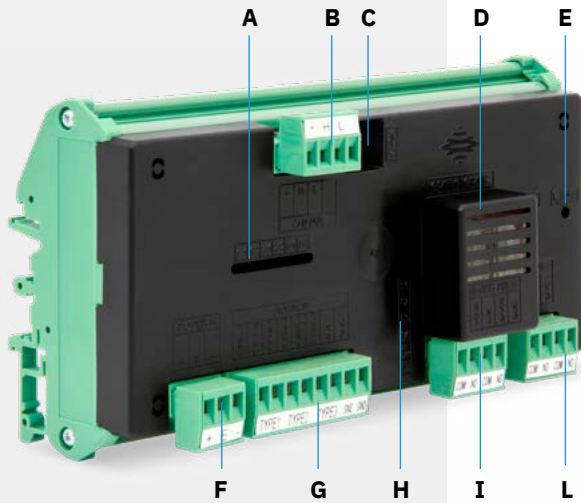
vertical wall  
mounting



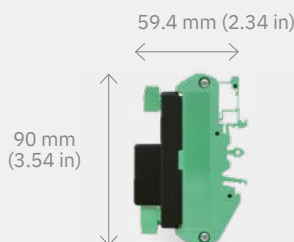
Cod. **90201011**

# 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 output 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.

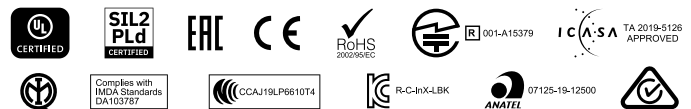
### Safety outputs

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

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

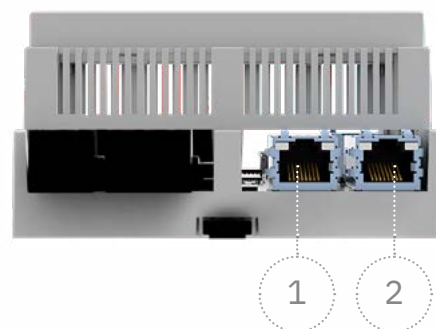
Cod. **90301010**

# 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. ProfiSafe, CIP Safety).**

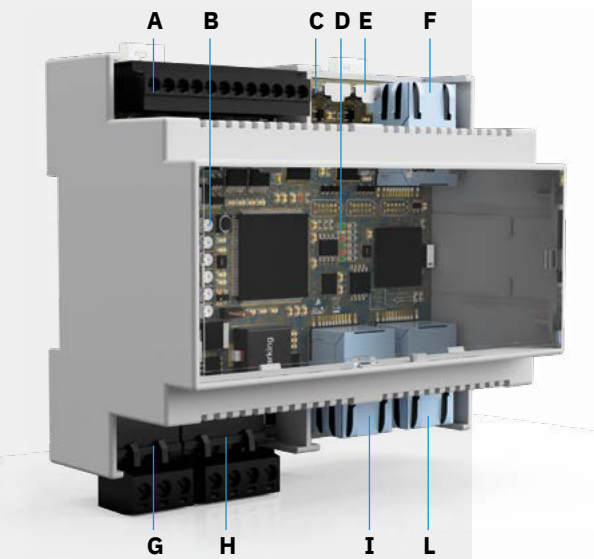


### Certification



### 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. ProfiSafe)
<i>Power supply</i>	24 Vdc (20–28 Vdc) 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 <sup>2</sup>   Max Current: 4A with 1 mm <sup>2</sup> cables

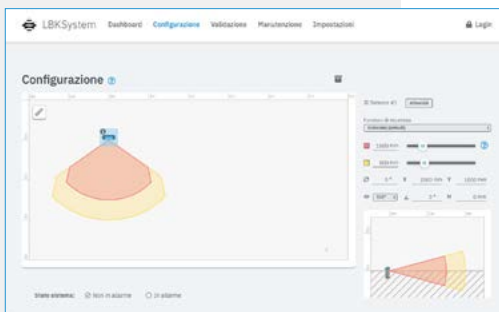


- A** - I/O Connector
- B** - Sensor status LED
- C** - Micro USB port for the communication with the Inxpect Safety App
- D** - Ethernet fieldbus status LED
- E** - Micro USB port (reserved)
- F** - Ethernet port for the communication with the Inxpect Safety App
- G** - Power supply connector
- H**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



# Inxpect Safety Application

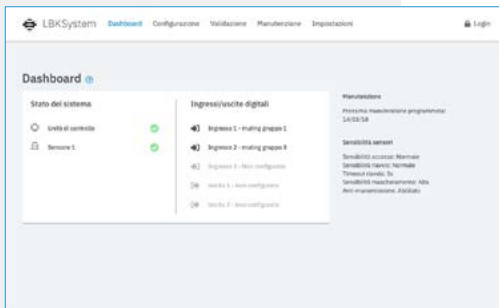
The software allows simple and intuitive configuration and subsequent validation of the coverage area. The Inxpect Safety App is a software that can be installed on any PC or Mac, used for easily configuring the volumetric coverage areas of Inxpect safety radar systems, setting I/O interfaces configuration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



1

## SYSTEM CONFIGURATION

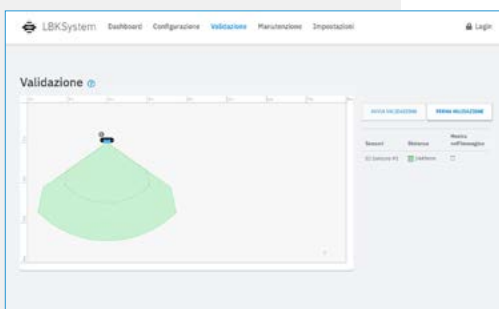
It is easy to set all sensor and controller parameters, as well as to import machinery layouts in different formats.



2

## SYSTEM STATUS CHECK

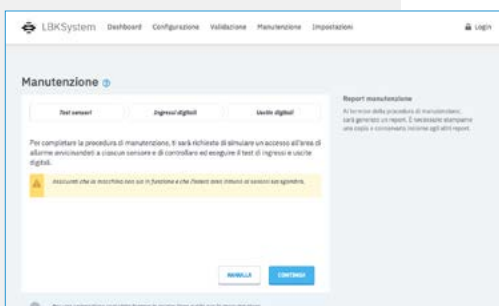
The status of the controller and single sensors, outputs and inputs can be checked through the application.



3

## SYSTEM VALIDATION

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



4

## MAINTENANCE

Maintenance and control activities on the system functions can be carried out using the Inxpect Safety App, to guarantee consistent correct operation.



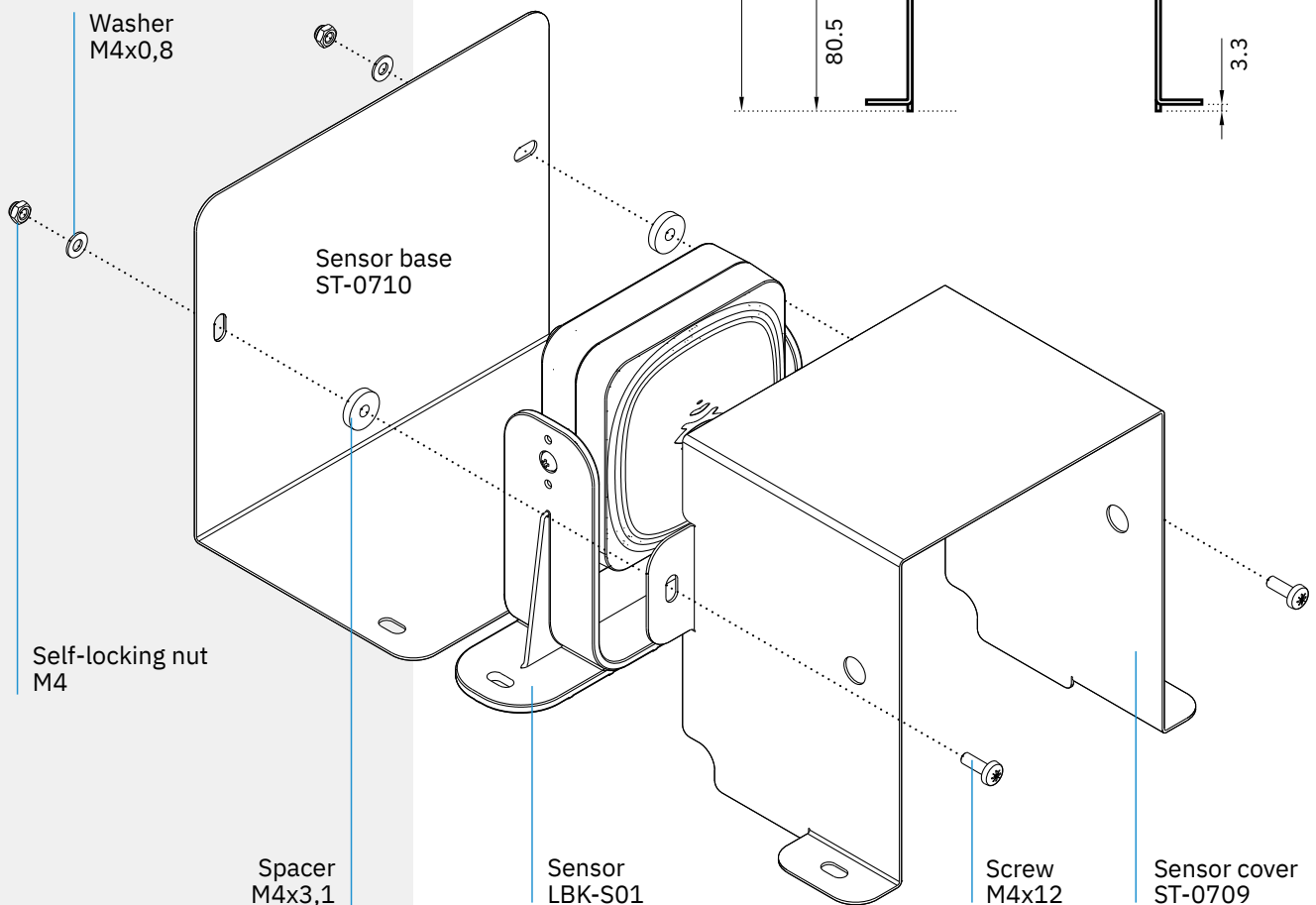
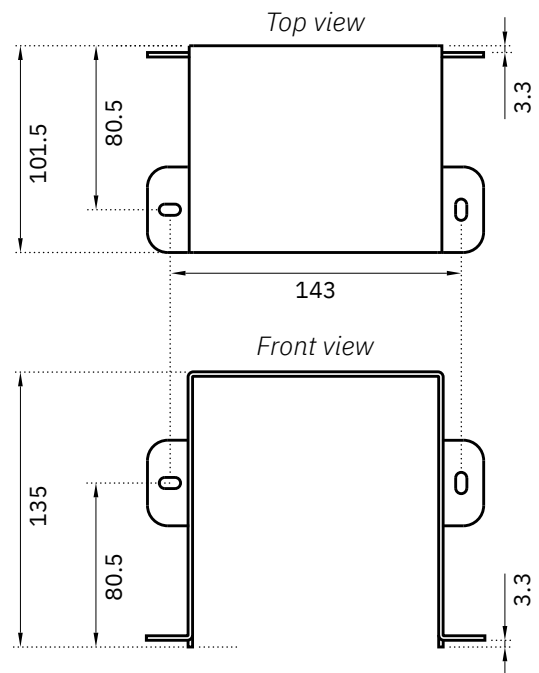
AISI 304 Stainless steel

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, PVC, totally shielded

**Controller side:** free wires

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

### LBK System

#### and LBK System Bus

Cod. **08000003** 5 m

Cod. **08000004** 10 m

Cod. **08000006** 15 m

#### SBV System Bus

Cod. **08000120** 5 m

Cod. **08000121** 10 m

Cod. **08000122** 15 m



## Sensor to sensor

Sensor/sensor cable:  
CAN bus, PVC, totally shielded

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

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

### LBK System

#### and LBK System Bus

Cod. **08000007** 3 m

Cod. **08000013** 5 m

Cod. **08000014** 10 m

Cod. **08000016** 15 m

#### SBV System Bus

Cod. **08000131** 5 m

Cod. **08000132** 10 m

Cod. **08000133** 15 m



## Bus terminator

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

Cod. **07000003**



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