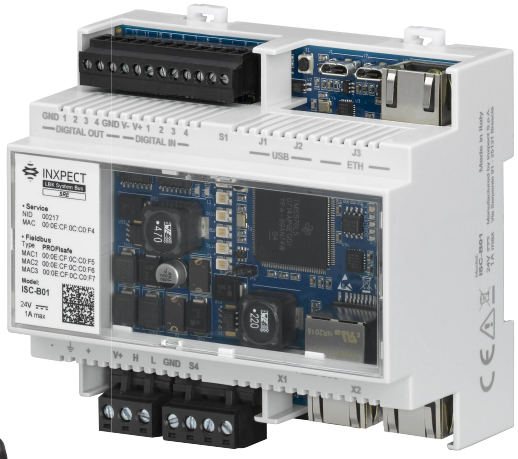
Leuze

Installation instructions

Sensor LBK S-01
Sensor LBK SBV
Controller ISC



The Sensor People

EN•2023-08-15•50149168

Installation instructions

General warnings

- Wrong installation and configuration of the system decrease or inhibit the protective function of the system. Follow the instructions provided in this document for correct installation of the system.
- The presence of static objects, in particular metallic objects, within the field of view may limit the efficiency of sensor detection. Keep the sensor field of view unobstructed.

Certifications

All updated certifications can be downloaded from www.leuze.com (from product download area).

CE conformity

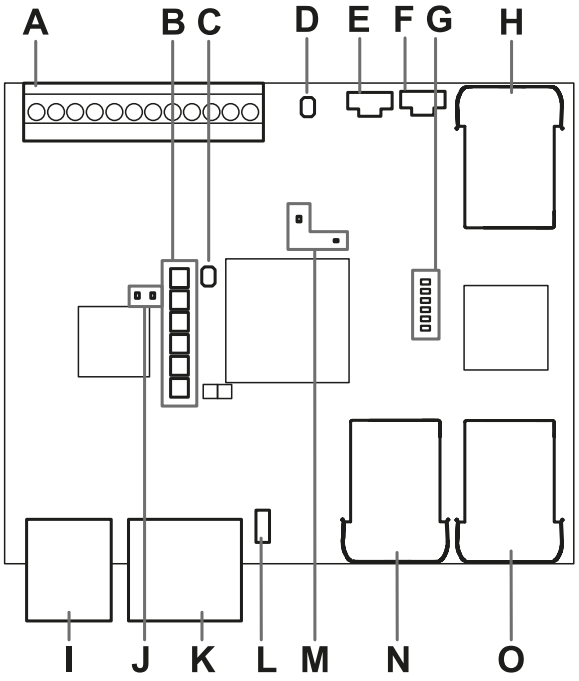
Leuze states that LBK S-01 System and LBK SBV System (Safety Radar Equipment) comply with the 2014/53/EU and 2006/42/EC directives. The full EU Declaration of Conformity text is available on the company's website: www.leuze.com (from the product download area).

UKCA conformity

Leuze states that LBK S-01 System and LBK SBV System (Safety Radar Equipment) comply with with Radio Equipment Regulations 2017 and Supply of Machinery (Safety) Regulations 2008. The full UKCA Declaration of Conformity text is available on the company's website: www.leuze.com (from the product download area).

Component structure

Structure Type A controllers

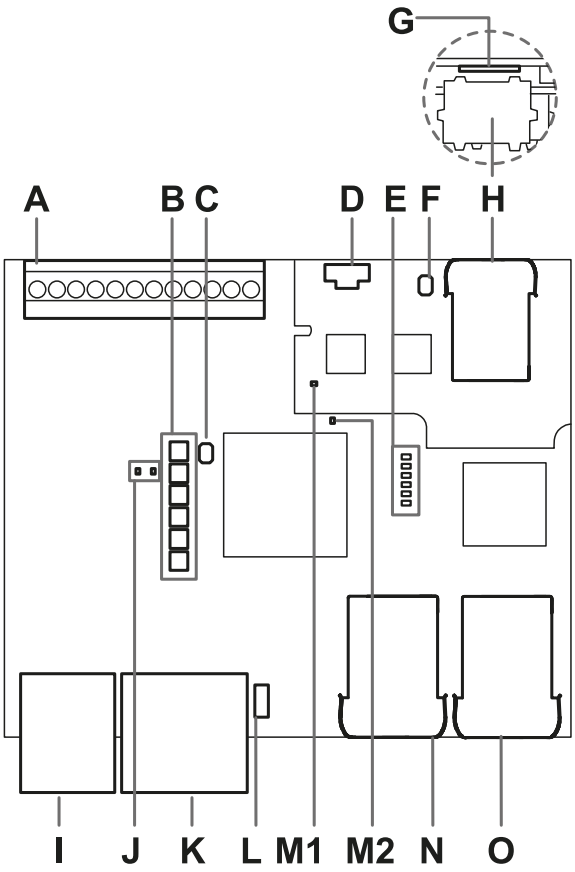


Part	Description	LBK ISC BUS PS	LBK ISC100E-F	LBK ISC-02	LBK ISC-03
A	I/O terminal block	x	x	x	x
B	System status LEDs	x	x	x	x
C	Network parameter reset button / Factory reset button	x	x	x	x
D	Reserved for internal use. Output reset button	x	x	x	x
E	Micro-USB port (micro-B type) for connecting the PC and communicating with the LBK Designer application	x	x	x	x
F	Micro-USB port, if mounted (reserved)	x	x	-	-
G	Fieldbus status LEDs	x	x	-	-
H	Ethernet port with LEDs for connecting the PC, communicating with the LBK Designer application, and for MODBUS communication	x	x	x	-
I	Power supply terminal block	x	x	x	x
J	Power supply LEDs (steady green)	x	x	x	x
K	CAN bus terminal block for connecting the first sensor	x	x	x	x
L	DIP switch to turn on/off the bus termination resistance: • On (top position, default) = resistance included • Off (bottom position) = resistance excluded	x	x	x	x
M1	Status LED of hardware functions of the secondary micro-controller	x	x	x	x
M2	Status LED of hardware functions of the primary micro-controller	x	x	x	x

Part	Description	LBK ISC BUS PS	LBK ISC100E-F	LBK ISC-02	LBK ISC-03
N	Fieldbus port no.1 with LEDs (PROFIsafe or EtherCAT® IN)	x	x	-	-
O	Fieldbus port no.1 with LEDs (PROFIsafe or EtherCAT® OUT)	x	x	-	-

Note: only for LBK ISC100E-F: the processing direction is from the N connection to the O connection. In normal operation, the device receives the data from the controller on N and sends the outgoing data on O.

Structure Type B controllers



Part	Description	LBK ISC110E-P	LBK ISC110E-F	LBK ISC110E	LBK ISC110
A	I/O terminal block	x	x	x	x
B	System status LEDs	x	x	x	x
C	Network parameter reset button / Factory reset button	x	x	x	x
D	Micro-USB port (micro-B type) for connecting the PC and communicating with the LBK Designer application	x	x	x	x
E	Fieldbus status LEDs	x	x	-	-

Part	Description	LBK ISC110E-P	LBK ISC110E-F	LBK ISC110E	LBK ISC110
F	SD Restore button	x	x	x	x
G	MicroSD slot	x	x	x	x
H	Ethernet port with LEDs for connecting the PC, communicating with the LBK Designer application, and for MODBUS communication	x	x	x	-
I	Power supply terminal block	x	x	x	x
J	Power supply LEDs (steady green)	x	x	x	x
K	CAN bus terminal block for connecting the first sensor	x	x	x	x
L	DIP switch to turn on/off the bus termination resistance: • On (top position, default) = resistance included • Off (bottom position) = resistance excluded	x	x	x	x
M1	Status LED of hardware functions of the secondary micro-controller	x	x	x	x
M2	Status LED of hardware functions of the primary micro-controller	x	x	x	x
N	Fieldbus port no.1 with LEDs (PROFIsafe or EtherCAT® IN)	x	x	-	-
O	Fieldbus port no.1 with LEDs (PROFIsafe or EtherCAT® OUT)	x	x	-	-

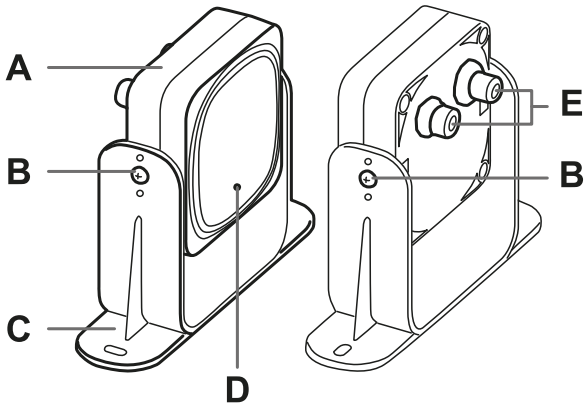
Note: only for LBK ISC110E-F: the processing direction is from the N connection to the O connection. In normal operation, the device receives the data from the controller on N and sends the outgoing data on O.

Controller system status LED

The LEDs are each dedicated to a sensor, and can display the following statuses:

Status	Meaning
Steady green	Normal sensor function and no motion detected
Orange	Normal sensor function and some motion detected
Flashing red	Sensor in error
Steady red	System error
Flashing green	Sensor in boot status

LBK S-01 sensors

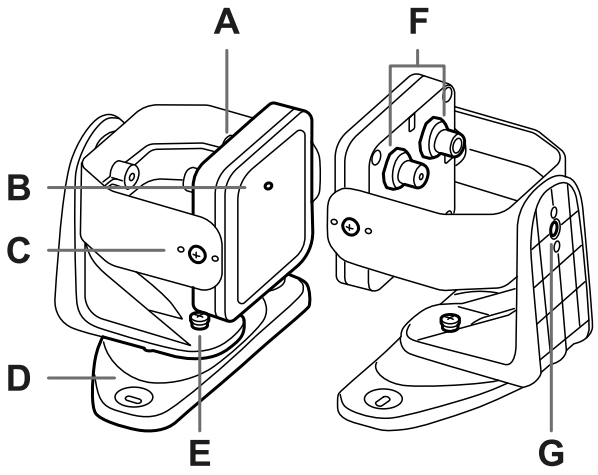


Part	Description
A	Sensor
B	Screws for fastening the sensor at a specific inclination
C	Mounting bracket
D	Status LED
E	Connectors for connecting the sensors in a chain and to the controller

LBK S-01 sensor status LED

Status	Meaning
Steady on	Sensor is working. No motion detected.
Rapid flashing on (100 ms)	Sensor is detecting motion. Not available if the sensor is in muting.
Other conditions	Error

LBK SBV sensors



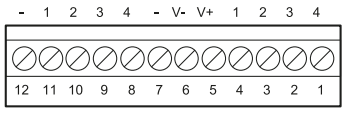
Part	Description
A	Sensor
B	Status LED
C	Tamper-proof screws to position the sensor at a specific angle around x-axis (tilt 10° steps)
D	Mounting bracket
E	Tamper-proof screw to position the sensor at a specific angle around y-axis (pan 10° steps)
F	Connectors for connecting the sensors in a chain and to the controller
G	Tamper-proof screw to position the sensor at a specific angle around z-axis (roll 10° steps)

LBK SBV sensor status LED

Status	Meaning
Steady blue	Sensor is working. No motion detected.
Flashing blue	Sensor is detecting motion. Not available if the sensor is in muting.
Purple	Firmware update conditions
Red	Error conditions

Terminal blocks and connectors pin-outs

Controller digital inputs and outputs terminal block



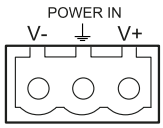
Note: facing the controller so that the terminal block is on the top left, number 12 is the closest to the controller corner.

Terminal block	Symbol	Description	Pin
Digital In	**4**	Input 2, Channel 2, 24 V DC type 3 - INPUT #2-2	1
	3	Input 2, Channel 1, 24 V DC type 3 - INPUT #2-1	2
	2	Input 1, Channel 2, 24 V DC type 3 - INPUT #1-2	3
	1	Input 1, Channel 1, 24 V DC type 3 - INPUT #1-1	4
	V+	V+ (SNS), 24 V DC for diagnostics of the digital inputs (mandatory if at least one input is used)	5
	V-	V- (SNS), common reference for all digital inputs (mandatory if at least one input is used)	6
Digital Out	**-**	GND, common reference for all digital outputs	7
	4	Output 4 (OSSD4)	8
	3	Output 3 (OSSD3)	9
	2	Output 2 (OSSD2)	10
	1	Output 1 (OSSD1)	11
	-	GND, common reference for all digital outputs	12

Note: the cables used must have a maximum length of 30 m and the maximum operating temperature must be at least 80 °C.

Note: use only copper wires with a minimum gauge of 18 AWG and a torque of 0.62 Nm.

Controller power supply terminal block



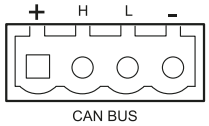
Note: front view of connector.

Symbol	Description
V-	GND
⏚	Earth
V+	+ 24 V DC

Note: the maximum operating temperature of the cables must be at least 70 °C.

Note: use only copper wires with a minimum gauge of 18 AWG and a torque of 0.62 Nm.

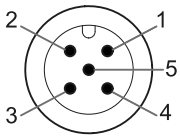
Controller CAN bus terminal block



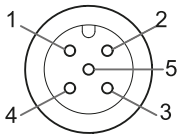
Symbol	Description
+	+ 12 V DC output
H	CAN H
L	CAN L
-	GND

Note: the operating temperature of the cables must be at least 70 °C.

Sensor M12 CAN bus connectors



Male connector



Female connector

Pin	Conductor color	Function
1	-	Shield, to be connected to ground circuit power supply terminal block of the controller.
2	Red	+ 12 V DC
3	Black	GND
4	White	CAN H
5	Blue	CAN L

Sensor M12 CAN bus connection cables

Part no.	Article	Description
50143389	KD DN-M12-5W-P1-150	Connection cable, M12 angled, 5-pin, 15m
50114696	KB DN/CAN-5000 BA	Connection cable, M12 axial, 5-pin, 5m
50114699	KB DN/CAN-10000 BA	Connection cable, M12 axial, 5-pin, 10m

Installation

Materials required

- Two tamper-proof screws to mount each sensor.
- Cables to connect the controller to the first sensor and the sensors to one another.
- A data USB cable with a micro-USB connector (micro-B type) or, only if the Ethernet port is available, an Ethernet cable to connect the controller to the computer.
- A bus terminator (product code: 50040099) with resistance of 120 Ω for the last sensor of the CAN bus.
- A screwdriver for tamper-proof screws to be used with the Hex pin security bit supplied in the controller package.
- (only for LBK S-01 sensors) If necessary, to protect the sensor and to prevent reflections from generating undesired alarms, one Metal protector kit (product code: 50143346) per sensor. See the instructions supplied with the kit for installation instructions.

Note: the Metal protector kit is particularly recommended if the sensor is installed on parts that are moving, vibrating or that are near vibrating parts.

Operating system required

- Microsoft Windows 10 or later
- Apple OS X 11.0 or later

Install the controller

⚠ WARNING

To prevent tampering, make sure the controller is only accessible to authorized personnel (e.g., key-locked electrical panel).

1. Mount the controller on the DIN rail.
2. Make electrical connections.

NOTICE

If at least one input is connected, the SNS input "V+ (SNS)" and the GND input "V- (SNS)" must also be connected.

NOTICE

When powered, the system takes about 2 s (for LBK S-01 System) and 20 s (for LBK SBV System) to start. During that period, the outputs and the diagnostic functions are deactivated, and the green sensor status LEDs of the connected sensors flash.

NOTICE

Make sure to avoid any EMC interference during the controller installation

Install LBK S-01 sensors

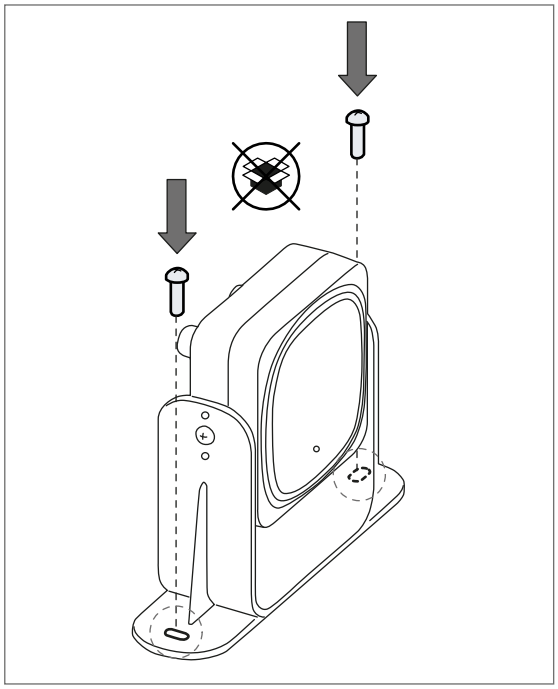
Note: for installation with Metal protector kit (product code 50143346), see the instructions supplied with the kit.

Note: the usage of a thread-locking fluid on the threads of fasteners is suggested, especially when the sensor is installed on a moving or vibrating part of the machinery.

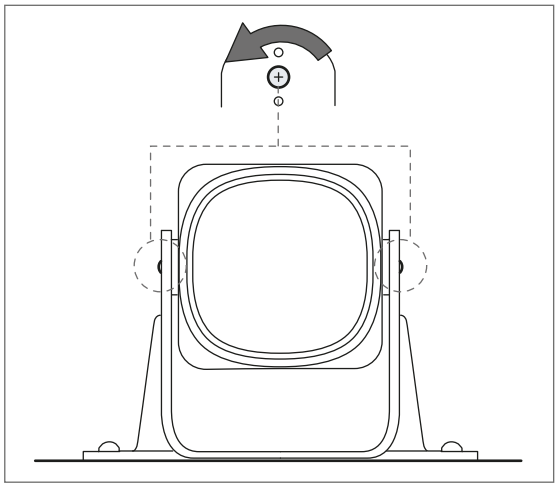
Note: if the sensor is installed on parts that vibrate and objects are present in the field of view, the sensor could generate undesired alarms.

1. Position the sensor as indicated in the configuration report and fasten the bracket with two tamper-proof screws.

NOTICE	
	Make sure the support does not inhibit machinery commands.

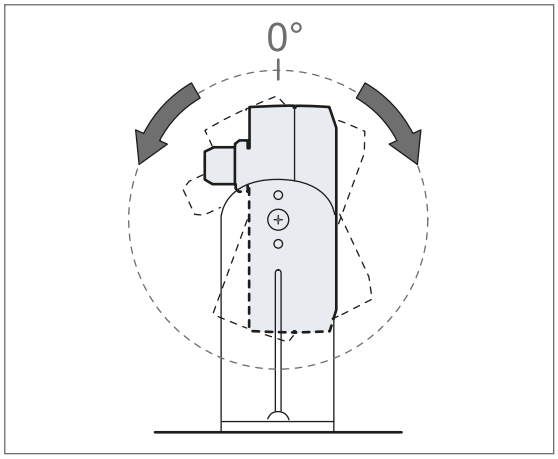


2. Loosen the side screws to tilt the sensor.

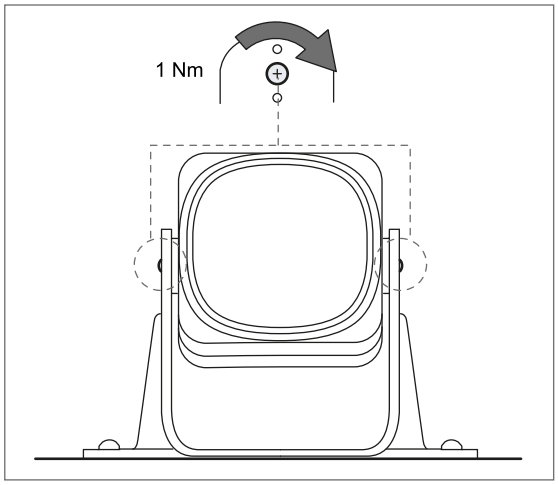


3. Tilt the sensor to the desired inclination.

   Note: a notch is equal to a 10° of inclination.



4. Tighten the screws.



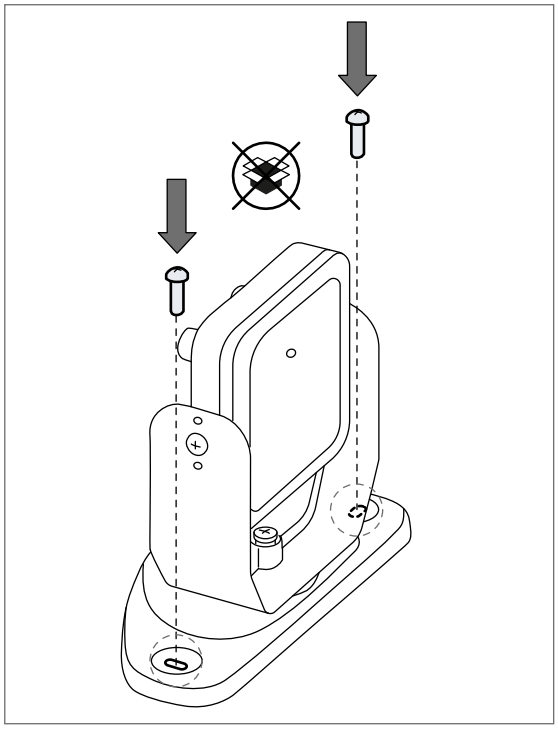
Install LBK SBV sensors

Note: the usage of a thread-locking fluid on the threads of fasteners is suggested, especially when the sensor is installed on a moving or vibrating part of the machinery.

Note: if no bracket is used for sensor installation, use tamper-proof screws and threadlocker.

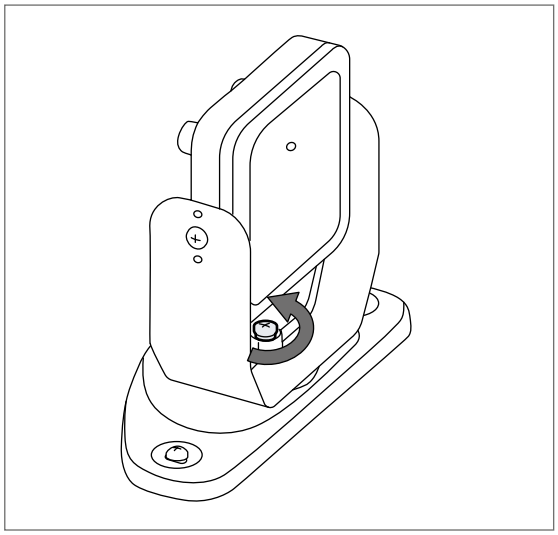
1. Position the sensor as indicated in the configuration report and fasten the bracket with two tamper-proof screws directly onto the floor or another support.

NOTICE	
	Make sure the support does not inhibit machinery commands.



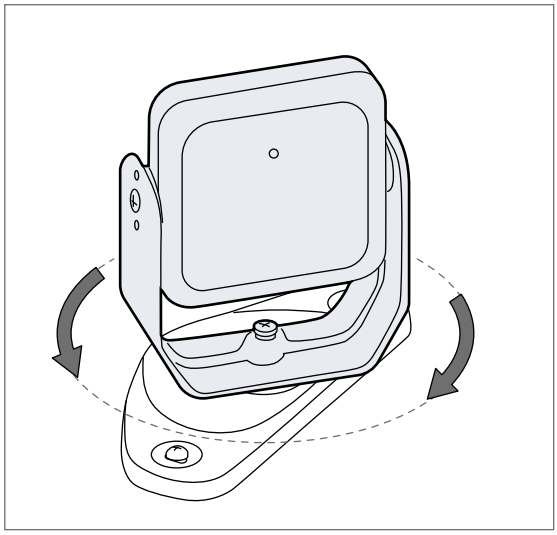
2. With an Allen key, loosen the screw at the bottom to pan the sensor.

   Note: to avoid damaging the bracket, loosen the screw completely before panning the sensor.

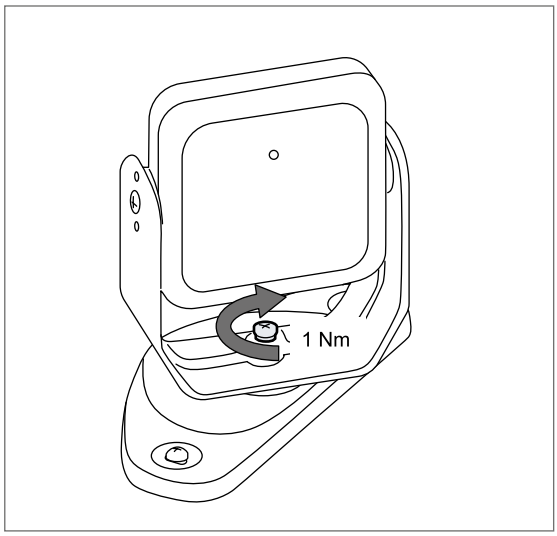


3. Pan the sensor until it reaches the desired position.

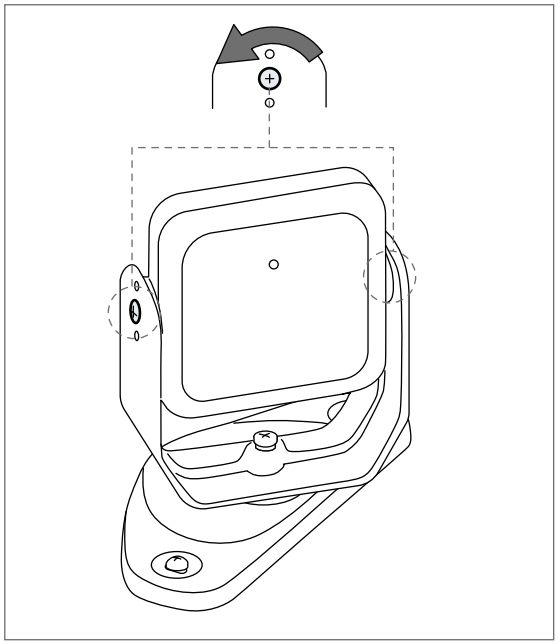
   Note: a notch is equal to a 10° of rotation.



4. Tighten the screw.

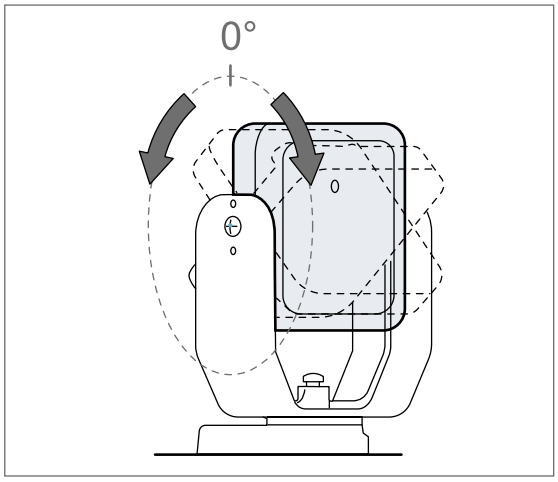


5. Loosen the tamper-proof screws to tilt the sensor.

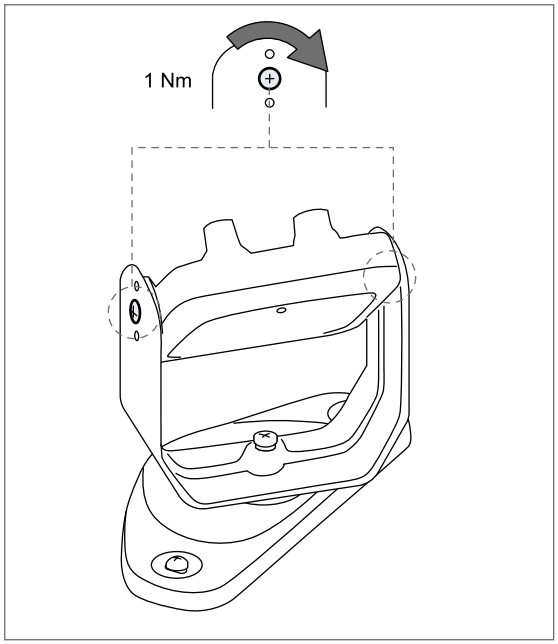


6. Tilt the sensor to the desired inclination.

   Note: a notch is equal to a 10° of inclination. For a finer regulation of the sensor inclination with a 1° precision (see LBK SBV System Instruction manual).



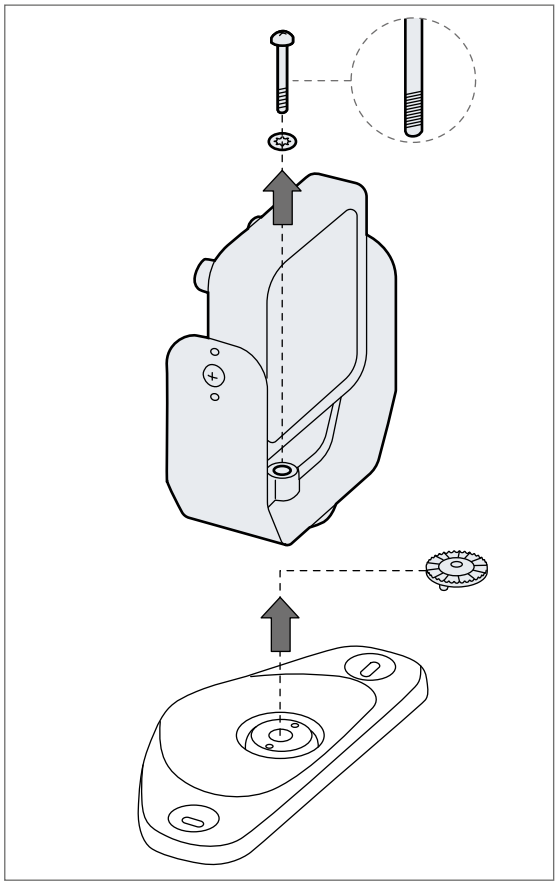
7. Tighten the screws.



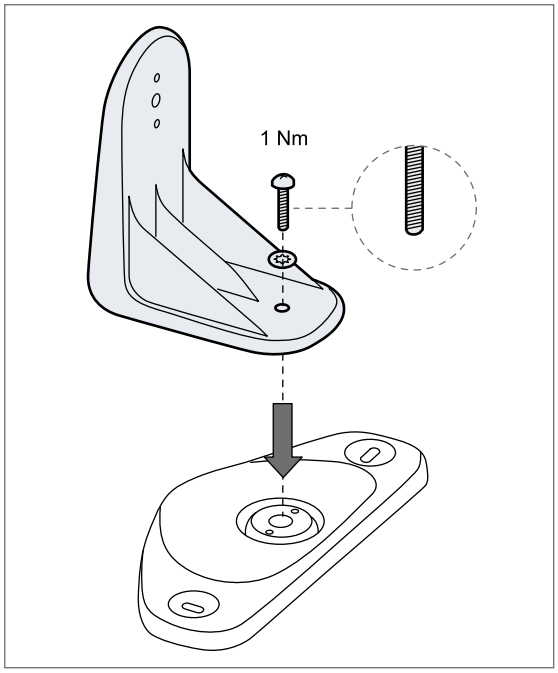
(optional and only for LBK SBV sensors) Mount 3-axes bracket

The bracket that allows rotation around the z-axis (roll) is an accessory in the package. To mount it:

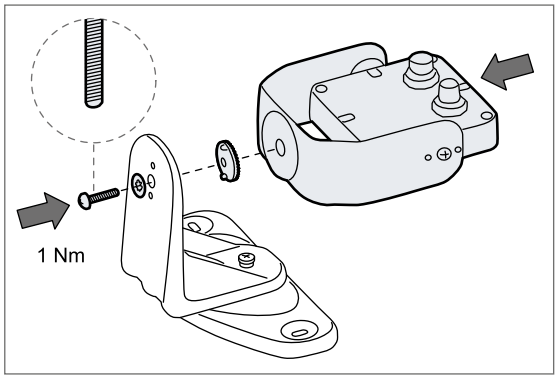
1. Unscrew the screw at the bottom and remove the bracket with the sensor and the aligning ring.



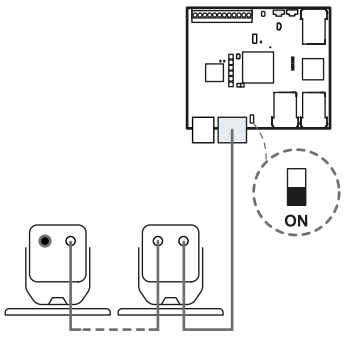
2. Attach the roll bracket to the base. Use the tamper-proof screw provided with the bracket.



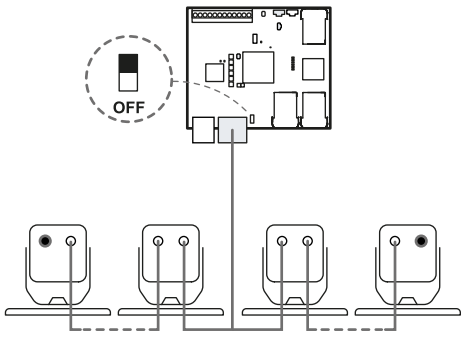
3. Mount the bracket with the sensor and the aligning ring. Use the tamper-proof screw provided with the bracket.



Chain examples



Chain with controller at the end of the chain and a sensor with termination connector



Chain with controller inside of the chain and two sensors with termination connector

Install the LBK Designer application

Note: if the installation fails, the dependencies needed by the application may be missing. Update your operating system or contact our Technical Support to receive assistance.

1. Download the application from the www.leuze.com website (from the product download area) and install it on the computer.
2. With Microsoft Windows operating system, download and install from the same site also the driver for USB connection.

Start the application

1. Connect the controller to the computer using a data USB cable with a micro-USB connector or the Ethernet cable (if an Ethernet port is available).
2. Supply power to the controller.
3. Start the LBK Designer application.
4. Configure the system (see Instruction manual).

What to do next

www.leuze.com