Kiwitron
SMART INDUSTRY SOLUTIONS

Edition 27 02 2026

KiwiEye

X001010 - X101010 - X001013 - X101013

Installation,
use and maintenance

Kiwitron
SMART INDUSTRY SOLUTIONS

CE

Declaration of Conformity - (DoC)

We

Manufacturer:	Kiwitron S.p.A.
Address:	Via Vizzano 44, 40037 Sasso Marconi (BO) - Italy

Declare that the DoC is issued under our sole responsibility and belongs to the following product:

KiwiEye X001010, X001012, X001013, X101010, X101012, X101013;

KiwiEye Open CPU X006980, X006982, X006983, X106980, X106982, X106983;;

Object of the declaration:

Industrial AI sensor

The subject of the above declaration is in accordance with the following rules:

Electromagnetic Compatibility Directive 2014/30/EU

Directive RED 2014/53/EU

and therefore complies with the following norms / standards:

UNI EN 12895:2019 Industrial trucks - Electromagnetic compatibility

ISO 13766-1:2018 Earthmoving and construction machinery - Electromagnetic compatibility - Part 1

ISO 13766-1:2018 Earthmoving and construction machinery - Electromagnetic compatibility - Part 2

UNI EN ISO 14982:2009 Agricultural and forestry machinery - Electromagnetic compatibility

and related harmonised standards / ETSI standards

Place: Sasso Marconi (BO) - Italy **Valid from:** 02/01/2021

Last update: 08/01/2025

Person authorized to compile the technical file: Daniele Parazza

Legal representative: Andrea Filippini

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SMART INDUSTRY SOLUTIONS

UK CA

UKCA Declaration of Conformity - (DoC)

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Industrial AI sensor

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Statutory Instruments: S.I. 2016:1091

Statutory Instruments: S.I. 2017:1206

and therefore complies with the following norms / standards:

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Table of contents

Inspections

Version	Comments	Modified chapters
00	Sections Warranty and Technical Data updated	Customer service and manufacturer's warranty, Technical Data
01	General update for product rebrand	All
02	Sections Warranty and Technical Data updated	Customer service and manufacturer's warranty, Technical Data
03	General update of document format. Update for new product features: Ethernet communication and radar functionality. Update of CE certifications. Technical data update for codes X001013 and X101013. Mounting zone update. General revision due to change of company name. Disposal instructions added. Functionality update. Disclaimer.	All

Table 1 - Document revisions

Purpose and scope

Users	Installer; Operator of the equipment on which it is installed; Qualified personnel authorized to perform maintenance on the device.
Purpose	To provide the information necessary for: ➢ The correct installation of the device; ➢ Properly raising operators' awareness of safety issues; ➢ The safe use of the device.

Table 2 - Purpose and scope

Key

	Warning/caution - Important safety information
	General information and suggestions
	PROHIBITED: Operations or actions NOT permitted.

Table 3 - Legend

Safety instructions and warnings

The device must be operated by suitably trained and qualified personnel.

Before installing and operating the device, carefully read and understand this manual to avoid damaging the product and putting your safety at risk.

The technical information contained in this document is provided for informational purposes only and does not constitute a contractual commitment.
Kiwitron reserves the right to make any graphic or functional changes to the devices and/or software without prior notice.

The Kiwitron device **cannot** replace the safety devices of the vehicle on which it is installed.

The Kiwitron device **must** be installed in compliance with general safety regulations.

It is forbidden to install the device to inhibit or alter the operation of the safety systems already present on the vehicle.

It is forbidden to use the system to operate power remote switches, as opening them while current is flowing would cause an electric arc.

Warn the vehicle **operator** before performing any remote operation (cloud web or remote connection via PC) to prevent dangerous situations.

If the device is installed in such a way that it can dynamically request the activation of a maximum/minimum performance limit, the safety of the machine and operators must be respected. In any case, it is forbidden to command the complete shutdown of the vehicle, but only a reduction in its speed. Any change in the vehicle's operating parameters must not create potential hazardous situations. In any case, connection and calibration operations external to the systems supplied by Kiwitron are the sole and complete responsibility of the installer, including any risk analyses that may be necessary.

Do not use the device in the presence of flammable gases or fumes, near refueling stations, fuel depots, chemical plants, or during blasting operations. **Avoid any potentially explosive atmosphere.**

To protect the health of operators, place the device at least half a meter away from the driver's seat to limit exposure to electromagnetic waves emitted by wireless devices.

It is forbidden to place the device near sources of intense heat or exposed to the elements.

Do not install the device in positions that restrict the driver's view or may interfere with their movements.

Avoid placing the device with metal parts covering the external Wi-Fi/Bluetooth antenna, as this may cause wireless devices to malfunction.

It is strictly forbidden to drill holes in the vehicle structure in order to install the device. Only use brackets or fastening systems that do not compromise the structure of the vehicle and that are provided and authorized by the manufacturer.

Disclaimer

This kit uses advanced technologies in the field of artificial vision and deep learning, but does not guarantee 100% accuracy in the identification of vehicles, pedestrians, road markings, traffic signs, etc., nor does it ensure 100% accurate warnings or output signals in all circumstances.

While driving, drivers must remain alert and attentive at all times, maintain full control of the vehicle throughout the maneuver, use driver assistance features judiciously, and take full responsibility for driving safety.

The product primarily analyzes and processes visual images. Performance degradation or functional limitations may occur due to factors including, but not limited to, lighting conditions, weather conditions, and clothing/posture variations that affect the effectiveness of the visual system.

- Foreign materials or obstructions on the sensor lens (e.g., smudges, oil residue, water marks, dust, and fingerprints) may also compromise product performance. Ensure that the lens remains clean and free of obstructions for optimal operation.
- Adverse weather conditions, including rain, snow, fog, mist, sandstorms, typhoons, or tornadoes, may affect product performance.
- Suboptimal lighting conditions may reduce the effectiveness of the product, including, but not limited to: low-light scenarios (backlighting, tunnels, underground tunnels, nighttime) and exposure to intense light sources (high beams, spotlights, lasers, flames, explosions).
- Special vehicle configurations may evade accurate identification, including vintage/classic vehicles, unconventional vehicle models, specialized engineering vehicles, and trailers carrying atypical loads.

- Pedestrians wearing low-contrast clothing (e.g., camouflage), unconventional clothing, assuming atypical postures, or who are partially obscured may pose challenges for recognition systems.

This product is classified as a driver assistance system. Neither its artificial intelligence capabilities, alerts, nor output signals, whether active or inactive, exempt, mitigate, transfer, or otherwise alter the driver's legal obligations.

The driver must maintain continuous concentration on driving, exercise complete control of the vehicle, and recognize that the driver has sole responsibility for the operation of the vehicle and driving safety.

The neural network training integrated into the KiwiEye device utilizes an extensive image database, which includes both data acquired operationally in the field and the integration of public datasets. These external resources have been carefully selected to ensure strict compliance with the user licenses required for commercial applications.

Radio wave emission warnings

The device receives and emits radio waves.

The maximum power radiated by the device is below the thresholds imposed by regulations.

Interference may occur when used in proximity to devices such as TVs, radios, computers, or any unshielded electrical and/or electronic equipment.

Observe restrictions on the use of electronic devices if the vehicle in which the device is installed is being used in a hospital or other healthcare facility or near an airport. In all areas where restrictions are imposed due to the use of electronic devices.

Intended use

The device is designed for use only on self-propelled industrial trucks or industrial vehicles with electric, internal combustion or hybrid traction, and earth-moving and agricultural machinery compliant with the Machinery Directive 2006/42/EC.

Prohibited use

Any use of the device not expressly described in this manual is not permitted.

In particular:

The installation of the Kiwitron device on vehicles that can travel on public roads is not permitted.

On trucks that cross tracks unless an auto-hold device is already installed on the start switch.

The Kiwitron device and its accessories are not a driving aid or an autonomous driving device.

The Kiwitron device is not an explosion-proof device.

The Kiwitron device and its accessories are not safety devices as they are not covered by Annex IV of Directive 2006/42/EC and therefore cannot be used to reduce residual risk.

The Kiwitron device cannot be installed on two- or multi-axle vehicles with electric traction or internal combustion engines, such as cars, trucks, mopeds, motorcycles, and work machines authorized for public circulation.

KiwiEye is not a video surveillance system

KiwiEye is not a biometric detection system

KiwiEye is not a facial detection and identification system

Risk assessment

The operator (vehicle owner) is responsible for carrying out an environmental risk analysis before installation.

During the installation phase, it is essential to ensure that any malfunction of the device does not compromise the safety or productivity of operators and the facility.

It is essential to assess the situation in which the device might malfunction.

It is possible that the vehicle may not be activated after a correct login, or that the machine may be slowed down without a collision having occurred.

Exclusion of liability

Kiwitron is not liable for any damage caused by:

- Improper use of the device.
- Use by unqualified and/or untrained personnel.
- Incorrect installation.
- Power supply defects.
- Inadequate maintenance.
- Unauthorized modifications or interventions.
- Incorrect operation.
- Use of non-original spare parts.
- Use of accessories not provided for or not authorized in writing.
- Total or partial failure to follow instructions.
- Exceptional events.
- Events that do not comply with the regulations and legislation currently in force in the country of installation.

Kiwitron is relieved of any responsibility in the event of installation of the device on vehicles also authorized to circulate on public roads: it is in fact the responsibility of the operator to decide on the installation and use of the device on the vehicle.

Kiwitron is not liable for any damage caused by the installation of the device on vehicles that are also authorized to travel on public roads: it is the operator's responsibility to decide on the installation and use of the device on the vehicle. In this case, it is absolutely necessary to disable the vehicle immobilizer and slowdown function in the event of a collision, in order to avoid creating situations of obstruction or danger (e.g., immobilization of the vehicle while crossing railroad tracks).

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Technical assistance and manufacturer's warranty

Technical assistance

In case of malfunction, contact Kiwitron technical support.

Kiwitron
Customer service
Tel. +39 051 1889 3470
Email: support@kiwitron.com
Website: www.kiwitron.com

Warranty

The warranty does not apply to breakages and/or defects caused by:

- Improper use of the device.
- Use by unqualified and/or untrained personnel.
- Incorrect installation.
- Power supply defects.
- Inadequate maintenance.
- Unauthorized modifications or interventions.
- Incorrect operation.
- Use of non-original spare parts.
- Use of accessories not provided for or not authorized in writing.
- Total or partial failure to follow instructions.
- Exceptional events.
- Events that do not comply with the regulations and legislation currently in force in the country of installation.

The warranty does not cover parts that wear out as a result of normal use, such as electrical cables and connectors.

Please refer to the sales documentation for full warranty terms and conditions.

General description

Glossary

Term	Definition
CANopen	Communication protocol and profile specification for devices for embedded systems used in automation.
GATT	GATT stands for Generic ATTribute Profile and defines how two Bluetooth Low Energy devices transfer data using concepts called Services and Characteristics.
RTSP	Real Time Streaming Protocol. Network protocol used in computer communication systems for controlling servers for multimedia streaming.
Risk mitigation	Mitigation of security risks. This is a process involving devices that, even if they are not certified or classified as security devices, can be used to mitigate the effects of the residual risks of an application without intervening or interfering with the security functions present.
TCP	Transmission Control Protocol (TCP). A network protocol that ensures reliable data communication between sender and recipient over a network.

Table 4 - Glossary

Device description

KiwiEye is an artificial intelligence-based device for detecting obstacles and measuring the distance between them and the device itself.

The obstacle is identified and classified based on the image data captured by the device's optics. The distance is measured using the front optical unit.

The device is installed on industrial vehicles and vehicles with drivers on board and/or on the ground or driverless vehicles such as:

- Front-lifting forklifts powered by electricity or combustion engines.
- Forklifts with overlapping forks, retractable forks, and forks between the side members.
- Electric company vehicles (caddies, motoscopes, trains, etc.).
- Agricultural and earth-moving vehicles.

The device is supplied complete with wiring and mounting bracket.

The KiwiEye device is not a video surveillance system.

Device overview

Front

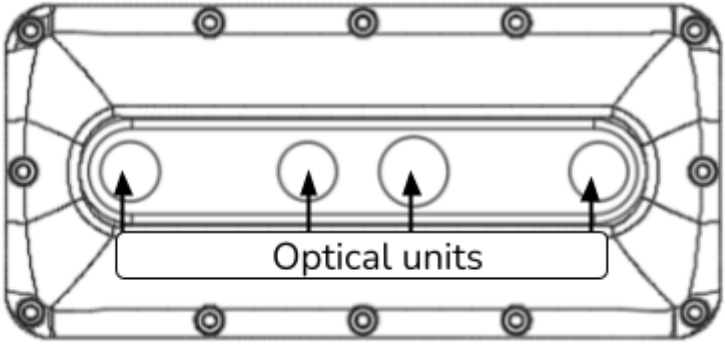


Figure 1 - Optical units

Rear

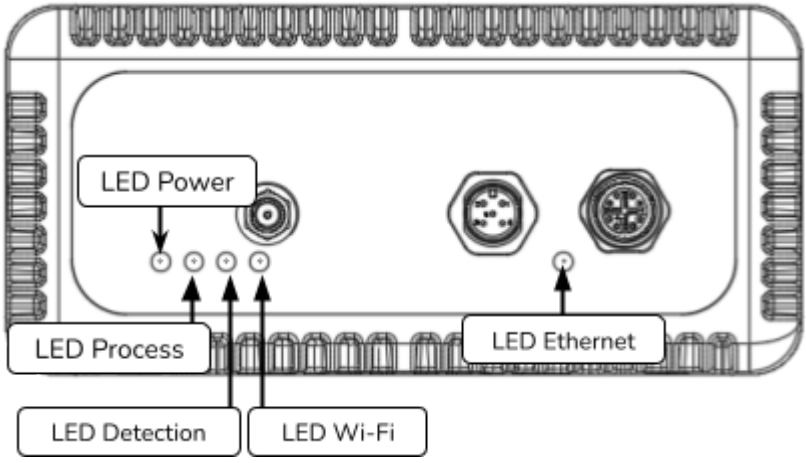


Figure 2 - LED

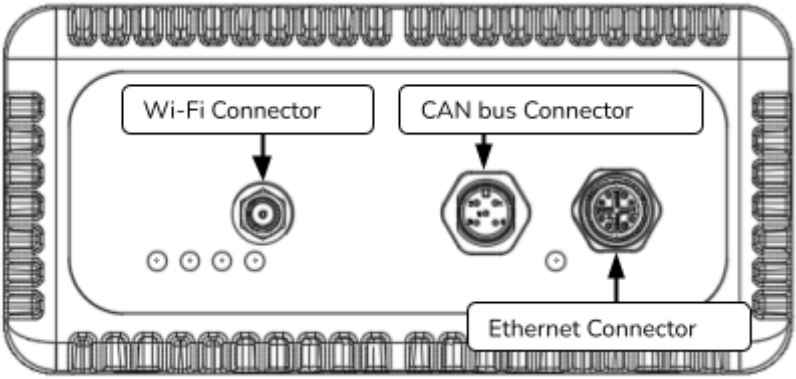


Figure 3 - Connectors

Pin configuration

CAN bus:

1. SHIELD
2. Vin +
3. Vin -
4. CAN H
5. CAN L

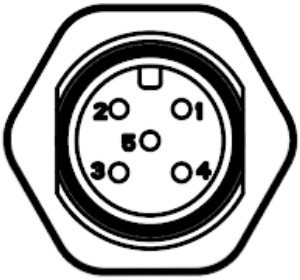


Figure 4 - CAN bus connector

Ethernet:

1. TX+/BI_DA+
2. TX-/BI_DA-
3. RX+/BI_DB+
4. RX-/BI_DB-
5. BI_DD+
6. BI_DD-
7. BI_DC-
8. BI_DC+

Figure 5 - Ethernet connector

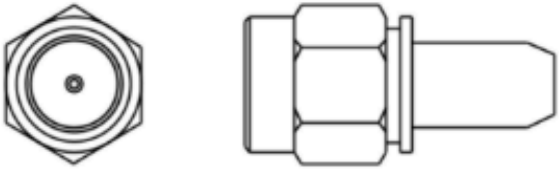


Figure 6 - Wi-Fi antenna connector

Accessories

Kiwitron bracket

The KiwiEye device is designed to be installed on a Kiwitron bracket (code **M101811**).

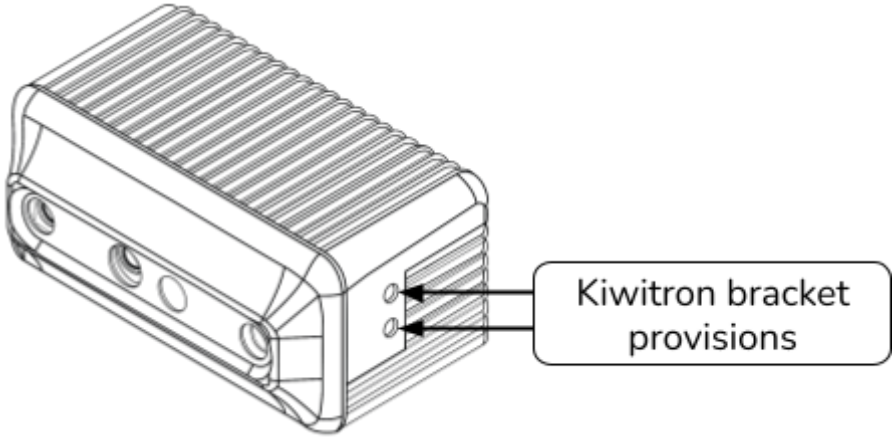


Figure 7 - Kiwitron bracket provisions

The bracket is designed to dampen vibrations on the device and protect it from the elements.

You can use the complete Kiwitron bracket (roof + base) or just the roof.

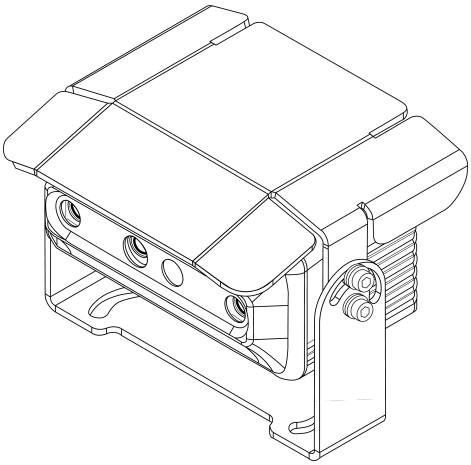


Figure 8 - KiwiEye on complete Kiwitron bracket

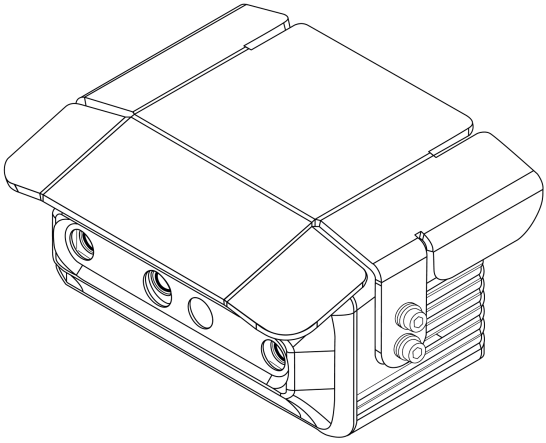


Figure 9 - Kiwitron bracket (roof only)

For more details, refer to the "Installation" section.

RAM bracket (optional)

The KiwiEye device is designed to be installed on the RAM bracket (optional, code **G006410**).

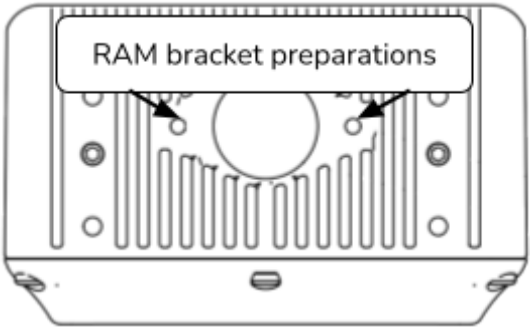


Figure 10 - RAM bracket preparations

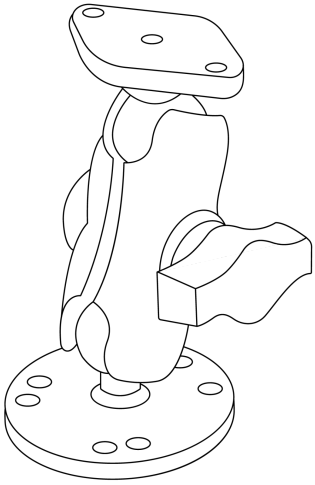


Figure 11 - RAM bracket

The bracket rod is 9.5 cm high and has a 2.5 cm TYPE "B" ball diameter.
The rod is used to support components weighing up to approximately 2kg.

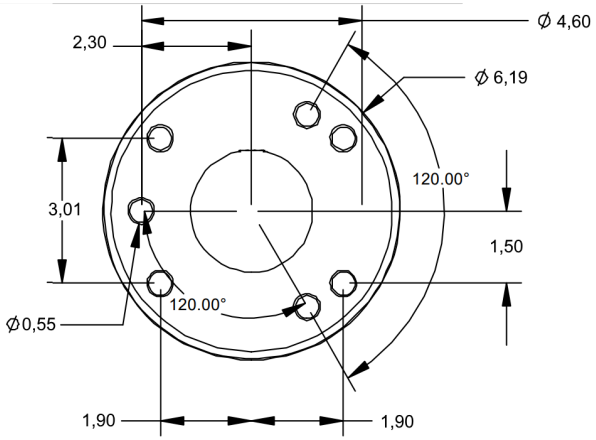


Figure 12 - Bracket dimensions (in cm) on the vehicle side

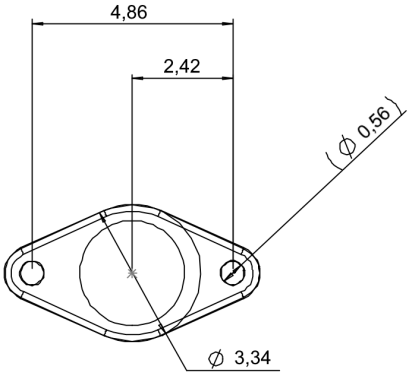


Figure 13 - Bracket dimensions (in cm) on the device side

Device functionality

KiwiEye is a risk mitigation device for industrial vehicles designed to increase safety in mixed workplaces with people and vehicles.

KiwiEye is a device designed to be integrated into Kiwitron systems such as Key and KiwiSafe.

KiwiEye provides information on detected objects via CANopen or LAN cable and is equipped with the features listed in Table 5.

- CANopen connection for integration into third-party systems (video feed excluded).
- LAN connection for integration into third-party systems (including video feed).
- Wi-Fi connection for integration of the video feed into third-party systems.

As this is a highly customizable device in terms of configurations and features, there may be functions or accessories on KiwiEye systems that are not currently included in this version of the manual.

In particular, KiwiEye performs the following functions:

Function	Description
Person detection and distance measurement.	This function is able to recognize a person as an obstacle and measures the distance from the sensor that is detecting them.
Trolley detection and distance measurement.	This function is able to recognize a cart as an obstacle and measures the distance from the sensor that is detecting it.
Road sign detection and distance measurement.	This function is able to recognize a road sign and measures the distance from the sensor that is detecting it.
ArUco code detection and distance measurement.	This function is able to recognize ArUco codes and measures the distance from the sensor that is detecting it.
Detection of partial (dirt) or total (completely covered lens) lens obstructions.	This function is able to recognize any occlusions of the device's optical units.
Detection of generic obstacles and distance measurement	This function detects general obstacles. It is available by activating the optional Radar feature.

Function	Description
KiwiEye tampering detection	This function detects whether the orientation of the KiwiEye has been changed from that set during installation.
Static scene detection	This feature is used to determine the most appropriate time to restart the application in the event of system overload.

Table 5 - Device features

Road sign recognition

The device is capable of detecting the following road signs:

Figure 14 - Road signs recognized by the device

Code recognition ArUco

The device is able to detect ArUco codes.
Example of an ArUco code that can be detected by the device:

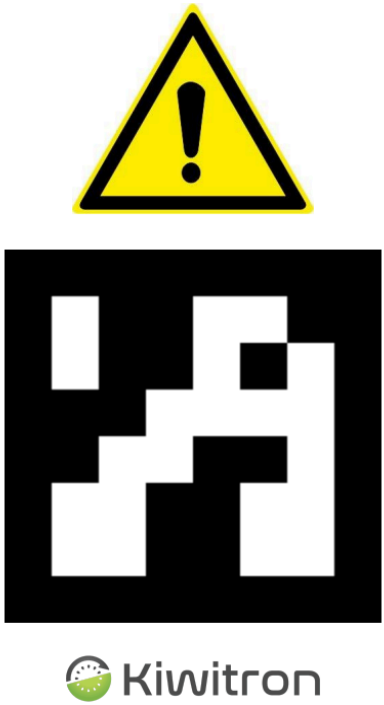


Figure 15 - Danger sign - e.g. ArUco recognized by KiwiEye

ArUco code detection index	
ArUco size (mm - in)	**Maximum detected distance (m - ft)**
45 mm 1,7 in	1,3 m 4,2 ft
80 mm 3,1 in	2,3 m 7,5 ft
150 mm 5,9 in	4,2 m 13,7 ft
250 mm 9,8 in	6,8 m 22,3 ft
350 mm 13,7 in	9,8 m 32,1 ft

Table 6 - ArUco detection

Operating principle

The device is installed on the vehicle using a bracket and connected to a power source.
The optical sensor must be positioned on the vehicle in relation to the area to be protected.

Internal operation of the device

- KiwiEye uses an artificial intelligence algorithm and, specifically, a neural network capable of detecting and locating obstacles via live video stream;
- Once a person has been identified, the distance data is extracted from the optical sensor;
- The results of the neural network and distance detection are made available via CANopen or Ethernet.

When is an obstacle detected?

- An obstacle is detected by the device if it is present in the video stream.
- The device is capable of detecting people, even if they have their backs turned or are bent over.
- The device is capable of detecting most carts.
- The device can detect and read ArUco codes.
- The device can detect generic obstacles using the optional Radar feature.

When is an obstacle NOT detected?

- An obstacle is not detected if it is not present in the video stream.
- An obstacle is not detected if it is not recognizable in its class (e.g., "human being," "trolley," "sign," etc.) or if the detection reliability percentage is below the set threshold.
- With the Radar feature enabled, a generic obstacle is not detected if it is not within the specific operating range of that option.

Technical data

Mechanical specifications			
Dimensions	145 x 67 x 90 mm 5.7 x 2.6 x 3.5 in	Material	Back: 6061 aluminum Front: ABS
Weight	900 g 31.8 oz	IP rating	IP67 and IP69K (only for X001013 and X101013)

Electrical specifications			
	min	**typ.**	**max**
Power supply (Vdc)	8	12/24	60

	typ.	**max**
Power consumption (W)	14	24

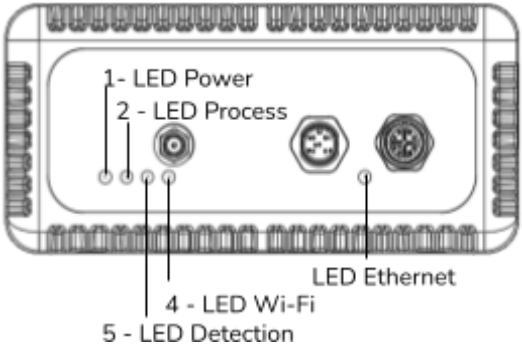
Grounding	Electrically insulated frame

Environmental conditions			
Ambient temperature	-20 to +60 °C from -4 to 140 °F	Ambient humidity	65% RH (non-condensing)

Technical data

Sensors			
Resolution	640 x 360 (image) 640 x 360 (depth)	Acquisition time	30 fps (33 ms)
Shutter	Global shutter	Modules	RGB/Depth
Detection distance	up to 25 m up to 82 ft (KiwiEye) up to 8 m up to 26.2 ft (Radar function)	Detection angle	Horizontal: 90° Vertical: 65°

Indicators/Operating principles KiwiEye



System powered: LED Power (1) steady

Technical data

System in pre-operational status: Process LED (2) steady System in operational status: Process LED (2) flashing
System in detection status: Detection LED (3) flashing
Wi-Fi communication: Wi-Fi Connection LED (4) steady
Ethernet communication: Ethernet communication active Ethernet LED flashing
Indicators/Operating principles Radar functionality **(When using KiwiEye with Radar functionality active, the LED indicators will be visible in operating status according to KiwiEye principles, as standard KiwiEye operation takes priority over Radar functionality (see examples in Table 8))**
System powered: Power LED (1) steady
System in pre-operational state: Process LED (2) steady System in operational status: Process LED (2) with one short and one long flash
System in detection status: Detection LED (3) steady
Wi-Fi communication: Wi-Fi Connection LED (4) steady
Ethernet communication: Ethernet Connection LED flashing
Interfaces
CANopen

Technical data
Wi-Fi
LAN
Bluetooth
Ethernet (X101010 only)

Table 7 - Technical data

Operating status LED indicators			
LED	**KiwiEye**	**Radar function**	**KiwiEye + Radar function**
Process LED (2)	Flashing	One short flash and one long flash	Flashing
LED Detection (3)	Flashing	Steady	Flashing if KiwiEye is in detection mode
			Steady if KiwiEye is NOT in detection mode and the Radar feature is in detection mode
			Off if KiwiEye and Radar functionality are not in detection mode

Table 8 - LED indicators

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Installation

KiwiEye mounting areas

The recommended areas for installing KiwiEye are:

- Upper vertical or horizontal pillars.
- Horizontal pillar (front or rear) or roof, but also at the front of the vehicle.
- On the side of the pillar (using the fixings provided by the manufacturer, such as headlight mounting brackets).

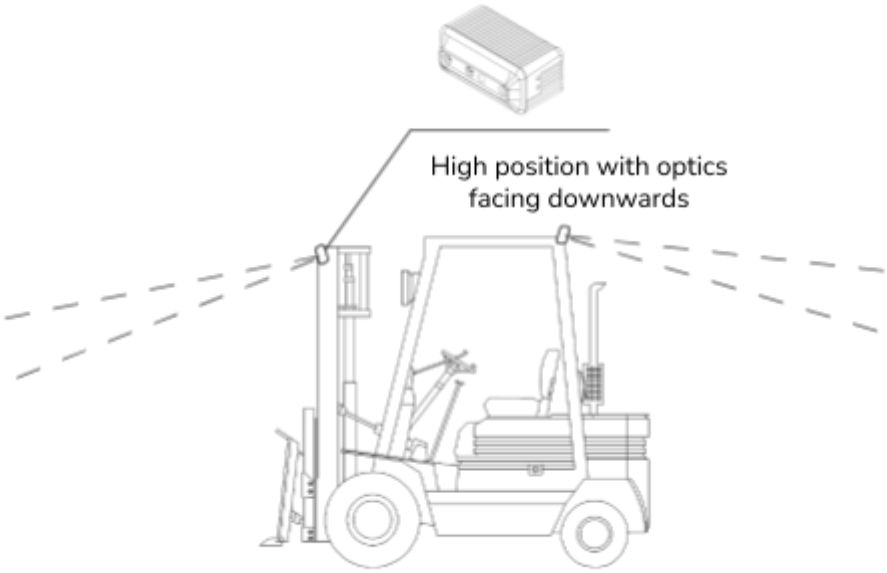


Figure 16 - KiwiEye mounting areas

It is recommended to install the device so that the optics have the widest possible visibility, for example on the pillar.

We recommend installing the device in an elevated position, with the optics facing downwards, to ensure optimal performance. This configuration allows for extended visibility and detection of categories even beyond any obstacles.

Avoid installing the device on the roof as the pillar may obstruct visibility.

Any object that obstructs the view of the optics will degrade the performance of the device.

The installation of the device must NEVER interfere with the safety and visibility of the driver.

Install the KiwiEye on the vehicle using a mounting bracket (Kiwitron, RAM, or other type). See the following sections for more details.

KiwiEye mounting areas with Radar functionality

If the KiwiEye is used with Radar functionality enabled, it is recommended that certain more stringent constraints be observed during installation. The optimal position for the KiwiEye is parallel to the ground and at a height of 1 meter above the ground.

As for mounting on the rear of the trolley, the optimal position is behind the seat, anchored to the trolley's counterweight so that the KiwiEye device is parallel to the ground, thus avoiding constant detection of the floor as an obstacle.

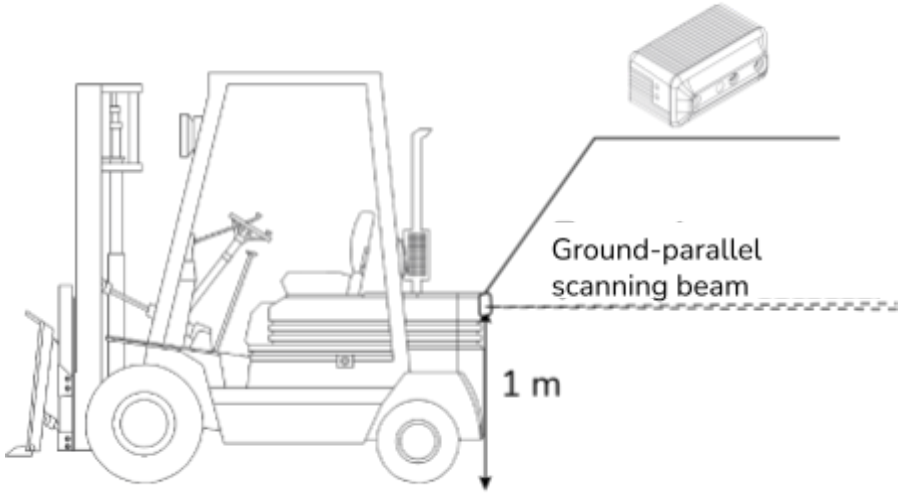


Figure 17 - KiwiEye mounting areas with radar functionality

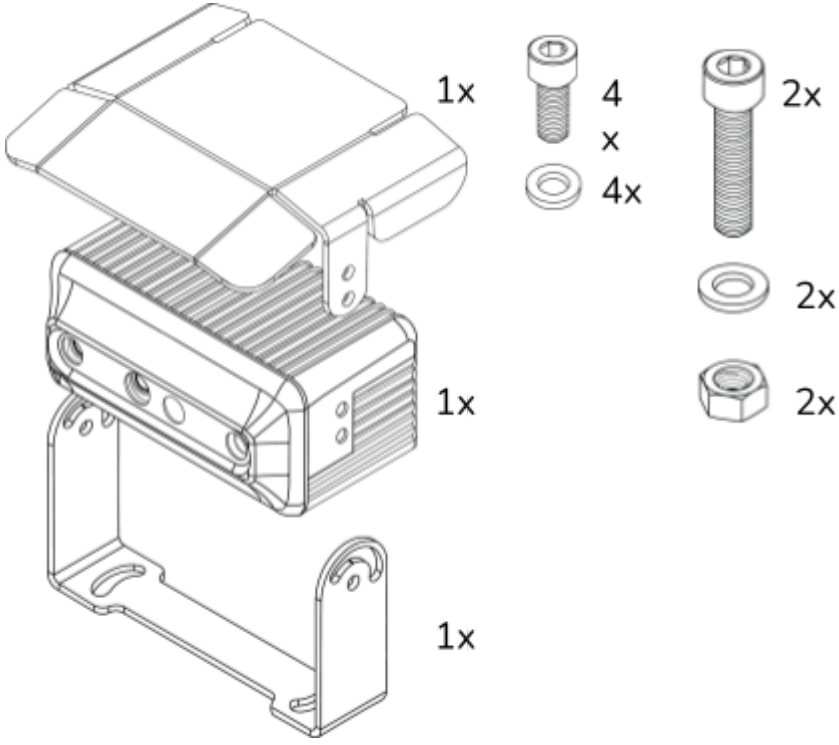
Wi-Fi antenna installation

It is essential to tighten the antenna with a torque of at least 0.3 Nm up to a maximum of 0.5 Nm to ensure both the correct functioning of the device and its waterproofing.

Warning: Insufficient tightening of the antenna will not guarantee the waterproofing of the device.

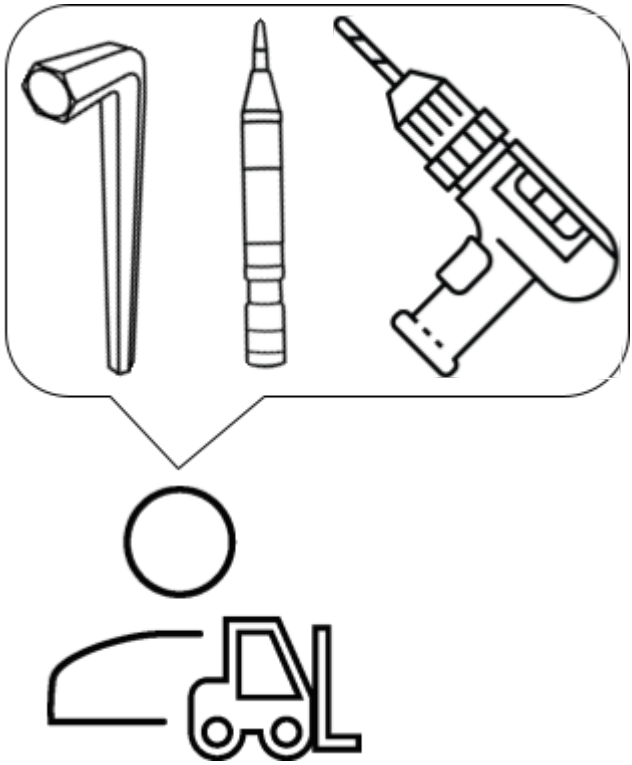
Installation on complete Kiwitron bracket

Materials



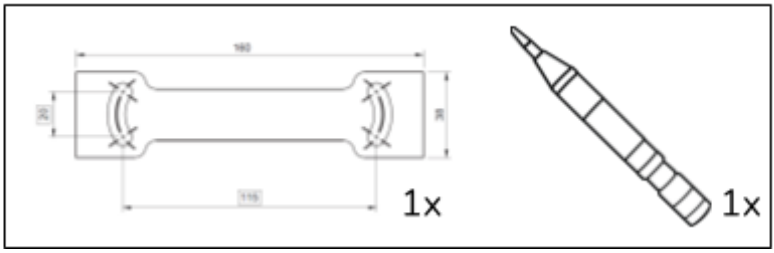
1x

Required tools



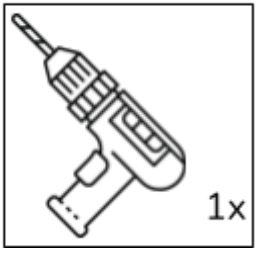
Installation

1



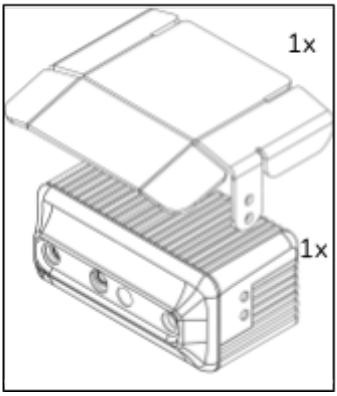
If not present, place the paper template on the desired installation location and use a chisel to mark two holes for attaching the bracket to the vehicle.

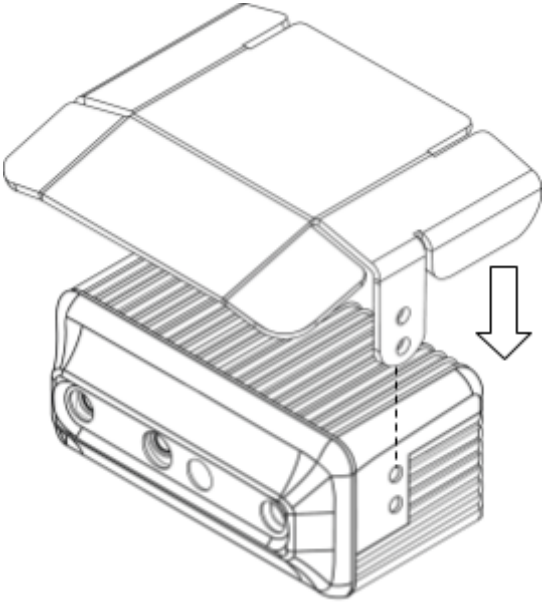
2



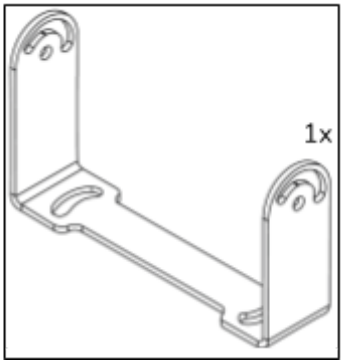
Enlarge the mounting holes marked in step 1 using a drill.

3

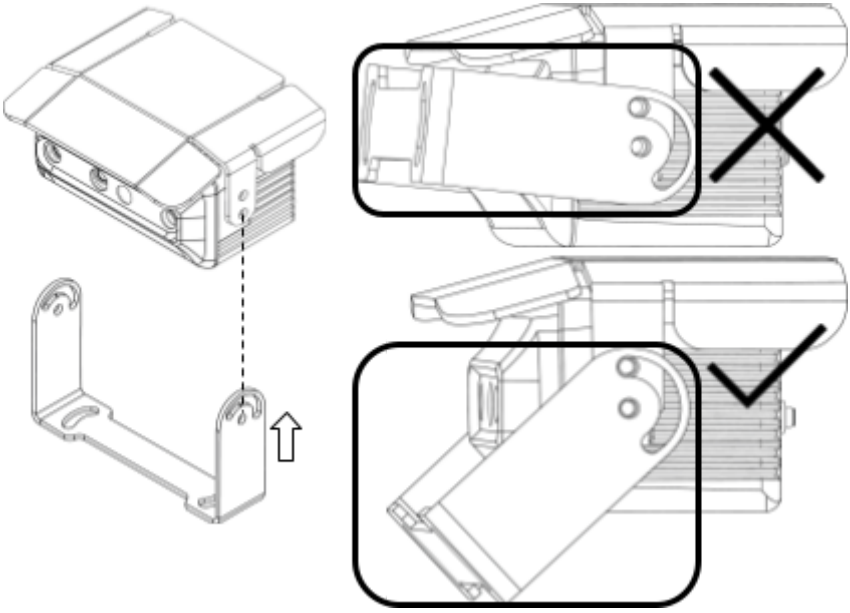




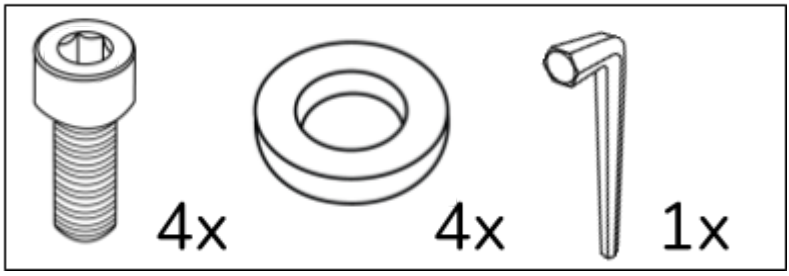
4



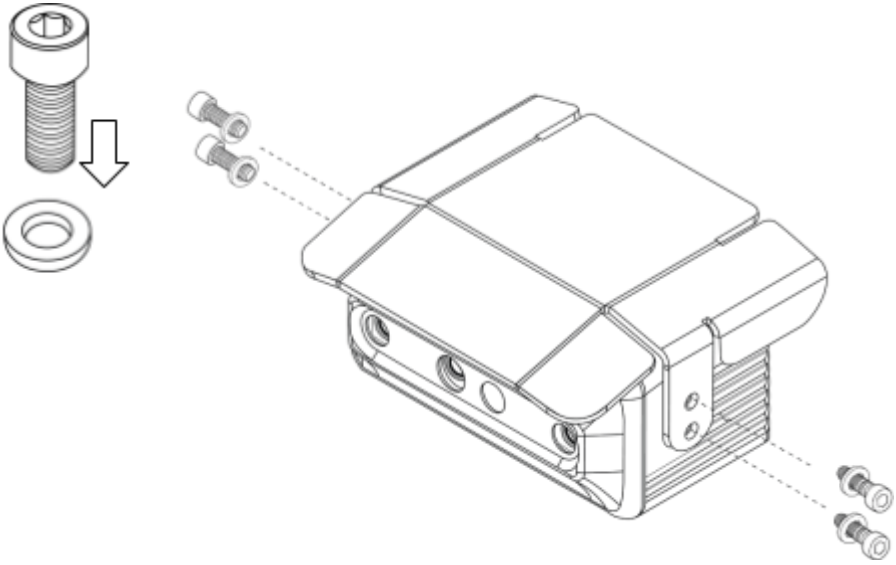
Determine the correct installation direction: the bracket must never cover the device's optics.

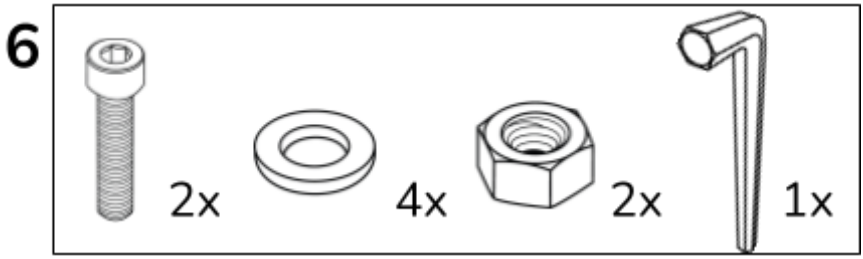


5

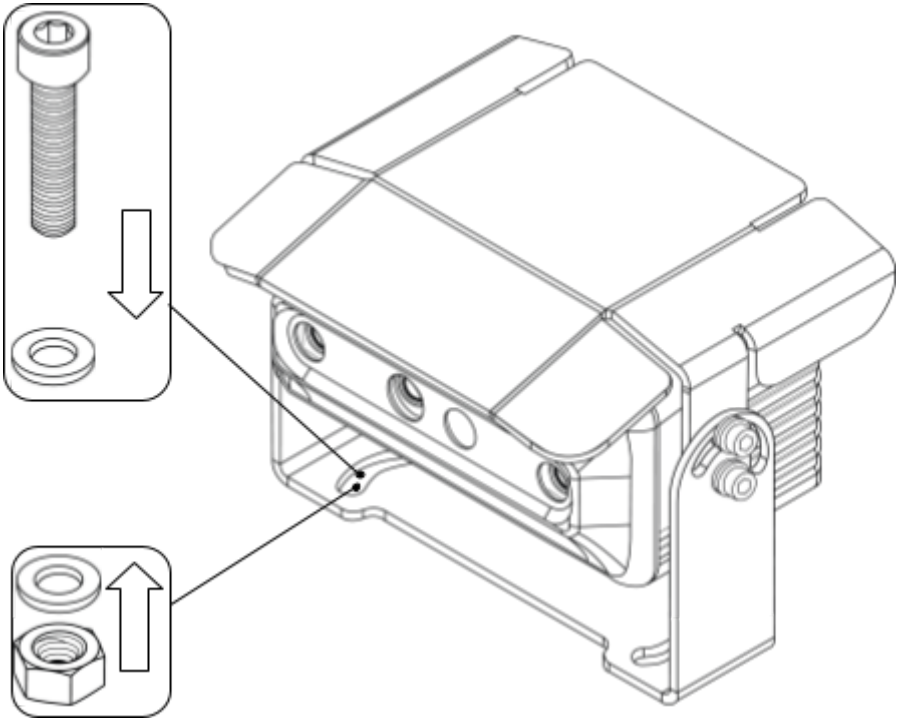


We recommend tightening the side screws starting from the bottom hole. After establishing the correct angle of the bracket, tighten the screws to a torque of 4 Nm.



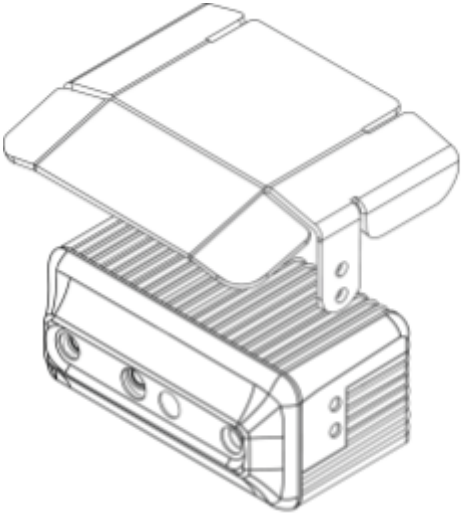


Secure the assembly to the vehicle, tighten the screws to a torque of 10 Nm.



Installation on Kiwitron bracket (roof only)

Material



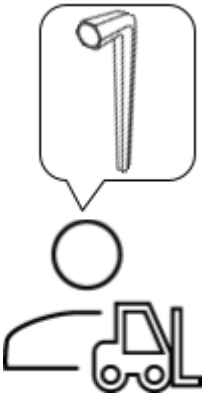
1x

4x

4x

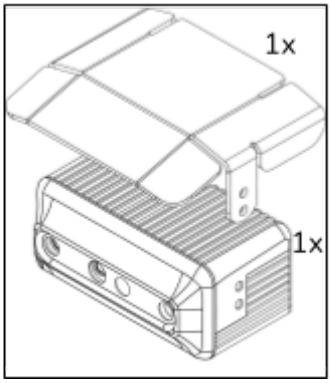
1x

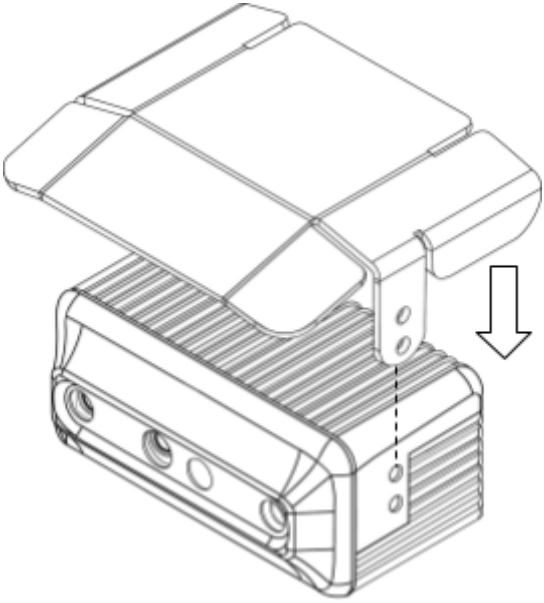
Tools required



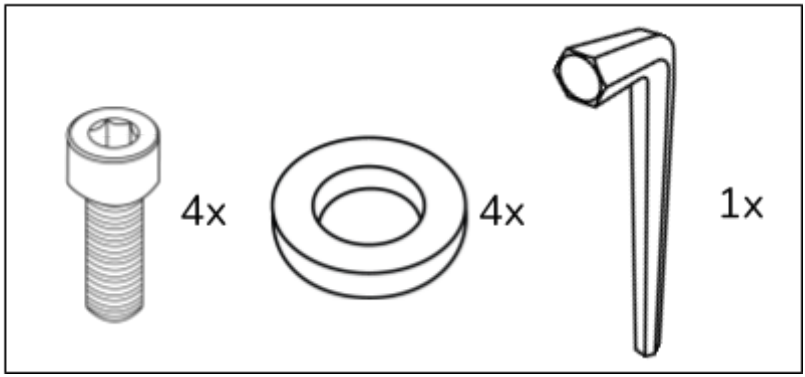
Installation

1

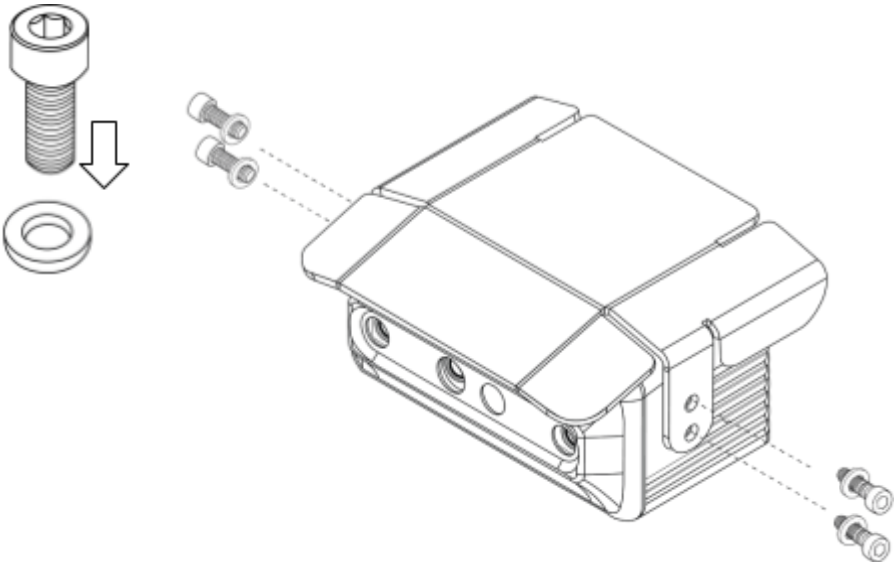




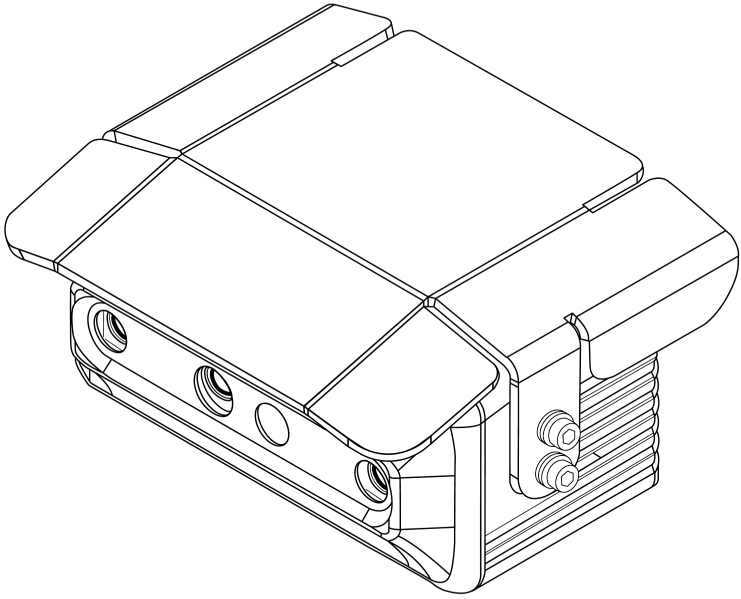
2



Tighten the screws with a torque of 4 Nm.

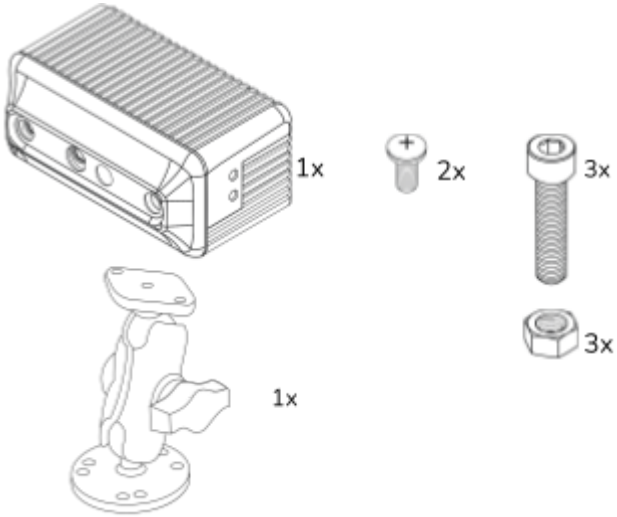


The following result will be obtained:

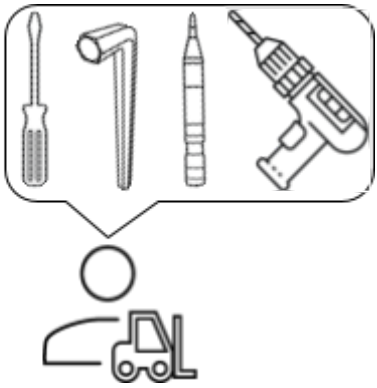


Installation on RAM bracket (optional)

Material

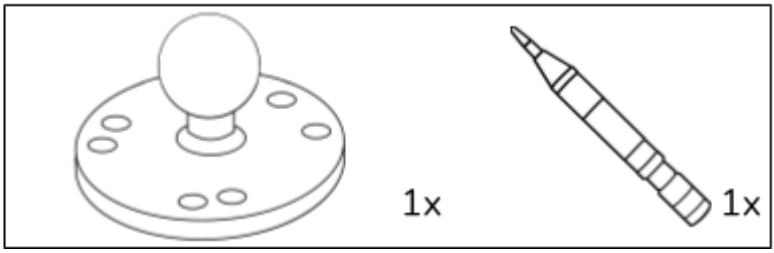


Required tools



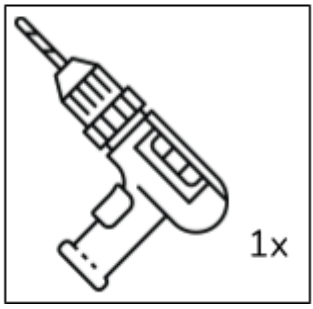
Installation

1



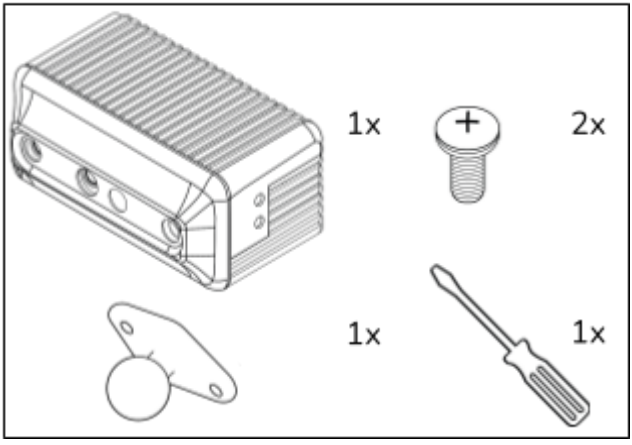
If not already present, position the base of the RAM bracket in the desired installation location and mark three mounting holes for the bracket using a chisel.

2

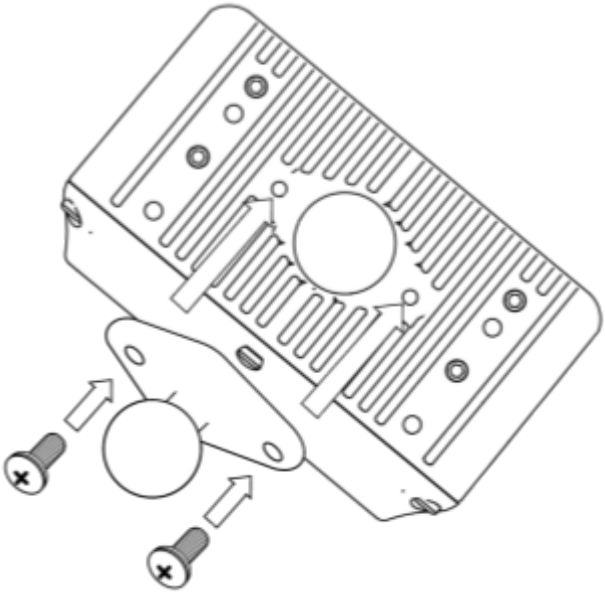


Enlarge the mounting holes marked in step 1 using a drill.

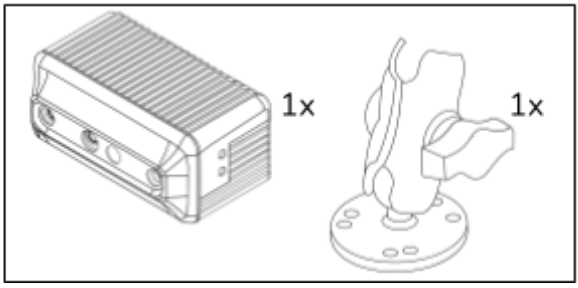
3



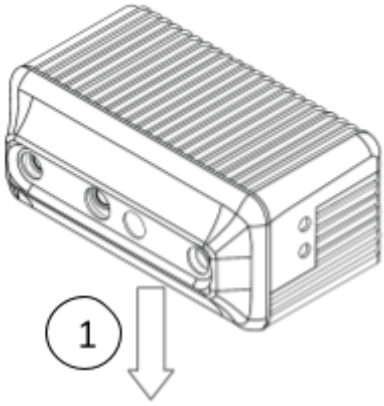
Screw the RAM bracket pin onto the back of the device using M4 screws, tighten the screws to a torque of 4 Nm.

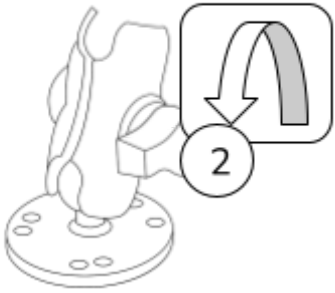


4

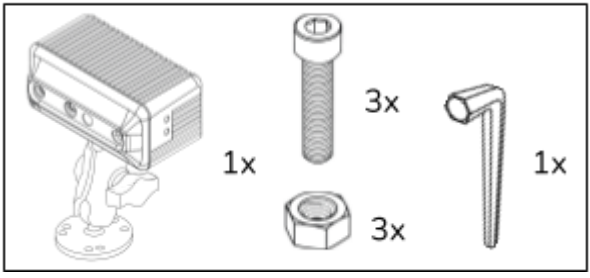


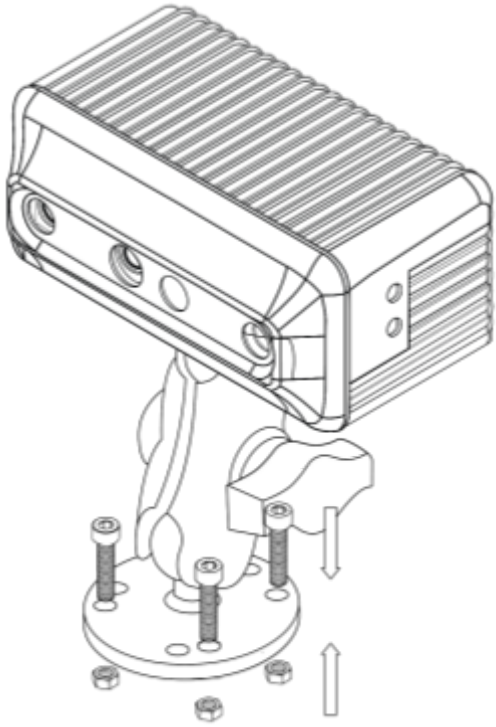
Insert the pin into the hole in the bracket (1) and tighten the grub screw by hand.





5





Secure the bracket to the vehicle using M5 screws and nuts in the holes provided on the bracket. Tighten to a torque of 10 Nm.

KiwiEye installation with Kiwitron systems

Below is an illustrative diagram of the KiwiEye connection for integration with Kiwitron systems (e.g., Key and KiwiSafe).

For more details on the complete installation diagram and the connections to be made, refer to the installation, use, and maintenance manual for the system in question.

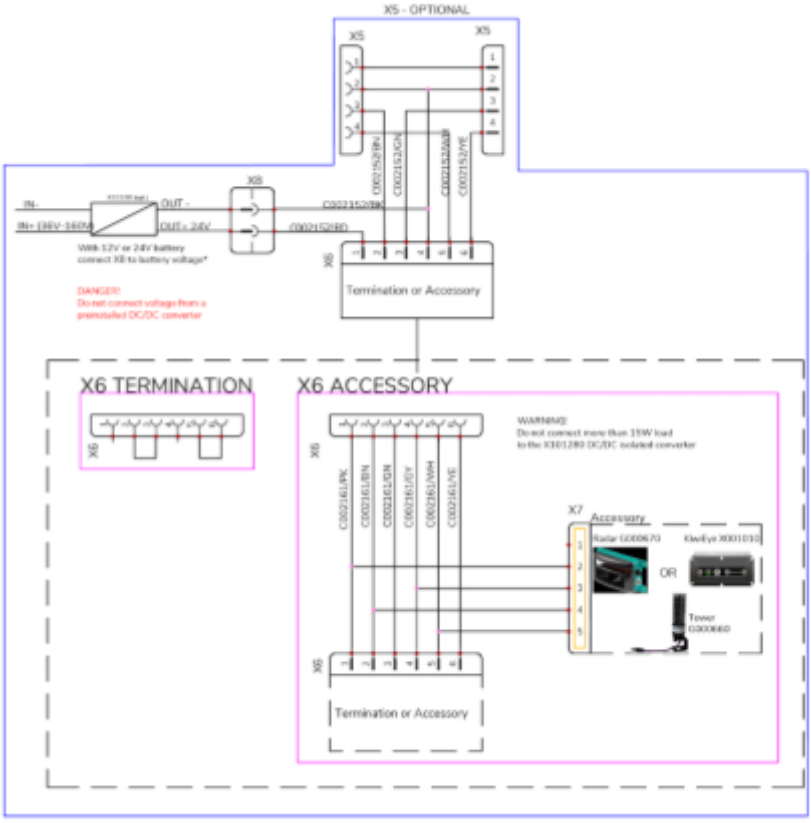


Figure 18 - KiwiEye installation with Kiwitron systems

KiwiEye installation with KiwiPad (optional)

Upon request, the KiwiPad Kit (K006910) can be integrated with the KiwiEye optical sensor.
The kit consists of a KiwiPad that must be attached to the vehicle and connected to a 24V power supply.
The KiwiPad acts as a hotspot for KiwiEye devices, which connect to the tablet's network via Wi-Fi and transmit video streaming to it.

KiwiPad mounting areas (optional)

The KiwiPad must be mounted inside the vehicle cabin.

Figure 19 - KiwiPad mounting areas

The device must be installed on the vehicle using a mounting bracket, the choice of which is up to the customer (a RAM mount bracket is available as an option and on request).

For more details, refer to the KiwiPad manual.

KiwiEye configuration

Various configurations are possible depending on the number of sensors.
Figure 20 shows some of the possible configurations.

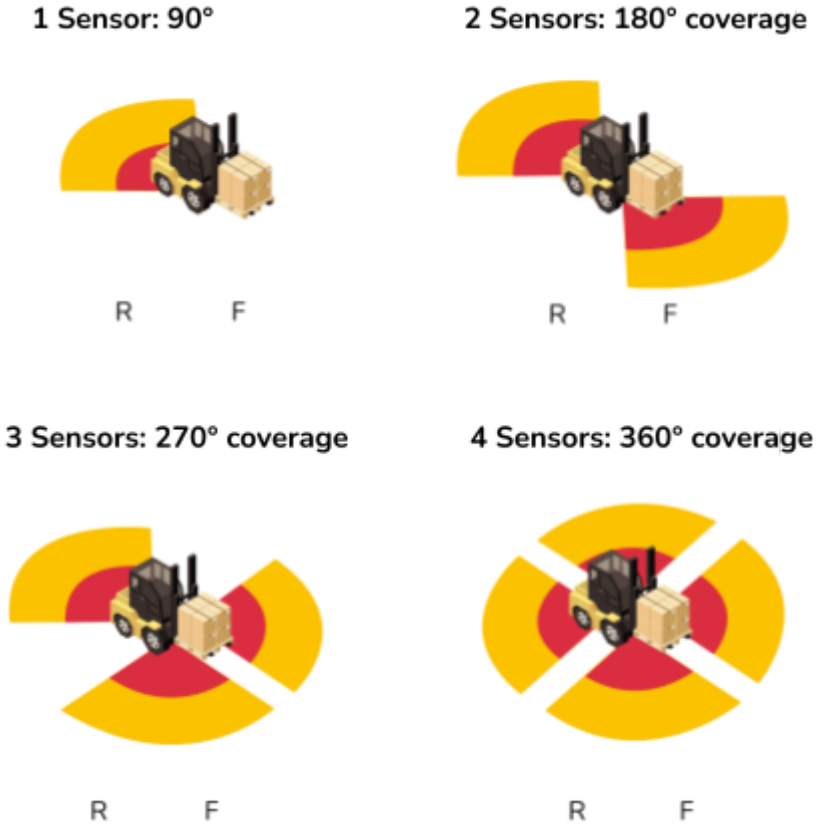


Figure 20 - Examples of installation configurations

Detection distances must be evaluated directly in the field, taking into account the FOV (Field of View) and the orientation of the sensor with respect to the projection plane.

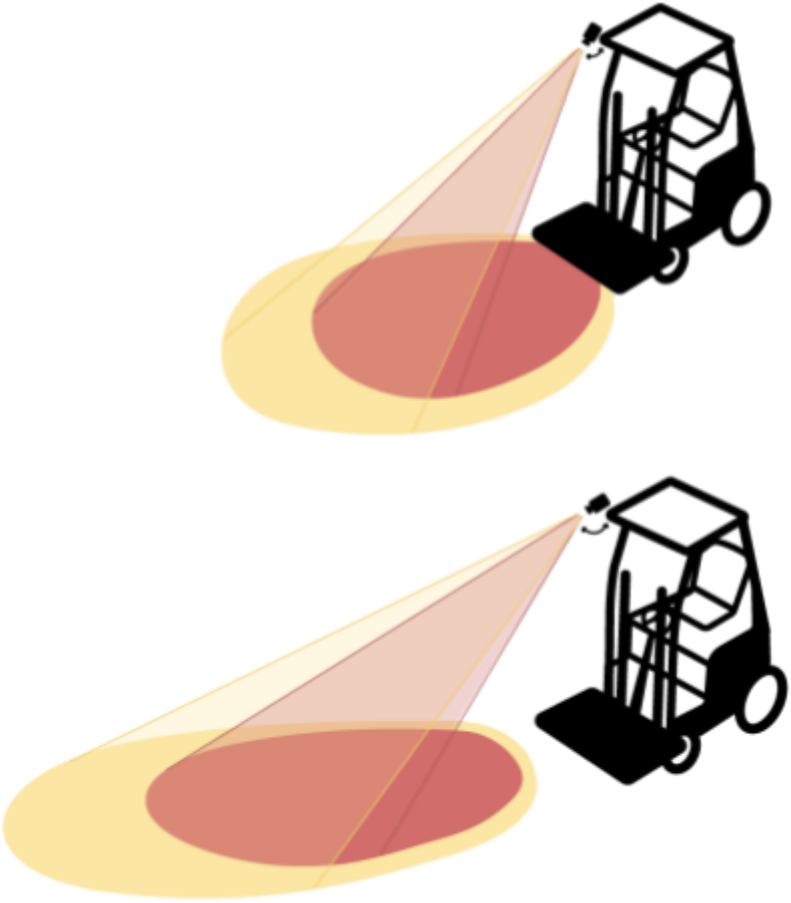


Figure 21 - Examples of KiwiEye orientation and projected distances

Verify correct installation

1. Turn on the vehicle.
2. Check that the KiwiEye LEDs light up in the following sequence:
    - When the optical sensor is powered up, the Power LED (the first from the left) lights up immediately.
    - After about 8 seconds, the Connection LED (fourth from the left) lights up. At this stage, the Connection LED has no meaning.
    - Between 8 and 16 seconds after startup, the Connection LED turns off and the Process LED (second from the left) turns on. The Process LED indicates that the main process is active.
    - When the master gives the operational command to the optical sensor (presumably in the moments following the lighting of the Process LED), the optical sensor will become operational and the Process LED will start flashing.
    - As soon as there is a detection (e.g., a person), the Detection LED (third from the left) will start flashing simultaneously with the Process LED.
    - If, after startup, the optical sensor connects to a known Wi-Fi network, the Connection LED (the fourth from the left) will light up and remain steady as long as the connection is active.
3. Place an object for which recognition has been enabled in the optical sensor's field of view and check that LEDs 2 and 3 on the optical sensor are flashing at a high frequency.

It is forbidden to perform the test referred to in point 3 while the machine's translation function is activated. Always comply with general safety regulations.

Use and maintenance

KiwiEye with KiwiPad

When installed, the tablet allows you to view the KiwiEye video stream. In particular, the display is divided into quadrants, each dedicated to the streaming of one sensor.

Below are some examples, for illustrative purposes only, of the video streaming of 3 KiwiEye sensors (two front and one rear) installed on the vehicle:

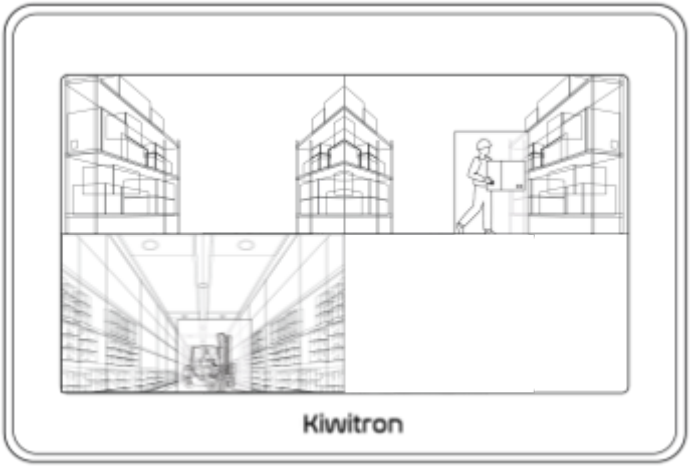


Figure 22 - Fixed display of the 3 KiwiEyes

Figure 23 - Display of front KiwiEye cameras only, forward gear engaged

Figure 24 - Display of rear KiwiEye only, reverse gear engaged

Maintenance

The main maintenance required for the KiwiEye device concerns the front optical unit.
This must always be kept clean in order to transmit an optimal video stream.

Use a clean, soft, lint-free cloth, moistened if necessary.

When cleaning, make sure that no residue remains on the viewers that could damage the glass.

Do not use abrasive cloths, towels, paper towels, or other similar items that could damage the product.

Do not rub the surfaces excessively to avoid damaging the product.

Do not use sprays, bleach, or abrasives.

Do not spray detergents directly onto the product.

Do not immerse the device in liquids or detergents of any kind.

We recommend periodically checking the condition of all other elements of the device, particularly cables and supports.

End of life - Disposal instructions

The devices manufactured by Kiwitron are professional electronic devices intended exclusively for commercial use (B2B). Unlike devices designed for domestic use (B2C), they cannot be disposed of through public collection centers for household waste, such as landfills or municipal recycling centers. At the end of their useful life, disposal must be managed directly by the customer, in accordance with current regulations on the management of professional electronic waste.

Disassembly/Assembly for maintenance

1. Disconnect all cables from the connectors on the back of the optical sensor;
2. If necessary, unscrew the device from the bracket;
3. Clean the optical unit;
4. Screw the device back onto the bracket;
5. Restore the connections referred to in point 1.

Do not unscrew the front screws of the optical sensor that secure the protective glass. If there are signs of damage to the optical unit or protective glass, contact Kiwitron technical support.

What to do if

The table below lists the most common problems encountered with the KiwiEye device and their solutions. As this device is highly customizable and configurable, the list may be incomplete.

For problems not described in this manual, please refer directly to Kiwitron support.

Symptom	What to do
LED 1 off	• Check that the wiring is connected correctly and use a multimeter to verify that the DC voltage on the power pins is within the range indicated on the label on the back of the KiwiEye. If it is correct and the problem persists, contact Kiwitron support.
LED 2 off	• Check that the wiring is connected correctly. If it is correct and the problem persists, contact Kiwitron support.
The optical sensor is detecting, but LED 2 is steady instead of flashing	• Check that the master and CAN network wiring is connected correctly. • Restart the device and, if the problem persists, contact Kiwitron support.
LEDs 2 and 3 are flashing alternately (not simultaneously)	• Contact Kiwitron support.

Symptom	What to do
LED 3 is not flashing	• If a tablet is present: Check the tablet display to ensure that the image shown corresponds to reality and that there are no obstructions or dirt on the optical sensor unit • Remove any obstructions from the optical sensor. • If the problem persists, contact Kiwitron support.
LED 4 is off if the optical sensor is configured to connect to Wi-Fi	• Check the Wi-Fi configuration on KiwiPad and Key/KiwiSafe • If the problem persists, contact Kiwitron support.
LED 4 flashing, LED 2 steady, and LED 3 off	• Check that the wiring is correctly connected • Check that the CAN master configuration is correct, i.e., that the KiwiEye node in question is configured

Table 9 - Possible faults

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