



Collection characterization solution

LIXO - Installation guide

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Thank you for your help in installing our solution.

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Once you are done with the installation, please call the Lix technical support to validate it

Technical support: +33 1 89 71 67 42

Of course don't hesitate to call us if you encounter any issue or have any questions.

Content

[1. Introduction](#)

[1.1. General scheme of the Lixo system](#)

[1.2. Package contents](#)

[1.3. Minimum tools required](#)

[2. Preparing to Attach the Camera](#)

[2.1. Identify the location](#)

[2.4. Prepare the necessary hooks](#)

[3. \[Option with lighting\] Hang the lights in the hopper](#)

[3.1. Identify the location of the lights \(right and left\)](#)

[3.2. Fix the lights collars](#)

[3.3. Orient the lights](#)

[4. \[Option with Roof antenna\] Installation of the roof antenna for 4G/GPS](#)

[5. Passage of cables from of the hopper to the driver's cabin](#)

[5.1. Passing the lighting cable and the camera cable at the same time](#)

[6. Fixing the Lixo box in the driver's cabin](#)

[6.1. Location of the Lixo case](#)

[7. Connecting each cable to the Lixo box](#)

[7.1. Truck power cable for Lixo box](#)

[8. Permanent camera attachment](#)

[8.1. Adjusting the camera's field of view](#)

[9. Regulatory](#)

[9.1. Supplier's Declaration of Conformity - FCC \(USA\)](#)

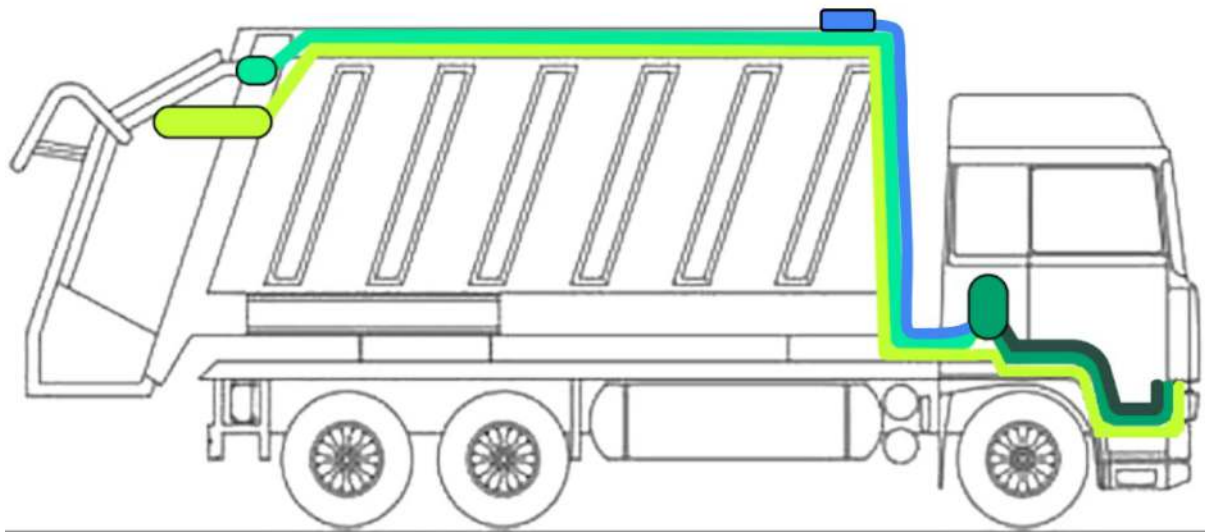
[9.2. Supplier's Declaration of Conformity - IC \(Canada\)](#)

[9.3. Radiofrequency radiation exposure Information](#)

1. Introduction

The purpose of this manual is to guide the technician(s) through the steps of installing and adjusting Lixo equipment. This manual is generic, adaptations may be necessary on certain trucks. Especially the schematics are provided for rear-loaders, but they remain true for side and front loaders.

1.1. General scheme of the Lixo system



 Lighting	 Lighting power supply
 Camera	 M12 Camera cable
 Compute box	 12V after ignition
 LTE/GPS Antenna	 DB25 cable
	 Antenna cable

1.2. Package contents

The package includes the following parts. If anything is missing, please contact the Lixo team immediately.

- ☐ Installation instructions (this document)
- ☐ A Lixo computation box
- ☐ A camera with its mounting brackets
- ☐ A 4G/GPS antenna
- ☐ 20m M12 camera cable (we provide 5m extension cables if necessary)
- ☐ 20m lighting power cable (length can be adjusted to 25m or 30m if necessary)
- ☐ 25m of protective loom
- ☐ Approximately 100 zip ties
- ☐ 5m power cable with connector
- ☐ A junction box containing a protection circuit with fuse holders
- ☐ A set of screws including
 - ☐ 10 M6×20
 - ☐ 10 self-drilling screws 5.5×38 or equivalent
 - ☐ 10 M6 nuts with thread lock
 - ☐ 10 chiseled M6 washers
 - ☐ 12 regular M6 washers (6 medium, 6 XL)
 - ☐ 6 M4×16 screws and 6 M4 nuts
 - ☐ 6 normal M4 washers and 6 chiseled M4 washers
 - ☐ 6 M5×18 screws and 6 M5 nuts
 - ☐ 6 normal M5 washers and 6 chiseled M5 washers

1.3. Minimum tools required

To complete the installation you need at least:

- ☐ A drill driver with flat bits / Philips
- ☐ Metal drills (diameter 2 to 6 mm)
- ☐ A set of taps (M4 - M6)
- ☐ Cutting pliers

2. Preparing to Attach the Camera

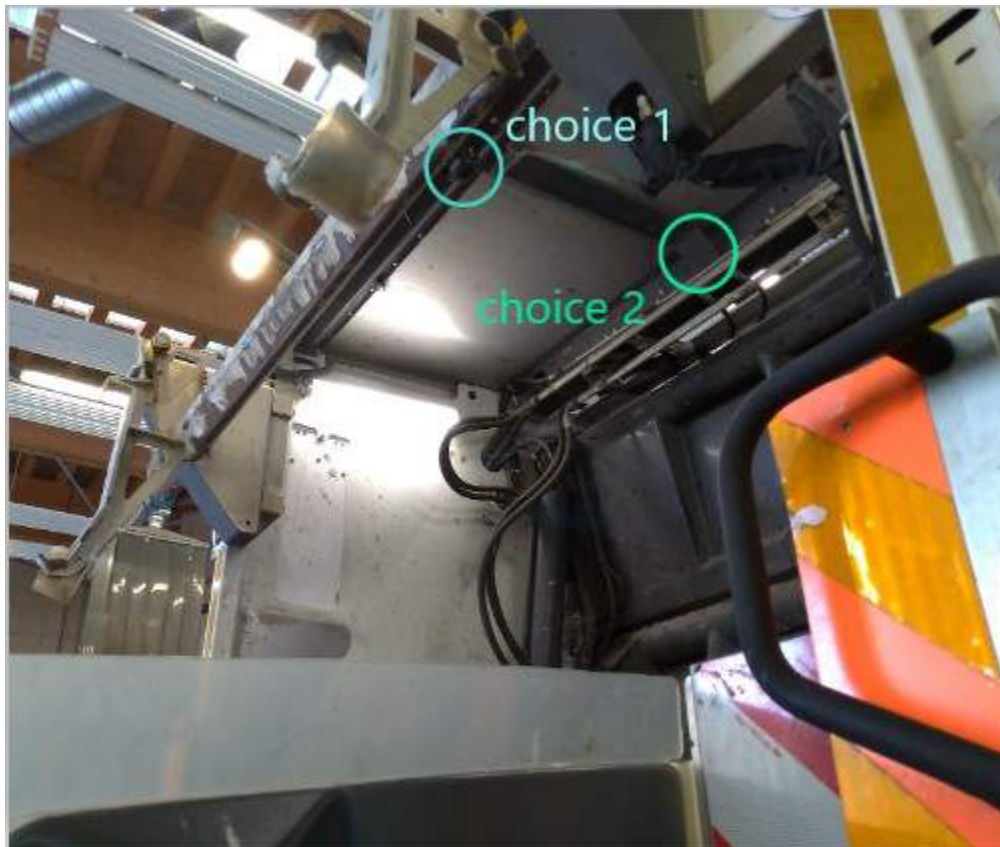
2.1. Identify the location

2.2. Rear Loaders

The camera must be mounted inside the hopper, high and centered in relation to the axis of the truck.

The two possible locations for installation are depicted in the image below. Note that this is highly dependent on the hopper model. Keep in mind that the general guidelines for finding the right location are:

- The camera must fully see the part of the hopper where the waste is thrown
- The camera must be protected from any mechanical movement
- The camera cable must not be cut due to mechanical movement



The camera can be mounted with one or two of its brackets (see below) by drilling and tapping one of the truck's metal sheets. Be careful not to damage the cables when drilling the sheet metal.

2.3. Side Loaders

The camera and the lights are usually mounted in the middle of the hopper, on the ceiling on the opposite side of the bins.



2.4. Prepare the necessary hooks

The camera should be slightly tilted toward the outside of the truck so you can see the entire hopper and the bins lids when they are lifted

2.4.1. MCDE7115 Camera

(A) The camera bracket requires 4 M6 screws (+4 nuts) to attach to the hopper.



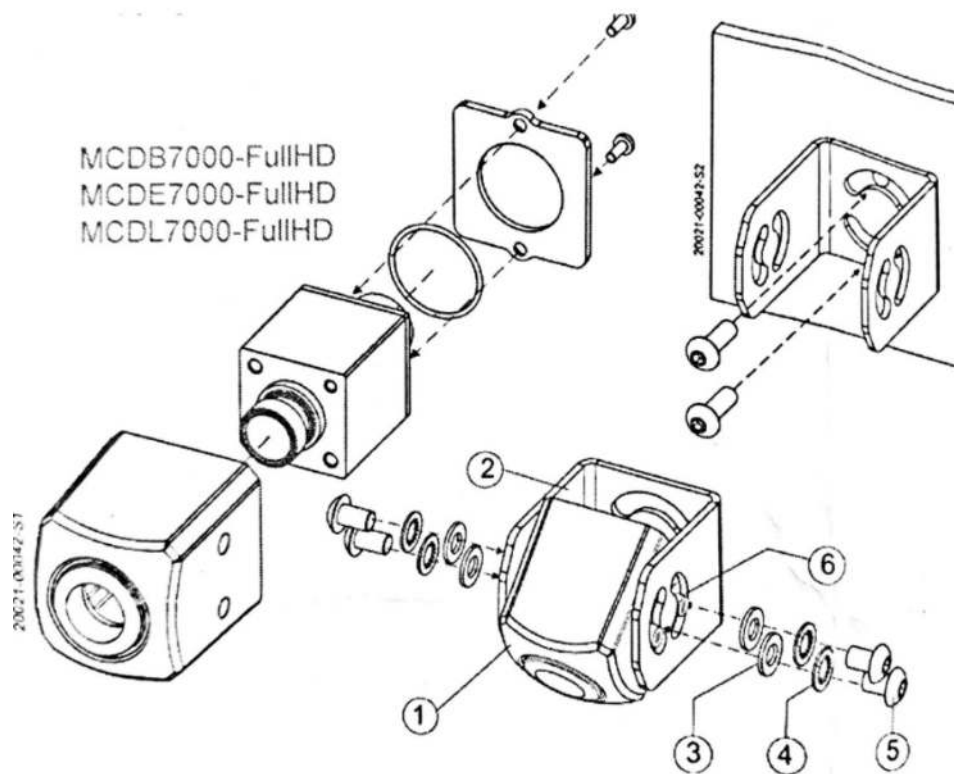
(B) Screw in the black camera bracket (M5 screws)



(C) Pass the camera cable and screw in the M12 connector



- (D) Add the waterproof silicone tape around the connector and screw the camera onto its bracket (screws supplied with the camera). **This silicone tape is essential to guarantee a good seal of the connector!**



(E) Screw the protective cover with M4 screws. Crimping is already planned.



(F) Call Lixo for image capture quality control. (This step is usually done at the end of the installation)

3. [Option with lighting] Hang the lights in the hopper

3.1. Identify the location of the lights (right and left)

The lights are 60 cm long tubes supplied with a cable of 2.5 m long for their food. The connection of the 2 lights is done via a cable with a T-connector.

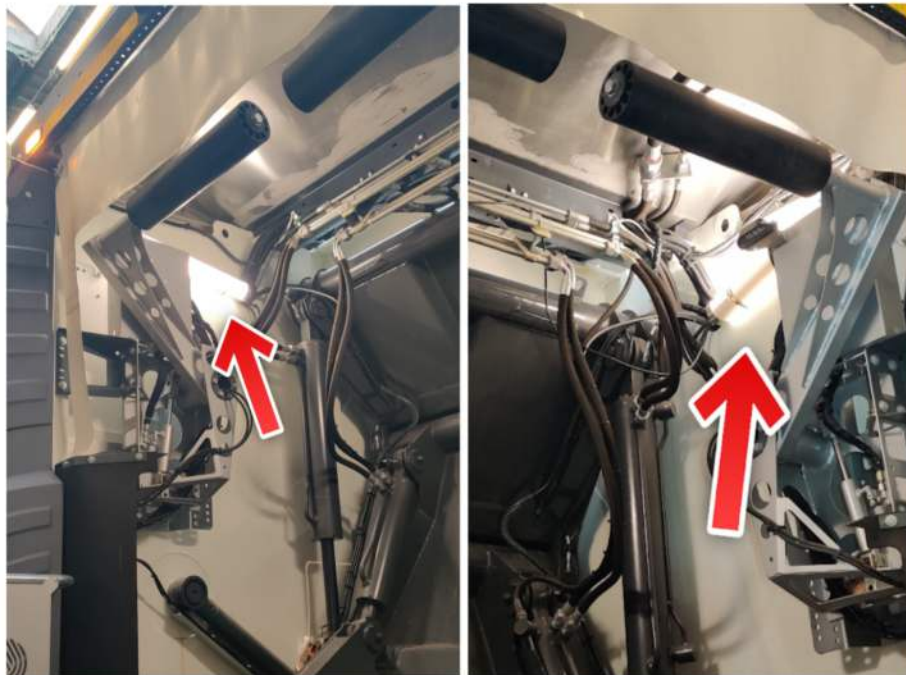
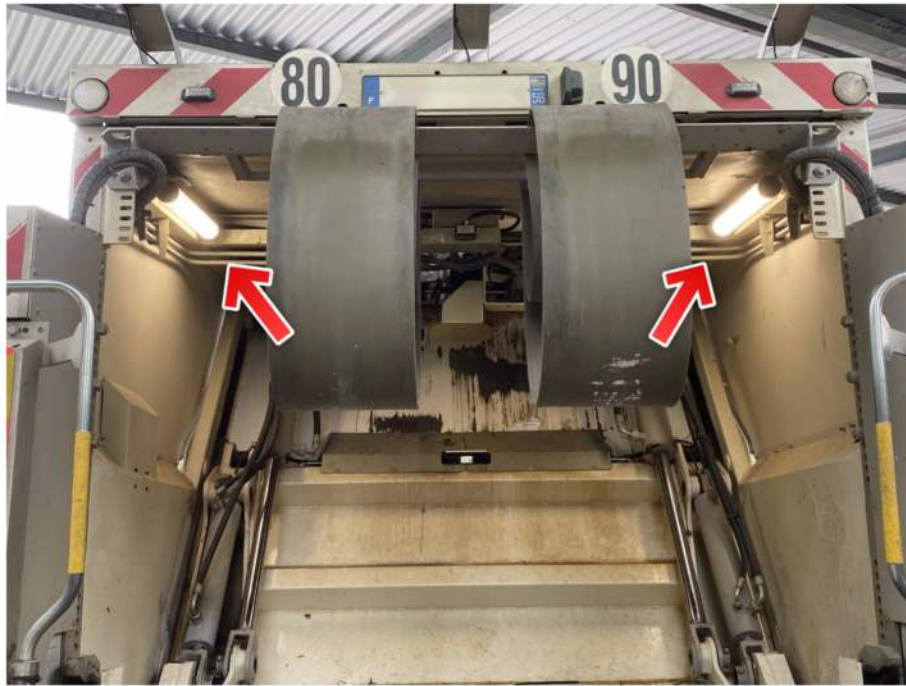
Note that the light wires can be black and red. In this case, respect the following convention:

Black = Blue = 0V

Red = Brown = +24V



The lights should be placed at the top of the side panels of the truck, so as to have uniform brightness inside the hopper.



For side loaders it's usually the configuration below that is the most relevant



3.2. Fix the lights collars

For each light fixture, we have supplied two fixing clamps. The collars are to be fixed on the inner wall using M6 screws. Do not definitively tighten the clamps until the lights are correctly positioned

3.3. Orient the lights

After powering the lights, angle them so that the beam is directed toward the bottom of the hopper.

4. [Option with Roof antenna] Installation of the roof antenna for 4G/GPS

First, identify a location on the roof of the truck. No metallic element must come between the antenna and the sky. Ideally, a slightly recessed location will protect the antenna.

Use the antenna adhesive carefully in addition to its magnetic fixation



**Then identify the cable descent towards the engine frame. The easiest way is to use the same cable routing as for the camera cable.
Ideally surround the cables with sheath.**



Cross the engine frame and bring the cables into the cabin by passing through the electrical panel.



Connect the cables with Fakra connectors to the blue and purple connectors on the Lixo box



5. Passage of cables from of the hopper to the driver's cabin

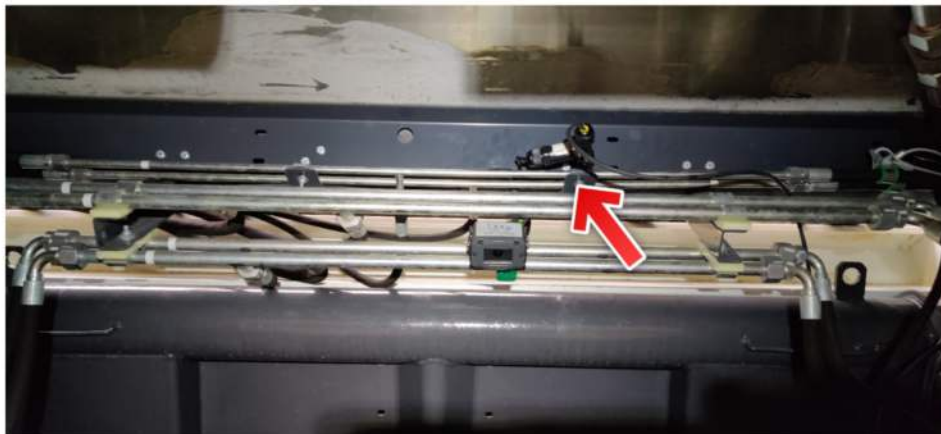
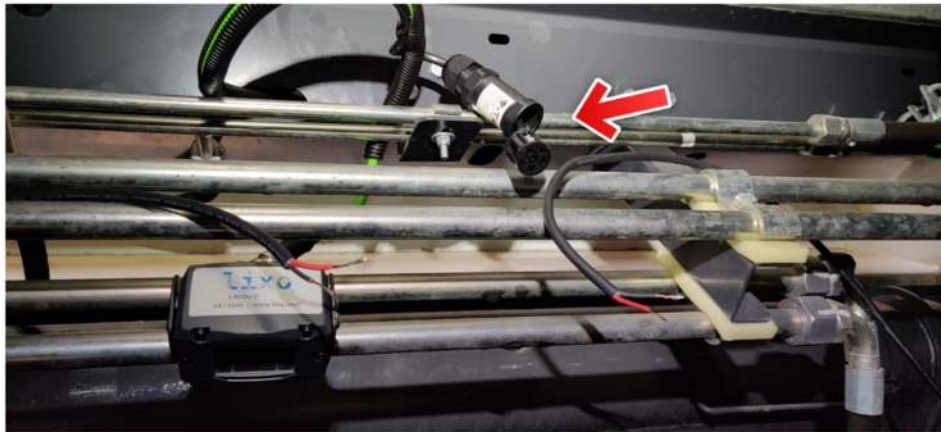
5.1. Passing the lighting cable and the camera cable at the same time

Before starting to pass the cables, they must be completely sheathed with a protective loom. The two cables to pass are:

- The 20m green cable with M12 connector, potentially with 5m extension cables if needed. **Important note : if you need to screw these extension cables, screw them tightly and add some rubber tape around the connector to make sure it's perfectly sealed.**
- The 30m black lighting power cable



In the following images, the T has been prepared just above the camera.



The path to pass the conduit to the driver's cabin is shown in the following images.

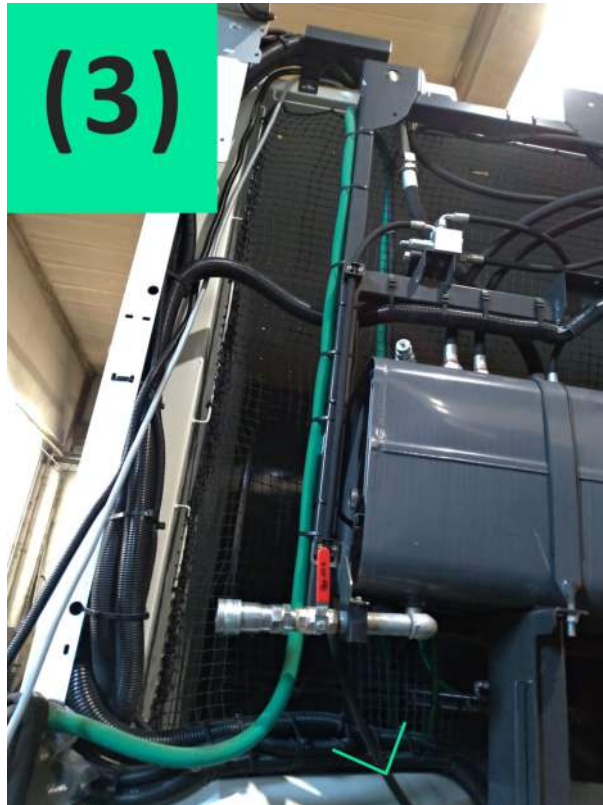
- (1) Take out the loom first from the hopper
- (2) Pass the loom through the roof alongside the existing ducts
- (3) The loom descends vertically at the back of the cabin
- (4) Pass next to the engine (requires tilting the cabin to gain access), following the cable paths that are already there
- (5) Raise the loom from the front of the cabin, it should normally arrive under the electrical panel



Cable tray from hopper to roof



Cable tray on truck roof to cab



The cable path goes down into the truck's chassis



The cable path passes through the motor frame



Finally to the truck's electrical panel

After this step, the available length allows the box to be connected behind the driver's seat. Before tilting the cabin again, remember to ensure clean management of the cable passages using the zip ties.

6. Fixing the Lixo box in the driver's cabin

6.1. Location of the Lixo case

The computer case attaches to the cabin behind and seat (passenger preferred), cable length planned allows you to cross the entire cabin.

The box is fixed with 2 metal mounting brackets/plates already equipped on the back of the Lixo box. Ideally, orient the connectors towards the bottom where there is the least risk of breakage (thrown of bags or equipment). Depending on the location chosen for the box, it can be fixed either by a screw/nut system or via self-drilling screws. Pay particular attention to the cables when drilling.

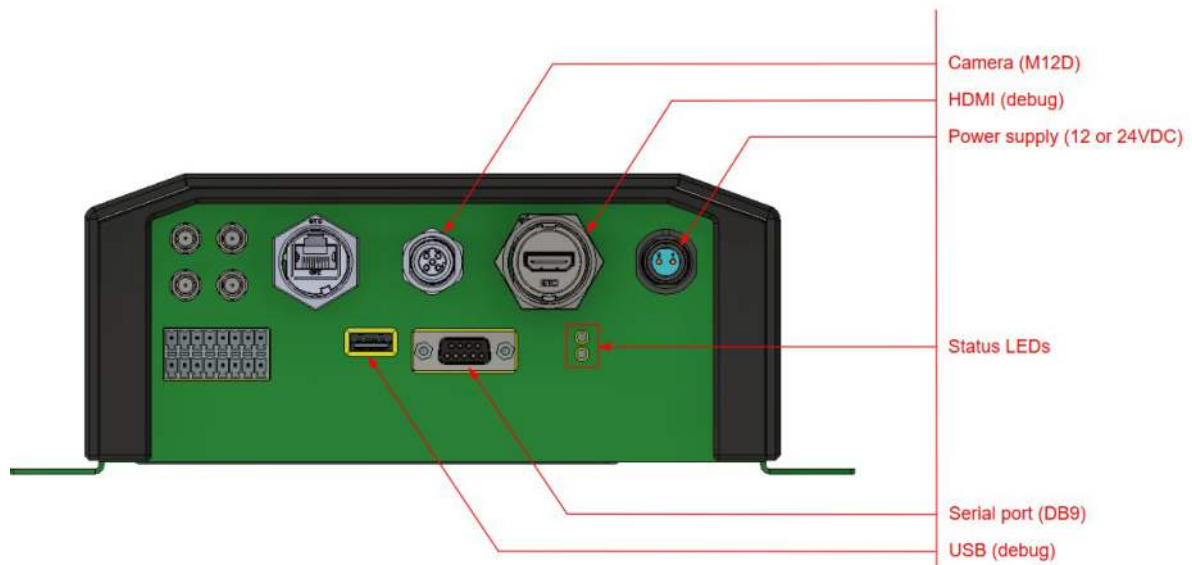
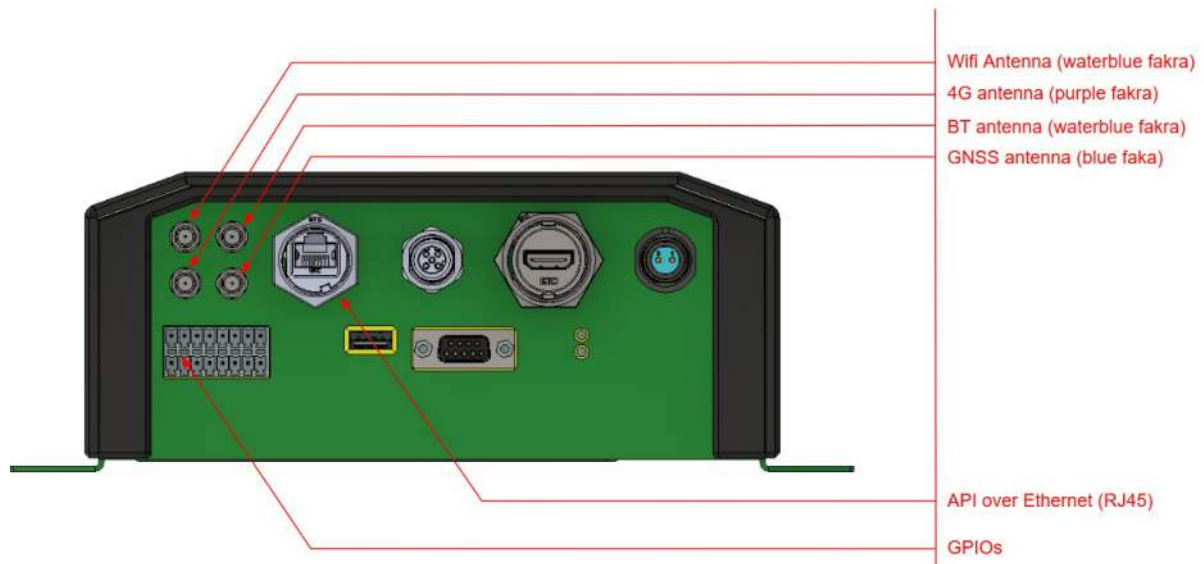
If the box is placed under a seat, make sure that the cables (or the box itself) cannot be damaged if the passenger moves the seat forward or backward.

The photo below shows an installation of the box attached behind the passenger seat, screwed into the rear cabin wall.



7. Connecting each cable to the Lixo box

The following diagrams show how to connect the different cables. The RJ45, GPIOs, HDMI, USB and DB9 connections are optional.



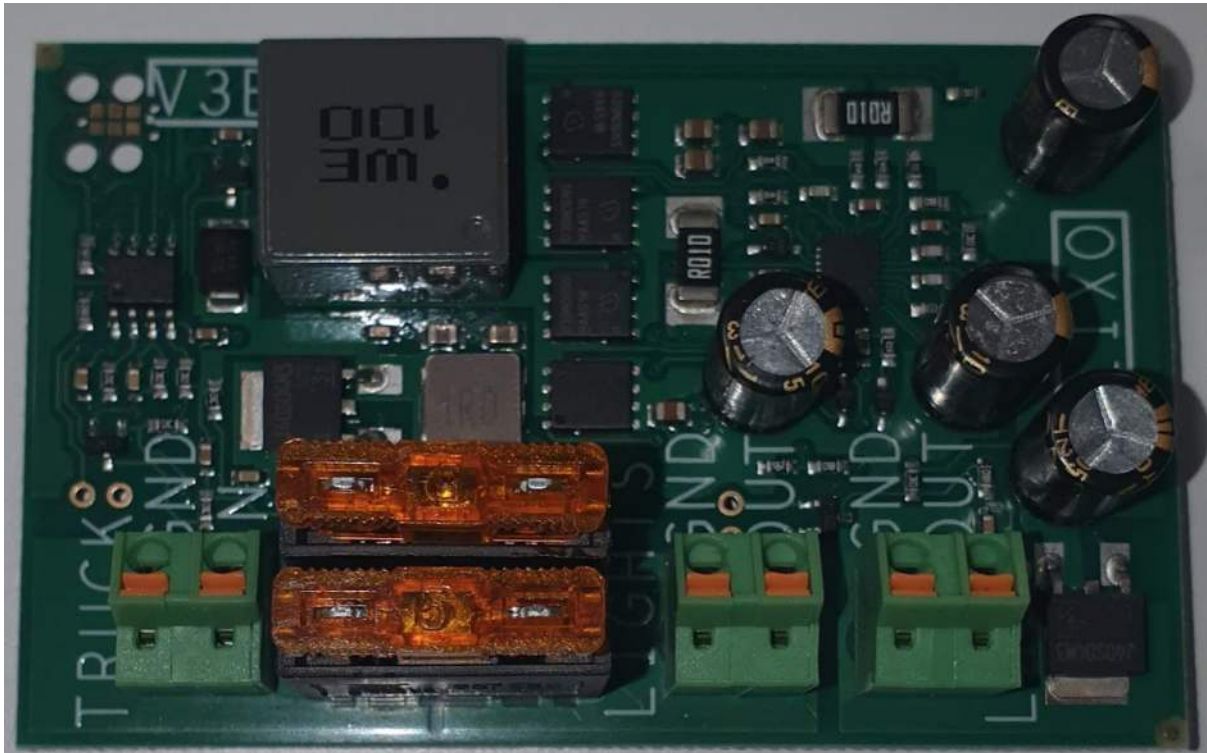
7.1. Truck power cable for Lixo box

All Lixo equipment is powered by 12V after ignition. We use a 10A fuse to properly isolate it from the rest of the truck's electrical equipment. It is important to respect the following convention:

- blue wire = ground
- brown wire = (+24V or +12V, depending on truck battery voltage)

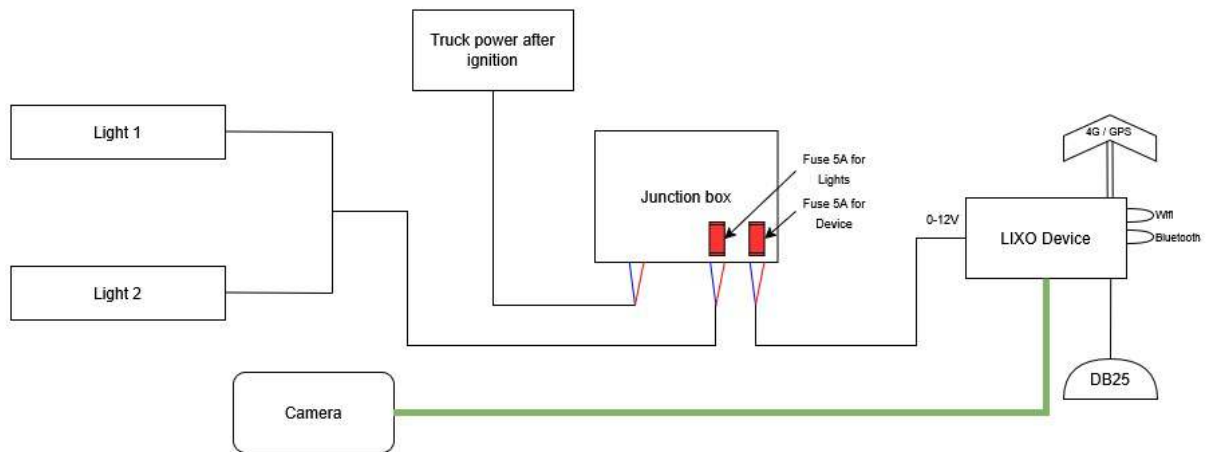
We use a protective board that has

- A 8-40V → 12V DC-DC converter, to protect against high voltages
- A circuit that detects micro-interruptions in the power supply and properly shuts down the power. It's required to avoid getting the equipment not being started properly when the engine starts, which can lower drastically the battery voltage.
- Two fuses to protect from any short-circuit on the lights or on the device



The board has three connectors

- One input, to be connected to the truck's power supply
- A first output, to be connected to the Lixo device
- A second output (optional), if you want to connect a lighting system (max power 60W)



Before connecting the box, check with a multimeter that the power supply is correctly wired.

When the box is properly connected, two red and green LEDs should light up when the battery is turned on. Otherwise, there is a connection error.

8. Permanent camera attachment

8.1. Adjusting the camera's field of view

To adjust the camera view, the image must be centered and the camera must record the whole hopper.

- Tip: It is possible to imagine the camera's field of view by taking a photo with a smartphone placed on the camera. This allows you to check whether the camera is correctly centered or not.

Below are some sample hopper images with interior and exterior hooks.

Call Lixo to check the quality of the camera image with our teams (telephone numbers are provided on page 1 of this document). It is also possible to contact us via Whatsapp.

Below we show some examples of photos taken with our camera. The hopper must be fully visible. Trash cans must be visible when lifted. However, you shouldn't see too much of the outside.



9. Regulatory

9.1. Supplier's Declaration of Conformity - FCC (USA)

Unique Identifier : LXCO-5

Responsible Party - U.S. Contact Information

Americas Compliance Consulting LLC, dba iCertifi
2445 NE Division Street, Suite 202
Bend, Oregon 97703, United States
Email: fccagent@icertifi.com

FCC Compliance Statement (e.g., products subject to Part 15)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: the user that changes or modifications not expressly approved by the party responsible for compliance
could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

9.2. Supplier's Declaration of Conformity - IC (Canada)

Unique Identifier : LXCO-5

Identifiant Unique : LXCO-5

Responsible Party - Canada Contact Information

iCertifi Global Approvals, LTD, 380 Wellington Street Tower B, 6th Floor, Suite 656, London, Ontario, N6A 5B5, +1 (226) 663-3170, ised@icertifi.com)

Représentant Légal - Information de contact au Canada

iCertifi Global Approvals, LTD, 380 Wellington Street Tower B, 6th Floor, Suite 656, London, Ontario, N6A 5B5, +1 (226) 663-3170, ised@icertifi.com)

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- This device may not cause interference; and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- l'appareil ne doit pas produire de brouillage;
- l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

9.3. Radiofrequency radiation exposure Information

This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Ce transmetteur ne doit pas être placé au même endroit ou utilisé simultanément avec un autre transmetteur ou antenne.