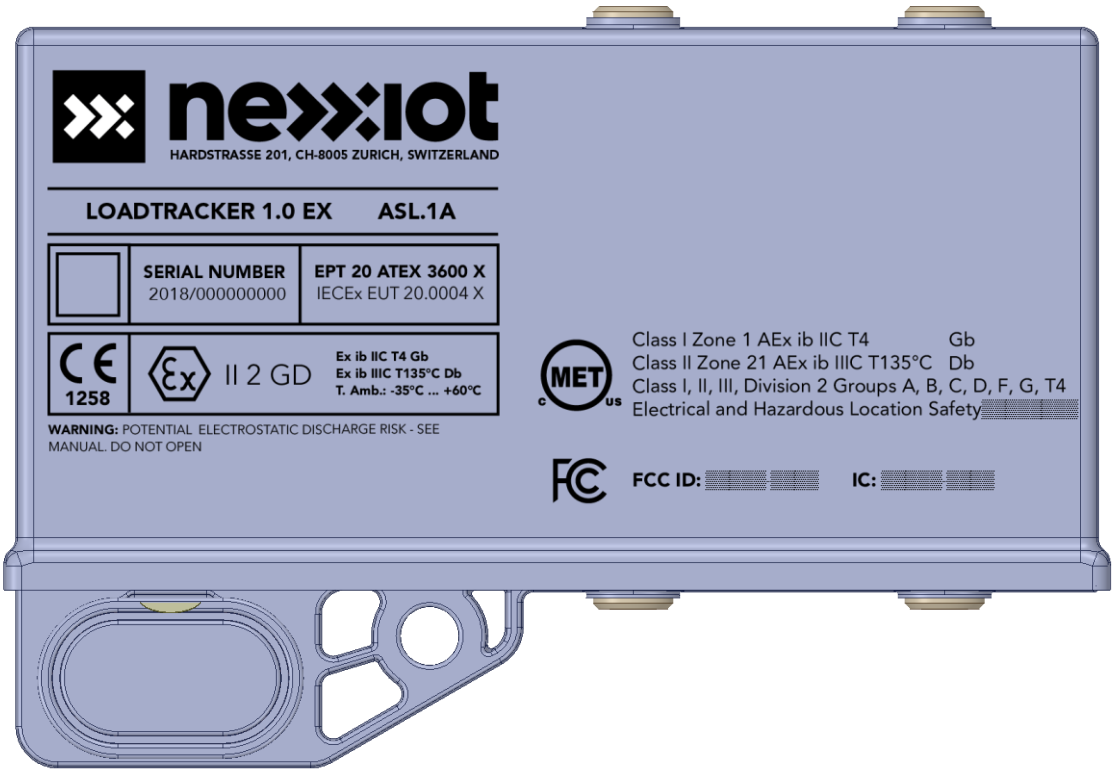
Loadtracker 1.0 Empty-Full Sensor
User Manual

Technical Data
Installation Manual
Certificates

This manual is an application example of the Loadtracker for a freight wagon with the UIC standard bogie type Y25 with I-beam profile.

Other bogie types may have a different mounting position and may require additional mounting material.

Before equipping a wagon according to these instructions, the procedure must be agreed with the person responsible entity in charge of maintenance (ECM) of the wagon.



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1 Revision History

Version	Author	Publishing date	Reason of the change
1.2	Nexxiot AG	2021-05-07	RF Exposure Warning added to section “Important”
1.1	Nexxiot AG	2021-03-30	Product label and certification updated
1.0	Nexxiot AG	2021-02-08	Initial release

2 Technical Data

Product		Loadtracker 1.0 EX / ASL.1A
ID		ASL.1A
Physical	Size	138.5 mm × 75 mm × 34 mm without ultrasonic 4.45 in x 2.95 in x 1.35 in without ultrasonic 138.5 mm × 95 mm × 34 mm with ultrasonic 4.45 in x 3.75 in x 1.35 in with ultrasonic
	Weight	425 g ± 10 g (without mounting accessories) 0.937 lb ± 0.02 lb (without mounting accessories)
	Enclosure Material	LEXAN™ [1)] EXL9330
Environmental	Operating temperature (EN 50155, Class TX)	-40 °C … +50 °C; Electronics operational up to +85 °C -40 °F … +122 °F; Electronics operational up to +185 °F
	ATEX ambient temperature (EN 60079-0)	-35 °C … +60 °C / -31 °F … +140 °F
	Altitude	2000 m / 6562 feet
Energy	Battery type	$LiMgO_2$ – Primary
	Nominal battery voltage	3 V
	Battery capacity	6000 mAh (2 × 3000 mAh)
	Nominal current (average)	76 µA
	Maximum current (under normal operation)	150 mA
	Battery certification	UN 38.3, UL 1642, IEC 60086-4, IEC 60079-11, RoHS, REACH
	Energy harvesting source	None
IEEE 802.15.4	Frequency range	2400 MHz … 2480 MHz
NFC	Frequency	13.56 MHz (passive, connected to microcontroller)
Lifetime	Maintenance free	6 to 10 years depending on environmental conditions and use of device

[1)] LEXAN™ is a registered trademark of SABIC, Saudi Arabia Basic Industries Corporation

3 Certifications

Environment:
RoHS
WEEE
EN 61373:2010 Category 2 (Vibrations and shocks for rail)
DIN EN 60529:2014 (IP66/IP67)
ISO 20653:2013 (IPX9K)
EN 50155:2007
EN 50125-1:2014
IEC 60721-3-5:1997
DIN EN IEC 60068-2-5:2019

Product Safety:
IEC 62368-1:2014
DIN EN 45545-2:2016

EMC:
ETSI EN 300 328 V2.1.1
ETSI EN 300 330 V2.1.1
ETSI EN 301 489-1 V2.2.0
ETSI EN 301 489-3 V2.1.1
ETSI EN 301 489-17 V3.2.0
EN 50121-3-2:2016/A1:2019 (EMC for Rail)

Battery:
UN 38.3, UL 1642

ATEX / IECEx:
ATEX Certification Number: EPT 20 ATEX 3600 X
IECEx Certification Number: IECEx EUT 20.0004 X
2014/34/EU
EN/IEC 60079-0, edition 7.0
EN/IEC 60079-11, edition 6.0
Ex II 2 GD
Ex ib IIC T4 Gb
Ex ib IIIC T135°C Db

4 Important

FCC Statements

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.

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 A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to pro-vide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

ISED Statements

This device complies with ISED Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) 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 : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Exposure Warning

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be located or operating in conjunction with any other antenna or transmitter.

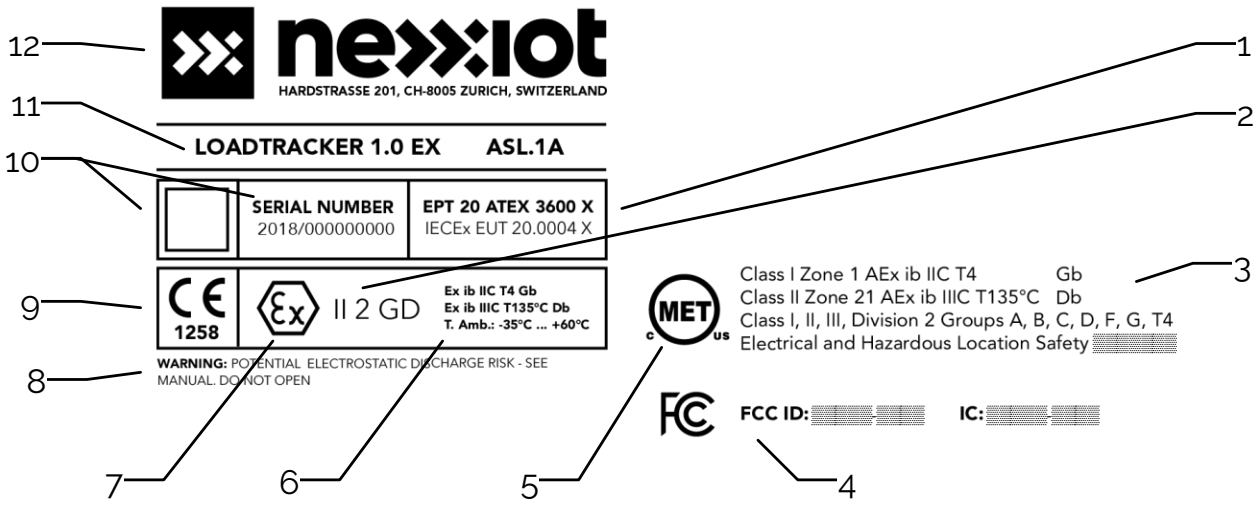
Les antennes utilisées pour ce transmetteur doivent être installé en considérant une distance de séparation de toute personnes d'au moins 20 cm et ne doivent pas être localisé ou utilisé en conflit avec tout autre antenne ou transmetteur.

5 Product Information

5.1 Safety Notice

1. Do not drop the device.
2. Do not open the device.
3. Do not expose device to conditions other than those in chapter “Technical Data”.
4. **Warning**: Device contains a Lithium Manganese Dioxide Battery ($LiMgO_2$). Danger of fire if punctured, crushed or otherwise forcefully damaged, exposed to heat above the values given in the chapter “Technical Data”.

5.2 Device Identification EU Version



Explanation of the label elements:

1 Certificate number issued by the notified body involved in the verification of the annex III of the directive 2014/34/EU

2 Group and Category of the equipment
   a II: group of equipment. Group II refers to equipment not used in mining.
   b 2 GD: In presence of potentially explosive atmospheres of gas (G) and/or dust (D) the category 2 is suitable to be installed in zone 1 and/or zone 21; the process connection of the equipment is suitable to be installed in zone 1

3 HazLoc classification of the device within specific areas
   a AEx ib: this type of protection is applicable to electrical equipment in which the electrical circuits themselves are incapable of causing an explosion in the surrounding explosive atmospheres
   b IIC: group of gas for which the equipment is suitable within Class I, Zone 1
   c IIIC: group of dust for which the equipment is suitable within Class II, Zone 21
   d T4: temperature class for gas
   e T135˚C temperature class for dust
   f Gb: equipment protection level, equipment for explosive gas atmospheres, having a “high” level of protection
   g Db: equipment protection level, equipment for explosive dust atmospheres, having a “high” level of protection
   h Hazloc class and division classification
      i. Class I, Division 2: Incendive concentrations of inflammable gases, vapors or liquids do not usually occur under normal operating conditions.
      ii. Class II, Division 2: Incendive concentrations of combustible dust do not usually occur under normal operating conditions
      iii. Class III, Division 2: Areas in which readily flammable fibers are stored or transported.
         1. Group A: Acetylene
         2. Group B: Hydrogen
         3. Group C: Ethylene
         4. Group D: Propane
         5. Group F: Coal
         6. Group G: Grain
         7. Temperature code T4: 135˚C, 275˚F
   i Electrical and Hazardous Location Safety together with MET Laboratories, Inc. certification number

4 Device Identifiers for North American certification
   a Logo of Federal Communications Commission (FCC)
   b FCC identifier (ID)
   c IC indicates that this is an Innovation, Science and Economic Development Canada (ISED) certification number
5 MET Laboratories, Inc. logo for Canada (C) and United States (US)
6 Classification of the device within specific areas
   a Ex ib: this type of protection is applicable to electrical equipment in which the electrical circuits themselves are incapable of causing an explosion in the surrounding explosive atmospheres
   b IIC: Group of gas for which the equipment is suitable
   c IIIC: group of dust for which the equipment is suitable
   d T4: temperature class for gas
   e T135˚C temperature class for dust
   f Gb: equipment protection level, equipment for explosive gas atmospheres, having a “high” level of protection
   g Db: equipment protection level, equipment for explosive dust atmospheres, having a “high” level of protection
   h IP Rating: IP 66/67: level of protection against ingress of water and dust
   i T Amb.: -35 ˚C ... + 60 ˚C: Ambient temperature for safe operation of the device according to ATEX
7 Specific symbol of ATEX directive 2014/34/EU, given in the annex II of the directive
8 Warning for specific risks when using the device
9 CE marking together with the registered number of the Notified Body involved in the verification of the product
10 Serial number of the device as human readable text and coded into data matrix, consisting of the manufacturing year and the serial number of the device
11 Device identification Loadtracker 1.0, ATEX certified
12 Nexxiot Logo and address

5.3 Functional Description

The Loadtracker 1.0 EX / ASL1A is an intelligent device for load status measuring of mobile installations. The device is equipped with a battery. The device is particularly suitable for load status measuring of railway vehicles. Do not use this device for any other purpose. Nexxiot AG is not liable for damage to property or personal injury resulting from improper use.

5.4 Warning Label

Due to a special plastic in the product housing, an electrostatic discharge may occur if the device is handled improperly. The warning ("Electrostatic Discharge Hazard") warns users to read the following instructions before performing any installation or maintenance. Important - this warning is only relevant if the Nexxiot Loadtracker 1.0 EX / ASL.1A is operated within a hazardous area.

5.5 Installation Instruction

It is not permitted to install the Loadtracker within a hazardous area. If the Loadtracker is installed outside a hazardous area, no special safety concerns or precautions are required.

Before mounting the unit in the desired location, ensure that the following conditions are met:

- Ensure that drilling holes at the selected location does not weaken the mechanical structure of the carriage. In case of doubt, please contact the manufacturer of the carriage to obtain suitable mounting locations.
- Make sure that the borehole is not placed in container walls where there is direct contact between the fixing material and the load. Special attention should be paid to all types of tank railcars and bulk railcars.
- Ensure that drilling does not damage electrical, hydraulic or pneumatic hoses or lines or functionally important installations on the railcar. To protect cables, they are usually laid behind the supports.

Wear personal protective equipment throughout the installation to avoid injury.

5.6 Maintenance Instruction

This device is maintenance-free. It is not possible to replace the battery.

5.7 Cleaning

For optimum performance, please clean the unit at each service interval of your car. The Loadtracker unit can be cleaned both inside and outside a hazardous area.

To prevent damage to the sensors, it is recommended that you wash the unit with a sponge or cloth with water and soap suitable for Makrolon® and polycarbonate surfaces. Alternatively, the unit can be wiped with a damp cloth or an antistatic dry cloth to avoid the risk of electrostatic discharge.

5.8 Device Replacement Instructions

Remove the old unit from your cart by removing the four screws and lifting the unit out of the basic holder. The App can then be used to initiate the decoupling process. Then install the new device on your car and connect the new device via the Smartphone App.

When installing a new device, the four screws must be replaced with new screws to ensure that the screw locking is guaranteed.

5.9 Decommissioning an Old Device

Devices taken out of service must be returned to Nexxiot AG. The delivery address can be found on our website. Nexxiot AG takes care of proper recycling.

6 Installation and Mounting Guide

6.1 Important Safety Notice

This installation and mounting guide focus on one specific type of bogie. The mounting principle are the same for any other type of bogie but must be checked in detail on any specific type of bogie to make sure the installation leads to meaningful measurements.

For any specific type of bogie, the manufacturer must be consulted to make sure the installation does not interfere with any safety critical features or functions on the specific type of bogie. Not properly chosen installation locations on the bogie can impair the safety of operation.

6.2 Material Lists (Mounting Kit)

No	Parts	Comment	Part number
Mounting kit 20190515006			
1	Sensor Loadtracker 1.0 EX / ASL.1A	weight app. 450g	20190208002
2	Bracket SCW-D6,5mm	2 pieces	971801102
3	Reflector plate	S700MC zinc-plated	2019718002
4	Fastening screws	4 pieces M5x8 A4	BN 624 1238647
5	Detent-edged washer	4 pieces M5 A4	BN 2332 2064146
6	Mounting plate	V4A ca. 250g	20190507001/2

6.3 Workshop Equipment

Nr	Parts	Comment	Part number
1	Adhesive 3M™ ScotchWeld™ DP 8407 NS	45ml-cartridge	DP8407NS
2	Static mixer ("mixing nozzle")	nozzle45	7000062907
3	Hand applicator	EPXHand3	7000033012
4	Feed piston 10:1	Kolben45	7000062909
5	Paint franking stencil	stainless steel V2A	201907300003
6	Adhesive stencil	stainless steel V2A	201907300004

6.4 Required Tools

The following tools are required for mounting the Loadtracker:

- Cordless screwdriver or angle grinder with rotary brush attachment
- Paint Clearance Template Type Nexxiot
- Isopropanol alcohol (IPA)
- Clean cleaning rag
- folding rule / folding rule / measuring tape
- Permanent markers (e.g. Edding® or Sharpie®)
- Spanner wrench 12mm
- Ring spanner or open-end wrench / impact wrench with nut SW 30mm
- One nut 8 mm for the torque wrench 5 Nm
- Torque wrench 5 +/- 0.3 Nm (calibrated and with valid test badge)
- Torque wrench 400 +/- 5 Nm (calibrated and with valid test badge)
- A self-locking nut of the M20 anti-lift device (steel circlip)
- A soft-face hammer
- Collet

6.5 Consumables

The following materials are consumed or subject to wear and tear and may need to be replaced:

- Nut M20 self-locking
- rotary brush
- Adhesive and 2K mixing tip
- Isopropanol alcohol (IPA)
- cleaning rags
- Paint franking stencil
- Permanent markers (e.g. Edding® or Sharpie®)

6.6 Explanation Coordinate System Freight Railcar - Indicators

In order to place the Loadtrackers at the intended locations on the wagon, it is first necessary that the alignment of the railcar is correctly recognised. In this section, the indicators are illustrated and explained using the example of a two-axle container railcar (Lgns).

The following figure shows this example railcar in the direction of travel (green arrow). In addition, the front half of the railcar is marked with "1" and the rear half with "2". When thought into this position on the railcar, the following recognition patterns result for the alignment of the railcar:

- The EBA and inspection plate holder is always located at the rear left of the railcar.
- If the railcar has only one brake cylinder, its piston rod moves in the direction of railcar end 2 during operation.
- If the railcar has a handbrake with only one handbrake wheel, this is usually turned towards railcar end 2.
- If the railcar has wheel markings on the sides (1L, 1R, 2L, 2R for a railcar with two-wheel sets), the half of the railcar marked "1" is the front half and the half marked "2" is the rear half. If other indicators contradict the wheel markings, they are still valid.

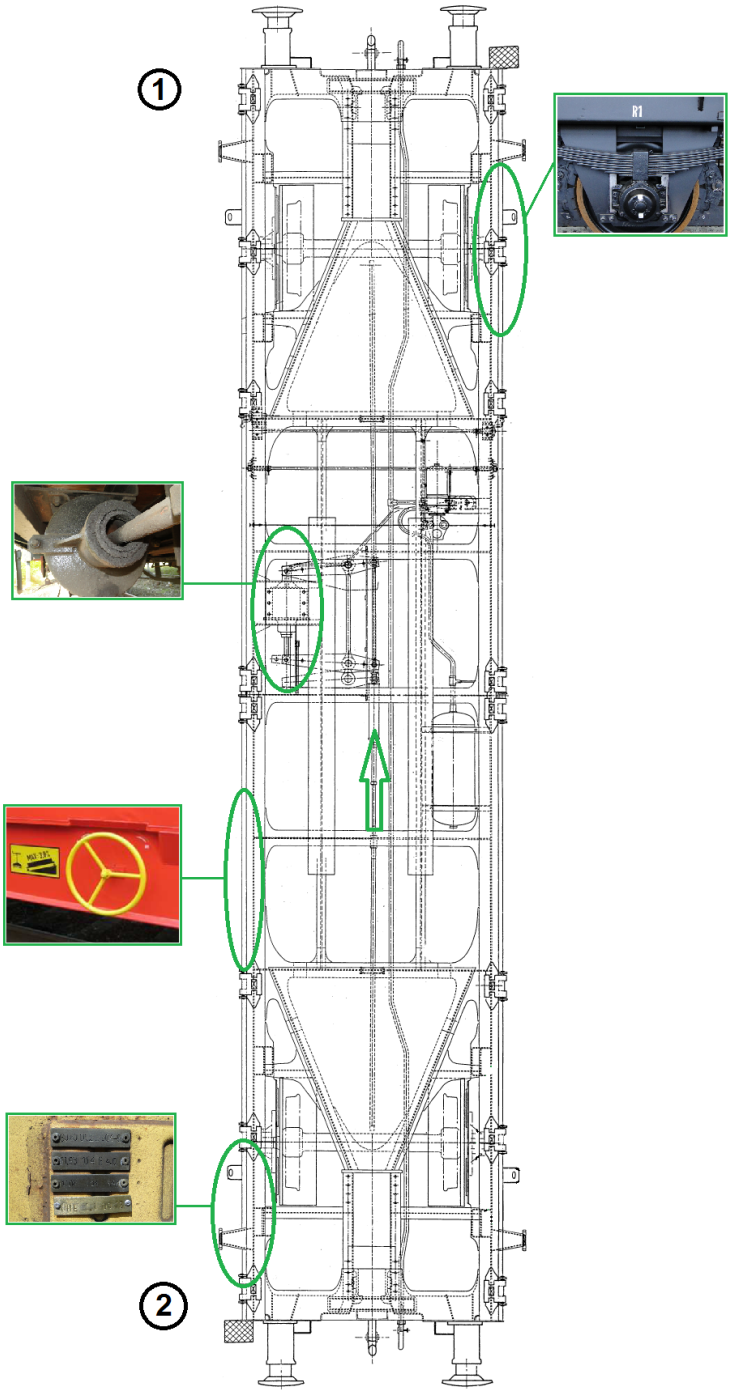


Figure 1: Orientation indicators on the railcar

7 Notes on the Devices

7.1 Loadtracker

The Loadtracker is maintenance-free and sealed and may only be opened by the manufacturer.

The lithium-manganese battery is permanently installed in the device and cannot be replaced!

When graffiti damage is repaired, cleaners containing solvents must be avoided, as these can damage the device!

7.2 Rotary Brush

The safety regulations for the use of this attachment on drills and cordless screwdrivers apply.

7.3 Adhesive 3M™ ScotchWeld™[2] 8407

The safety regulations of 3M™ for the product ScotchWeld™ 8407 according to the data sheet MSDS DP8407NS of 10.09.2018 apply.

[2] 3M™ and ScotchWeld™ are registered trademarks of 3M Company

8 Installation Locations

8.1 Overview

The drawings below are intended to provide an overview of the trolley. You can see the views from right and left to the sides of the car. For additional orientation, the railcar ends 1 and 2 are shown in the drawings. The mounting locations of the Loadtrackers are marked in green. The sensors should be placed symmetrically on the railcar, similar to the UHF and NFC transponders. One sensor is placed at railcar end 1 on the left bogie beam, the second on the right bogie beam at railcar end 2.

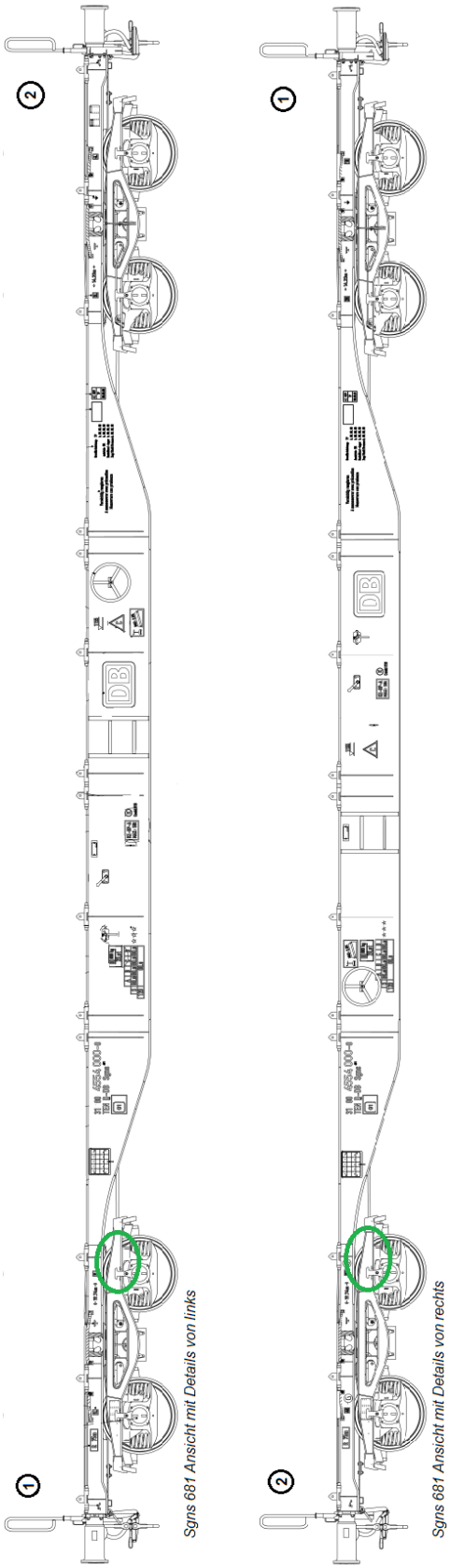


Figure 2: Overview drawings of the railcar from the side

8.2 Detailed Installation Location of Sensors on the Bogie

The drawings below show the mounting position from above. The positions of the bogies in the railcar are marked in it. Thus bogie 1 represents railcar end 1 and bogie 2 the one located at railcar end 2. The Loadtracker should be mounted in the green area of the bogie frame.

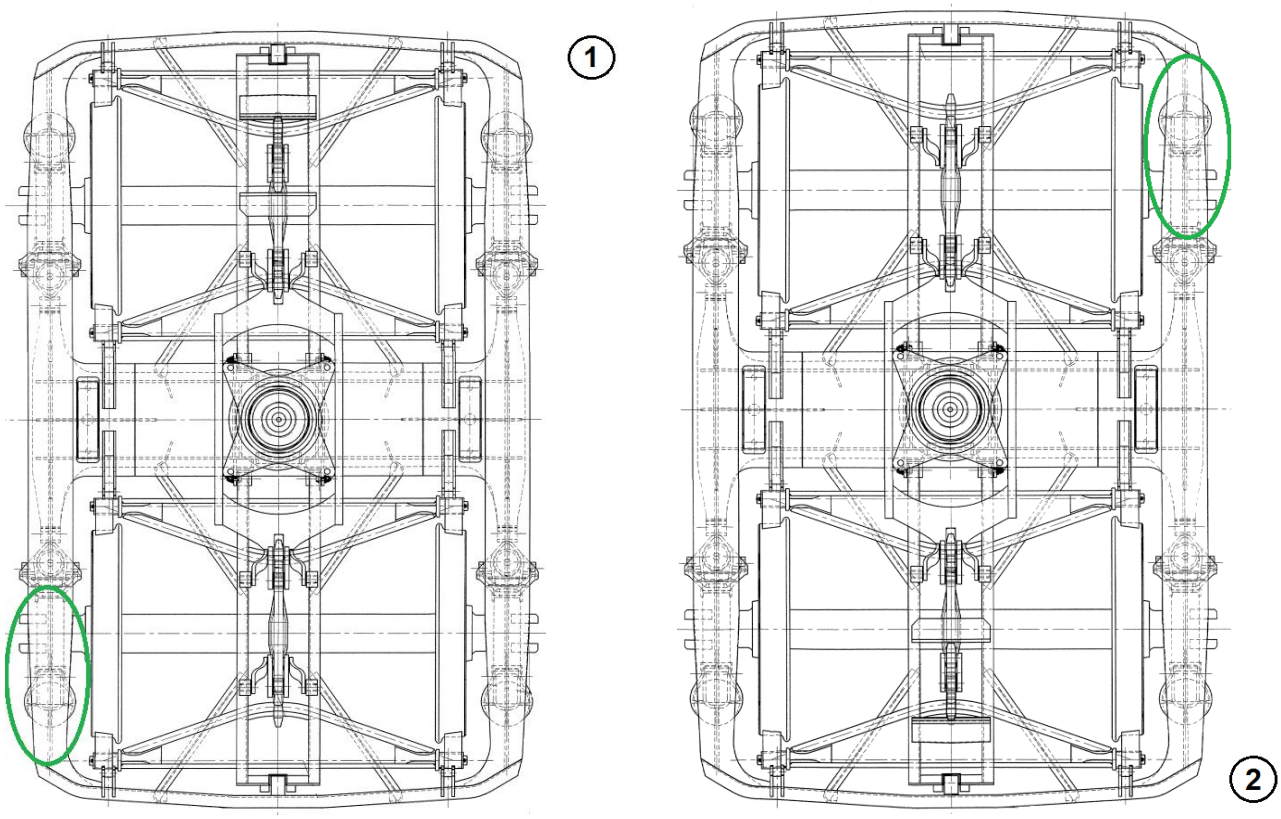


Figure 3: Mounting diagram on the bogies

The following pictures show the front bogie of the railcar from the left and below in detail. The exact mounting location is in the rear half of the bogie in the long beam. The mounting dimension of 470 mm is to be taken from the beginning of the end cross member and applies to the left end of the sensor mounting plate.

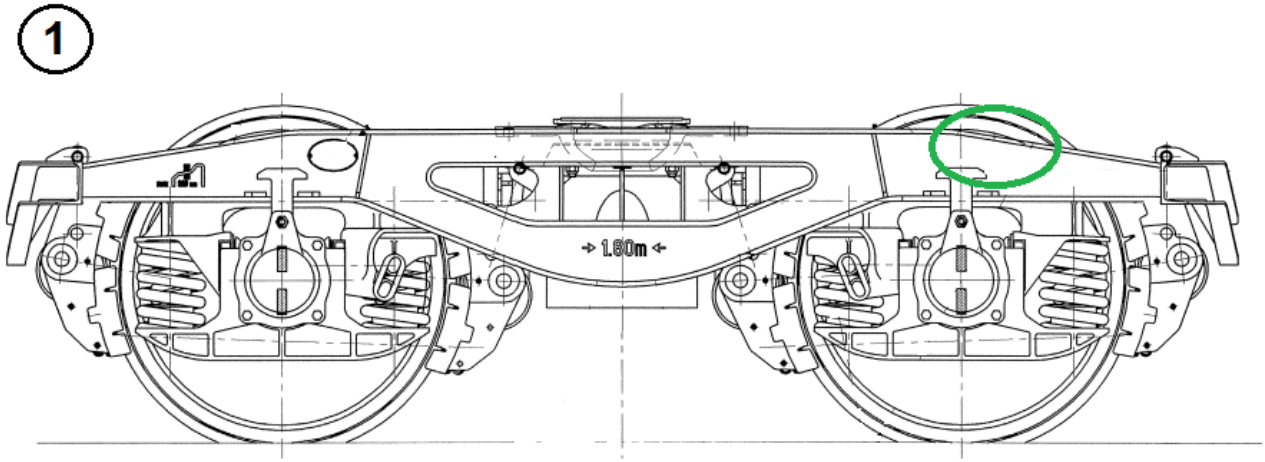


Figure 4: View of the bogie at railcar end 1 from the side with the assembly site marked

The following pictures are meant to visualize the installation site spatially. The front side of the sensor should be placed with the upper belt.

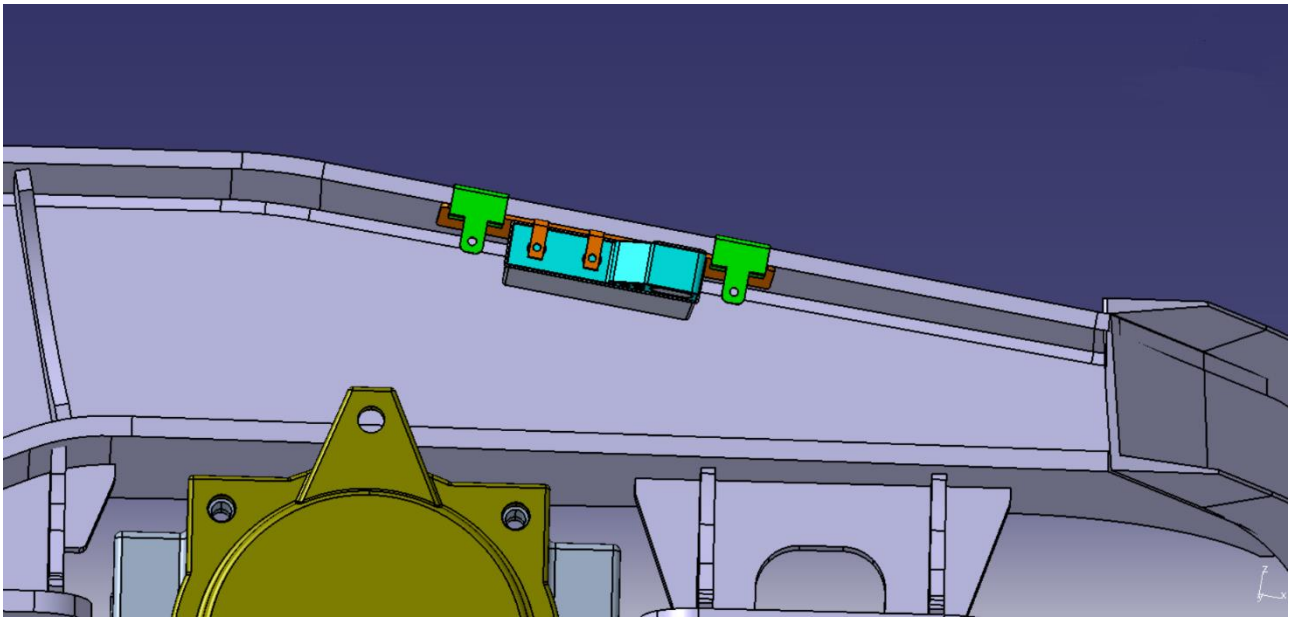


Figure 5: Detailed view of the installation site from below; the protruding "oriel" with the two cylindrical measuring heads is visible. The sensor is in the mounting plate (orange), which in turn is held by the clamps on the carrier (green).

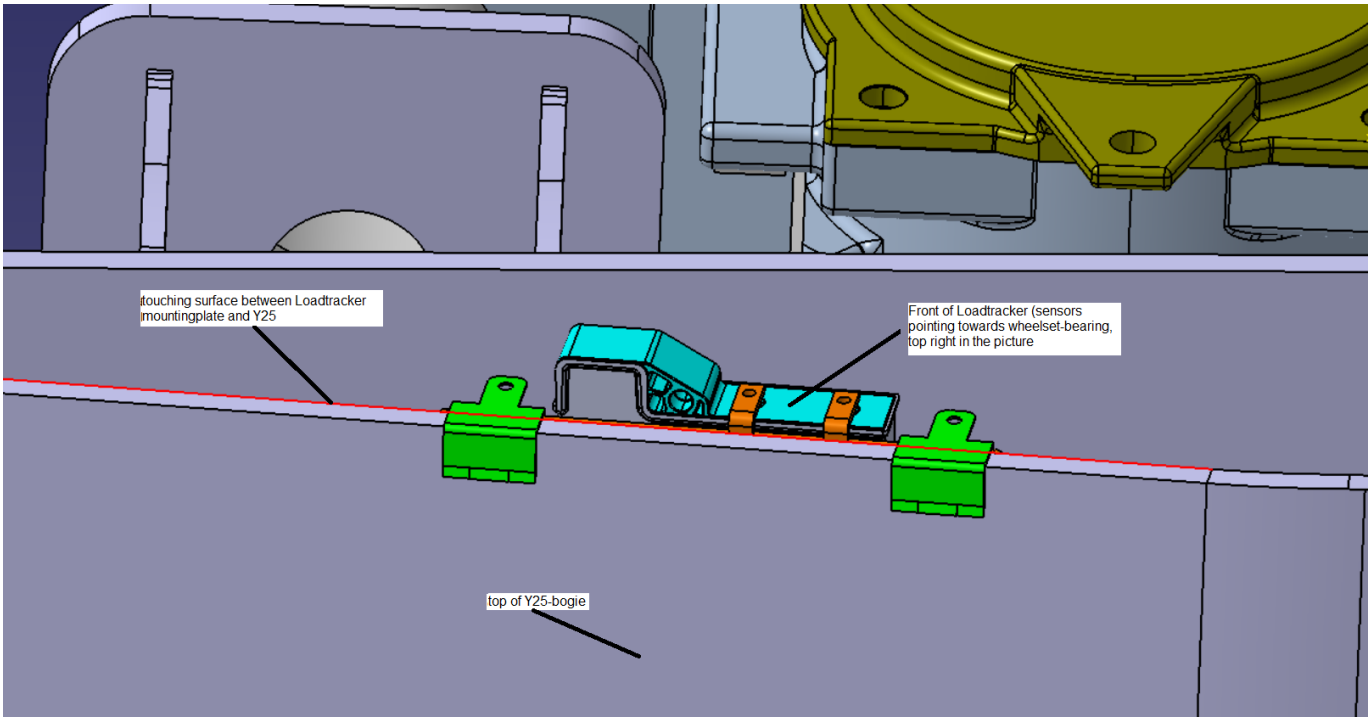
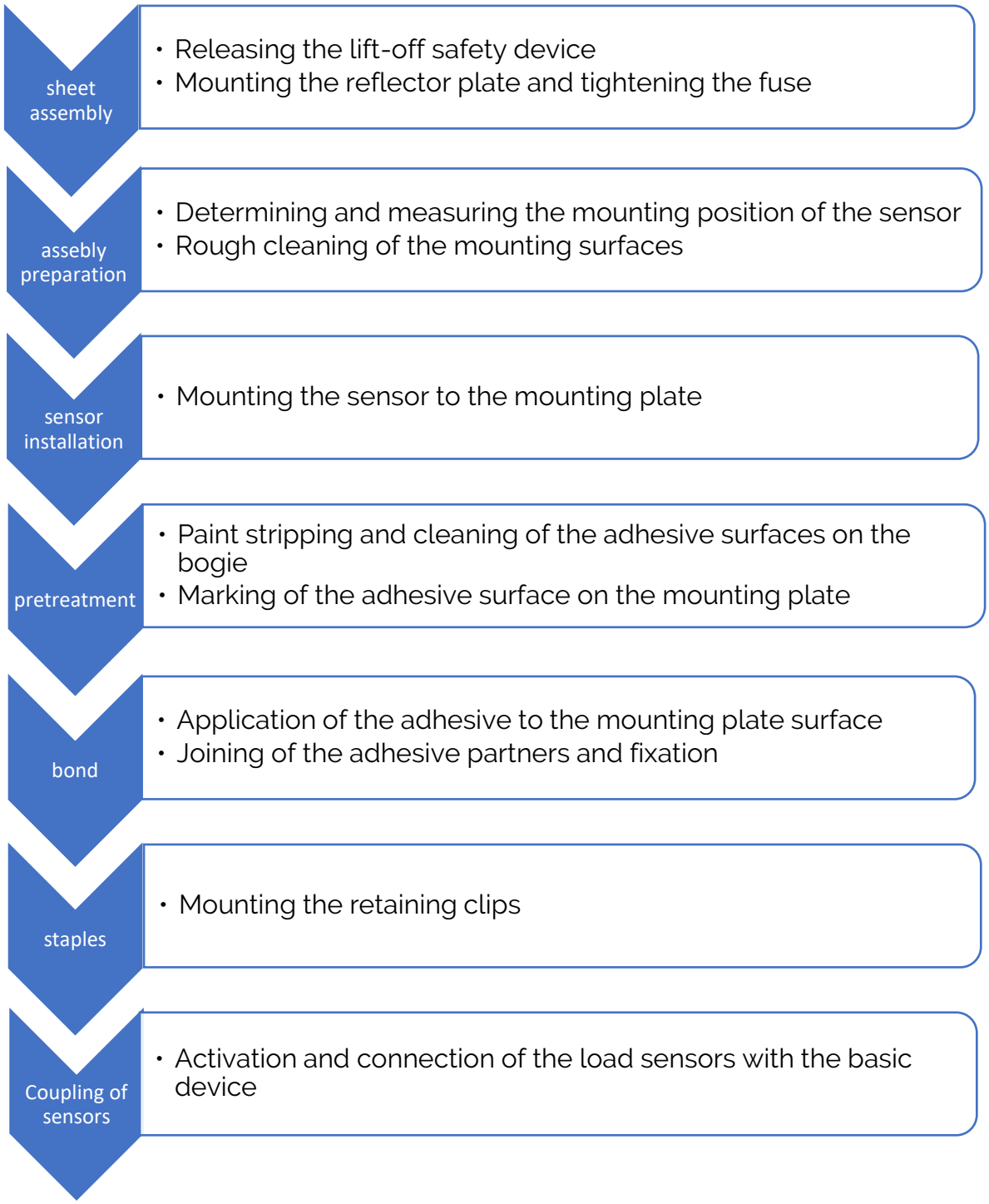


Figure 6: Detail view from above on the upper chord of the long beam

The figure above shows how to align the sensor in the bogie frame. The front edge of the mounting plate must be aligned flush with the front side of the top flange of the long beam so that only the "oriel" with the sensor heads looks out (these look down towards the wheelset bearing in the picture). The following picture shows the complete mounting of a Loadtracker with reflector plate on a Y25 bogie.

9 Assembly Procedure

The assembly procedure is clearly shown in the diagram below.



9.1 Mounting the Reflector Plate

Before the reflector plate can be fitted, the wheelset bearing cap must be checked for compatibility.

Before mounting the reflector plate on the lift-off safety device, it must first be loosened using the Allen key and ring spanner. The dismantled nut must be disposed of. The plate can then be placed on the screw of the lift-off safety device. The following picture shows this step.

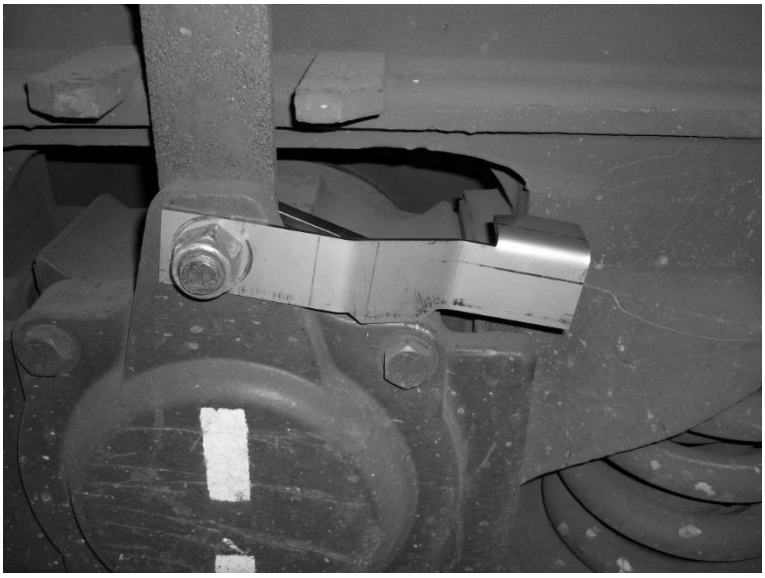


Figure 7: View of mounted reflector plate on standard wheelset bearing type Y25

Before tightening the lift-off safety nut, it is important that the widening of the plate contacts the wheelset bearing housing (see following figure). This widening (or support point) ensures that the plate is always fastened at the correct angle to the sensor.

Figure 8: Correct contact of the plate widening to the axle box bearing cap

Now the reflector plate can be screwed tight with a new, self-locking nut. Make sure that the plate is seated correctly. To tighten the lift-off safety nut, use a tested torque wrench with a spanner width of 30 mm and a tightening torque of 400 +/- 5 Nm (note currently valid IW-C 2016/035!).

9.2 Assembly Preparation

This chapter shows how to determine the mounting position of the sensor on the bogie frame. Measurements are taken from the end cross member to the left in the direction of the center of the bogie (see picture on the right).

Figure 9: Measuring the Mounting Position for the Sensor and the Paint Clearance Template (Place on the right of the Head Bracket, make a mark on the left of the Mounting Plate)

Measure and mark 470 mm (+/- 5 mm) from the end cross member to the left. This marking not only represents the left end of the mounting plate, but it is also required for the paint franking template.

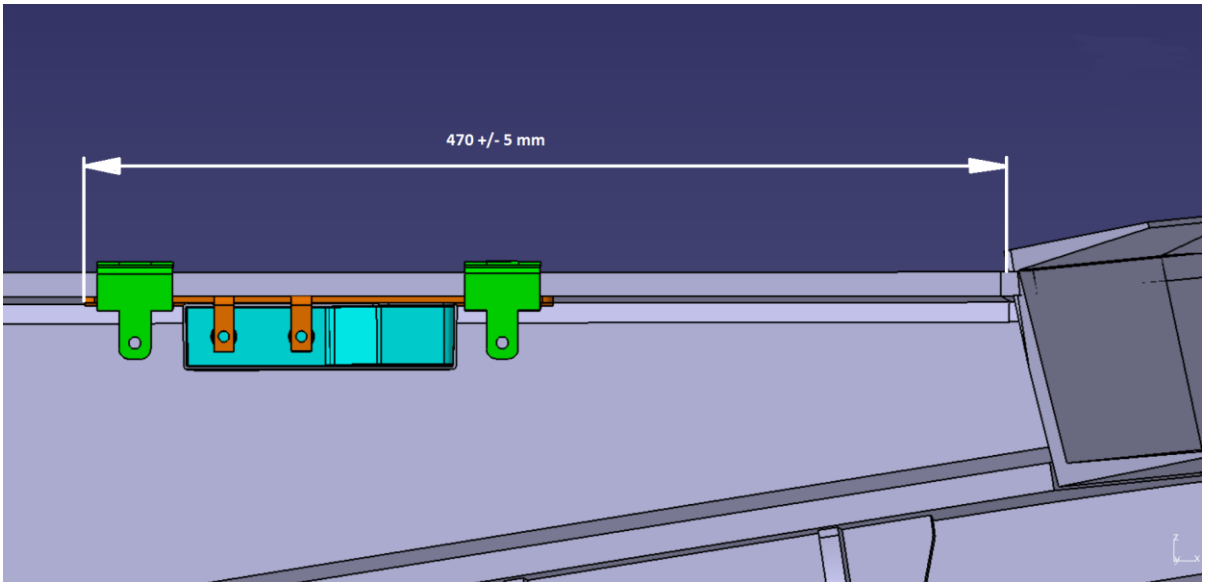


Figure 10: Representation of the measuring section starting from the end cross member on the right up to the left outer edge of the mounting plate.

To check the freedom of construction, the mounting plate should be held briefly in its intended position to ensure that it can also be placed there. Coarse dirt deposits should be removed by suitable means and the surface cleaned of unevenness should be cleaned with cleaning liquid and cleaning rags if necessary.

9.3 Preparation of the Bonding Surfaces

The template included in the assembly kit is now used for paint stripping. The left side of the mounting plate marked in the preparation is used. At this point the template is placed and then fixed with small screw clamps or a grip pliers (the 90° edge is placed at the end of the belt and points upwards). Now the spot to be glued can be cleaned of varnish and dirt with the help of the rotary brush device.

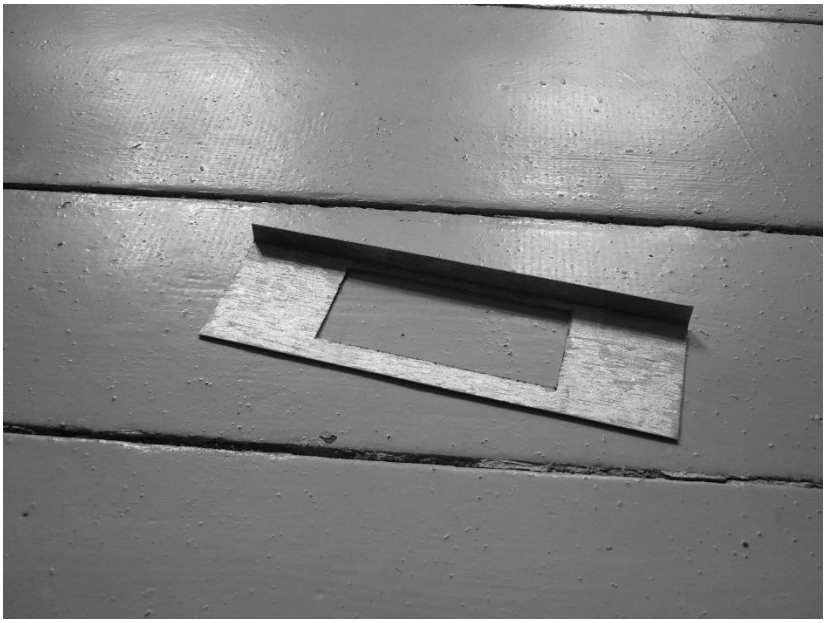


Figure 11: Paint Clearance Template Type Nexxiot

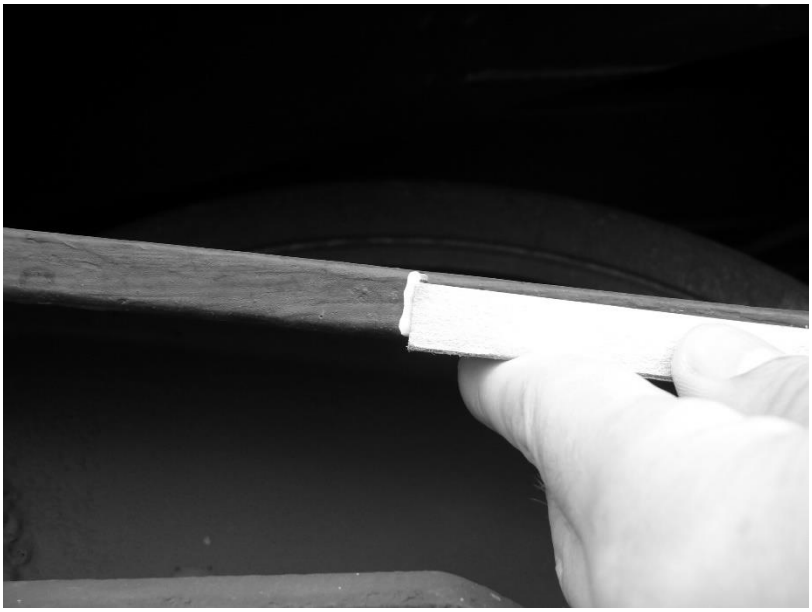


Figure 12: Apply the paint franking template to the mark known from Chapter 6.2 (the 90° bend faces the fitter).

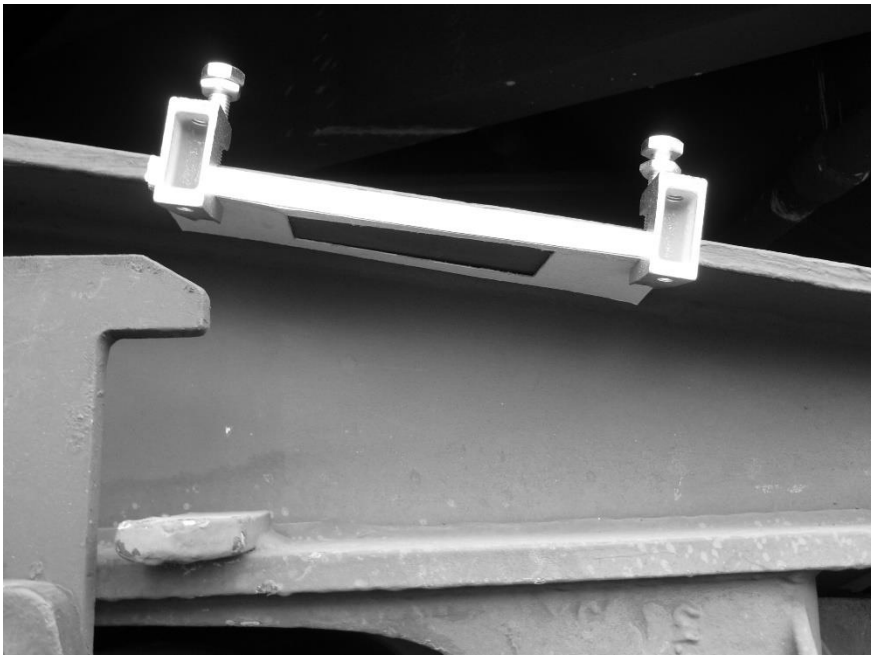


Figure 13: Correctly positioned Paint Clearance Template, right angle flush with the front of the support. The stencil was fixed for the paint stripping with small screw clamps.

Figure 14: Example picture: stripped adhesive after using the rotary brush device (template has already been removed)

The brush should be used until no lacquer residues are visible in the stencil area. Then clean the prepared area with isopropanol alcohol and a clean cloth. **The bonding surface must be free of grease and clean before bonding!**

9.4 Mounting the Sensor onto the Mounting Plate

The sensor must be attached to the mounting plate using the enclosed screws before gluing. The equipment kit contains a set of locking washers to secure the screws. The following picture shows the required small parts.

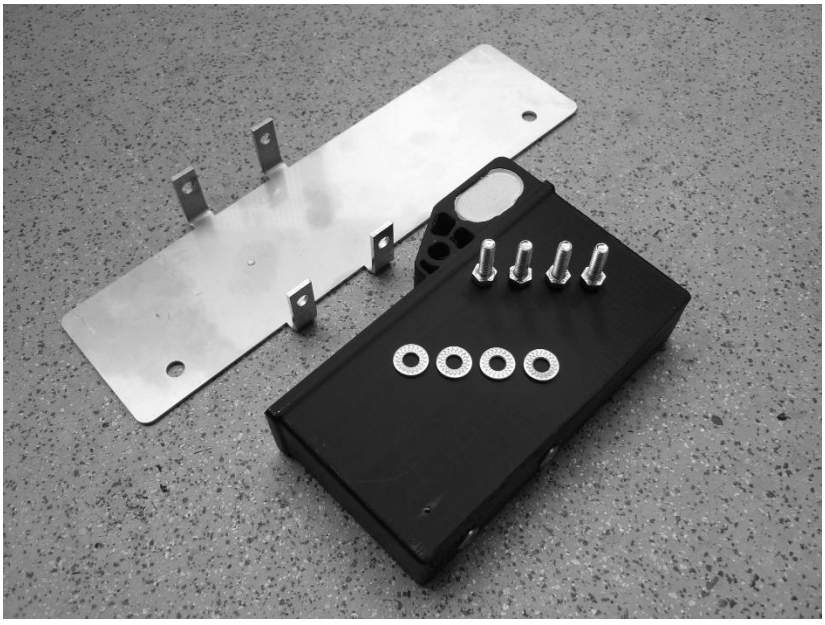


Figure 15: The parts of the sensor required for pre-assembly, consisting of the mounting plate, the sensor, the M5 screws and the associated locking washers.

Mounting on bogie type Y25 provides for mounting on the underside of the top chord on the bogie frame. Therefore, the sensor heads (small white area on the "balcony") must look away from the mounting plate. The following picture shows the correct mounting.

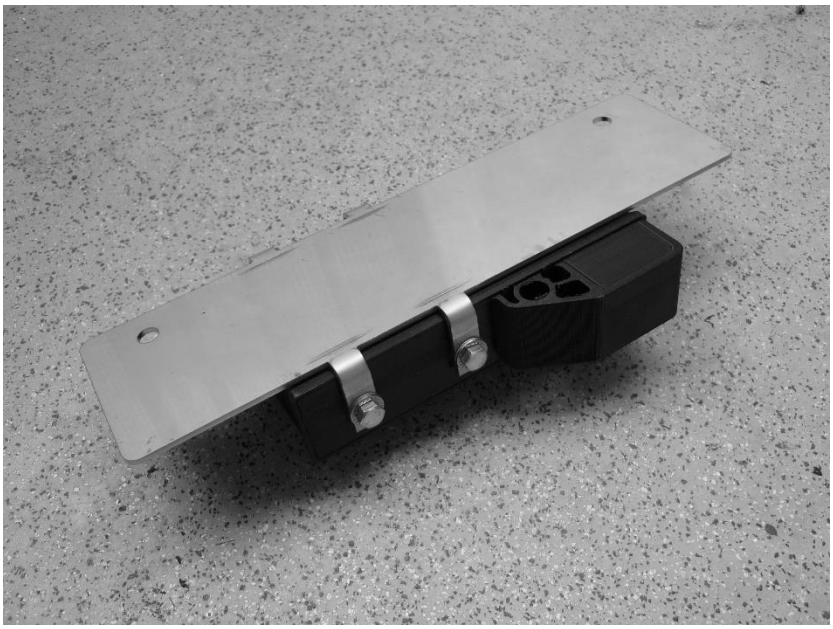


Figure 16: Correct pre-assembly of the sensor with type Y25. White sensor heads look down to the floor, sensor balcony to the right of the screw connection and large drill holes in the rear part of the plate.

It is particularly important to ensure that the knurled side of the locking washers faces the screw head. For the sake of completeness, a further picture of the pre-assembled plate from the lower perspective:

Figure 17: Same sensor, bottom view. This time the sensor areas (white) can be seen. It would be, so to speak, the view from the wheelset bearing upwards.

The screws are then tightened to 5 +/- 0.3 Nm (DIN ISO 6789:2017) using a tested torque wrench with a valid plate. Make sure to remove the protective foil if still in place, covering the sensors. This foil would impair the proper operation of the device if not removed (see Figure 27: Remove sensor protection foil)

9.5 Carrying out the Splice

The rear side of the mounting plate must be cleaned with isopropanol alcohol and a clean cloth, since due to the production process there may still be fuel or bearing material residues on the plate. Place the adhesive template flush on the back of the mounting plate and mark the cut-out surface with a permanent marker (e.g., Edding® or Sharpie®). The following picture shows this process.

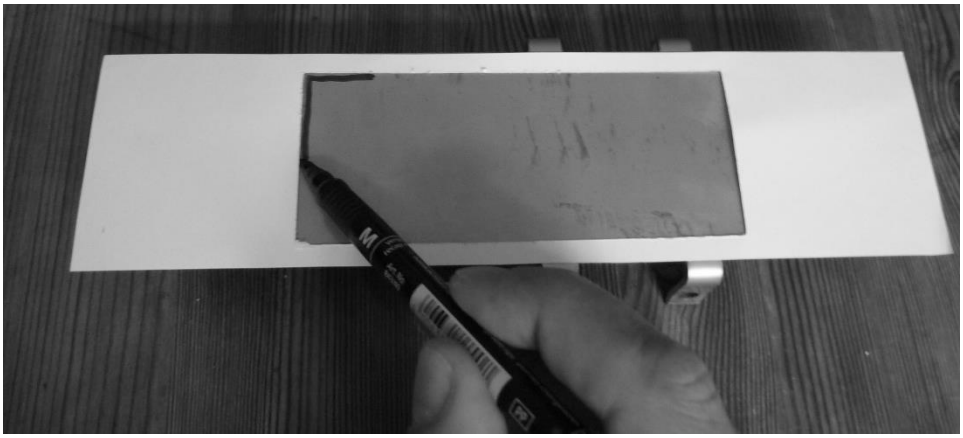


Figure 18: Mark the application area of the 2K adhesive on the back of the mounting plate using the adhesive template.

In order to waste as little adhesive as possible, it is recommended to prepare both bogies for bonding. The two sensors are bonded directly to the carriage one after the other, thus making optimum use of the curing time of the adhesive and saving mixing tips!

An application on one sensor requires approx. 8-9 ml of adhesive. After the consecutive gluing of two sensors, the mixing tip should be removed, and the adhesive cartridge closed.

One adhesive cartridge (45ml) is therefore sufficient for two cars with 2 sensors each and consumes two mixing tips.

Before applying the adhesive to the adhesive surface of the sensor, the following steps must be carried out:

- Insert the adhesive cartridge into the hand applicator.
- Place the 2-component mixing tip on the cartridge (ensure correct orientation).
- Cleaning the adhesive surface of the sensor

Figure 19: The three elements of the adhesive dispenser: manual applicator, two-component tube and mixing tip

Figure 20: Step 1: Place the tube on the front of the manual applicator (pay attention to the respective piston diameters)

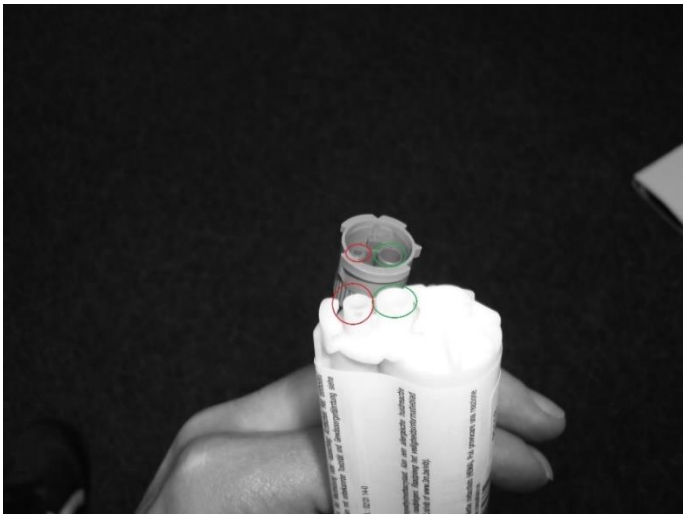


Figure 21: Step 2: Put on the mixing tip. Ensure that the mixing tip is correctly seated [small openings (red) and large openings (green) must lie on top of each other]. This must then be fixed with a twist.

Once the dispenser cartridge has been fitted and is ready for use, the mixing tip can be filled with a slow movement of the handle. After the adhesive has come out for the first time, press out an adhesive bead approx. 1 cm long and dispose it. The adhesive can then be applied to the prepared areas as shown in the following picture.

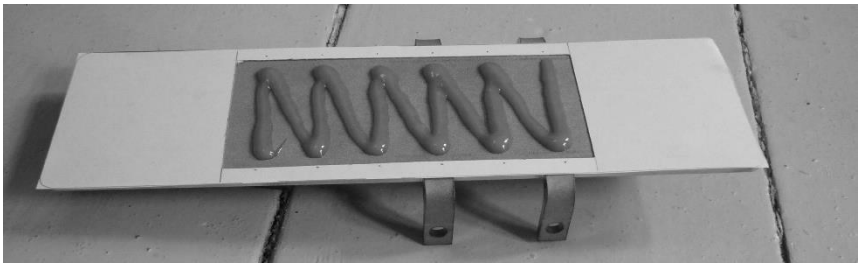


Figure 22: Adhesive application diagram on the mounting plate

The sensor must then be fixed at the intended position with the holding device. This prevents the sensor from slowly drifting away while the adhesive is curing and ensures that the adhesive can easily emerge at the outer edges (corrosion protection). After at least 10 min curing time (at 20 °C / 65 °F the adhesive partner; 30 min at 5 °C / 40 °F) the mounting of the holding clamps (see section 5.5) can be started.

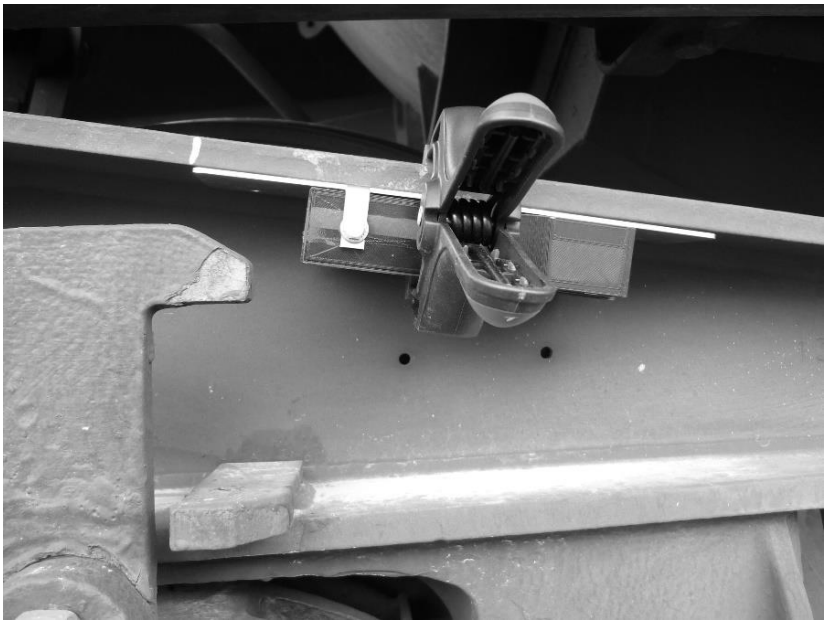


Figure 23: Fixation of the sensor with the aid of a clamping pliers

9.6 Mounting the Retaining Clips

After gluing, the holding clamps of the sensor can be mounted. After the minimum curing time has expired, the mounting of the clamps can begin. The clamp should be applied manually before using a hammer, so that it already rests with the holding teeth on the mounting plate or on the bogie girder.

The clamps can be attached with **light blows using a soft hammer.**

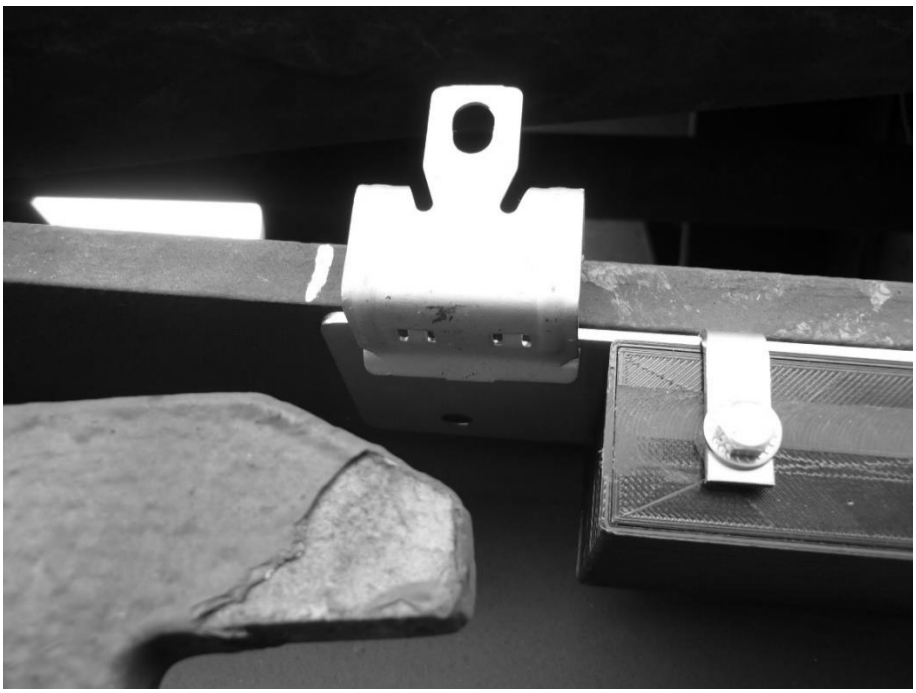


Figure 24: Applying the left clamp before driving in

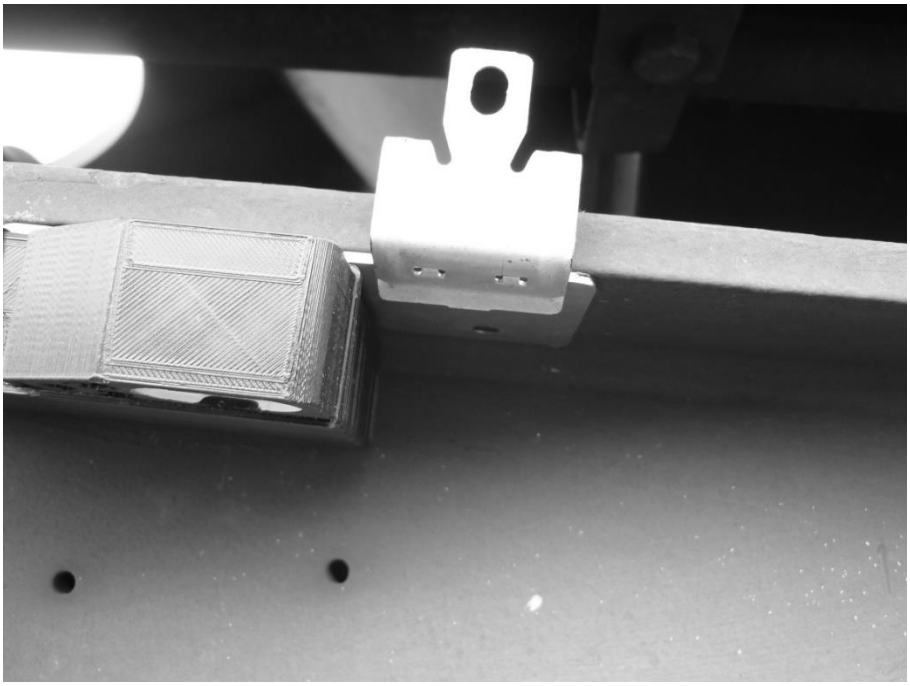


Figure 25: Applying the right clamp before hammering in

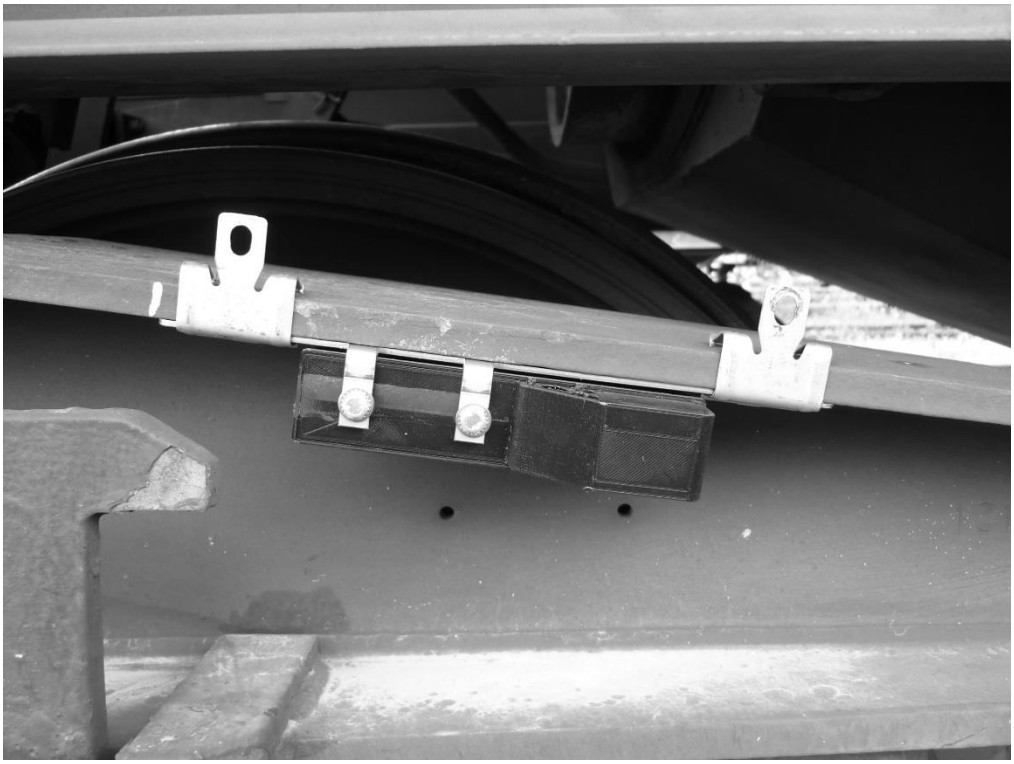


Figure 26: Result of mounting the sensor - both clamps are properly attached

After the sensor has been mounted, remove the cover foil, shown in red from the sensor surface if it is still in place. The purpose of this foil is to prevent contamination of the sensor surfaces during mounting with adhesive, which impairs or even prevents the correct function of the sensor.

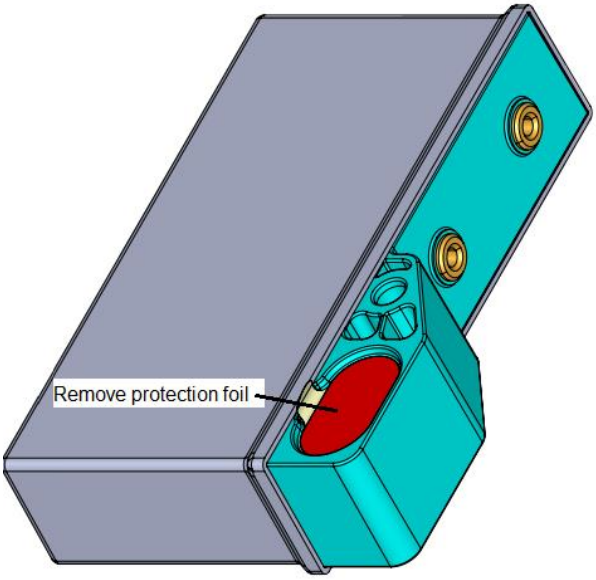


Figure 27: Remove sensor protection foil

10 Removing the Loadtracker

The removal of the sensor can be carried out in the following steps:

- Lever and pull the clamps using a larger screwdriver.
- Attaching a chisel directly to the bonding point with subsequent chiseling off the bonded joint
- Removal of any adhesive residue with a hammer and chisel or a stable spatula.

Figure 28: Disassembly of the sensor: Attach a large screwdriver or chisel to the bonding area.

Before repositioning a sensor or sealing the mounting surface, the surface free of adhesive residues must be prepared in accordance with section 6. Only then will a secure hold of the new sensor or the sealing lacquer be guaranteed.

The reflector plate is removed in reverse order to the mounting.

- Releasing the lift-off safety device
- Removal of the reflector plate
- Tightening the lift-off safety device with a new self-locking nut M20 using a torque wrench SW 30 with 400 +/- 5 Nm

11 Coupling the Loadtracker with the Globehopper

The Loadtracker must be commissioned in accordance with the following document:
20201203001 EN Pairing App General

12 Device Overview Drawings

The following drawings are for information only. The parts must be manufactured according to separate approved drawings.

Details of the retaining clip:

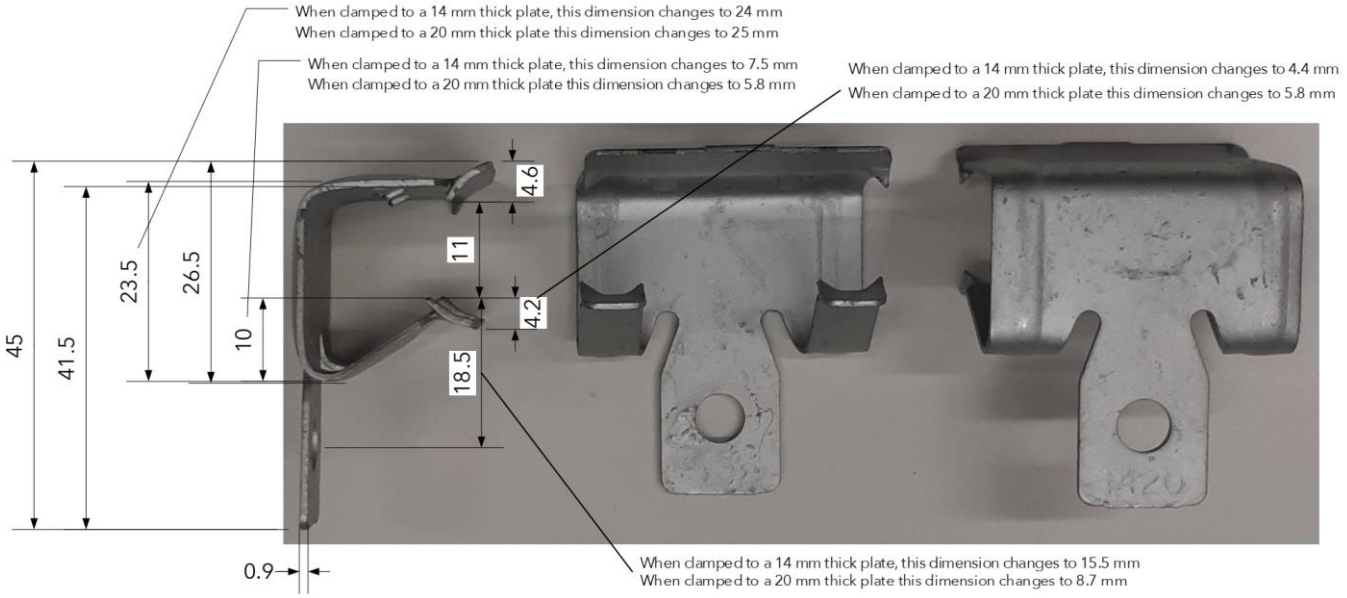


Figure 29: Retention clamp

Details of the Paint Clearance Template:

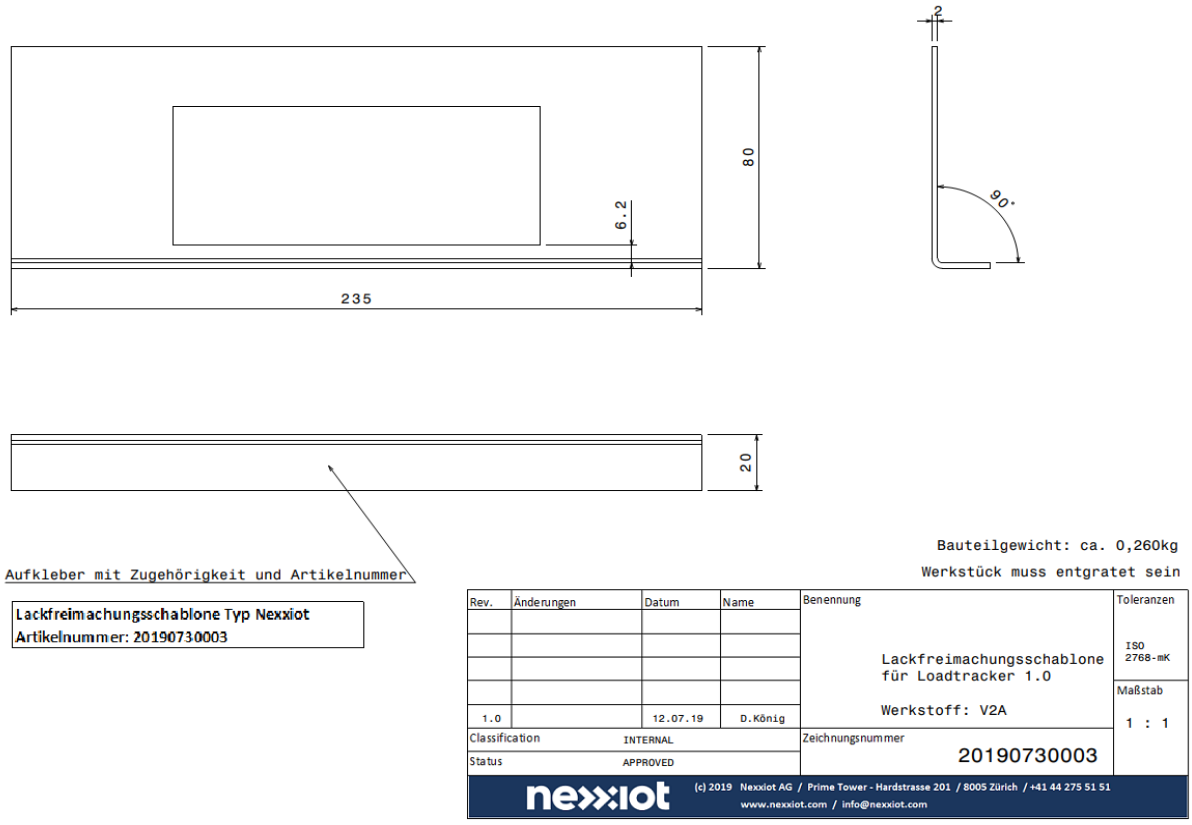


Figure 30: Paint franking stencil

Details about the reflector plate:

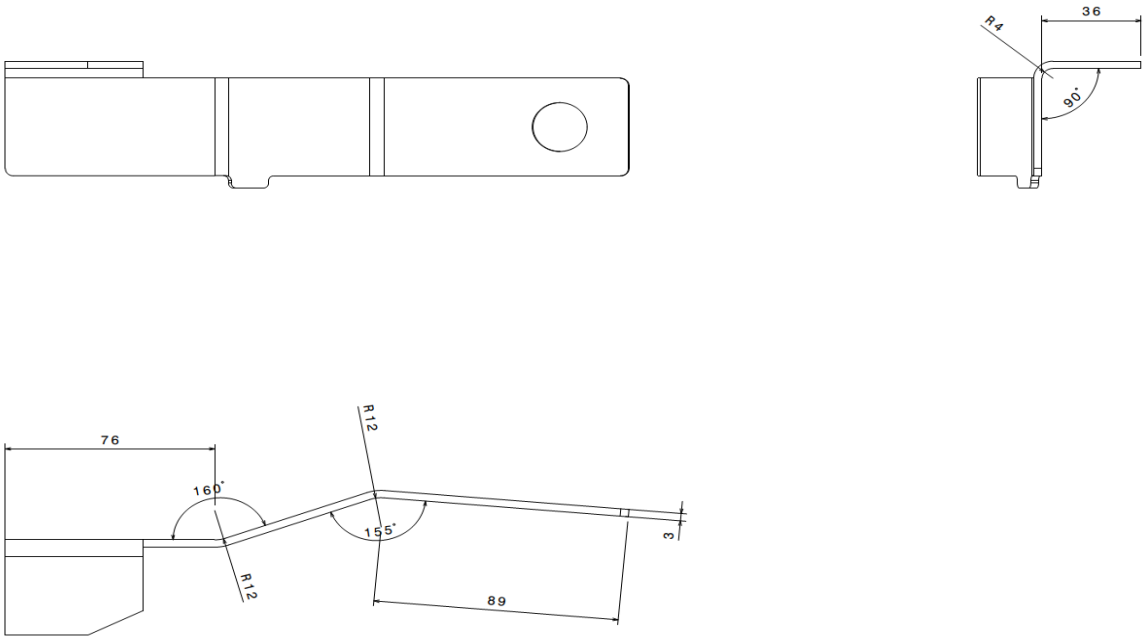


Figure 31: reflector plate

Loadtracker details:

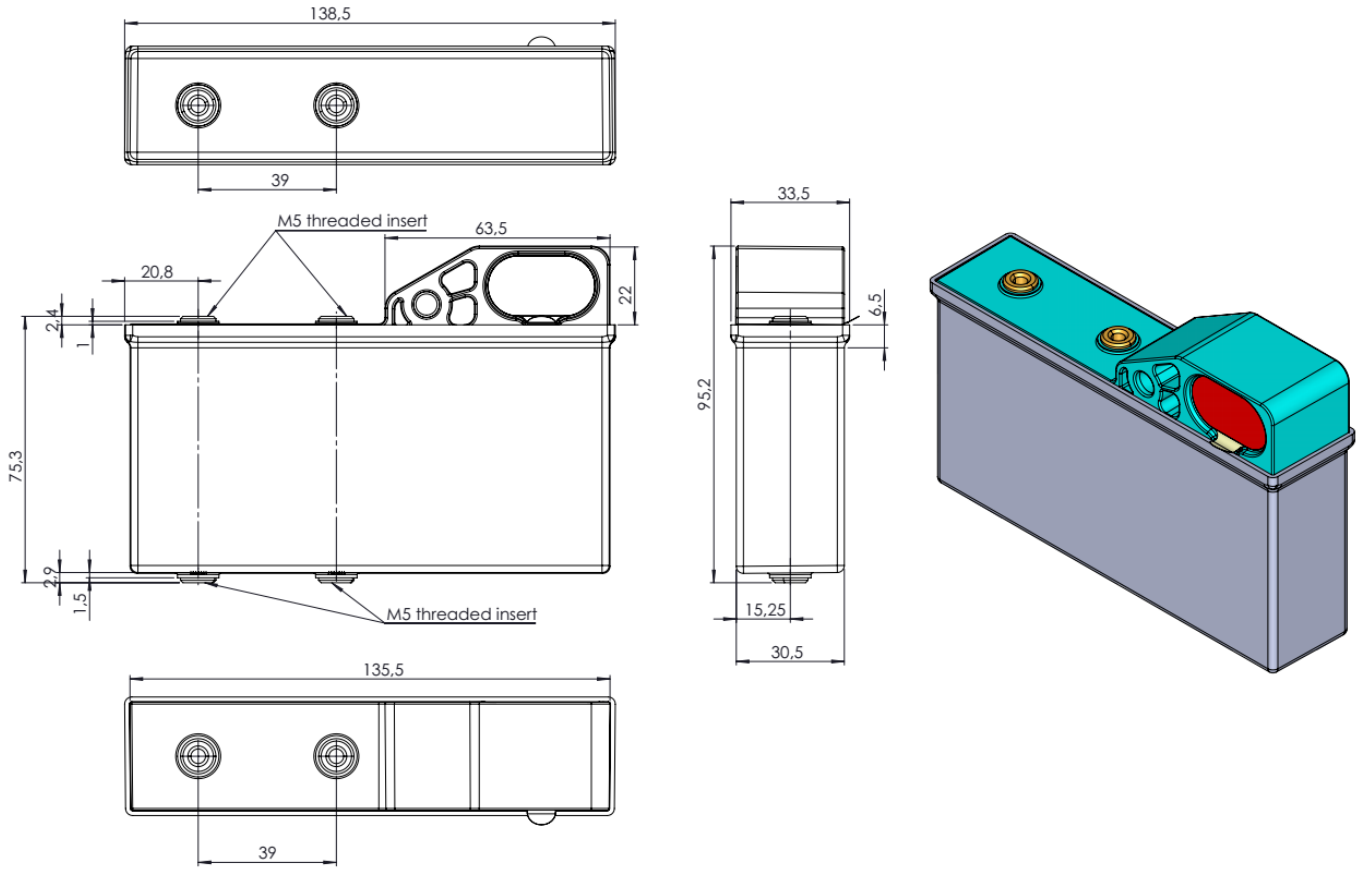


Figure 32: Loadtracker

Mounting plate details:

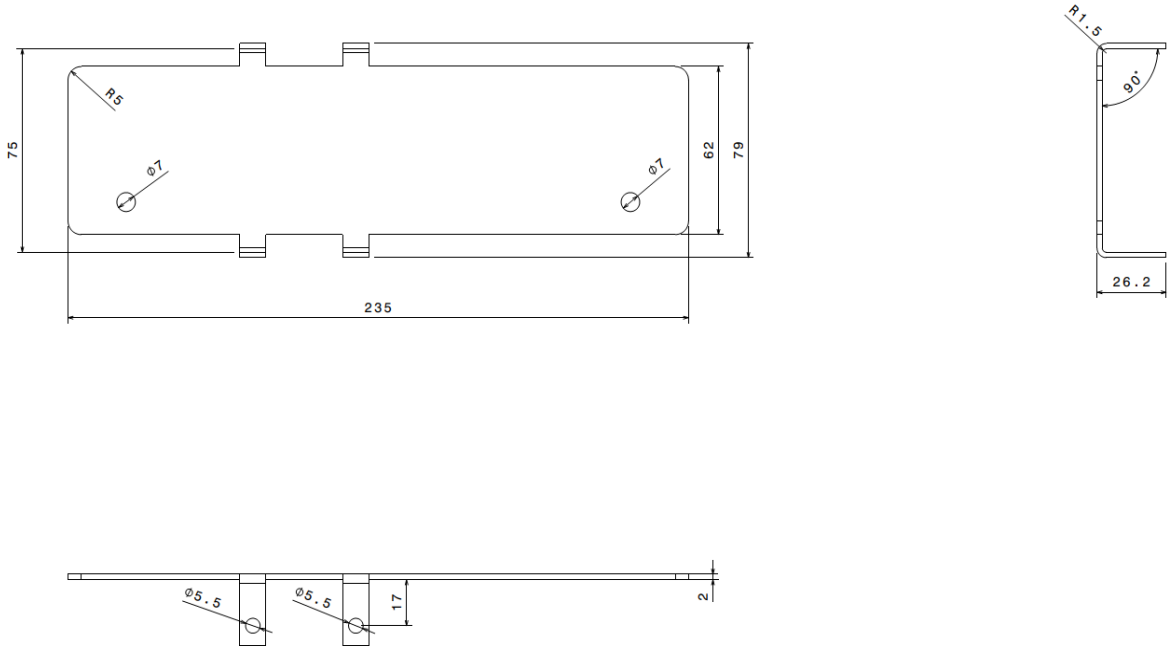


Figure 33: mounting plate

Details of the adhesive application template:

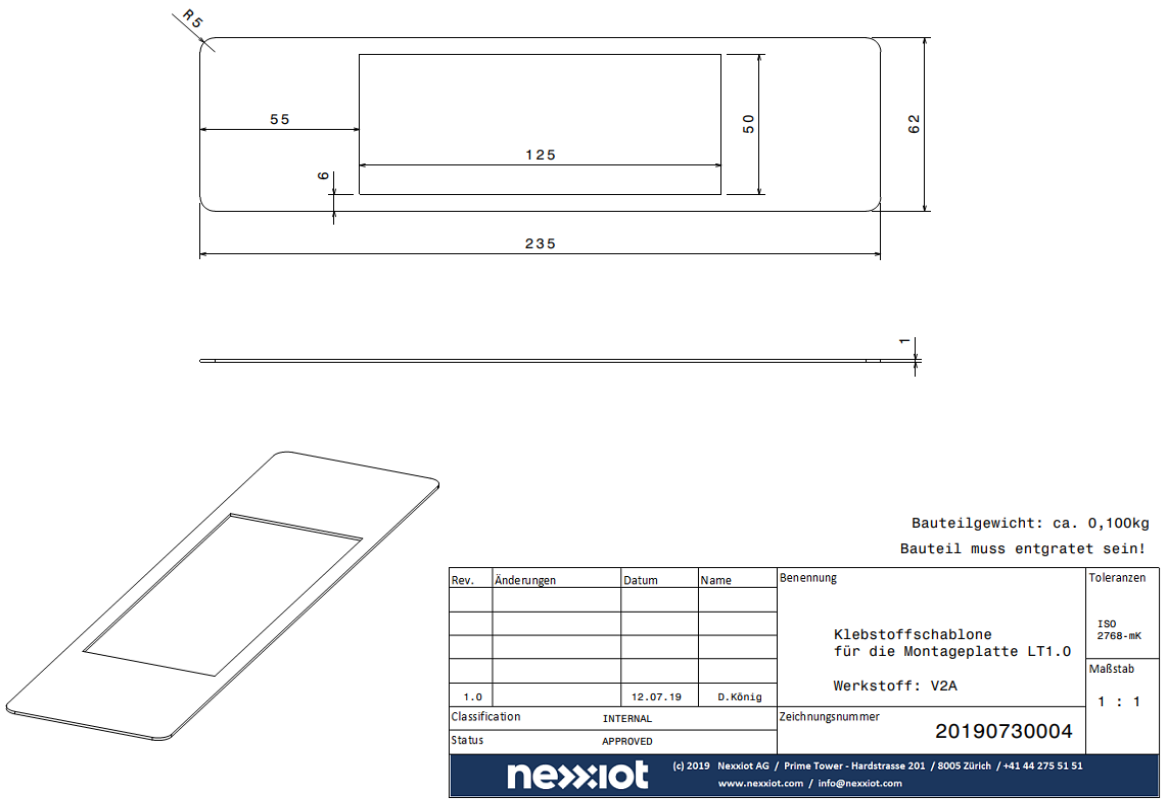


Figure 34: adhesive template

13 Appendix Certifications and Declarations

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[1] **EU-TYPE EXAMINATION CERTIFICATE**

[2] **Equipment intended for use in potentially explosive atmospheres**
Directive 2014/34/EU – Annex III

[3] Certificate Number: **EPT 20 ATEX 3600 X** **issue 1**

[4] Equipment: **Empty-Full Ultrasonic Sensor for Digital Rail**
Loadtracker 1.0 EX / ASL.1A

[5] Manufacturer: **Nexxiot AG**

[6] Address: Prime Tower, Hardstrasse 201, Zürich 8005 - Switzerland

[7] This equipment and its accepted variations are specified in the annex to this Certificate.

[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive. The examination and test results are recorded in the confidential Report N° EPT.21.REL.01/2013095

[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the standard:

EN IEC 60079-0: 2018; EN 60079-11: 2012

[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.
Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.

[12] The equipment shall include the sign Ex and the following strings:

II 2G Ex ib IIC T4 Gb
II 2D Ex ib IIIC T135 °C Db

-35 °C ≤ Ta ≤ +60 °C

CE

Place and date of issue:
Torino, 2021-03-02

Dionisio Bucchieri
Directive Responsible

Paolo Trisoglio
Managing Director

Eurofins Product Testing Italy
eurofins
Notified Body N. 0477

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
PRD N° 119B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

This Certificate has Pag. 4 pages and it is reproducible only in its entirely. Conditions of validity are reported below.

Eurofins Product Testing Italy S.r.l. - Via Cuorgnè, 21 - 10156 Torino - Italia
Notified Body N. 0477

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[13] **ANNEX**

[14] **EU-TYPE EXAMINATION CERTIFICATE EPT 20 ATEX 3600** issue 1

[15] **Equipment description**

Loadtracker 1.0 EX / ASL.1A is a zero-maintenance hardware unit for enabling real-time monitoring of load status for non-powered rail cars by ultrasonic sensors in hazardous areas.

The equipment has autonomous power supply using internal, non-replaceable primary lithium manganese dioxide (Li-MnO_2) batteries, fully encapsulated with all electronic components in the device frame.

The encapsulated device has an external cover; no part of casting compound is exposed.

The Loadtracker 1.0 EX / ASL.1A is wireless connected with an external device.

The equipment has been designed for use in hazardous areas zone 1 and zone 21, with "Ex i" type of protection.

Model Reference

The apparatus is identified by the following code:

Loadtracker 1.0 EX / ASL.1A

Rated characteristics

Voltage (U_n): 3.0 V_{dc}
Current: (I_n): 0.076 ÷ 150 mA
Power: (P_n): 0.228 ÷ 450 mW

Warning label

"WARNING - POTENTIAL ELECTROSTATIC DISCHARGE RISK – SEE MANUAL. DO NOT OPEN"

Routine tests

None.

[16] **Assessment Report n° EPT.21.REL.01/2013095**

This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this certificate performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.

[17] **Specific conditions of use**

Potential electrostatic charging hazard – see instructions

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Dionisio Bucchieri
Directive Responsible

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2021-03-02

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Notified Body N. 0477

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[13] **ANNEX**

[14] **EU-TYPE EXAMINATION CERTIFICATE EPT 20 ATEX 3600** issue 1

[18] **Essential Health and Safety Requirements**

Assured by compliance with harmonized standards listed in [9].

[19] **Descriptive documents**

The equipment objects of this Certificate are described by the following scheduled documents that cannot be modified without the explicit authorization of the Notified Body.

Item	Type of document	Document identification		Rev.	Date
		Title	Code		
1	Raw material technical specifications	1805 Loadtracker Raw Material Specification	*20190110002	1.8	2020-06-09
2	Technical note	1805 Loadtracker PCBA Architecture and Design	*20190206004	1.6	2021-02-24
3	PCB bill of materials	1805 Loadtracker BOM PCBA (Bill Of Material Printed Circuit Board Assembly)	20190308002 [1]	1.9	2020-02-14
4	Schematics	Loadtracker v11.PrjPcb Wireless sensor to detect load on railway's wagon	20190308002 [1]	16	2020-02-14
5	PCB technical specifications	Load Tracker Wireless sensor to detect load on railway's wagon	20190308002 [1]	19	2019-12-20
6	Topographic Assembly	Load Tracker Wireless sensor to detect load on railway's wagon	20190308002 [1]	16	2019-12-20
7	Bill of materials of mechanics assembly (complete device)	1805 Loadtracker 1.0 BOM Assembly	*20190515001	1.6	2020-06-08
8	Device assembly technical specification	1805 Loadtracker 1.0 Assembly Instruction	*20190517002	1.4	2020-06-09
9	Safety instructions	Loadtracker 1.0 Empty-Full Sensor User Manual	*20190724002	1.7	2021-01-21
10	Device technical specifications	Loadtracker 1.0 Empty-Full Sensor for Digital Rail Datasheet	*20190724003	2.0	2020
11	ATEX marking label	1805 Loadtracker 1.0 ATEX Label Drawing	20191106002	1.1	2020-01-30
12	Mechanical drawing	Antenna cover top	*NX001-0001	1	2020-06-11
13	Mechanical drawing	Inner structure	*NX001-0002	3	2020-06-11
14	Mechanical drawing	Outer box	*NX001-0003	3	2020-06-11
15	Mechanical drawing	Battery structure	*NX001-0004	2	2020-06-11
16	Mechanical drawing	Battery holder	*NX001-0008	1B	2020-06-11
17	Mechanical drawing	Antenna cover bottom	*NX001-0010	1	2020-06-11
18	Mechanical drawing	BATTERY LITHIUM PRIMARY 3.2V 3Ah 9.6Wh	*D110000356	5	2020-05-20

Note [1] *These documents are a printed output generated from computer aided design program with the same project number (document code), but they are identified by description and own revision level and issue date.*

Note [2]: *Documents that are new or revised*

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2021-03-02

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Notified Body N. 0477

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[13] ANNEX

[14] EU-TYPE EXAMINATION CERTIFICATE EPT 20 ATEX 3600 issue 1

[20] **Terms and conditions**

The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.

The following conditions may render this certificate invalid:

- changes in the design or construction of the product;
- changes or amendments to the Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.

[21] **History**

Issue	Description	Date
0	First Emission.	2020-03-09
1	The descriptive scheduled documents have been upgraded due to minor changes introduced by the manufacturer for improve the production process. These changes have no impact on type of protection.	2021-03-02

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End of Certificate

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2021-03-02

Eurofins Product Testing Italy S.r.l. - Via Cuorgnè, 21 – 10156 Torino - Italia
Notified Body N. 0477

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	**IECEx EUT 20.0004X**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 1	Issue 0 (2020-03-09)
Date of Issue:	2021-03-02		
Applicant:	**Nexxiot AG** Prime Tower Hardstrasse 201 Zürich 8005 **Switzerland**		
Equipment:	**Empty-Full Ultrasonic Sensor for Digital Rail, Type Loadtracker 1.0 EX / ASL.1A**		
Optional accessory:			
Type of Protection:	**Equipment protection by intrinsic safety "i"**		
Marking:	**Ex ib IIC T4 Gb** **Ex ib IIIC T135 °C Db** Ambient temperature range: **-35** °C ≤ **Ta** ≤ **+60** °C		

Approved for issue on behalf of the IECEx Certification Body: **Dionisio Bucchieri**

Position: **Head of IECEx Certification Body**

Signature: (for printed version)

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.

Certificate issued by:

Eurofins Product Testing Italy S.r.l.
Via Cuorgnè
n.21 - 10156 Torino
Italy

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IECEx Certificate of Conformity

Certificate No.:	**IECEx EUT 20.0004X**	Page 2 of 4
Date of issue:	2021-03-02	Issue No: 1

Manufacturer:
Nexxiot AG
Prime Tower
Hardstrasse 201
Zürich 8005
Switzerland

Additional manufacturing locations:
ESCATEC Switzerland AG
Heinrich-Wild-Strasse
Heerbrugg 9435
Switzerland

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements.This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :
The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Edition:7.0	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60079-11:2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

IT/EUT/ExTR20.0003/01

Quality Assessment Report:

CH/SEV/QAR20.0001/00

IECEx Certificate of Conformity

Certificate No.: **IECEx EUT 20.0004X** Page 3 of 4

Date of issue: 2021-03-02 Issue No: 1

EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

Loadtracker 1.0 EX / ASL.1A is a zero-maintenance hardware unit for enabling real-time monitoring of load status for non-powered rail cars by ultrasonic sensors in hazardous areas.

The equipment has autonomous power supply using internal, non-replaceable, primary lithium manganese dioxide (Li-MnO_2) batteries, fully encapsulated with all electronic components in the device frame.

The encapsulated device has an external cover; no part of casting compound is exposed.

The Loadtracker 1.0 EX / ASL.1A is wireless connected with an external device.

The equipment has been designed for use in hazardous areas zone 1 and zone 21, with "Ex i" type of protection.

Model Reference

The apparatus is identified by the following code:

Loadtracker 1.0 EX / ASL.1A

Rated characteristics (nominal values)**:**

Voltage: (Un) 3.0 Vdc

Current: (In) 0.076 ÷ 150 mA

Power: (Pn) 0.228 ÷ 450 mW

Warning label:

"WARNING: POTENTIAL ELECTROSTATIC DISCHARGE RISK – SEE MANUAL. DO NOT OPEN"

Routine tests:

None.

SPECIFIC CONDITIONS OF USE: YES as shown below:

POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS.

IECEx Certificate of Conformity

Certificate No.: **IECEx EUT 20.0004X** Page 4 of 4

Date of issue: 2021-03-02 Issue No: 1

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
The descriptive scheduled documents have been upgraded due to minor changes introduced by the manufacturer in order to improve the production process.
These changes have no impact on type of protection.

nexxiot
the source of flow

1805 Loadtracker 1.0
EU DECLARATION OF CONFORMITY

Product model:
Loadtracker 1.0 EX / ASL.1A

Name and address of the manufacturer:
Nexxiot AG
Hardstrasse 201
8005 Zürich, Switzerland

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration:
The Nexxiot Loadtracker sensor module is built to measure the load status of a railway wagon.

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

Electromagnetic compatibility (EMC): Directive 2014/30/EU
Equipment for explosive atmospheres (ATEX): Directive 2014/34/EU
Low voltage (LVD): Directive 2014/35/EU
Radio equipment (RED): Directive 2014/53/EU
Restriction of the use of certain hazardous substances (RoHS): Directive 2011/65/EU and Directive 2015/863 (RoHS 3)

References to the relevant harmonized standards to which conformity is declared:

EN 50121-3-2:2016	**EN 61000-3-12:2011**	**EN IEC 60079-0:2018**
EN 60079-11:2012	**EN 62368-1:2014**	**EN 300 328 V2.1.1**
EN 300 330 V2.1.1		

Signed for and on behalf of:
Nexxiot AG
Zürich, June 16, 2020

Andy Nutz (COO)

CE

Doc. Nr.:	20191017002
Version:	1.1
Status:	APPROVED
Classification:	PUBLIC
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