EN

Aloxy Pulse v01

Instruction manual EN

Instruction manual for the Aloxy Pulse v01

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Before installing, configurating or operating the Aloxy Pulse or performing any maintenance activities associated with it, read these instructions carefully!

1 Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

Signal Words

The following signal words, as defined by the ANSI Z535.6 standard, are used in this document.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
NOTICE	NOTICE is used to address practices not related to personal injury.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by personnel qualified for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of ALOXY products

⚠ WARNING
ALOXY products may only be used for the applications described in the manual and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by ALOXY. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

2 Introduction

2.1 Purpose of this documentation

This instruction manual includes specifications, installation, basic setup and configuration, and maintenance and troubleshooting information for the ALOXY Pulse.
Do not install, operate, or maintain a ALOXY Pulse without being fully trained and qualified in valve, , and accessory installation, operation, and maintenance. To avoid personal injury or property damage, it is important to carefully read, understand, and follow all of the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions, contact your ALOXY sales office or Local Business Partner before proceeding.

See also

http://www.aloxy.io

2.2 Purpose

The Aloxy Pulse is a multi-purpose industrial Internet-of-Things device and platform that enables numerous different applications. Typically, it will be attached to (industrial) assets such as valves, motors, pumps or mobile vehicles to monitor their behavior and state based on its inertial sensors.

Depending on the use-case, the Aloxy Pulse can be programmed or configured to capture signals from one of its embedded sensors, perform initial pre-processing of the measured data on its microcontroller and wirelessly transmit the resulting data over one of the supported communication networks.

For instance, by attaching the Aloxy Pulse to the hand wheel or lever of a manual valve, it can monitor the position (open or closed) of the valve in real-time. By attaching the Aloxy Pulse to rotating equipment such as a motor or ventilation unit, it can monitor vibrations or ambient temperature and in real-time send an alert when a certain threshold is exceeded.

The ALOXY Pulse is a wireless IOT sensor used for manual valve position monitoring in the following Industries:

- Chemicals
- Oil and gas
- Energy production
- Food and beverages
- Pulp and paper
- Water/waste water
- Pharmaceutical industry
- Offshore plants

2.3 Checking the consignment

1. Check the packaging and the delivered items for visible damage.
2. Report any claims for damages immediately to the shipping company.
3. Retain damaged parts for clarification.
4. Check the scope of delivery by comparing your order to the shipping documents for correctness and completeness.

⚠ WARNING

Using a damaged or incomplete device
Risk of explosion in hazardous areas.

- Do not use damaged or incomplete devices.

⚠ WARNING

This product is intended for a specific temperature range and other application specifications. Failure to adhere to these specifications could result in the malfunction of the product, property damage, or personal injury.

3 Radio compliance

3.1 USA radio compliance (FCC compliance)

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 instructions, 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 the 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 a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

3.2 Canadian radio compliance / conformité de la radio canadienne (conformité ISED ISED compliance)

This device complies with Industry Canada license-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.

English version

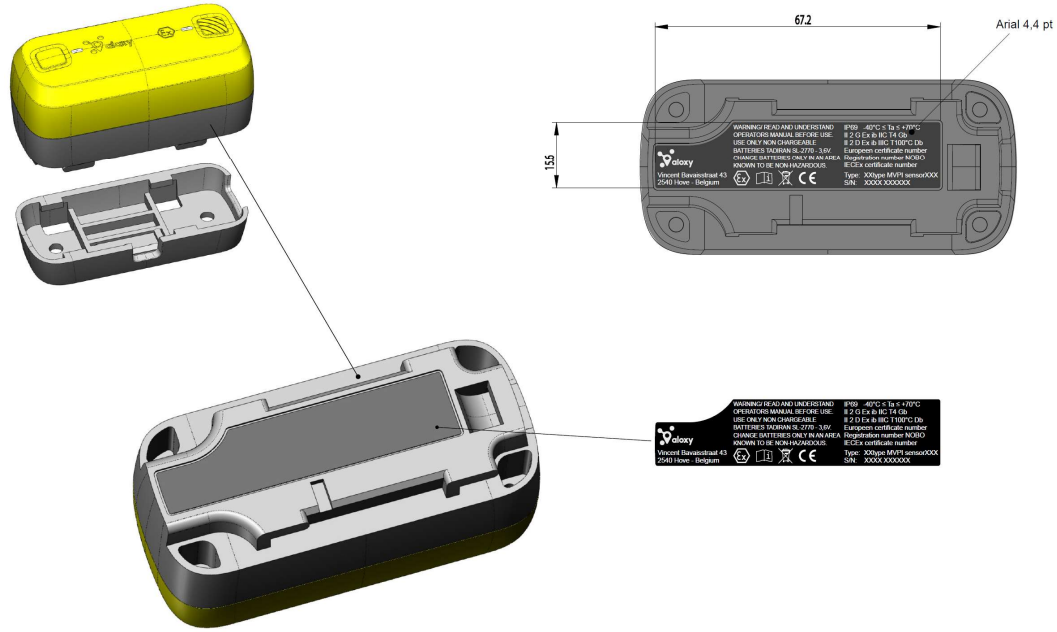
This device complies with Industry Canada's RSSs applicable to licence-exempt radio equipment. Operation is permitted under the following two conditions: (1) the apparatus shall not cause interference, and (2) the user of the apparatus shall accept any radio interference received, even if the interference may cause undesired operation.

La version française

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.

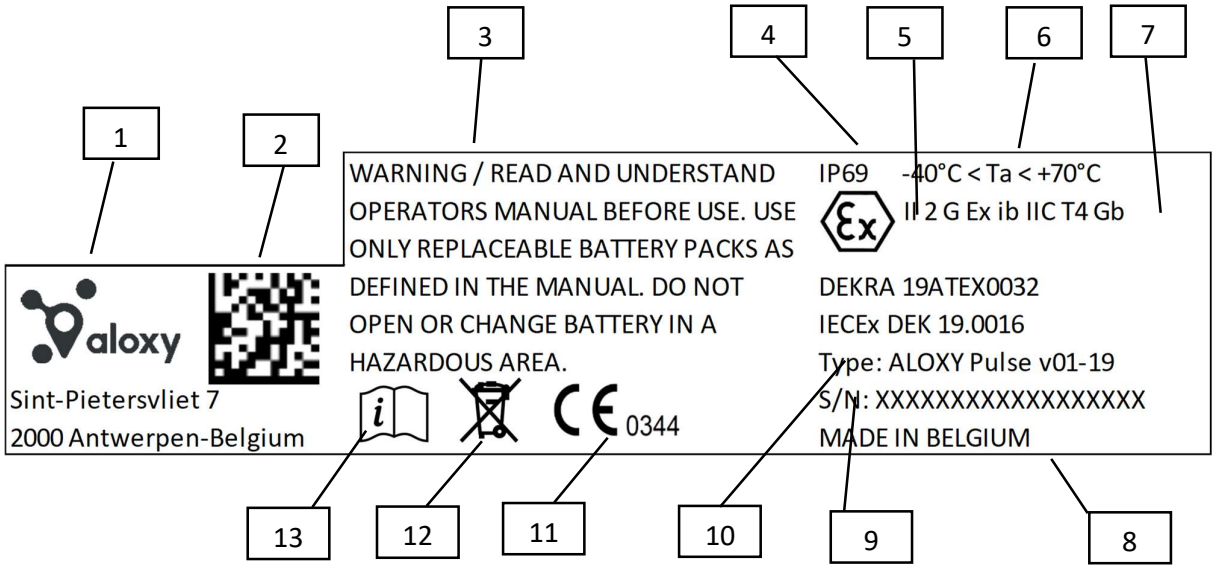
3.3 Marking label

The identification label of the Aloxy Pulse is attached to the bottom of the device:



Name plate dimensions 67,2 mm (L) x 15.6mm (W)

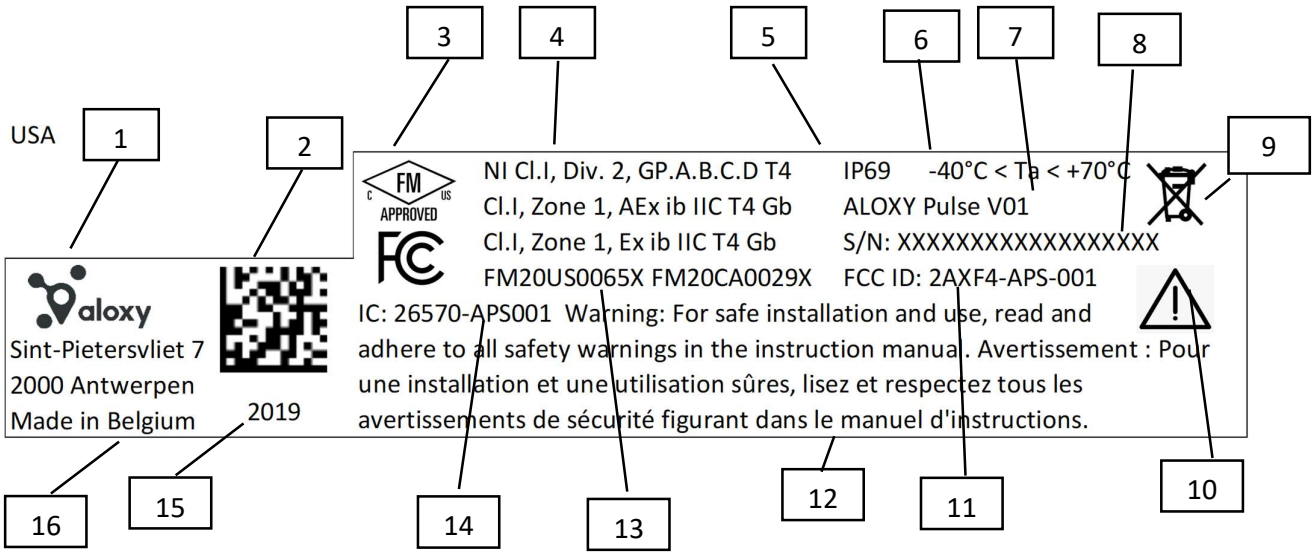
European marking label



1. Manufacturer
2. Manufacturing QR code
3. Warning
4. Protection class
7. ATEX/IECEx marking for hazardous area
8. Serial number (Order code)
9. Product name, type and year of manufacturing

5. ATEX / IECEx marking for hazardous area
6. Permitted ambient temperature for the hazardous area of the corresponding temperature class
10. Approvals
11. Conformity with country-specific directives
12. Waste instructions
13. Consult operating instructions

USA & Canadian marking label



1. Manufacturer
2. Manufacturing QR code
3. Conformity with country-specific cerifications (FCC, cFMus)
4. FM / CSA marking for hazardous area
5. Ingress Protection class
6. Permitted ambient temperature for the hazardous area of the corresponding temperature class
7. Product name, type and model
8. Serial number (Order code)
9. Waste instructions
10. Consult operating instructions
11. FCC ID n°
12. Warning
13. cFMus approvals cerification N°
14. ISED ID N°
15. Year of production
16. Place of manufacture
17. FCC statement (there is no room for this on the label) see instruction manual

This device complies with Part 15 class B Digital Device of the FCC rules. Operation is subject to the following 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.

3.4 Security information

ALOXY provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.
In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. ALOXY products and solutions only form one element of such a concept.
Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.
ALOXY products and solutions undergo continuous development to make them more secure. ALOXY strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

3.5 Transportation and storage

To guarantee sufficient protection during transport and storage, observe the following:

- Keep the original packaging for subsequent transportation.

⚠ CAUTION
Insufficient protection during storage The packaging only provides limited protection against moisture and infiltration. • Provide additional packaging as necessary.

3.6 Notes on warranty

The contents of this manual shall not become part of or modify any prior or existing agreement, commitment or legal relationship. The sales contract contains all obligations on the part of ALOXY as well as the complete and solely applicable warranty conditions. Any statements regarding device versions described in the manual do not create new warranties or modify the existing warranty.
The content reflects the technical status at the time of publishing. ALOXY reserves the right to make technical changes in the course of further development.

4 Safety instructions

4.1 Precondition for use

This device left the factory in good working condition. In order to maintain this status and to ensure safe operation of the device, observe these instructions and all the specifications relevant to safety.
Observe the information and symbols on the device. Do not remove any information or symbols from the device. Always keep the information and symbols in a completely legible state.

4.2 Warning symbols on the device


Consult operating instructions

4.3 Laws and directives

Observe the test certification, provisions and laws applicable in your country during connection, assembly and operation. These include, for example:

- National Electrical Code (NEC - NFPA 70) (USA)
- Canadian Electrical Code (CEC) (Canada)

Further provisions for hazardous area applications are for example:

- EN 60079-0
- EN IEC 60079-0
- EN 60079-11

4.4 Conformity with European directives

The CE marking on the device shows conformity with the regulations of the following European guidelines:

Electromagnetic compatibility EMC 2014/30/EU	Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating to electromagnetic compatibility.
Atmosphère explosible ATEX 2014/34/EU	Directive of the European Parliament and of the Council on the harmonization of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.

4.5 Improper device modifications

⚠ WARNING
Improper device modifications Risk to personnel, system and environment can result from modifications to the device, particularly in hazardous areas. • Only carry out modifications that are described in the instructions for the device. Failure to observe this requirement cancels the manufacturer's warranty and the product approvals.

4.6 Use in areas subject to explosion hazard

Qualified personnel for hazardous area applications

Persons who install, connect, commission, operate, and service the device in a hazardous area must have the following specific qualifications:

- They are authorized, trained or instructed in operating and maintaining devices and systems according to the safety regulations for electrical circuits, high pressures, aggressive, and hazardous media.
- They are authorized, trained, or instructed in carrying out work on electrical circuits for hazardous systems.
- They are trained or instructed in maintenance and use of appropriate safety equipment according to the pertinent safety regulations.

5 Installation and commissioning

⚠ WARNING
Install the equipment as per the NEC NFPA 70

1. **Aloxy logo, Ex marking & NFC area:** The Aloxy logo indicates the area of the Aloxy Pulse device that can be scanned by an NFC reader or NFC-enabled smartphone or tablet.
2. **Left LED**: Multi-color LED light on the left-side of the device allowing to give a light signal to the user
3. **Left button**: Left push button for configuration and operation actions
4. **Top shell** of the enclosure of the Aloxy Pulse device
5. **Bottom shell** of the enclosure of the Aloxy Pulse device
6. **Mounting bracket**: Detachable bracket for easy mounting of the device to any surface
7. **Right LED**: Multi-color LED light on the right-side of the device allowing to give a light signal to the user
8. **Right button**: Right push button for configuration and operation actions. Contrary to the left button, the right button can be recognized by the wave pattern on the button.
9. **Release slot:** Slot to unlock the Aloxy Pulse sensor from the mounting bracket.

⚠ WARNING

Please observe the corresponding safety instructions when working on manual valves in use.

⚠ WARNING

Impermissible accessories and spare parts
Risk of explosion in areas subject to explosion hazard.

- Only use original accessories or original spare parts.
- Observe all relevant installation and safety instructions described in the instructions for the device or enclosed with the accessory or spare part.

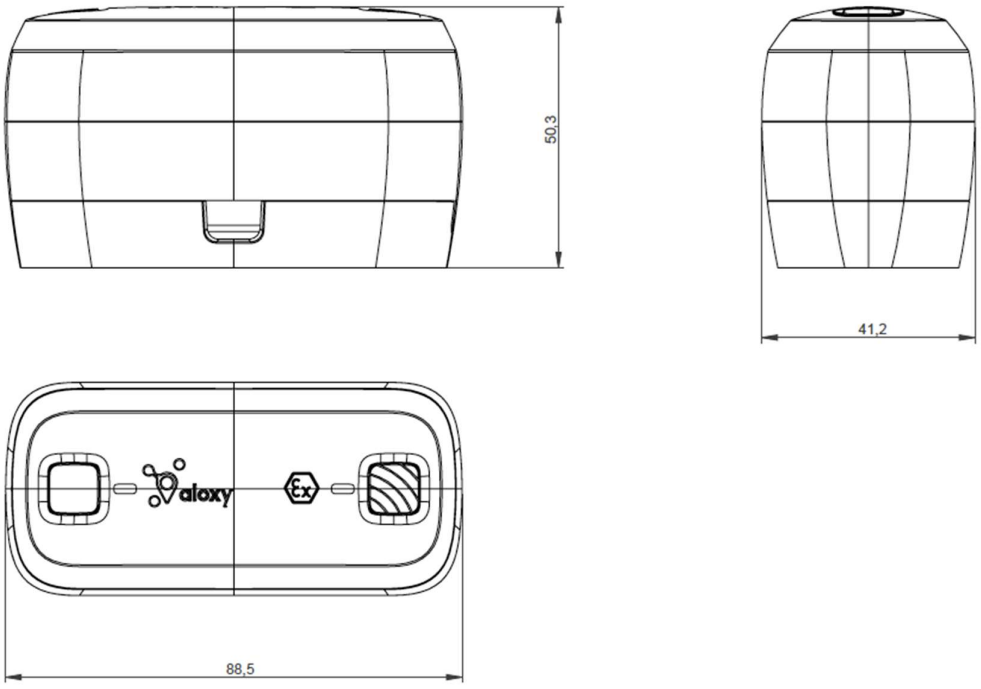
⚠ WARNING

Mechanical impact energy
In order to ensure the degree of protection of the housing (IP69), protect the housing from mechanical impact energy:

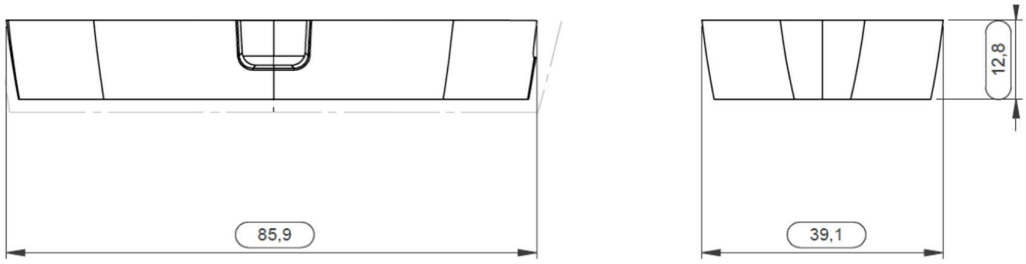
- ALOXY Pulse not greater than 2 Joule

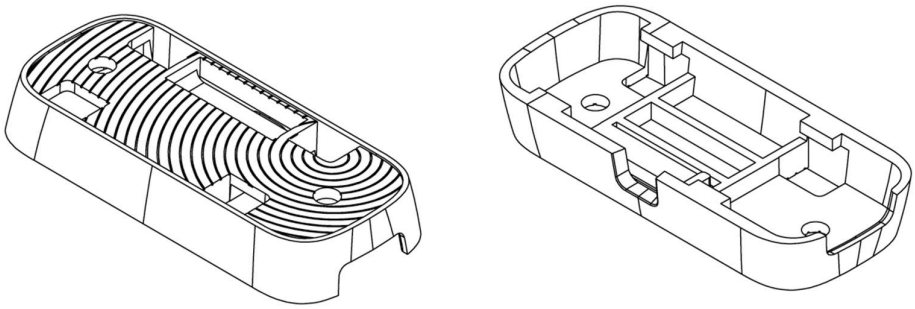
5.1 Dimensions

The Aloxy Pulse has the following dimensions: length 88.5mm x with 41.2mm x height 50.3mm, including the mounting bracket.

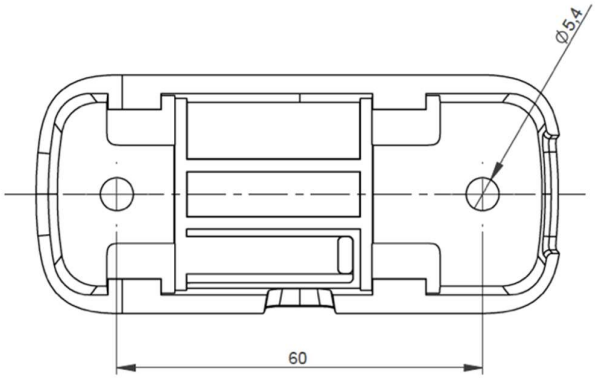


The individual mounting bracket has the following dimensions: length 85.9mm x with 39.1mm x height 12.8mm:





The screw holes in the mounting bracket have a diameter of 5.4mm and are positioned at a distance of 60mm:



5.2 Installing / mounting

⚠ WARNING
Before mounting the ALOXY Pulse: • Always wear protective clothing, gloves, and eyewear when performing any installation procedures to avoid personal injury or property damage. • Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

⚠ WARNING
Loss of explosion protection The Aloxy Pulse can only be used within a process temperature range of -40°C ≤ Ta ≤ +70°C when mounted on pipes or machines.

⚠ CAUTION
Loss of type of protection Damage to device if the enclosure is open or not properly closed. The type of protection specified on the nameplate or in technical data is no longer guaranteed. • Make sure that the device is securely closed.

NOTICE
Incorrect mounting The device can be damaged, destroyed, or its functionality impaired through improper mounting. • Before installing ensure there is no visible damage to the device. • Mount the device using suitable tools.

NOTICE
Torque on screws regarding plastic mounting bracket Device damage. The maximum torque of the mounting plate must not be exceeded 1 Nm (0.73 ft lb).

6 Usage of the Aloxy Pulse

6.1 Mounting the Aloxy Pulse to an industrial asset

The Aloxy Pulse is only intended for fixed installations and NOT for portable use. Always follow EN-IEC 60079-14, local regulations and local codes of practice when using the Aloxy Pulse.

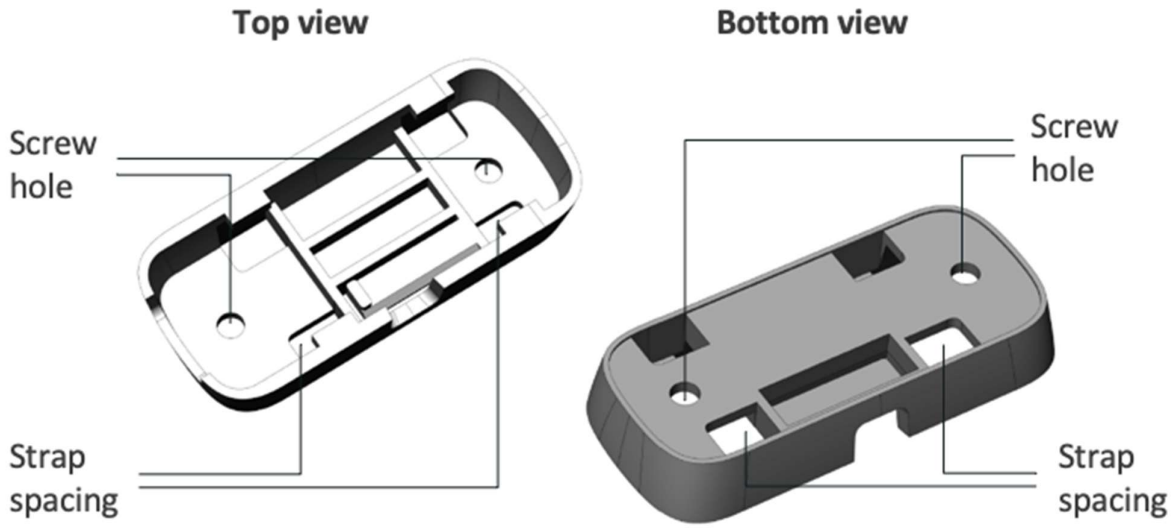
The Aloxy Pulse can be attached to any (industrial) asset using a variety of attachment methods such as bolts, straps, magnets or glue. Following procedure must be followed precisely.

Step 1: Remove the Aloxy pulse device from the mounting bracket.

To remove the Aloxy Pulse device from its mounting bracket, put a screwdriver or similar tool in the release slot to unlock the Aloxy Pulse device from the mounting bracket. Gently pull the device to the left side while holding the mounting bracket in position and keeping the screwdriver inserted in the release slot.

Step 2: Attach the mounting bracket to the asset

Depending on the type of asset and surface, the mounting bracket offers several options to attach, either directly using plastic / metal straps, bolts / screws (M5), magnets or glue, either by using an external metal bracket in between the mounting bracket and the asset surface.



⚠ CAUTION

Before sliding the Aloxy Pulse device in its mounting bracket after installation, ensure the mounting bracket is firmly attached on the asset and does not move when putting force in any direction.

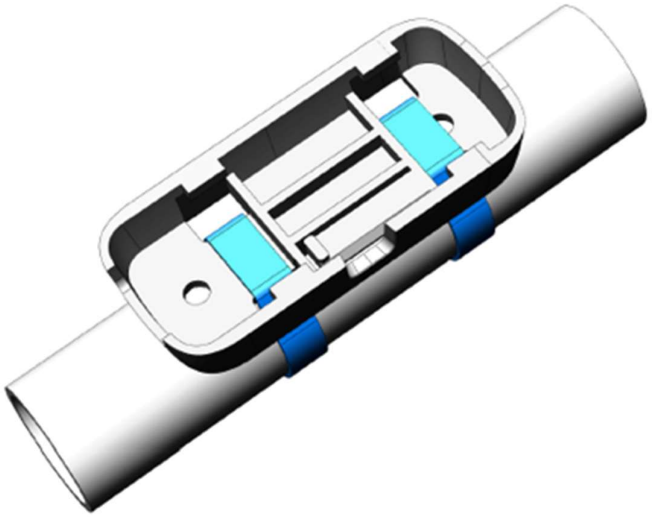
NOTICE

When the Aloxy Pulse should measure a certain motion, for instance the motion of the hand wheel of a manual valve to monitor the valve's position, make sure that the Aloxy Pulse device is attached to the moving part and follows the same motion as the part it is monitoring. No other motions are allowed after installing the sensor!

NOTICE

The following installation examples ensure a correct fixation of the mounting bracket to the surface of an asset. Depending on the formfactor of the asset and the use-case, certain attachment methods are more suited than others. For instance, to monitor vibration, the Aloxy Pulse should be firmly attached to the surface of the asset to follow the same vibration pattern, hence, options using glue or clips are not well suited.

A. Installation using **double straps** (metal or plastic) on a tube- or bar-shape surface:



This method ensures good, non-intrusive fixation of the Aloxy Pulse to an asset suitable for instance for movement detection and vibration monitoring. Typical applications are manual valve position monitoring by attachment to a valve lever or a spoke of the valve wheel, vibration monitoring of a tube, asset tracking, etc.

For cable tie use for instance:

ALOXY article ID: 43361.186.047

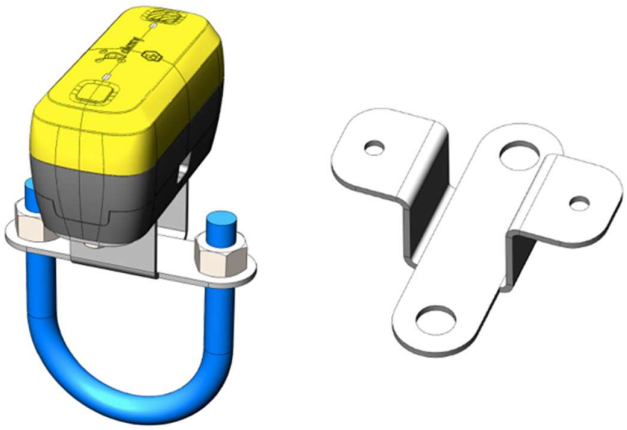
CABLE TIE PLASTIC POLYAMIDE (NYLON) 6.6 **UV-RESISTANT** 186X4.7

Tensile strength (N) 220

⚠ CAUTION
Premature aging of the tie rap Only use tie raps that are UV resistant.

B. Installation using a generic **external metal U-bracket** on a U-clamp that can be attached around a tube-shape surface:

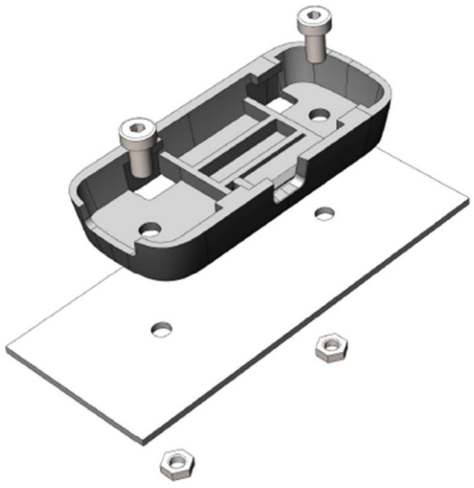
NOTICE
Device damage. Torque on screws regarding plastic mounting bracket. The maximum torque of the mounting plate must not be exceeded 1 Nm (0.73 ft lb).



This method ensures good, non-intrusive fixation of the Aloxy Pulse to an asset suitable for instance for movement detection and vibration monitoring. Typical applications are manual valve position monitoring by attachment to a valve lever or a spoke or outer ring of the valve wheel, vibration monitoring of a tube, etc.

C. Installation using **M5 bolts or screws** on a flat surface:

NOTICE
Device damage. Torque on screws regarding plastic mounting bracket. The maximum torque of the mounting plate must not be exceeded 1 Nm (0.73 ft lb).

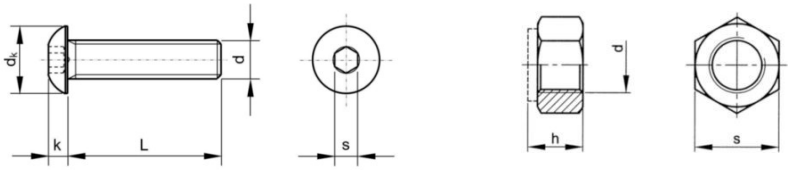


Use M5 bolts or screws with a maximum head height of 4 mm, such as hexagon socket head (DIN 7984) cap screws with low head.

This method ensures excellent, but intrusive fixation of the Aloxy Pulse to an asset suitable for instance for movement detection and vibration monitoring. Typical applications are manual valve position monitoring by attachment to a flat valve lever or a flat spoke of the valve wheel, vibration monitoring of the surface of rotating equipment, asset tracking of mobile vehicles, attachment to a wooden surface, etc.

It is best to use the following bolts and nuts:

- LOW-BULB HEAD of max SCREW WITH HEXAGON SOCKET ISO 7380-1 STAINLESS STEEL A2 M5X10
- SELF-LOCKING HEXAGON NUT WITH PLASTIC WASHER DIN 985 STAINLESS STEEL (STAINLESS STEEL) A2 M5

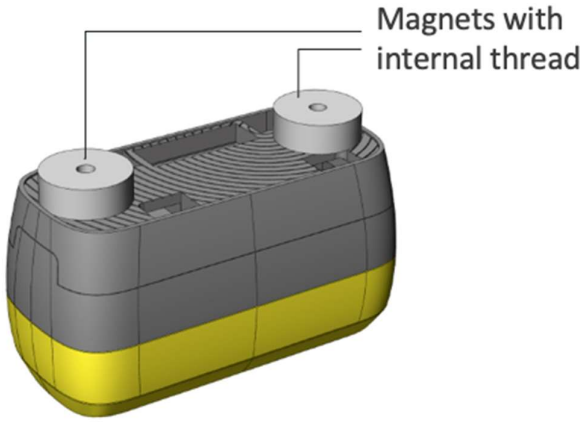


k (max.) 2.75 never more than 3,5mm!

D. Installation on a flat metallic surface using **two magnets**:

⚠ CAUTION
The magnet material has been specifically chosen to provide a long-term stable magnetic field. However, as with any magnet, care must be taken when handling the magnet assembly.

NOTICE
Device damage. Torque on screws regarding plastic mounting bracket. The maximum torque of the mounting plate must not be exceeded 1 Nm (0.73 ft lb).



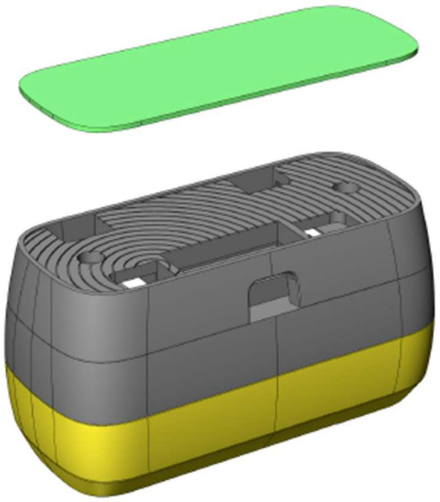
This method ensures good, non-intrusive, rather temporary fixation of the Aloxy Pulse to a flat metallic surface suitable for instance for movement detection and vibration monitoring. Typical applications are temporary vibration monitoring of a rotating equipment, temporary asset tracking, temperature monitoring around a motor, etc.

It is best to use the following magnets:

ALOXY Articel ID: ITN-25 M5 magnet

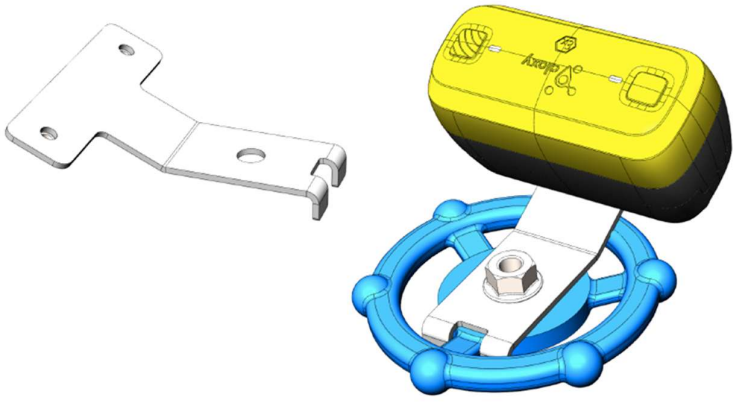
Strength ca. 14 kg (ca. 137 N)

E. Installation on a surface using **double sided foam sticker**:



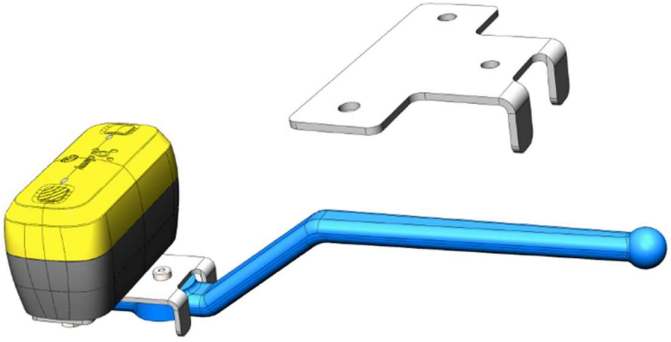
This method ensures fair, non-intrusive fixation of the Aloxy Pulse to a flat asset surface suitable for instance for movement detection and temperature monitoring. Typical applications are asset tracking, temperature monitoring around a motor, etc.

F. Installation using an **external metal bracket** on the spindle of a multi-turn valve:



This method ensures excellent non-intrusive attachment of the Aloxy Pulse to the handwheel of a multi-turn valve. A typical application is manual valve position monitoring of small multi-turn valves.

G. Installation using an **external metal bracket** on the spindle of a quarter-turn valve:



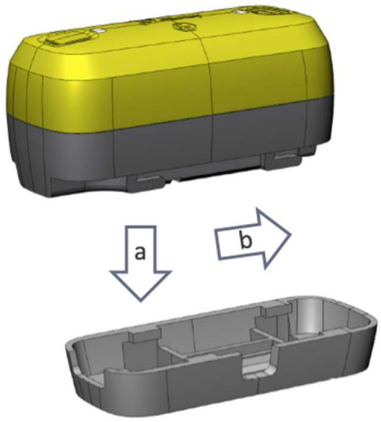
This method ensures excellent non-intrusive attachment of the Aloxy Pulse to the lever of a quarter-turn valve. A typical application is manual valve position monitoring of small quarter-turn valves.

Step 3: Slide the Aloxy Pulse device in its mounting bracket

⚠ CAUTION
Before sliding the Aloxy Pulse device in its mounting bracket after installation, ensure the mounting bracket is firmly attached on the asset and does not move when putting force in any direction.

Position the Aloxy Pulse device on top of the mounting bracket slightly to the left-side so the hooks below the Aloxy Pulse device align within the mounting bracket (a).

Slide the Aloxy Pulse device to the right-side until it locks in position (b). Check that the edges of the Aloxy Pulse device perfectly align with the edges of the mounting bracket.



To remove the Aloxy Pulse device again from its mounting bracket after installation, put a screwdriver or similar tool in the release slot to unlock the Aloxy Pulse device from the mounting bracket. Gently pull the device to the left side while keeping the screwdriver in the release slot.

7 Inspections and maintenance

7.1 Basic safety instructions

⚠ DANGER

The ALOXY Pulse contains one primary lithium metal battery pack. Under normal conditions of use, the battery materials are self-contained and are not reactive as long as the batteries and power module integrity are maintained. Care should be taken to prevent mechanical, electrical, or thermal damage. DO NOT recharge, short-circuit, disassemble, heat, or expose the battery pack to water. The battery contain flammable materials and performing any of the above actions could cause them to become damaged, ignite, or explode, resulting in personal injury or property damage. Observe all warnings included with the battery pack before installing, operating, storing, or shipping the ALOXY Pulse.

The devise contains high power lithium batteries designed especially for this sensor and for the conditions as foreseen on the marking label. The use of non-original batteries can cause serious injuries!

Personal injury and property damage can result from fire or explosion if the battery pack is subjected to heat above 100°C (212°F). Battery packs should be stored in a cool, dry and ventilated area; for maximum life, storage should not exceed 30°C (86°F).

⚠ WARNING

Impermissible repair of the device

- Repair must be carried out by ALOXY authorized personnel only.
- Only battery replacement is allowed

⚠ WARNING

Impermissible accessories and spare parts
Risk of explosion in areas subject to explosion hazard.

- Only use original accessories or original spare parts.
- Observe all relevant installation and safety instructions described in the instructions for the device or enclosed with the accessory or spare part.

⚠ WARNING

Loss of explosion protection
Only original parts may be used to repair the sensor. Using non-original parts may cause injury or damage. Loss of explosion protection when:

- Non-original parts are used.
- Repairs being carried out in an incompetent manner
- If the enclosure appears dented, cracked, broken or no longer in a good condition.

NOTICE
Penetration of moisture into the device Device damage. • Make sure when carrying out cleaning and maintenance work that no moisture penetrates the inside of the device.

7.2 Cleaning the enclosure

- Clean the outside of the enclosure with the inscriptions and the display window using a cloth moistened with water or a mild detergent.
- Do not use any aggressive cleansing agents or solvents, e.g. acetone. Plastic parts or the painted surface could be damaged. The inscriptions could become unreadable.

⚠ WARNING
Electrostatic charge Risk of explosion in hazardous areas if electrostatic charges develop, for example, when cleaning plastic surfaces with a dry cloth. • Prevent electrostatic charging in hazardous areas.

7.3 Battery replacement

An empty battery in the Aloxy Pulse can be replaced by a fully charged one.

USE ONLY THE FOLLOWING BATTERIES ON THE ALOXY PULSE v01:

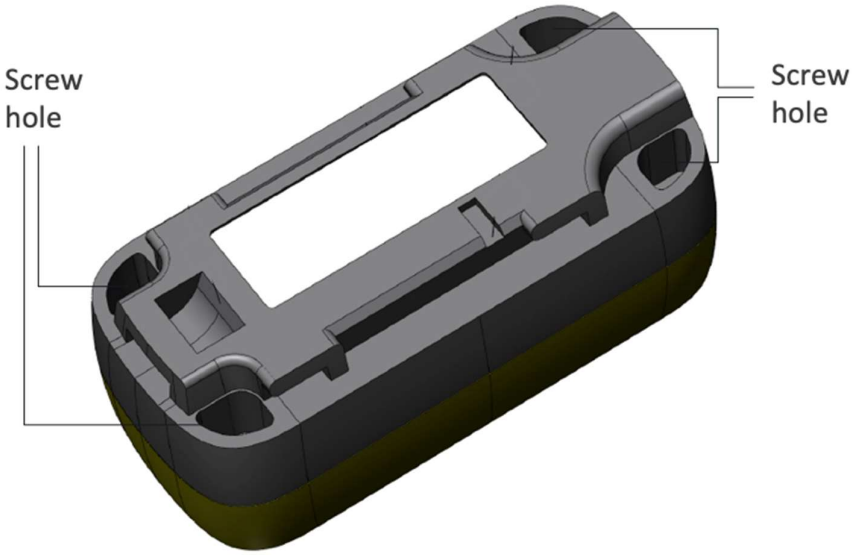
ALOXY partnumber: T36851CCC
ALOXY partnumber: E36850CCC

To do so, the Aloxy Pulse device must be opened to access the battery compartment.

Remove the Aloxy Pulse device from its mounting bracket as described in section 6.1 (step 3) and bring it to a workshop area.

⚠ WARNING
Do not open the Aloxy Pulse in the field or within an hazardous (classified) area to replace the battery. The device can only be opened in a workshop equipped to handle electronic components.

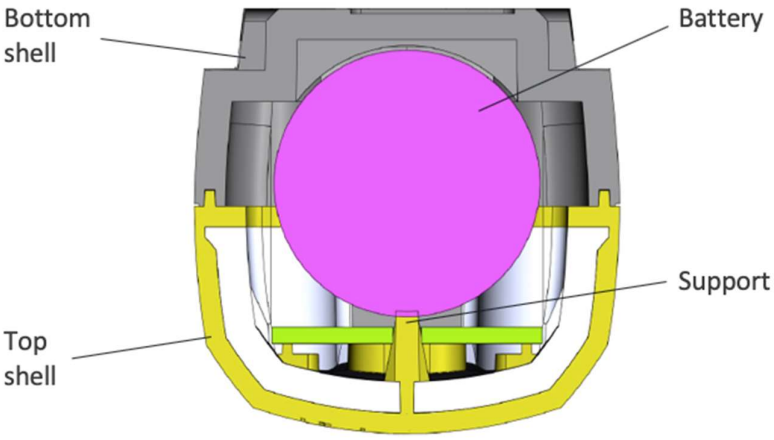
To open the Aloxy Pulse, put the device upside-down on a workbench and remove the 4 screws counter-clockwise from the screw holes using a Torx (6-point star-shaped) T10 screwdriver.



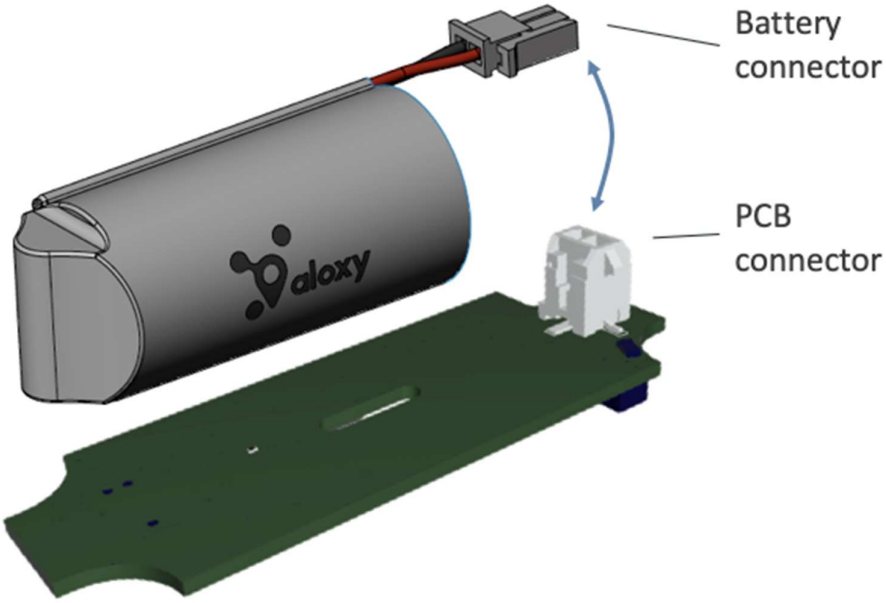
Store the 4 screws for later use and gently left the bottom shell from the top shell.

⚠ CAUTION
Risk of damaging the electronics When opening the Aloxy Pulse, avoid touching the electronic circuits and the green PCB (Printed Circuit Board) to avoid damage. Always ensure you are discharged of static electricity by wearing for instance an antistatic wrist strap band.

Lift the battery from its support in the top shell.



Unplug the battery connector from the PCB (Printed Circuit Board) connector, without removing the PCB from the top shell.



Remove the battery and replace it by a new fully charged battery. Connect the battery connector from the new battery to the PCB connector.

NOTICE
Condensation in the device Damage to device through formation of condensation if the temperature difference between transportation or storage and the mounting location exceeds 20 °C (36 °F). • Before taking the device into operation let the device adapt for several hours in the new environment.

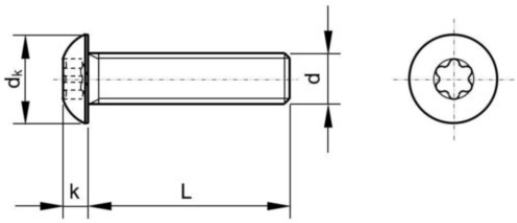
NOTICE
Make sure that the wire running from the battery to the PCB is positioned on top of the battery, i.e., on the opposite side of the PCB, to ensure correct operation of the Aloxy Pulse device.

Position the new battery on the support in the top shell and close the Aloxy Pulse again by repositioning the bottom shell on top. Close the device by the 4 original screws, using a calibrated torque screwdriver (with Torx T10 head) according to the table

7.4 To insure ingress protection IP69

⚠ WARNING
Loss of ingress protection IP69 • Make sure that before assembly the tooth and groove is still resilient, clean and intact. • When assembling make sure that the gasket is seated correctly before tightening the bolds.

Only use LOW-HEAD SCREW WITH T-STER ISO ≈7380-1 STAINLESS STEEL A2 M3X8



k (max.) 2.75 never more than 3,5mm!

Steps	Force
Insert the 4 screws	
Hand-tighten the 4 screws clockwise at	0 Nm
Tighten the 4 screws in a clockwise direction at	0,2 Nm (0.15 ft lb)
Tighten the 4 screws in a clockwise direction at	0,45 Nm (0.33 ft lb)
Tighten the 4 screws again in a clockwise direction at	0,45 Nm (0.33 ft lb)

NOTICE
Device damage The maximum torque of the gasket must not be exceeded. Refer to the section "Technical specifications for the torque value. • Do not exceed torque on screws regarding gasket

The Aloxy Pulse is ready for operational use and can be positioned in its mounting bracket as explained in the previous chapter (step 3).

8 Disposal

Devices described in this manual should be recycled. They may not be disposed of in the municipal waste disposal services according to the Directive 2012/19/EC on waste electronic and electrical equipment (WEEE).
Devices can be returned to the supplier within the EC, or to a locally approved disposal service for eco-friendly recycling. Observe the specific regulations valid in your country.

8.1 Technical support

If this documentation does not provide complete answers to any technical questions you may have, contact Technical Support by addressing your questions to:
Carl.stevens@aloxy.io

9 Technical data

Battery powerd wireless IoT sensor, Type ALOXY Pulse vXX			
Certifications			**Reference**
CE conformety	The applicable directives and applied standards with their revision levels can be found in the EU declaration of conformity on the Internet. This product complies with the following directives: ATEX Directive (2014/34/EU) Electro Magnetic Compatibility (EMC) (2014/30/EU) Radio Equipment Directive (RED) (2014/53/EU) Reduction of Hazardous Substances (RoHS) (2011/65/EU)		ALOXY_D_400_Declaration of Conformity ALOXY Pulse v01.docx
Electrical Classification	FM (Canada and USA) Intrinsically Safe resp. Non-incendive ATEX— Intrinsically Safe IECEx— Intrinsically Safe		NA
Ex	Intrinsic safety "i", "IS" for GAS zone 1	Temp range -40°C ≤ Ta ≤ +70°C (-40 to 158°F)	
ATEX / IECEx	 II 2G Ex ib IIC T4 Gb		DEKRA 19ATEX0032
	Ex ib IIC T4 Gb		IECEx DEK 19.0016
cFMus	Non-incendive Class I, Division 2, T4 groups ABCD		US cert # FM20US0065X Canada Cert # FM20CA0029X
	Class I, Zone 1, AEx ib IIC T4 Gb		
	Class I, Zone 1, Ex ib IIC T4 Gb		
QMS			223642700-19ATEXQ0058 Iss.0-QAR19.0009-00-PQAN
FCC	USA	FCCID: XXXXX-XXXXXX	Certification ongoing
ISED	Canada	IC: XXXXX-XXXXXX CAN ICES-X (B) / XXX-X (B)	Certification ongoing

LoRaWAN	EU				Labo De Nayer PCC-RAD-4918_ed2 PCC-RAD-5034_ed2
	USA				Certification ongoing
	Canada				Certification ongoing
DASH7	EU				Self-certification based on D7A v1.2 towards reference stack implementation
	USA				Certification ongoing
	Canada				Certification ongoing
Compliant					**Reference**
WEEE					2011/65/EU
RoHAS					2012/19/EU
Enclosure					**Reference**
Mounting position	Horizontal or vertical				NA
Demensions	L x H x W		88,5 x 50,3 x 41,2 mm		NA
Weight	With PCB and power supply		approx. 150gr (5.3oz)		NA
	Battery		approx. 50gr (1.8oz)		NA
			Lithium content 2,2 gr (0.078oz)		NA
Materials	Top shell	Softpart yellow	TPE yellow (conductivity 285Mohm)		Kraiburg HTC8797/137
		Softpart black	Nylabond TE ESD		RTP C146255B1Black
		Hard part	Nylon PA6 natural		SOLVAY Technyl C206F
	Bottom shell		Nylon 6 ESD protection black		RTP0299AX123289BLACK
	Mounting plate				

PA6 general information	Thermoplastics used are non-reinforced polyamide, PA We use the modern, semi-crystalline insulation material, polyamide, which is now an essential component in electrical engineering and electronics. It has long occupied a leading position and is authorized for use by the relevant approval authorities such as the CSA, KEMA, PTB, SEV, UL, VDE, etc. Polyamide has excellent electrical, mechanical, and chemical properties, even at high operating temperatures. Brief peak temperatures up to approximately 200°C are permitted as a result of heat aging stabilization. Depending on the type (PA 4.6, 6.6, 6.10, etc.), its melting point is in the region of 215°C to 295°C. Polyamide absorbs moisture from its surroundings, on average 2.8%. However, this moisture is not crystallization water in the plastic itself, but chemically bonded H2O groups in the molecular structure. This makes the plastic flexible and resistant to breakage, even at temperatures as low as -40°C. As per UL 94, PA has a flammability rating of V2 to V0.			NA
TPE general information	Main Characteristics: Excellent flexural fatigue resistance Good electrical properties Good tear & abrasion resistance Resistance to Low & High Temperatures from -50°C to +140°C High impact strength Colourability Recyclable Excellent resistance to chemicals & weathering			NA
Gasket	Top shell - bottom shell		Is part of the soft part	NA
Mechanical strenght	Droptest	at +20°C	A drop from 2 meters and this 5 times on each side.	ALOXY
		at +80°C		
		at - 45°C		
	Impact test	at +20°C	Resistant to 2 joule	ALOXY
		at +80°C		
		at - 40°C	Only resistant up to -20°C. The housing will be adjusted for the next production. We will have to	ALOXY

			do the tests again to see if we can lower the housing.	
Ingress Protection	IP65		Water jets. Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects. Test duration: 1 minute per square meter for at least 3 minutes Water volume: 12.5 litres per minute Pressure: 30 kPa at distance of 3 m.	ALOXY
	IP68		5m for 60 minutes	ALOXY
	IP69		Powerful high temperature water jets. Protected against close-range high pressure, high temperature spray downs. Specimens rotate slowly on a turntable, from 4 specific angles. Test duration: Fixture: 30 sec. in each of 4 angles (2 min. total) Water volume: 14–16 litres per minute Pressure: 8–10 MPa (80–100 bar) at distance of 0.10–0.15 m Water temperature: 80 °C	DEKRA 10/12/2019 Number 2235413.01-AOC
Torque	For gasket compression IP69		0,45 Nm (0.33 ft lb)	NA

UV resistance	Chamber temperature 35-45°C Black standard temperature: 65°C Intensity 0,5W/m² (340nm) Radiation dose 2,900Mj/m² Rain cycle 102:18 Test duration: After 0, 800, 1,600 and 3,200 hours exposed to UV (carousel) / weathering, the colour of the material is measured and expressed in the following scheme: L*a*b*: L* (Brightness): 0 = black, 100 = white a* (Colour): + = increased red, - = increased blue/green b* (Colour): + = increased yellow, - = increased blue/purple As the unexposed material is yellow, the value b* and L* are high. Tests show that weathering lowers b*, which is a typical reaction of the material under UV light (material tends to become yellowish with reduced “shining”), however, this effect is only minimal as the Aloxy material is already yellow. The material came from a bright colour to a more fade tone on the Greyscale of 2.5. After testing there is no oil bleed out, no stickiness and no blooming after 3,200 hours of aging. As expected, there appear slight surface cracks, however the material stays intact with minimal impact on the shore.	Tested by supplier according to DIN EN ISO 4892-2

Battery (replaceable)					**Reference**
T36851CCC	Lithium Metal battery with supercap		3,6V - 8500mAh		Custom made
E36850CCC	Lithium Metal battery without supercap		3,6V - 8500mAh		Custom made
E36851CCC	Lithium Metal battery with supercap		3,6V - 8500mAh		Custom made
Authonomy	DASH7		5 to 8 years		ALOXY_MVP_001_Battery consumption
	LoRaWAN	SF7	5 to 6 years		

		SF9	4 to 5 years	
		SF12	1 to 3 years	
Optimal battery temperature range	-20°C to +50°C			ALOXY
PCB				**Reference**
Sensors	Accelerometer		±2g/±4g/±8g/±16g acceleration scales	ALOXY
	Gyroscoop		full-scale angular rate range of ±125/±250/±500/±1000/±2000 DPS	
	Magnetometer		dynamic range of ±50 gauss	
	Atmospheric pressure		300hPa - 1250hPa	
	Ambient temperature			
NFC	ISO/IEC 15693 (AFI, Application Family Identifier)			
LED's	Green		2X	
	Red		2X	
Wireless communication				**Reference**
Communication protocol	DASH7 Appliance protocol v1.2			D7A Specification Version 1.2
	LoRaWAN class A, EU and USA			NA
Wireless Signal	868MHz - 915MHz Maximum 10 dBm			NA
Wireless Classifications	Class A digital device, complies with part 15 of the FCC Rules Contains FCC ID: LW2RM2510 Contains IC: 2731A-RM2510			NA
	GFSK			D7A Specification Version 1.2
	LoRa			NA
Encription	AES-128 authentication and encryption			
Output power	Max 10dBm			ALOXY
	DASH7		500m	ALOXY

Communication range	LoRaWAN	SF7	500m	SF and distance to the gateways has a profond inpact on the battery life.	
		SF9	1 km		
		SF12	<2 km		
Frequency	DASH7 - EU		863-870MHz		NA
	LoRaWAN - EU		867-870 MHz		NA
	DASH7 - USA		902-928MHz		NA
	LoRaWAN - USA		902-928MHz		NA
Payload	DASH7		max 251 bytes		NA
	LoRaWAN		max 243 bytes depending on SF		NA
Latency	Dash7		max 1 sec		NA
	LoRaWAN		up to 4 min		NA
EMC	Compliance		Europe		LDN: PCC-EMC-5002 LDN: PCC-RAD-4918
Rated condition					**Reference**
Ambient conditions			For use indoors and outdoors.		NA
Ambient temperature			In hazardous areas, observe the maximum permissible ambient temperature corresponding to the temperature class.		NA
Permissible ambient temperature for operation			Permissible ambient temperature for operation -40 to +70 °C (-40 ... +112 °F)		NA
Relative humidity			0 ... 100%		NA
IEC 61010 Compliance			Meets Pollution Degree 3		NA
Altitude Rating			Up to 2000 meters (6562 feet)		NA
Operating Temperature Limits			Battery Power: -40°C ≤ Ta ≤ +70°C (-40 to 158°F)		NA
Vibration resistance	Harmonic oscillations (sine) according to EN 60068-2-6/10.2008		3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axle 98.1 m/s² (321.84 ft/s²), 27 ... 300 Hz, 3 cycles/axle		Pending for evaluation

	Bumping (half-sine) according to EN 60068-2-27/02.2010	150 m/s² (492 ft/s²), 6 ms, 1000 shocks/axle	Pending for evaluation
	Noise (digitally controlled) according to EN 60068-2-64/04.2009	10 ... 200 Hz; 1 (m/s²)²/Hz (3.28 (ft/s²)²/Hz) 200 ... 500 Hz; 0.3 (m/s²)²/Hz (0.98 (ft/s²)²/Hz) 4 hours/axle	Pending for evaluation
	Recommended range of continuous operation of the entire manual valve:	≤ 30 m/s² (98.4 ft/s²) without resonance peak	Pending for evaluation

Documentation					
Available languages	EN				
Safety instructions					
Please read the user manual carefully.					
It is an integral part of the described equipment and must be available at all times.					

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