



Ubisense DIMENSION4™

Industrial Tag and Multi-mode Tag User Guide

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Ubisense Industrial Tags and Multi-mode Tags

Ubisense Industrial Tags and Ubisense Multi-mode Tags are devices that you can use to locate your assets such as vehicles, in real-time.

Industrial Tags

Industrial Tags are mechanically strong and resistant to dust and water. You can use these tags in harsh environments such as car manufacturing units.

After you attach an Industrial tag to an asset, the asset can be located to an accuracy of up to 15 cm in either 2D or 3D, in real-time.



Industrial tags are also available with a magnet activated switch instead of a button which makes them suitable for use in extreme weather conditions, for example on vehicles that are driven in heavy rainfall. They are activated using a magnet.

Multi-mode Tags

Multi-mode Tags are designed for use in situations where the tag must be tracked both indoors and outdoors. Outdoors the tag is located through the use of GPS.

Suitably-configured Ubisense sensors or the discontinued Ubisense 2.4GHz Receivers are needed to receive the 2.4GHz uplink transmission from the tag that contains the GPS location.

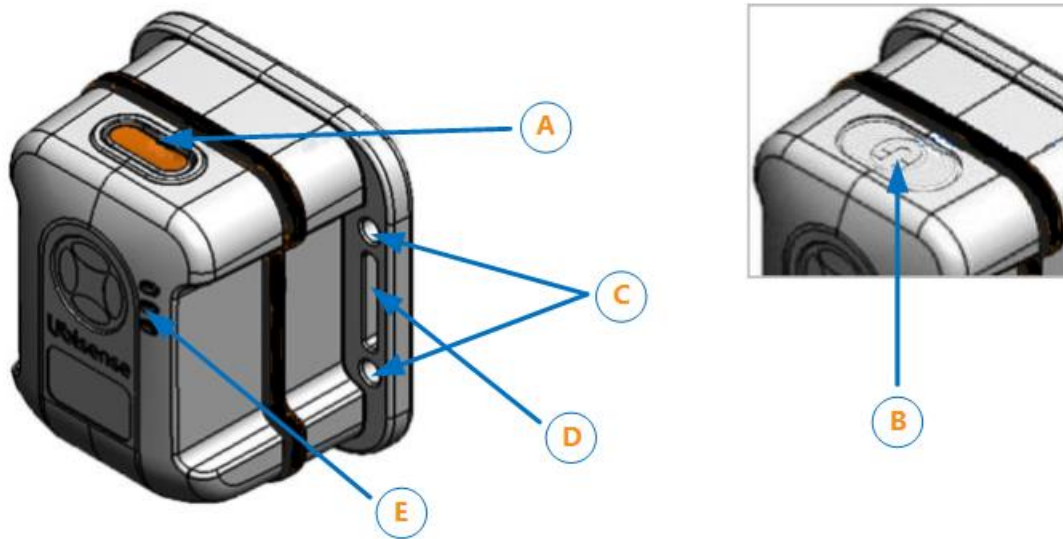
Attaching Tags

You can securely attach the tags to your host assets, by using a variety of attachment options, depending on:

- The type of host asset on which you are mounting the tag.
- The environment in which the tags are likely to be used.

Features of Industrial Tags and Multi-mode Tags

The features of Industrial Tags and Multi-mode Tags, are shown in the following figure.

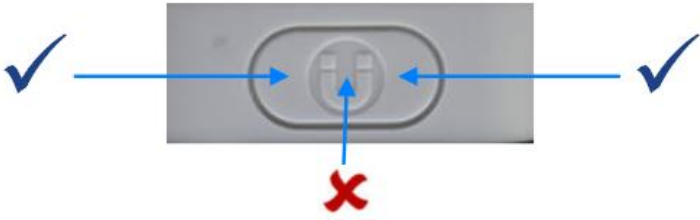


Features of Industrial Tags and Multi-mode Tags



The gasket is black on an Industrial Tag (as shown above) and blue on a Multi-mode Tag.

Feature	Description
A. Button	The button enables you to activate the tag from the deep sleep state.
B. Magnet Point (Industrial Tag only)	<p>Instead of a button, an Industrial Tag can be supplied with a magnet activated switch.</p> <p>To activate a tag of this type, hold the magnet against the magnet point. The correct position may depend on the strength and polarity of the magnet being used to activate the tag.</p>

Feature	Description
	
C. Mounting holes	<p>The tag has four mounting holes. The diameter of each hole is 4.3 mm. You can connect the tag to either a universal mounting bracket, or a custom mounting bracket.</p>
D. Strapping slots	<p>You can also mount the tag by using straps. The strapping apertures have the following dimensions:</p> <ul style="list-style-type: none"> • Length: 19.5 mm • Width: 4 mm
E. LEDs	<p>The tag has three LEDs, which flash when the tag is active.</p> <p>The Green LED flashes to indicate that the tag is operating correctly, and the tag is communicating with the DIMENSION4 Real-time Location System.</p>

Additional features of the Multi-mode Tag

The Multi-mode Tag incorporates a SiRFStar-based GPS receiver.

Activating Industrial Tags and Multi-mode Tags

To ensure that the tags do not use batteries unnecessarily, Industrial Tags and Multi-mode Tags are supplied in the deep sleep (deactivated) state.

Before you use a tag for the first time, it must be woken up (activated) from the deep sleep state.

To activate a tag:

1. Do one of the following:

- *Industrial Tags and Multi-mode Tags*: Press and hold the button on the tag.
- *Buttonless Industrial Tags*: Hold the magnet against the magnet point on the tag case.

The three LEDs light up and remain brightly lit for as long as you press the button.

2. Do one of the following:

- *Industrial Tags and Multi-mode Tags*: Release the button.
- *Buttonless Industrial Tags*: Remove the magnet from the magnet point.

The green LED blinks brightly and then starts to blink at a lower intensity, at regular intervals. The tag is now activated and ready to be used.

Putting an Industrial Tag or Multi-mode Tag into Deep Sleep

If an Industrial Tag or Multi-mode Tag is activated, you can put it back into the deep sleep state, to preserve battery life.

It is not possible to *accidentally* put a tag into deep sleep because the tag sets a 'challenge' and expects a 'response'. The LED will blink one or more times and you respond by pressing the button or swiping the magnet on the tag the same number of times. The tag then repeats the challenge and you respond again. After the second challenge and a successful response, the LED blinks brighter than normal and then switches off indicating the tag is now in deep sleep.

Putting a Tag into a Deep Sleep

To put a tag into the deep sleep state:

1. Hold down the button on the tag or *hold* the magnet against the magnet point.



You may need to offset the magnet against the magnet point (see [Features of Industrial Tags and Multi-mode Tags](#)).

2. The LED first stops blinking in readiness for the first challenge. It then starts blinking again.
 - a. Count the number of times the LED blinks brightly. This can be from one to five blinks.
 - b. Press the button on the tag or *swipe* the magnet against the magnet point the same number of times.
3. Carry out the second challenge:
 - a. Count the number of times the LED blinks brightly.
 - b. Press the button on the tag or *swipe* the magnet the same number of times.
4. If you are successful, the LED blinks brightly and switches off. The tag is now deactivated. If you are unsuccessful, the green LED on the tag will continue to blink at a lower intensity, at the programmed UWB beacon rate.

Testing Whether a Tag is in Deep Sleep

You can check whether an Industrial Tag or a Multi-mode Tag is in a deep sleep by, pressing the button on the tag, or holding the magnet against the magnet point, for a few seconds.



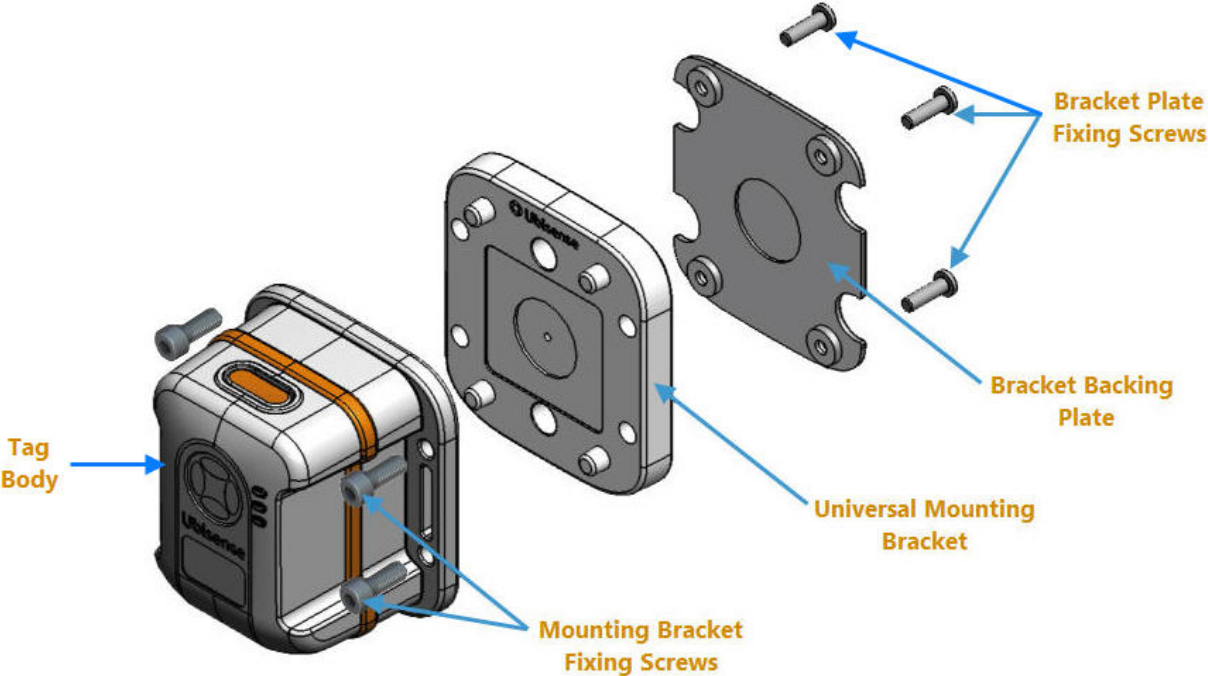
Do not hold for too long as you will activate the tag again.

Mounting Industrial Tags and Multi-mode Tags

You can mount Ubisense Industrial Tags and Multi-mode Tags by using the following options:

- Screw and strap loop mounting.
- Adhesive foam and Industrial Velcro® mounting.
- Magnetic mounting.

The exploded view of a tag is shown in the following figure.



Parts of an Industrial Tag or Multi-mode Tag

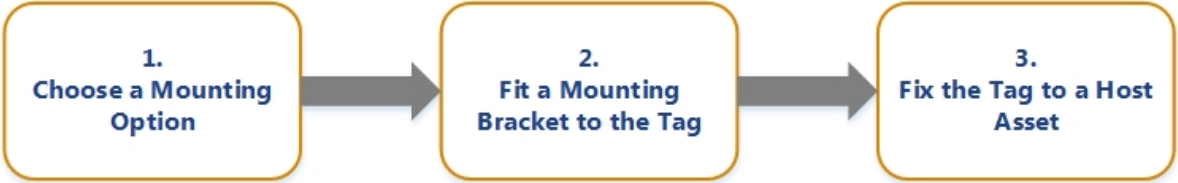
Part	Description
Bracket backing plate	Part of the mounting bracket.
Bracket plate fixing screws	Four M3 x 10 mm Plas-Fix® screws that are used for attaching the bracket plate to the universal mounting bracket.

Mounting Industrial Tags and Multi-mode Tags

Part	Description
Mounting bracket fixing screws	Four M4 x 10 mm A2 stainless steel screws that are used for attaching the mounting bracket to the tag.
Tag body	The body of the tag that contains the battery and the module.
Universal mounting bracket	The bracket that is used for attaching the tag to a host asset.

Mounting Process

The process for mounting Industrial Tags and Multi-mode Tags is shown in the following figure.



Process for Mounting Industrial Tags and Multi-mode Tags

Choosing a Mounting Option

Before you fix an Industrial Tag or Multi-mode Tag to a host asset, choose the appropriate mounting option depending on the type of host asset and the environment in which the tag will be used.

You can use one of the following mounting options:

- Screws.
- Velcro® mounting.
- Magnetic mounting.
- Customized mounting options.

Mounting a Tag by Using Screws

If you want to fix the tag to a host asset by using screws:

1. Fix the bracket to the tag, as described in [*Fixing a Bracket to an Industrial Tag or Multi-mode Tag*](#).
2. Fix the tag to the host asset, as described in [*Fixing a Tag to a Host Asset*](#).

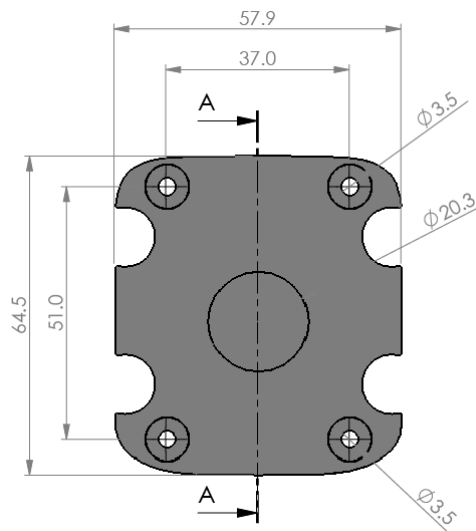
Velcro® Mounting

Depending on the surface properties of a host asset, you can fix the tag mounting bracket to the host asset by using either:

- A strong adhesive foam label.
- Adhesive Velcro® attached to the bracket backing plate.

If you require help with producing a suitable die cutter, contact Ubisense for a template of the outline of the mounting backing plate. The template is supplied as a DXF file.

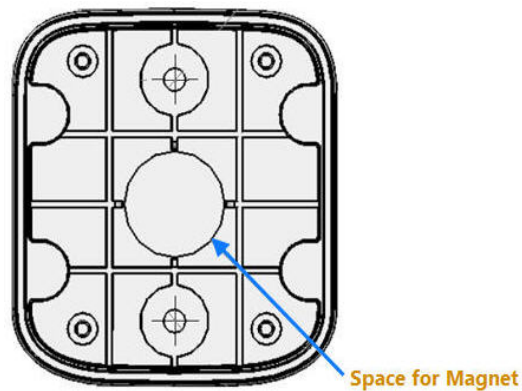
The dimensions of the bracket backing plate are shown in the following figure. The measurements are in millimeters (mm).



Dimensions of Bracket Backing Plate

Magnetic Mounting

The universal mounting bracket contains a space for a 20 x 5 mm circular magnet, as shown in the following figure.



Space for Magnet

To fix a tag to a host asset by using a magnet:

1. Insert the magnet into the space in the universal mounting bracket.
2. By using the four M3 x 10mm Plas-Fix® screws, fix the backing plate together with the mounting bracket. After the backing plate is connected to the mounting bracket, this provides a flat surface.
3. Attach a protective pad to the underside of the bracket using the die cutter outline, described in [Velcro® Mounting](#).

We recommend that you use a magnet with the specifications listed in the following table.

Diameter	20 mm
Height	5 mm
Coating	N42 – Ni-Cu-Ni plated
Pull	Typical 6.4 kg

Customized Mounting Options

To provide application-specific mounting of tag, you can customize the mounting bracket.

For example, you can create a custom mounting bracket for auto manufacturing applications by bonding or bolting a PTFE riser or rubber mount to the universal mounting bracket, as shown in the following figure.



Custom Magnetic Mounting on a Vehicle



Do not use these mounting options to attach a tag to:

- Vehicles that are driven on public highways.
- Vehicles that might travel at a high speed.

Fixing a Bracket to an Industrial Tag or Multi-mode Tag

After choosing a mounting option, fix either of the following brackets to an Industrial Tag or Multi-mode Tag:

- Universal mounting bracket supplied by Ubisense.
- Custom mounting bracket.

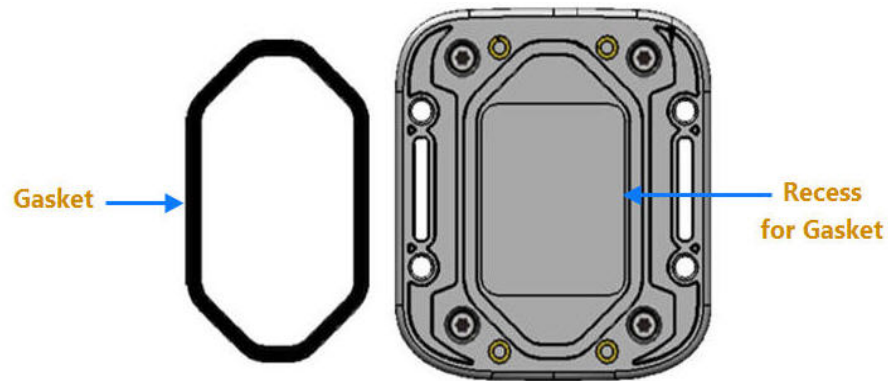
When fixing a bracket, depending on the environment in which the tag will be used, you can also use neoprene or silicon gaskets to form a watertight seal.

About Using Neoprene or Silicon Gaskets

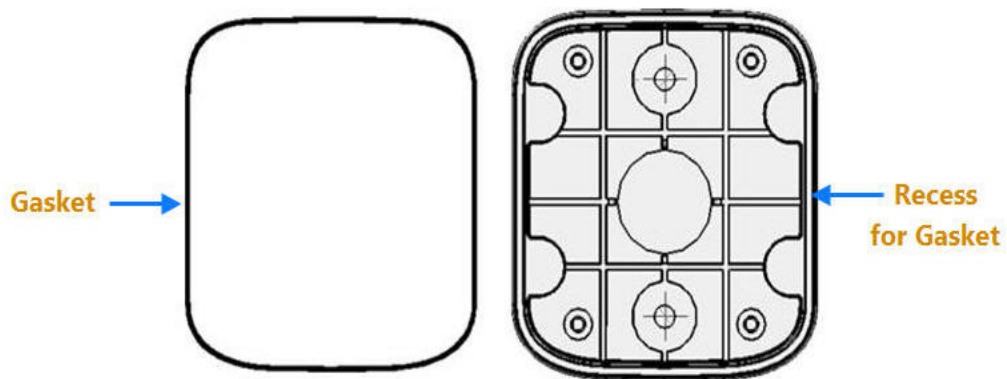
If your industrial environment is harsh, to form a complete watertight seal, you can fit neoprene or silicone gaskets between:

- The tag and the universal mounting bracket.
- The mounting bracket and host asset.

The tag and bracket include a recess (space) where you can fit the gasket, as shown in the following figures.



Recess for a Tag Gasket



Recess for a Bracket Gasket



Ensure that you choose an appropriate sealing material based on its temperature and media resistance. For information about various rubber characteristics, see:

https://www.rubbermanuk.co.uk/rubber_property.htm.

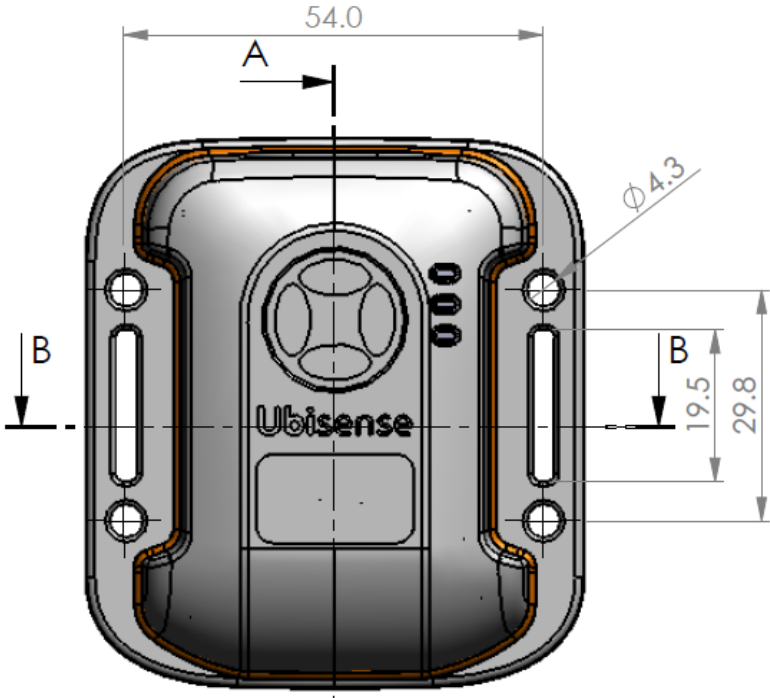
Fixing a Universal Mounting Bracket

You can fix a universal mounting bracket to a tag by using either:

- The four M4 x 10 mm A2 stainless steel screws that are supplied with the mounting bracket.
- Straps. The tag has strap apertures that are 19.5 mm long and 4 mm wide.

i If you are mounting a tag by using straps, we recommend that you use extruded polyester straps up to 19 mm wide.

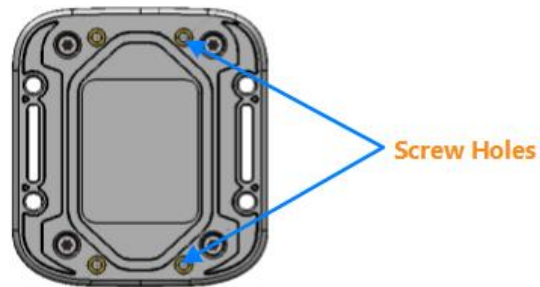
The dimensions of the screw and strap mounting holes on an Industrial Tag or Multi-mode Tag, are shown in the following figure.



Dimensions of Screw and Strap Mounting Holes

Fixing a Custom Bracket

To fix a custom bracket to a tag, connect the bracket directly to the tag, by using the four screw holes provided on the base of the tag, shown in the following figure.



Tag Screw Fixing Holes

The screw holes have the following dimensions:

- Diameter: 2.4 mm
- Depth: 6 mm

To ensure that the tag is held firmly in place, we recommend that you use self-tapping plastic screws:

- Diameter: 3 mm
- Length: 5.5 mm

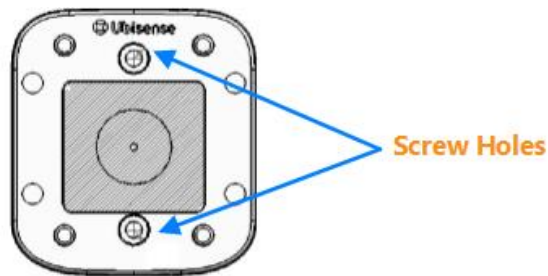
Fixing a Tag to a Host Asset



When fixing a tag to a host asset, you can optionally place a gasket between the bracket base and the host asset to create a watertight seal. For more information, see [About Using Neoprene or Silicon Gaskets](#).

If you fix a tag by using Adhesive foam, Velcro, or a Magnet, place the tag directly on the host asset.

To fix a tag to a host asset by using screws, use the M4 Cap Head screws supplied with the bracket. The screw holes on the bracket are shown in the following figure.



Top View of Universal Mounting Bracket Screw Fixing Holes

Replacing the Battery of Industrial Tags and Multi-mode Tags



Tag parameters are retained when the power source is removed from the tag.

This procedure explains how to replace the batteries of Ubisense Industrial Tags and Multi-mode Tags.

Prerequisites

Before you begin, ensure that you have the following tools and components:

- M3 Torx variable torque screwdriver (manual or electric), set to a torque of 0.8 Nm.
- Tadiran™ TL-2770 3.6 V Size-C (8.5Ah) Lithium Thionyl Chloride batteries. More information about Tadiran batteries is available at: <http://www.tadiranbatteries.de/pdf/lithium-thionyl-chloride-batteries/SL-2770.pdf>.
- Electrolube™ SOB01K contact treatment Oil 2X.
- A Metcal AC-YS4 Sponge.
- AF-SBU000 safebuds.

Precautions

When replacing the battery of an Industrial Tag or Multi-mode Tag, ensure that you:

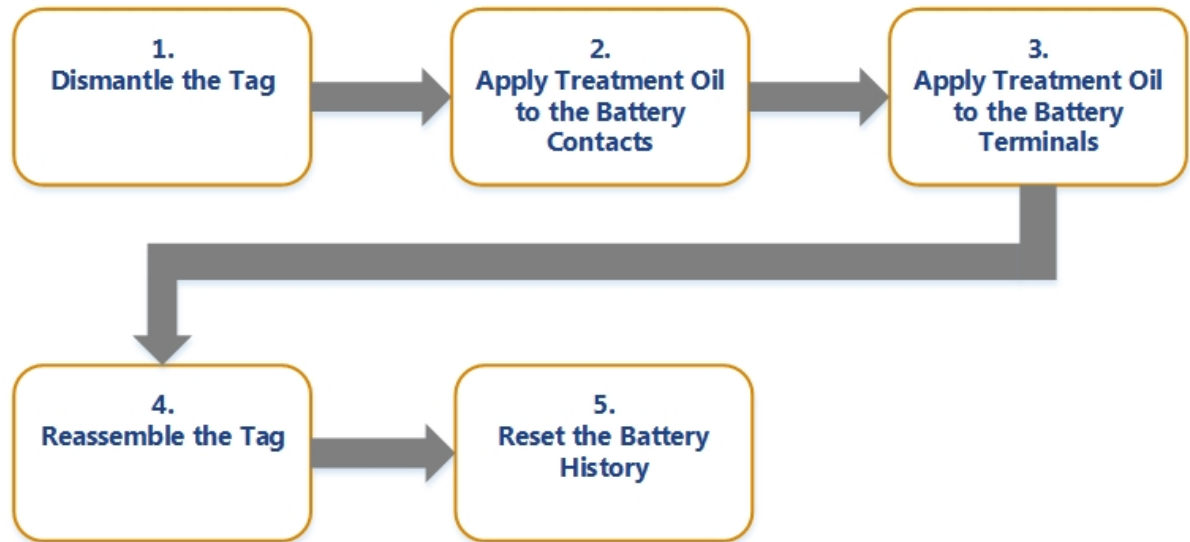
- Take anti-static precautions for dismantling and reassembling tag.
- Follow the Health and Safety (H&S) procedures and use appropriate protection, for example, wear eye protection and gloves.



When replacing the battery, do not separate the case lid (with the barcode label) and the Tag Module. If you do this, the module's programmed Tag ID will no longer be associated with the Tag ID on the barcode label.

Process

The process for replacing the battery of an Industrial Tag or Multi-mode Tag, is shown in the following figure.



Battery Replacement Process

You can replace the battery either with:

- An individual operator performing all the steps.
- A number of operators, each performing particular tasks described in the process.

Dismantling the Industrial Tag or Multi-mode Tag

To dismantle an Industrial Tag or Multi-mode Tag:

1. Place the tag upside down. You should be able to see the large Ubisense **CE** label.
2. By using an electric screwdriver, remove the four M3 x 10 mm screws.
To prevent plastic swarf contamination, any plastic swarf should be cleaned off the screws if you intend to reuse them. Otherwise, the screws can be discarded and replaced. You require new M3 x 10 mm stainless steel screws to reassemble the tag.
3. Carefully remove the top molding and place in a tray. When you remove the molding, you can see the module and carrier board.
4. Lift the carrier board and the old battery out of the base. Ensure that the gasket remains in place on the base molding.
5. Turn the base and top cases upside down to ensure any loose material falls out. Ensure that the gasket is placed properly when inverting the base molding.
6. Apply treatment oil to the carrier board and new battery, as described in [Applying Treatment Oil to the Battery Carrier Contacts](#).

Applying Treatment Oil to the Battery Carrier Contacts

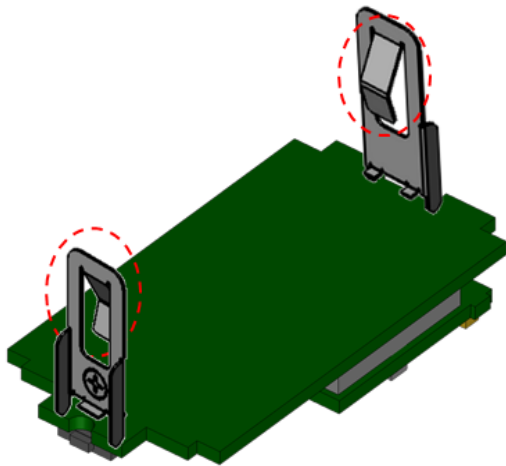
To prevent fretting of the battery contacts and the battery terminals, apply treatment oil to the battery carrier contacts.

We recommend that you purchase SOB01K Contact Treatment Oil 2X from Electrolube (Farnell part code 315-336). For more information about the SOB Electrolube 2X Oil, see the Technical Data Sheet available at: http://www.ulbrich-group.com/chemical-technical-products/TDS_ELECTROLUBE_SOB_2X_Contact_Treatment_Oil_eng.pdf.

This treatment oil is suitable for situations where a thin film of oil is required. You can also use the treatment oil to clean and remove any oil, grease, and dirt deposits from the contact surfaces.

Precaution: Apply Treatment Oil Only to Metal Contacts

Ensure that you apply the treatment oil to the area of the battery contact (the outside of the angled surface of the sprung clip portion) that touches the battery, shown in the following figure.



Angled Surfaces that Touch the Battery



Ensure that you apply the treatment oil only to the metal contacts. The treatment oil might have adverse effects on some paints, rubbers, and thermoplastics, including ABS/PC blends, such as those used for the enclosure.

The supplier describes various ways in which you can apply the treatment oil. However, because of the design of the battery contacts and the small area to which you must apply the treatment oil, we recommend that you use a safe bud (cotton bud), shown in the following figure.



Using a Safe Bud to Apply Treatment Oil

To apply the treatment oil:

1. Select a clean, dry area to work.
2. The Electrolube SOB01K treatment oil removes any small deposits from the battery contacts. However, if there is any hardened dirt or tarnish on the battery contacts, clean the contacts with a suitable material such as canvas, leather, cloth, hard wood, or abrasive that can absorb the oil.
3. Wet the safe bud with a small amount of the Electrolube SOB01K contact treatment oil 2X.
4. Apply the oil to both contacts in a circular motion to ensure a uniform, thin coverage.

The following figures show examples for applying the treatment oil correctly.

Applying Treatment Oil to the Battery Carrier Contacts



Correct Application of Treatment Oil



Too Much Treatment Oil Applied

Applying Treatment Oil to the Battery Terminals

To prepare the battery terminals:

1. Moisten a rectangular piece of sponge with Electrolube Contact Treatment Oil 2X. If you place a piece of paper on the moistened sponge, the paper should get slightly dampened:



Appropriate Quantity of Oil to Apply on Sponge

2. Place the negative terminal of the battery on the sponge. To apply a thin layer of treatment oil, move the battery on the sponge in a circular motion several times:



Apply slight pressure when moving the battery. Repeat this process by placing the positive terminal on the sponge.

Ensure that you do not apply too much treatment oil. The following figures show examples

Applying Treatment Oil to the Battery Terminals

for applying the treatment oil correctly.



Correct Application



Too Much Treatment Oil Applied

3. Leave the battery to dry for 10 minutes.

Reassembling the Tag

To reassemble the tag:

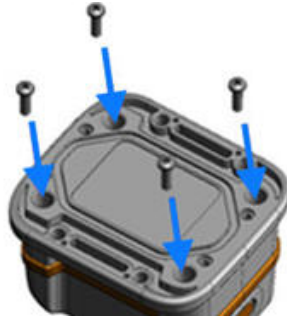
1. Discharge the capacitors on the carrier (module), to ensure that the tag does not receive power through the retained charge from the on-board capacitors. With the battery removed, press the button on the carrier board for at least 5 seconds. This ensures the Energy Counter based RAM variables are cleared.
2. Fit a new battery and PCB.
 - a. Check that the gasket is clean and undamaged.



It is very important to remove any dust or dirt on the gasket, particularly in the groove on both sides of the gasket and around the screw holes, as this may compromise the IP rating of the tag. A good way of removing the static that attracts the dust is to blow on the gasket and the tag.

- b. Check that the gasket on the base molding is fitted correctly and adjust the fitting if necessary.
 - c. Fit the new battery into the carrier, ensuring the battery contacts are centralized at both ends.
 3. Fit the module to the PCB, ensuring that the antenna and the top molding sealing edges are not damaged. Also ensure that the top molding with the bar code (Tag ID) is connected with the associated programmed module.
 - a. Place the carrier (with new battery) into the base molding.

When placing the carrier, use the wooden end of a safe bud to apply a small force to the spring clip of the battery carrier.
 - b. Fix the case together using four new stainless steel M3 x 10 mm Torx screws:



- c. Tighten the screws using an electric torque screwdriver, set to 0.8 Nm.
- d. As a final check, re-tighten the screws with a manual torque screwdriver, set to 0.8 Nm.



We recommend that you perform regular checks, especially on a variable torque screwdriver, to ensure that you are using the correct torque setting.

Disposing of Batteries

After you have replaced batteries, dispose of the old batteries according to the manufacturer's instructions, available at: <http://www.tadiranbat.com/index.php/shipping-and-information>.

Resetting the Battery History

After you have replaced the battery in a DIMENSION4 tag, you must reset the battery history of the tag. This enables you to:

- Clear all previous battery usage history
- Restart the battery history data collection process for the new battery

You can reset the battery history:

- If you have a license for the SmartSpace Visibility feature, on the Tag and Battery Status screen of SmartSpace Web. See [Resetting Battery Status](#) on the SmartSpace website.
- For tags which have been associated with a SmartSpace object, in SmartSpace Config on the TAG ASSOCIATION tab.
- By using the command-line tool `ubisense_tag_battery_replaced` and specifying the `<tag>` ID

For example:

```
ubisense_tag_battery_replaced 00:11:ce:00:00:De:ad:Be:ef
```

Or, by running `ubisense_tag_battery_replaced` without the `<tag>` argument and reading tag IDs from standard input

Note: This tool was introduced with version 3.6 and replaces the use of the `ubisense_battery_monitor_config` command-line tool in earlier 1.x versions.

Regulatory Information - Industrial Tags

Regulatory Information for United States of America

The Ubisense tag is a wideband wireless device certified under FCC Part 15.250. Its use is subject to technical requirements for wideband systems. Users should note carefully the following information:

- Operation on board an aircraft or a satellite is prohibited.
- 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.

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.

Users should also carefully note the following information:



Any changes or modifications made to the device, which are not expressly approved by Ubisense Limited could void the user's authority to operate the equipment.

Regulatory Information for Canada

This Ubisense tag is approved under Industry Canada documents RSS-GEN, RSS-210 and RSS-220.

This device complies with Industry 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.

Cet appareil est conforme avec Industrie Canada RSS standard exempts de licence (s). Son utilisation est soumise aux deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

This Class B digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada, ICES-3 (B)/NMB-3(B).



CAUTION: Any changes or modifications made to the device which are not expressly approved by Ubisense Limited could void the user's authority to operate the equipment. This device must only be used indoors.

Regulatory Information for Europe

CE 0889

Hereby, Ubisense declares that this Ubisense tag is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. A copy of the Declaration of Conformity for this equipment may be obtained from:

Ubisense
St. Andrew's House
St. Andrews Road
Chesterton
Cambridge
CB4 1DL, United Kingdom

This UWB transmitter must not be installed at a fixed outdoor location or used in flying models, aircraft and other forms of aviation.

Regulatory Information - Multi-mode Tags



Multi-mode Tags are not available in Canada.

Regulatory Information for United States of America

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- Operation on board an aircraft or a satellite is prohibited.
- 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.

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.

Users should also carefully note the following information.



Any changes or modifications made to the device, which are not expressly approved by Ubisense Limited could void the user's authority to operate the equipment.

Regulatory Information for Europe

CE 0889

Hereby, Ubisense declares that this Ubisense tag is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. A copy of the Declaration of Conformity for this equipment may be obtained from:

Ubisense
St. Andrew's House
St. Andrews Road
Chesterton
Cambridge
CB4 1DL
United Kingdom

This UWB transmitter must not be installed at a fixed outdoor location or used in flying models, aircraft and other forms of aviation.