# Terabee People Counting L-XL

# User manual

PoE Model
LoRa Model



Document version 3.0

Technical support: terabee.com/support
Sales and commercial support: terabee-sales@terabee.com

Many thanks for buying our People Counting L-XL device.

Using our product will allow you to be fully GDPR compliant and maintain the privacy of your customers while acquiring an accurate count for all your people counting needs.

If you have any questions or remarks regarding the product, please contact your commercial representative or our support team here: terabee.com/support



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# 1. General information and important notice

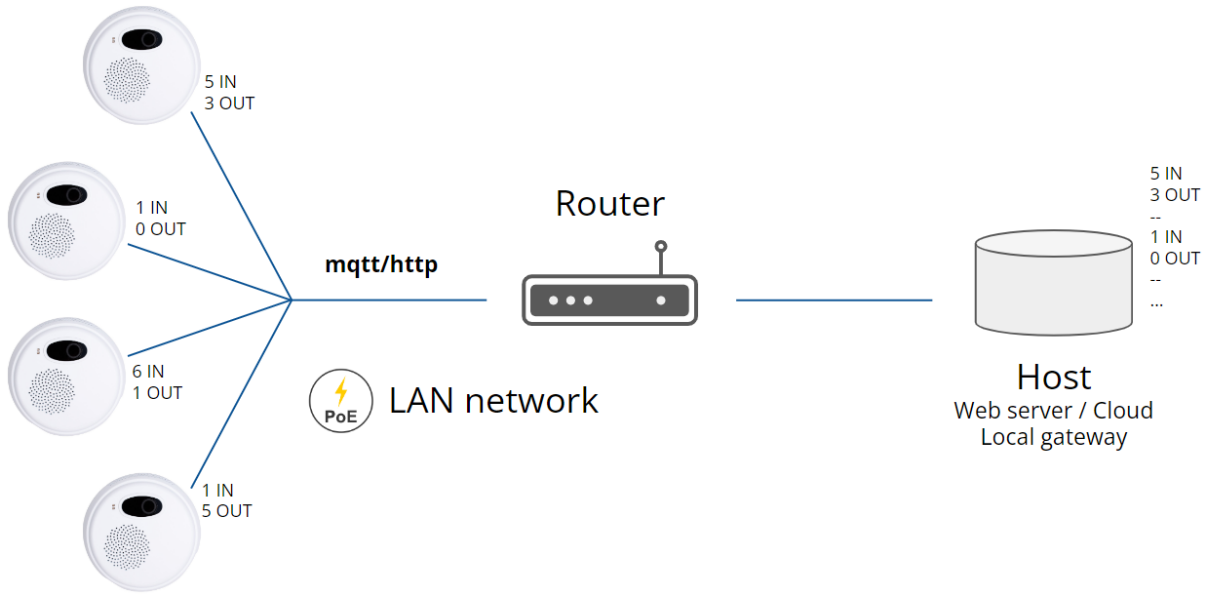
## 1.1. Content declaration

This user manual is intended for integrators and solution providers, applicable for **software version 3.4.1** and later of the People Counting L-XL. It includes instructions for installing, configuring, and using the device on your network. Basic knowledge of network configuration and the specific network in which the sensor is operated is required when using this product.

## 1.2. Product overview

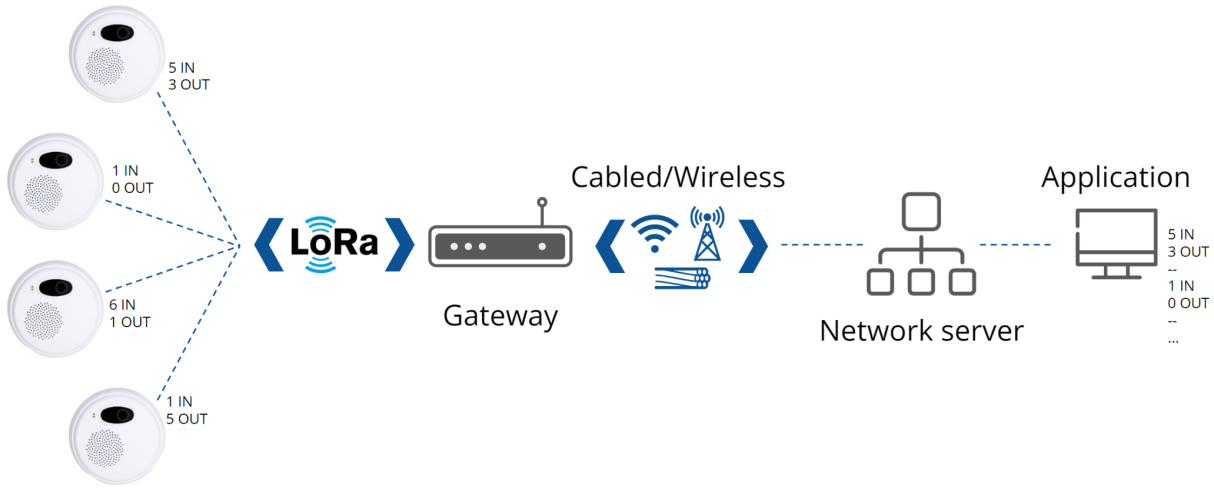
People Counting L-XL is available in two different versions:

1. **People Counting L-XL PoE version** is intended to (1) be used in a LAN network, connected via PoE (Power over Ethernet) using the **PoE IEEE 802.3af** standard, which delivers **15W** per port ; (2) interoperate with a compatible computer via the LAN network and a host such as a cloud platform or web server able to receive HTTP(S) or MQTT(S) payloads. Please note that Terabee delivers only the hardware product. The rest of the LAN infrastructure should be handled by the user.




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2. **People Counting L-XL LoRa version** is intended to (1) be used in a LoRa infrastructure powered via micro USB in **5 V** and **2.5 A** ; (2) interoperate with a compatible computer via the device WiFi access point and a LoRa gateway able to receive the LoRa packets and send them to a network server. Please note that Terabee delivers only the hardware product. The rest of the LoRaWAN infrastructure should be handled by the user.




## 1.3. SKU information

| Device name | Device SKU | Data transmission | Power requirement |
|---|---|---|---|
| Terabee People Counting L-XL PoE White | TB-PCL-XL-W | PoE / Ethernet | PoE IEEE 802.3af<br>5 VDC - 2.5 A |
| Terabee People Counting L-XL PoE Black | TB-PCL-XL-B | PoE / Ethernet | PoE IEEE 802.3af<br>5 VDC - 2.5 A |
| Terabee People Counting L-XL LoRa EU White | TB-PCL-XL-LORA-EU-W | LoRaWAN 863 to 870 MHz / Ethernet | 5 VDC - 2.5 A |
| Terabee People Counting L-XL LoRa EU Black | TB-PCL-XL-LORA-EU-B | LoRaWAN 863 to 870 MHz / Ethernet | 5 VDC - 2.5 A |
| Terabee People Counting L-XL LoRa US White | TB-PCL-XL-LORA-US-W | LoRaWAN 902 to 928 MHz / Ethernet | 5 VDC - 2.5 A |
| Terabee People Counting L-XL LoRa US Black | TB-PCL-XL-LORA-US-B | LoRaWAN 902 to 928 MHz / Ethernet | 5 VDC - 2.5 A |

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# 1.4. Safety and regulatory statement

## 1.4.1. Use and care





⚠ **Make sure to remove the plastic film on the optical part before using the product** ⚠

**EN** Please handle your People Counting L-XL with care. It is not waterproof, make sure to keep it away from any liquids. This product is not a toy; keep it away from children. The People Counting L-XL PoE version is intended to interoperate on a LAN network enabled with PoE (for the PoE version) or on a wireless LoRaWAN network (for the LoRa version).

Changes or modifications to this product not expressly approved by Terabee could void its compliance to test standards and negate the user's authority to operate it. The product comes with plastic film protection on the black optical part. This helps prevent dust and scratches during shipment and installation of the device. To avoid wrong counts, **please remove the plastic film** shown in the above pictures before powering the device for the first time and during normal operation.

**FR** Veuillez manipuler votre People Counting L-XL avec soin. Il n'est pas étanche, veillez à le tenir à l'écart de tout liquide. Ce produit n'est pas un jouet, veillez à le tenir éloigné des enfants. Le People Counting L-XL version PoE est destiné à fonctionner sur un réseau LAN activé en PoE (pour la version PoE) ou sur un réseau sans fil LoRaWAN (pour la version LoRa).

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Les changements ou modifications apportés à ce produit sans l'approbation expresse de Terabee peuvent annuler sa conformité aux normes de test et annuler le droit de l'utilisateur à le faire fonctionner. Le produit est livré avec un film plastique de protection sur la partie optique noire. Cela permet d'éviter la poussière et les rayures pendant l'expédition et avant l'installation de l'appareil. Pour éviter les erreurs de comptage, **veuillez retirer le film plastique** comme indiqué sur les photos ci-dessus avant de mettre l'appareil sous tension pour la première fois et pendant son fonctionnement normal.

**DE** Bitte behandeln Sie Ihr People Counting L-XL mit Sorgfalt. Es ist nicht wasserdicht, halten Sie es bitte von Flüssigkeiten fern. Dieses Produkt ist kein Spielzeug. Bitte halten Sie es von Kindern fern. Die People Counting L-XL PoE-Version ist für den Betrieb in einem PoE-fähigen LAN-Netzwerk (für die PoE-Version) oder in einem drahtlosen LoRaWAN-Netzwerk (für die LoRa-Version) vorgesehen.

Änderungen oder Modifikationen an diesem Produkt, die nicht ausdrücklich von Terabee genehmigt wurden, können dazu führen, dass es nicht mehr den Teststandards entspricht und der Benutzer nicht mehr berechtigt ist, es zu betreiben. Das Produkt wird mit einer Kunststofffolie zum Schutz des schwarzen optischen Teils geliefert. Dadurch werden Staub und Kratzer während des Transports und vor der Installation des Geräts vermieden. Um Fehlzählungen zu vermeiden, **entfernen Sie bitte die Plastikfolie** wie auf den obigen Bildern gezeigt, bevor Sie das Gerät zum ersten Mal einschalten und während des normalen Betriebs.

**ES** Por favor, maneje su People Counting L-XL con cuidado. No es impermeable, asegúrese de mantenerlo alejado de cualquier líquido. Este producto no es un juguete, asegúrese de mantenerlo alejado de los niños. La versión PoE de People Counting L-XL está pensada para interoperar en una red LAN habilitada en PoE (para la versión PoE) o en una red inalámbrica LoRaWAN (para la versión LoRa).

Los cambios o modificaciones de este producto no aprobados expresamente por Terabee podrían anular su conformidad con las normas de ensayo y anular la autoridad del usuario para utilizarlo. El producto viene con una película de plástico de protección en la parte óptica negra. Esto ayuda a evitar el polvo y los arañazos durante el envío y antes de instalar el dispositivo. Para evitar recuentos erróneos, **retire la película de plástico** como se muestra en las imágenes anteriores antes de encender el dispositivo por primera vez y durante el funcionamiento normal.

**IT** Si prega di maneggiare con cura il People Counting L-XL. Non è impermeabile, assicurarsi di tenerlo lontano da qualsiasi liquido. Questo prodotto non è un giocattolo, assicurarsi di tenerlo lontano dai bambini. Il People Counting L-XL versione PoE è destinato a interagire su una rete LAN abilitata a PoE (per la versione PoE) o su una rete wireless LoRaWAN (per la versione LoRa).

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Cambiamenti o modifiche a questo prodotto non espressamente approvati da Terabee possono invalidare la sua conformità agli standard di prova e negare all'utente l'autorizzazione a utilizzarlo. Il prodotto è dotato di una pellicola di protezione in plastica sulla parte ottica nera. Questo aiuta a prevenire polvere e graffi durante la spedizione e prima dell'installazione del dispositivo. Per evitare conteggi errati, si prega di **rimuovere la pellicola di plastica** come mostrato nelle immagini precedenti prima di accendere il dispositivo per la prima volta e durante il normale funzionamento.

**NL** Ga voorzichtig om met je People Counting L-XL. Het is niet waterdicht, dus houd het uit de buurt van vloeistoffen. Dit product is geen speelgoed, houd het uit de buurt van kinderen. De People Counting L-XL PoE versie is bedoeld voor gebruik op een LAN netwerk met PoE (voor PoE versie) of op een draadloos LoRaWAN netwerk (voor LoRa versie).

Wijzigingen of aanpassingen aan dit product die niet uitdrukkelijk door Terabee zijn goedgekeurd, kunnen de conformiteit met de testnormen tenietdoen en de bevoegdheid van de gebruiker om het te bedienen tenietdoen. Het product wordt geleverd met een plastic filmbescherming op het zwarte optische gedeelte. Dit helpt stof en krassen te voorkomen tijdens de verzending en voordat u het apparaat installeert. Om verkeerde tellingen te voorkomen dient u de **plastic film te verwijderen** zoals op de bovenstaande foto's voordat u het apparaat voor het eerst aanzet en tijdens normaal gebruik.

**PT** Por favor, manuseie com cuidado o seu People Counting L-XL. Não é à prova de água, certifique-se de o manter afastado de quaisquer líquidos. Este produto não é um brinquedo, assegure-se de o manter afastado das crianças. A versão People Counting L-XL PoE destina-se a interoperar numa rede LAN activada em PoE (para a versão PoE) ou numa rede LoRaWAN sem fios (para a versão LoRa).

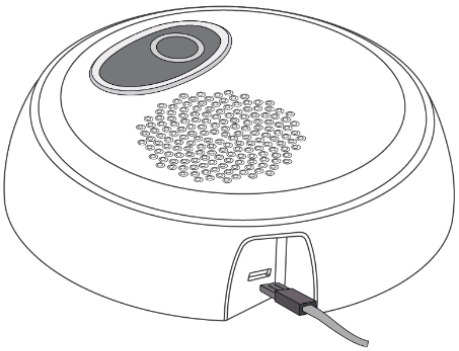
Alterações ou modificações a este produto não expressamente aprovadas pela Terabee poderiam anular a sua conformidade para testar as normas e negar a autoridade do utilizador para o operar. O produto vem com uma protecção de película plástica na parte óptica preta. Isto ajuda a evitar pó e riscos durante a expedição e antes da instalação do dispositivo. Para evitar contagens erradas, **remova a película de plástico**, como se mostra nas imagens acima, antes de ligar o dispositivo pela primeira vez e durante o funcionamento normal.

**SE** Var försiktig när du hanterar din People Counting L-XL. Den är inte vattentät, se till att hålla den borta från vätskor. Den här produkten är inte en leksak, se till att hålla den borta från barn. People Counting L-XL PoE-versionen är avsedd att fungera i ett LAN-nätverk som är aktiverat i PoE (för PoE-versionen) eller i ett trådlöst LoRaWAN-nätverk (för LoRa-versionen).

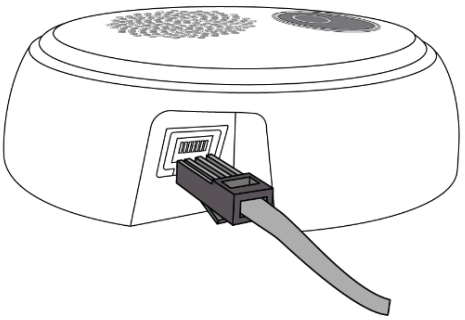
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Ändringar eller modifieringar av den här produkten som inte uttryckligen godkänts av Terabee kan göra dess överensstämmelse med teststandarderna ogiltig och förneka användarens behörighet att använda den. Produkten levereras med ett plastfilmsskydd på den svarta optiska delen. Detta hjälper till att förhindra damm och repor under transporten och innan enheten installeras. För att undvika felaktiga räkningar bör du ta **bort plastfilmen** enligt bilderna ovan innan du sätter igång enheten för första gången och under normal drift.

### 1.4.2. Safety instructions



**Micro USB 5 VDC - 2.5 A**
(LoRa version)



**RJ45 PoE (PoE IEEE 802.3af)**
(PoE version)

**EN** Functioning and safety of the device is ensured by (1) using the product in an operating temperature range of 0 to 35°C ; (2) for the **LoRa version** using a power supply circuit (5 VDC) which must be an ES1 and PS2 circuit according to the classifications of the IEC 62368-1: 2014 standard ; (3) for the **PoE version** using the PoE IEEE 802.3af standard ; (4) power the device accordingly as shown on the above schematics.

**FR** Le fonctionnement et la sécurité du dispositif sont assurés (1) en utilisant le produit dans une plage de température de fonctionnement de 0 à 35°C ; (2) pour la **version LoRa**, en utilisant un circuit d'alimentation (5VDC) qui doit être un circuit ES1 et PS2 selon les classifications de la norme IEC 62368-1 : 2014 ; (3) pour la **version PoE**, en utilisant la norme PoE IEEE 802.3af ; (4) en alimentant le dispositif en conséquence comme indiqué sur les schémas ci-dessus.

**DE** Die Funktion und Sicherheit des Geräts wird dadurch gewährleistet, dass (1) das Produkt in einem Betriebstemperaturbereich von 0 bis 35°C verwendet wird; (2) für die **LoRa-Version** ein Stromversorgungskreis (5VDC) verwendet wird, bei dem es sich um einen ES1- und PS2-Stromkreis gemäß den Klassifizierungen der Norm IEC 62368-1: 2014 handeln muss; (3) für die **PoE-Version** der PoE-Standard IEEE 802.3af verwendet

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wird; (4) das Gerät entsprechend den oben dargestellten Schaltplänen mit Strom versorgt wird.

**ES** El funcionamiento y la seguridad del dispositivo se garantizan (1) utilizando el producto en un rango de temperatura de funcionamiento de 0 a 35°C ; (2) para la **versión LoRa** utilizando un circuito de alimentación (5VDC) que debe ser un circuito ES1 y PS2 de acuerdo con las clasificaciones de la norma IEC 62368-1: 2014 ; (3) para la **versión PoE** utilizando la norma PoE IEEE 802.3af ; (4) alimentar el dispositivo de acuerdo con lo indicado en el esquema anterior.

**IT** Il funzionamento e la sicurezza del dispositivo sono garantiti da (1) l'utilizzo del prodotto in un intervallo di temperatura operativa compreso tra 0 e 35°C; (2) per la **versione LoRa**, l'utilizzo di un circuito di alimentazione (5VDC) che deve essere un circuito ES1 e PS2 secondo le classificazioni dello standard IEC 62368-1: 2014; (3) per la **versione PoE**, l'utilizzo dello standard PoE IEEE 802.3af; (4) l'alimentazione del dispositivo come indicato negli schemi sopra riportati.

**NL** De werking en de veiligheid van het apparaat worden gewaarborgd door (1) het product te gebruiken in een bedrijfstemperatuurbereik van 0 tot 35°C ; (2) voor de **LoRa-versie** een voedingscircuit (5VDC) te gebruiken dat een ES1- en PS2-circuit moet zijn overeenkomstig de classificaties van de IEC 62368-1: 2014-norm ; (3) voor de **PoE-versie** de PoE IEEE 802.3af-norm te gebruiken ; (4) het apparaat overeenkomstig de bovenstaande schema's van stroom te voorzien.

**PT** O funcionamento e segurança do dispositivo é assegurado (1) utilizando o produto numa gama de temperaturas de funcionamento de 0 a 35°C ; (2) para a **versão LoRa** utilizando um circuito de alimentação (5VDC) que deve ser um circuito ES1 e PS2 de acordo com as classificações da norma IEC 62368-1: 2014 ; (3) para a **versão PoE** utilizando a norma PoE IEEE 802.3af ; (4) alimentar o dispositivo em conformidade com os esquemas acima indicados.

**SE** Enhetens funktion och säkerhet säkerställs genom att (1) använda produkten i ett driftstemperaturintervall på 0-35 °C, (2) för **LoRa-versionen** använda en strömförsörjningskrets (5 VDC) som måste vara en ES1- och PS2-krets enligt klassificeringarna i standarden IEC 62368-1: 2014, (3) för **PoE-versionen** använda PoE-standarden IEEE 802.3af, (4) strömförsörja enheten i enlighet med vad som framgår av ovanstående scheman.

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### 1.4.3. EU Regulatory statements

CE

**EN** The manufacturer, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, France) hereby declares that the People Counting L-XL complies with European RED and RoHS Directives. The full text of the EU declaration of conformity, including the product frequency bands and maximum radio frequency power is available on request. Please contact us via terabee.com/support.

**FR** Le fabricant, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, France) déclare par la présente que le People Counting L-XL est conforme aux directives européennes RED et RoHS. Le texte complet de la déclaration de conformité de l'UE, y compris les bandes de fréquences du produit et la puissance maximale des fréquences radio, est disponible sur demande. Veuillez nous contacter via terabee.com/support.

**DE** Der Hersteller, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, Frankreich) erklärt hiermit, dass das People Counting L-XL den europäischen Richtlinien RED und RoHS entspricht. Der vollständige Text der EU-Konformitätserklärung, einschließlich der Produktfrequenzbänder und der maximalen Funkfrequenzleistung, ist auf Anfrage erhältlich. Bitte kontaktieren Sie uns über terabee.com/support.

**IT** Il produttore, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, Francia) dichiara che il People Counting L-XL è conforme alle direttive europee RED e RoHS. Il testo completo della dichiarazione di conformità UE, comprese le bande di frequenza del prodotto e la potenza massima in radiofrequenza, è disponibile su richiesta. Contattateci tramite il sito terabee.com/support.

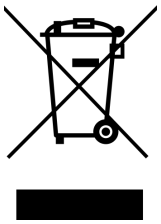
**NL** De fabrikant, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, Frankrijk) verklaart hierbij dat de People Counting L-XL voldoet aan de Europese RED- en RoHS-richtlijnen. De volledige tekst van de EU-conformiteitsverklaring, inclusief de productfrequentiebanden en het maximale radiofrequentievermogen, is op verzoek verkrijgbaar. Neem contact met ons op via terabee.com/support.

**ES** El fabricante, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, Francia) declara por la presente que el People Counting L-XL cumple con las directivas europeas RED y RoHS. El texto completo de la declaración de conformidad de la UE, incluidas las bandas de frecuencia del producto y la potencia máxima de radiofrecuencia, está disponible bajo petición. Póngase en contacto con nosotros a través de terabee.com/support.

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**PT** O fabricante, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, França) declara por este meio que a People Counting L-XL cumpre as directivas europeias RED e RoHS. O texto completo da declaração de conformidade da UE, incluindo as bandas de frequência do produto e a potência máxima de radiofrequência, está disponível a pedido. Por favor contacte-nos através de terabee.com/support.

**SE** Tillverkaren, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, Frankrike), förklarar härmed att People Counting L-XL överensstämmer med de europeiska direktiven RED och RoHS. Den fullständiga texten till EU:s försäkran om överensstämmelse, inklusive produktens frekvensband och maximal radiofrekvenseffekt, finns tillgänglig på begäran. Vänligen kontakta oss via terabee.com/support.



**EN** This symbol indicates that your product must be disposed of according to local laws and regulations without mixing it with unsorted municipal waste. When your product reaches its end of life, contact Terabee or your local authorities to learn about recycling options. Proper treatment and recycling of your product will help conserving natural resources, protecting environment and human health.

**FR** Ce symbole indique que votre produit doit être éliminé conformément aux lois et réglementations locales, sans le mélanger aux déchets municipaux non triés. Lorsque votre produit atteint sa fin de vie, contactez Terabee ou les autorités locales pour connaître les possibilités de recyclage. Le traitement et le recyclage appropriés de votre produit contribueront à la conservation des ressources naturelles, à la protection de l'environnement et de la santé humaine.

**DE** Dieses Symbol zeigt an, dass Ihr Produkt gemäß den örtlichen Gesetzen und Vorschriften entsorgt werden muss, ohne es mit unsortiertem Siedlungsabfall zu vermischen. Wenn Ihr Produkt das Ende seiner Lebensdauer erreicht hat, wenden Sie sich an Terabee oder an Ihre örtlichen Behörden, um sich über Recyclingmöglichkeiten zu informieren. Die ordnungsgemäße Behandlung und das Recycling Ihres Produkts tragen dazu bei, die natürlichen Ressourcen zu erhalten und die Umwelt und die menschliche Gesundheit zu schützen.

**IT** Questo simbolo indica che il prodotto deve essere smaltito secondo le leggi e le normative locali, senza mescolarlo con i rifiuti urbani non differenziati. Quando il prodotto raggiunge la fine del suo ciclo di vita, contattare Terabee o le autorità locali per

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conoscere le opzioni di riciclaggio. Il trattamento e il riciclaggio corretto del prodotto contribuiranno a preservare le risorse naturali, a proteggere l'ambiente e la salute umana.

**NL** Dit symbool geeft aan dat uw product volgens de plaatselijke wet- en regelgeving moet worden afgevoerd en niet mag worden gemengd met ongesorteerd gemeentelijk afval. Als uw product het einde van zijn levensduur heeft bereikt, neem dan contact op met Terabee of uw lokale autoriteiten voor informatie over de mogelijkheden voor recycling. Een juiste behandeling en recycling van uw product draagt bij aan het behoud van natuurlijke hulpbronnen, de bescherming van het milieu en de volksgezondheid.

**ES** Este símbolo indica que su producto debe ser eliminado de acuerdo con las leyes y regulaciones locales sin mezclarlo con residuos municipales no clasificados. Cuando su producto llegue al final de su vida útil, póngase en contacto con Terabee o con las autoridades locales para conocer las opciones de reciclaje. El tratamiento y el reciclaje adecuados de su producto ayudarán a conservar los recursos naturales y a proteger el medio ambiente y la salud humana.

**PT** Este símbolo indica que o seu produto deve ser eliminado de acordo com as leis e regulamentos locais, sem o misturar com resíduos municipais não triados. Quando o seu produto chegar ao fim de vida, contacte a Terabee ou as suas autoridades locais para se informar sobre as opções de reciclagem. O tratamento e reciclagem adequados do seu produto ajudarão a conservar os recursos naturais, protegendo o ambiente e a saúde humana.

**SE** Den här symbolen visar att produkten måste kasseras i enlighet med lokala lagar och bestämmelser utan att blandas med osorterat kommunalt avfall. När din produkt har nått slutet av sin livslängd ska du kontakta Terabee eller dina lokala myndigheter för att få information om återvinningsalternativ. Korrekt behandling och återvinning av din produkt bidrar till att bevara naturresurser, skydda miljön och människors hälsa.



**EN** This device is intended for indoor use only, please make sure not to expose and install it in an outdoor environment.

**FR** Cet appareil est destiné à être utilisé à l'intérieur uniquement, veillez à ne pas l'exposer et à ne pas l'installer dans un environnement extérieur.

**DE** Dieses Gerät ist nur für die Verwendung in Innenräumen vorgesehen. Bitte achten Sie darauf, dass es nicht im Freien aufgestellt wird.

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**ES** Este dispositivo está destinado únicamente a su uso en interiores, por favor, asegúrese de no exponerlo e instalarlo en un entorno exterior.

**IT** Questo dispositivo è destinato esclusivamente all'uso in ambienti interni; assicurarsi di non esporlo e installarlo in un ambiente esterno.

**NL** Dit apparaat is alleen bedoeld voor gebruik binnenshuis, zorg ervoor dat het niet wordt blootgesteld en geïnstalleerd in een buitenomgeving.

**PT** Este dispositivo destina-se apenas a uso interior, por favor certifique-se de que não o expõe e instala num ambiente exterior.

**SE** Den här enheten är endast avsedd för inomhusbruk, se till att den inte exponeras och installeras i en utomhusmiljö.



**EN** This symbol indicates that the device requires a direct and continuous current (DC).
NOTE: PCL-XL LoRa version must be powered with a 5V DC - 2.5 A power supply.

**FR** Ce symbole indique que l'appareil nécessite un courant continu (DC).
NOTE: La version PCL-XL LoRa doit être alimentée par une alimentation 5V DC - 2.5 A.

**DE** Dieses Symbol zeigt an, dass das Gerät einen kontinuierlichen und permanenten Strom (DC) benötigt.
HINWEIS: Die PCL-XL LoRa-Version muss mit einem 5V DC - 2.5 A Netzteil versorgt werden.

**ES** Este símbolo indica que el dispositivo requiere una corriente continua (DC).
NOTA: La versión PCL-XL LoRa debe ser alimentada por una fuente de alimentación de 5V DC - 2.5 A.

**IT** Questo simbolo indica che il dispositivo richiede una corrente continua (DC).
NOTA: la versione PCL-XL LoRa deve essere alimentata da una tensione di 5V DC - 2,5 A.

**NL** Dit symbool geeft aan dat het apparaat een continue gelijkstroom (DC) nodig heeft.
OPMERKING: De PCL-XL LoRa-versie moet worden gevoed door een 5V DC - 2,5 A.

**PT** Este símbolo indica que o dispositivo requer uma corrente contínua directa (CC).
NOTA: A versão PCL-XL LoRa deve ser alimentada por um 5V DC - 2.5 A.

**SE** Den här symbolen visar att enheten kräver kontinuerlig likström.
OBS: PCL-XL LoRa-versionen måste drivas av en 5V DC - 2,5 A.

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### 1.4.4. UK Regulatory statements

The manufacturer, Terabee SAS (90 rue Henri Fabre, 01630 Saint-Genis-Pouilly, France) hereby declares that the People Counting L-XL complies with UKCA Directives.

### 1.4.5. US and Canada Regulatory statements

This equipment complies with FCC/ISED radiation exposure limits set forth for an uncontrolled environment. 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.

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 provide 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.

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## 1.5. Package contents

- People Counter device **x1**
- People Counter ID card **x1**
- Mounting plate **x1**
- Concrete screws and wall plug **x3**
- Plaster screws and wall plug **x3**




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## 1.6. Connectivity requirements

### 1.6.1. Protocols used

- PoE version
  - HTTP/HTTPS
  - MQTT/MQTTS
- LoRa version
  - LoRaWAN 1.0.3

### 1.6.2. Ports

- Outbound:
  - 53 (DNS)
  - 80/443 (HTTP)
  - 1883/8883 (MQTT)
- Inbound: None
- Domains to whitelist: ***.terabee.com**

### 1.6.3. Data traffic

The current rough estimate: 20 MiB daily (15 MiB down and 5 MiB up) for the PoE version.

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# 2. Prerequisites

Make sure to respect our prerequisites and recommendations before you install your People Counting L-XL.

Here is a quick checklist:

- ❏ The point of installation is clearly identified
- ❏ There is no direct sunlight exposure on the ground
- ❏ Installation height and minimum clearance from the vertical wall can be respected
- ❏ Doors and entryway dimensions correspond to the monitoring area coverage
- ❏ PoE, or an electrical outlet is available at the point of installation

If you cannot fulfill one or several points mentioned above, or if you are unsure about one of the above, please contact your commercial representative or our support team here: terabee.com/support. We will help you resolve any problems.

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# 3. Device installation

## 3.1. Guidelines and recommendations for installation

### 3.1.1. Installation height and wall clearance

The Terabee People Counting L-XL is designed for installation on the ceiling. The size of the monitored area varies depending on the installation height. The higher the device is installed, the wider the monitored area will be.

To maximize the people counting monitoring area, you must install the device with some clearance from the wall, including the monitored passage.

The table below gives monitoring width variation and wall clearance, depending on the installation height for one device.

| Installation height (m) | Door or corridor width (m) | Min clearance from wall (m) |
|---|---|---|
| 2.40 (min installation height) | 1.50 | 0.30 |
| 2.50 | 1.55 | 0.30 |
| 2.60 | 1.60 | 0.30 |
| 2.70 | 1.70 | 0.40 |
| 2.80 | 1.80 | 0.40 |
| 2.90 | 1.90 | 0.50 |
| 3.00 | 2.10 | 0.50 |
| 3.10 | 2.20 | 0.60 |
| 3.20 | 2.30 | 0.60 |
| 3.30 | 2.40 | 0.60 |
| 3.40 | 2.50 | 0.60 |
| 3.50 | 2.60 | 0.70 |
| 3.60 | 2.75 | 0.70 |
| 3.70 | 2.90 | 0.70 |
| 3.80 | 3.05 | 0.80 |
| 3.90 | 3.20 | 0.80 |
| 4.00 (max installation height) | 3.40 | 0.90 |

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### 3.1.2. Sunlight exposure

The Terabee People Counting L-XL works in the infrared wavelength, just like the sun, which can affect the device's operation.

To avoid any problem, installing the device inside your building where the sun's reflection is not projected onto the ground is recommended.

If it is impossible to install the device in this way, try the following:

- Lower the device to make sure that the impact of the direct sunlight on the field of view is reduced
- Place non-reflective flooring in the exact place where sunlight hits

### 3.1.3. Obstacles and external infrared sources



Avoid placing the Terabee People Counting L-XL above Exit signs or any obstacles that could block the FoV or create interference.

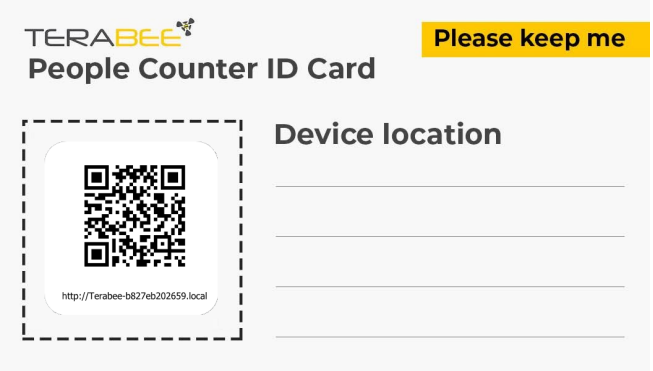
On some rare occasions, other infrared sources, such as automatic door sensors or security cameras, can impact the device's operation.

If you observe abnormal counts or a highly affected infrared image (black pixels), move the device and check if the problem persists.

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### 3.1.4. People Counting ID card

This is the Terabee People Counting L-XL identification card. It connects to the device to set the parameters and record the location information once the device is installed.

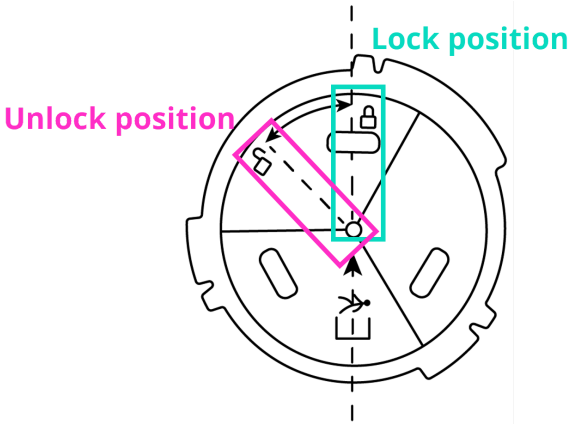



Scanning the QR code on the left allows you to connect to the device. The empty fields on the right side allow you to record information during the installation. It is recommended to note information such as building name, area name, and door name where the device is installed.

*Please keep this card after installing your device; you may have to use it in case of device maintenance or when you contact our technical support team*

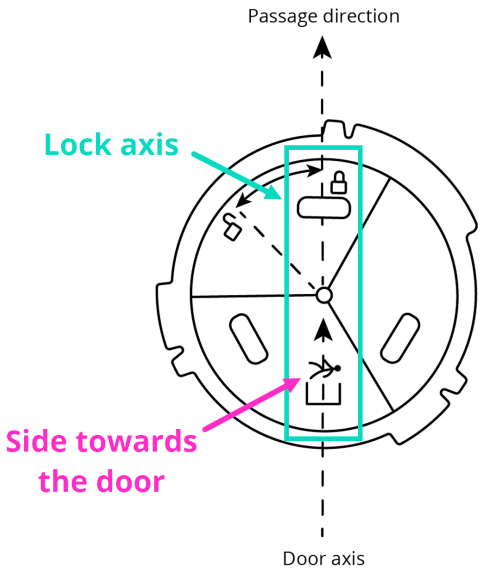
### 3.1.5. Device orientation and mounting plate

The device must be **correctly oriented** above the monitored door. For this purpose, the mounting plate will serve as the base of the People Counting L-XL and has to be correctly installed.



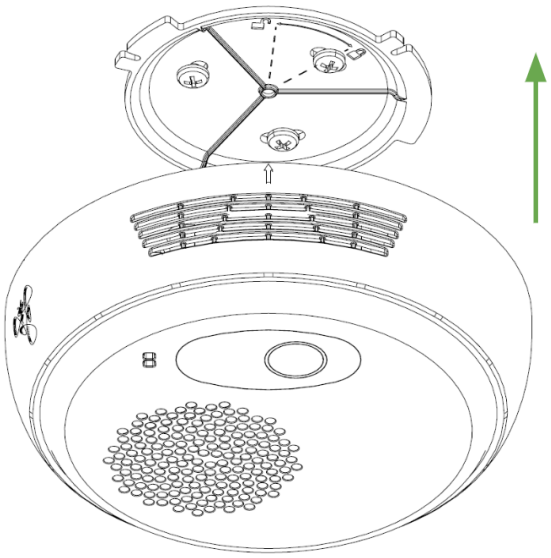

On the mounting plate are indicated two locks that specify the “unlock” and “lock” positions of the Terabee People Counting L-XL device

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When installing the mounting plate, make sure to have the **lock axis perpendicular to the door and point the icon of the person leaving the door to the door**

This will give the device the correct orientation



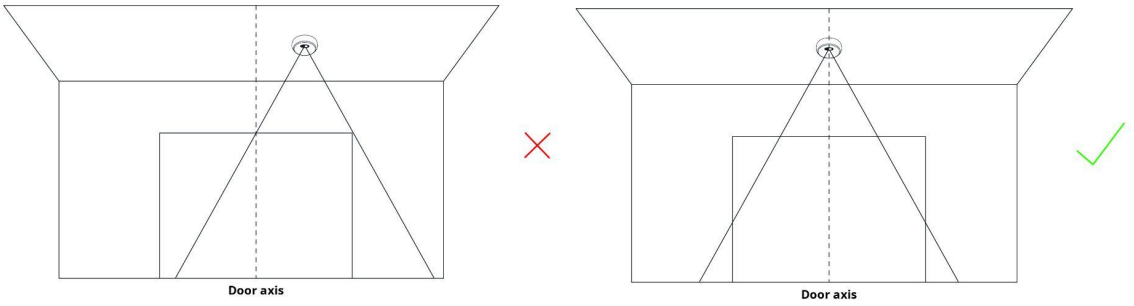
When the device is in **unlock** position, it can be taken out of the ceiling and easily replaced or maintained

When the device is in **lock** position, it is securely fixed and can be connected to the power (PoE or 5 V - 2.5 A)

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### 3.1.6. Device placement

Pay attention that the Terabee People Counting L-XL is installed **directly on the ceiling**, **centered on the door** axis. It works similarly if installed on both sides of the door. However, the installation is easier if the device is installed on the opposite side from the door swing direction.




## 3.2. Necessary tools and accessories

**Included accessories**

- People Counting L-XL **x1**
- People Counter ID card **x1**
- Mounting plate **x1**
- For concrete ceiling: concrete screws and wall plug **x3**
- For false ceiling: plaster screws and wall plug **x3**

**Not included**

- Drilling machine
- Drill bit size 6 mm for **concrete ceiling**
- Drill bit size 8 mm for **suspended ceiling** (Plaster)
- Mallet or hammer
- Cross-headed screwdriver
- Measuring tape
- RJ45 cable (cat 6 or above)
- PoE injector or switch (PoE IEEE 802.3af) - PoE version
- Micro-USB power supply (5 V - 2.5 A) - LoRa version

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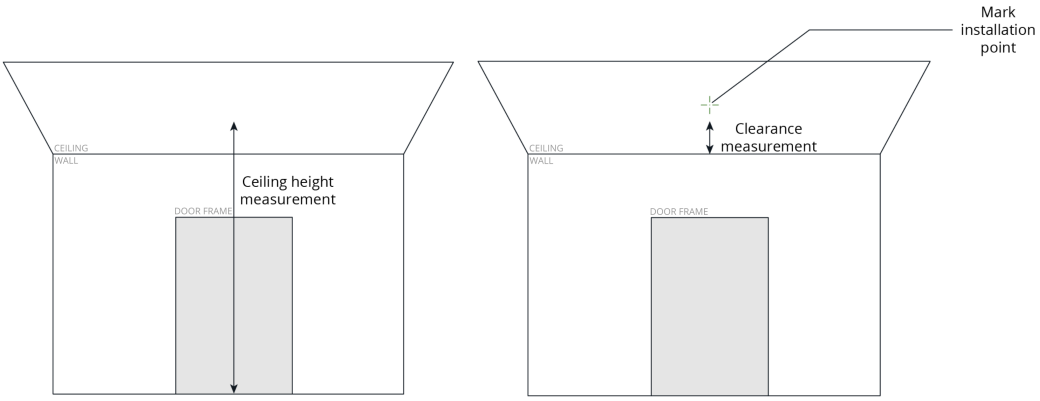
## 3.3. Mounting instructions

We recommend looking at section 3.1. Guidelines and recommendations to understand all the Terabee People Counting L-XL installation aspects.

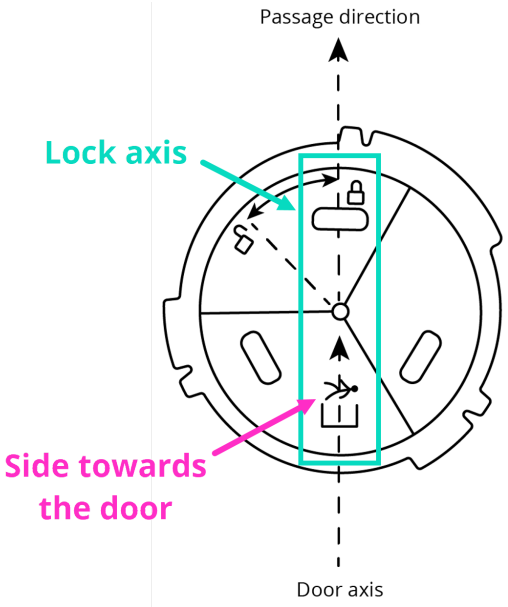
**👇 To install your People Counting L-XL follow these steps 👇**

1 **Locate and mark the device position on the ceiling**

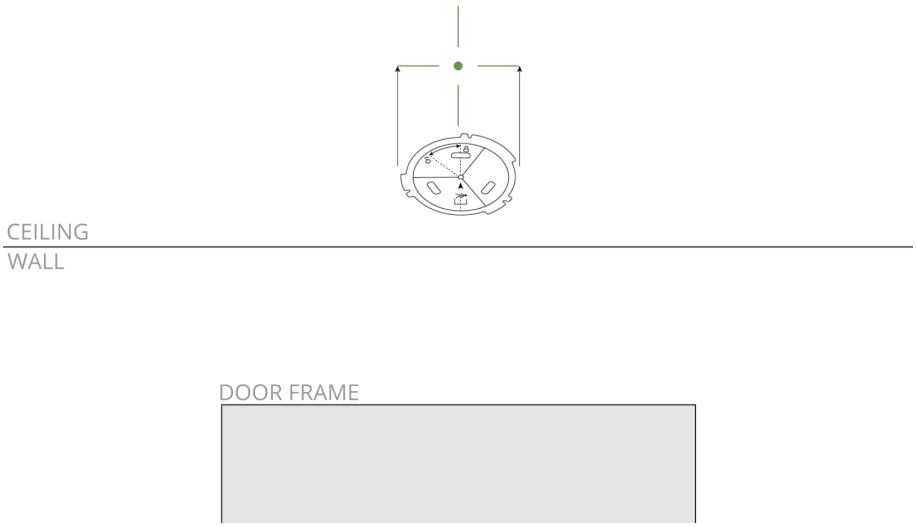
- ➔ Identify the central door axis
- ➔ Measure ceiling height
- ➔ Check clearance requirements



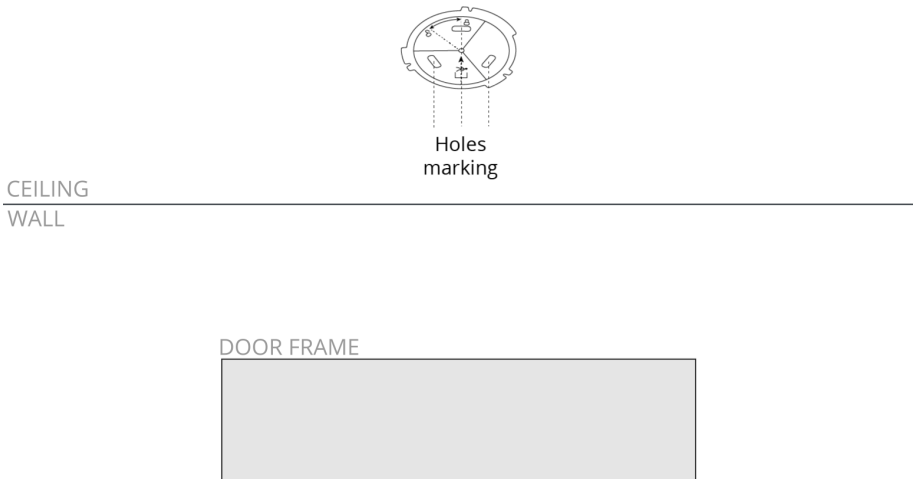

2 Position the mounting plate while making sure the printed “lock axis” is perpendicular to the door and the person icon is oriented towards the door




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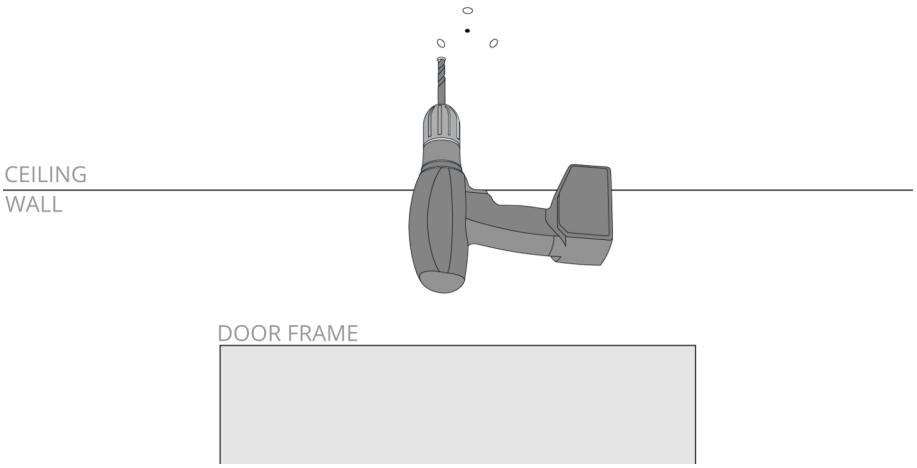



## 3 Mark the holes to drill

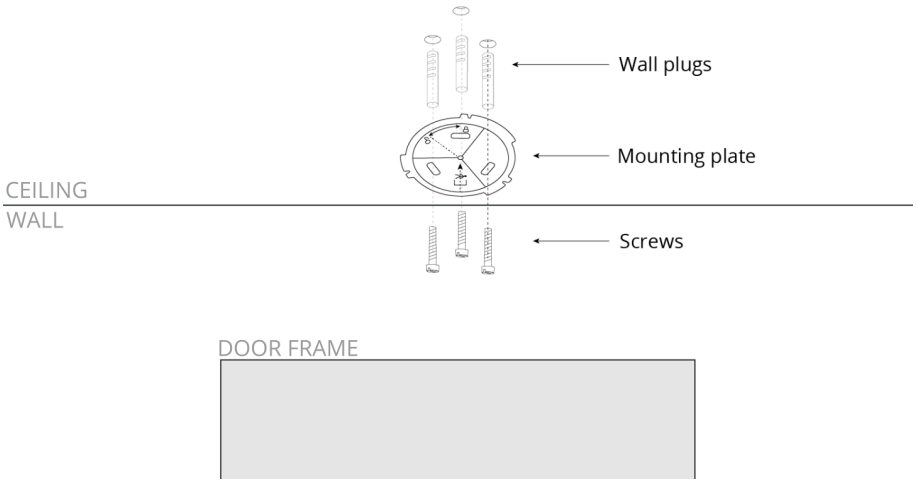



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4 Drill the holes in the ceiling

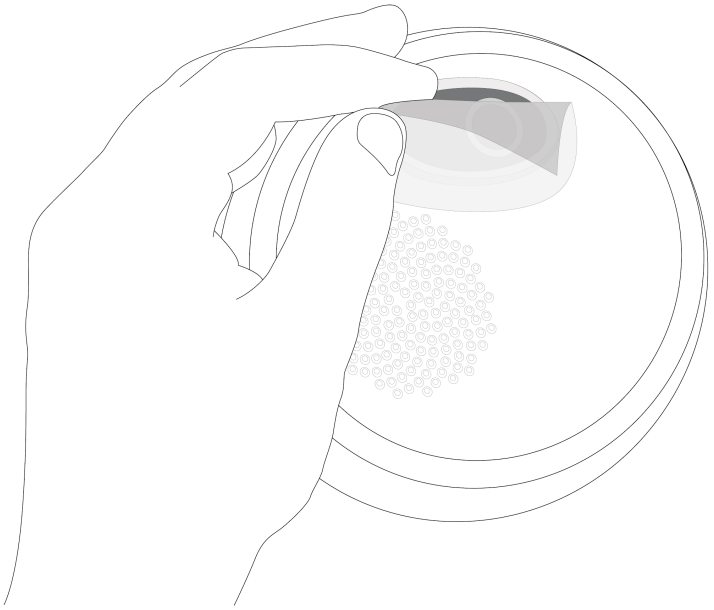



5 Install the mounting plate with the supplied screws

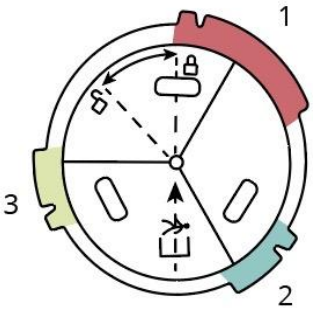


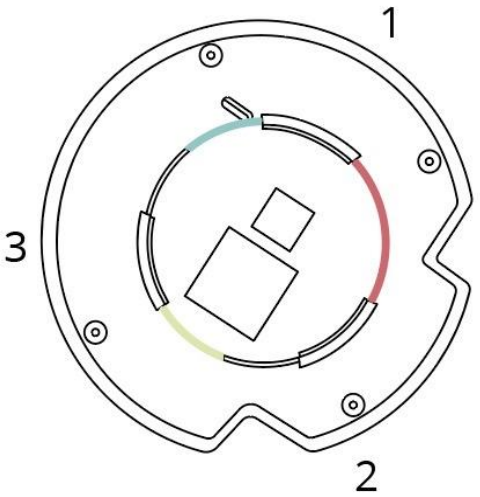

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6 **Before installing the device**, make sure to **remove the plastic film** on the optical part



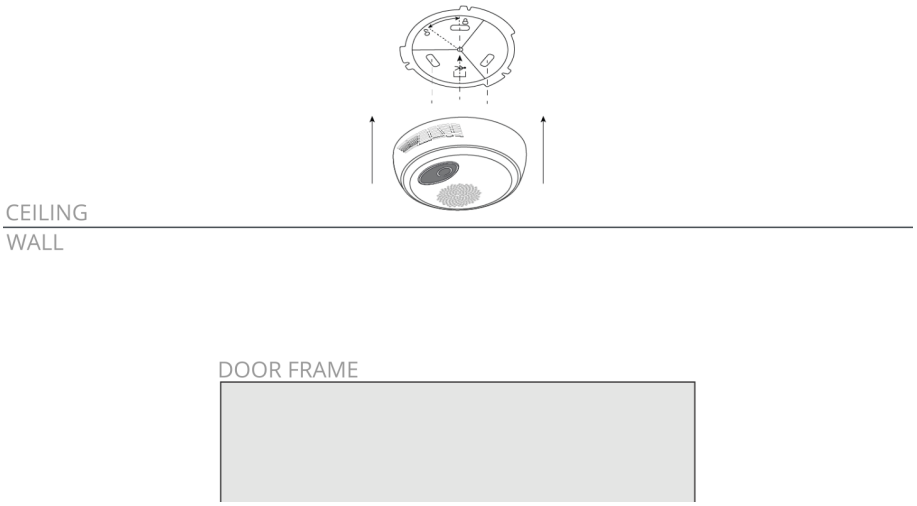
7 Match the mounting plate fins pattern with the device back part



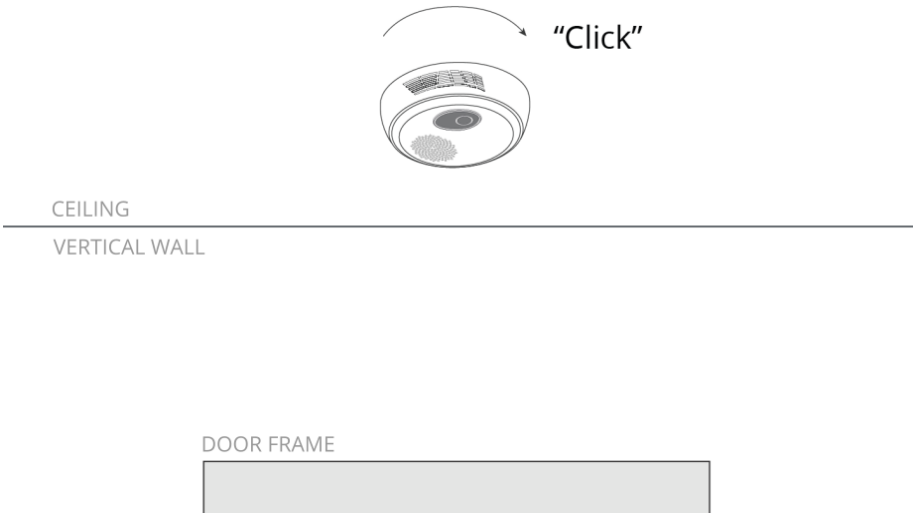




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8 Position the device onto the mounting plate

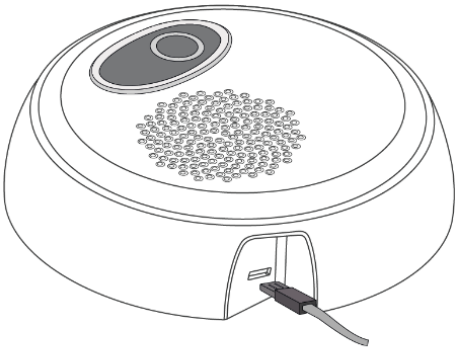



9 Clip the device on the mounting plate by rotating it to the right until it clicks

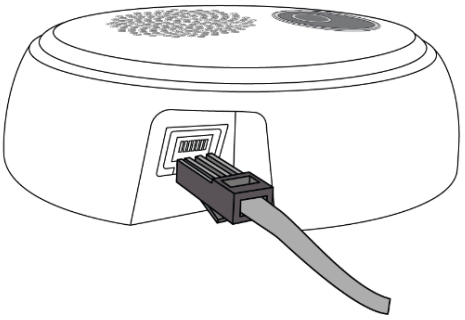



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10 Finally, connect the device to the power with an **RJ45 PoE** (PoE version only) cable or a **5 V - 2.5 A** power cable (LoRa version only)



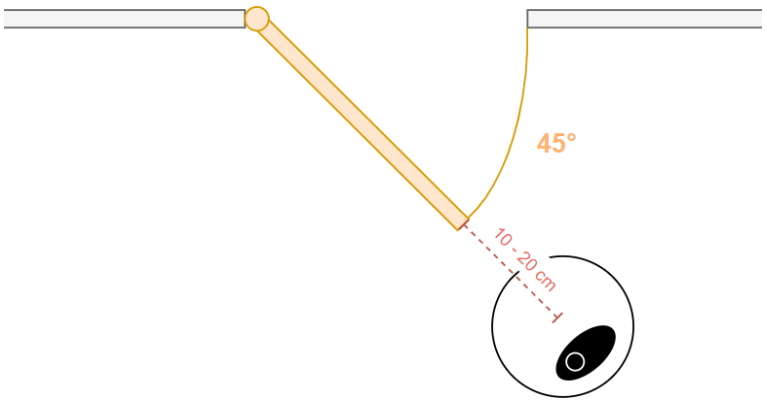
**Micro USB 5 VDC - 2.5 A**
(LoRa version)



**RJ45 PoE (PoE IEEE 802.3af)**
(PoE version)

## 3.4. Mounting instructions above a door swing

In this specific case, when the device is installed on the side where the door swings, you need to consider installing the device the following way to leave some space to avoid counting the door and have enough margin to detect and count people:




The device should therefore be placed aligned with the door swing when it is open at 45° and clearance between 10 to 20 cm between the door edge and the center of the device. Once the alignment is located, you can follow the installation steps from 2 to 9 of the previous section.

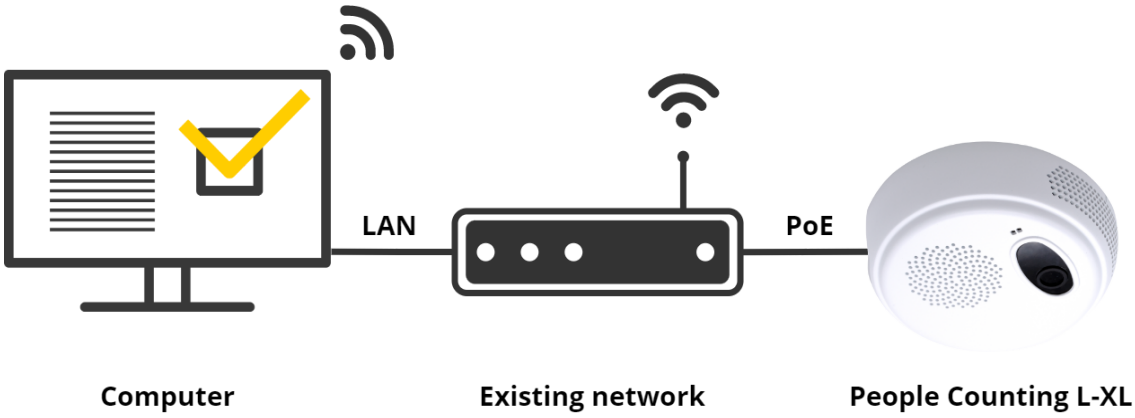
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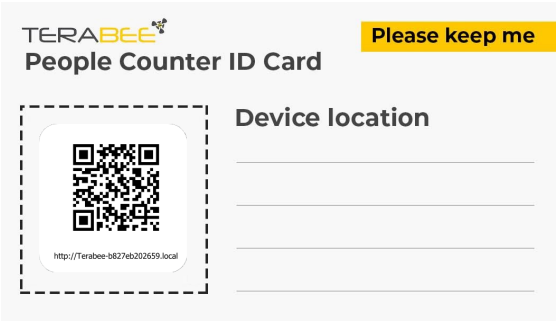
# 4. Web GUI access

## 4.1. Access the web GUI via the LAN network

### RECOMMENDED FOR POE PRODUCT VERSION

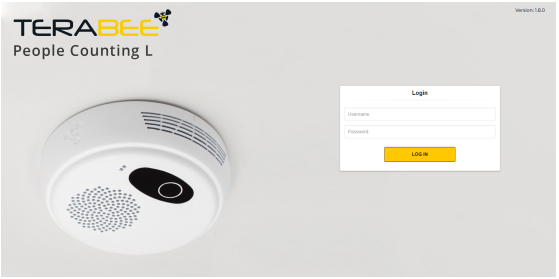
Wait approximately 1-2 minutes for the device to start up and ensure that your computer or phone is **connected to the same network** via Wi-Fi or Ethernet.




Flash the QR code on the People Counter ID card, or manually enter the web address. You will access the web GUI configuration tool

The URL should be in the following format: *http://terabee-<device_id>.local*




Once on the **Login page**, connect using the following credentials:

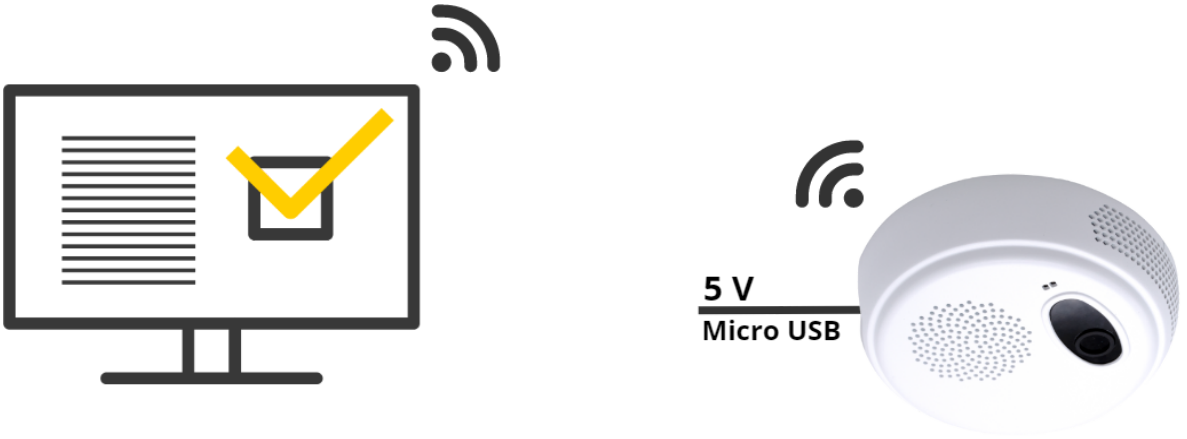
Username: **people_counting_admin**
Password: **<device_id>--admin**
*(for example **b827eb6abb6f--admin**)*

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## 4.2. Access the web GUI via Wi-Fi AP connection

**RECOMMENDED FOR LORA PRODUCT VERSION**

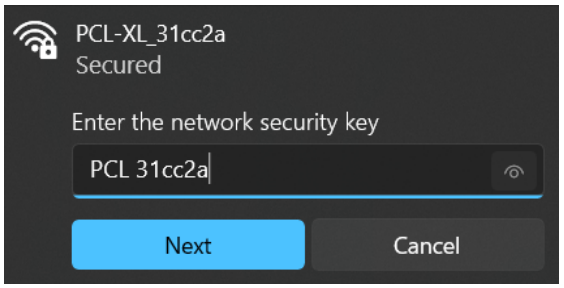
Wait approximately 1-2 minutes for the device to start up after powering it via the Micro-USB connector. A WiFi access point starts after the device boots up.




**Computer** **People Counting L-XL**

Using your computer or phone, connect to the WiFi access point with the following format SSID: ***PCL-XL_xxxxxx*** *(the "xxxxxx" corresponds to the six last digits of the device serial number).*

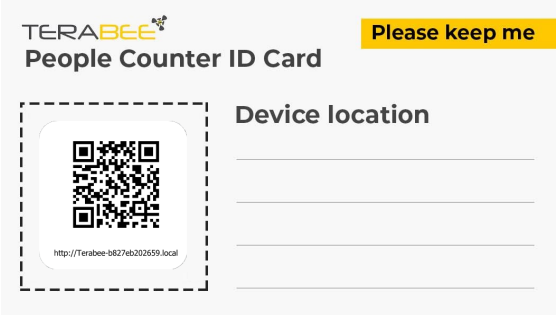
Type the password using the following format: ***PCL xxxxxx***




Example based on the left picture:
WiFi SSID : **PCL-XL_31cc2a**
WiFi Password : **PCL 31cc2a**

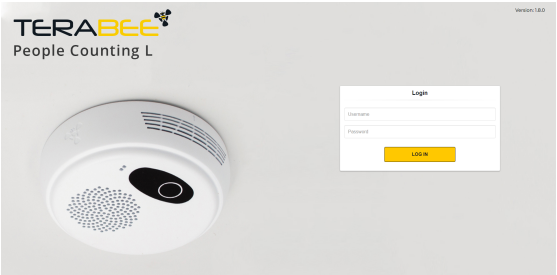
Once connected, you can access the web GUI on IP: **192.168.4.1**

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Note that you can also use the local URL located on the People Counter ID card.

Flashing the QR code or typing the URL in the following format *http://terabee-<device_id>.local* allows access to the web GUI




Once on the **Login page**, connect using the following credentials:

Username: **people_counting_admin**
Password: **<device_id>--admin**
*(for example **b827eb6abb6f--admin**)*

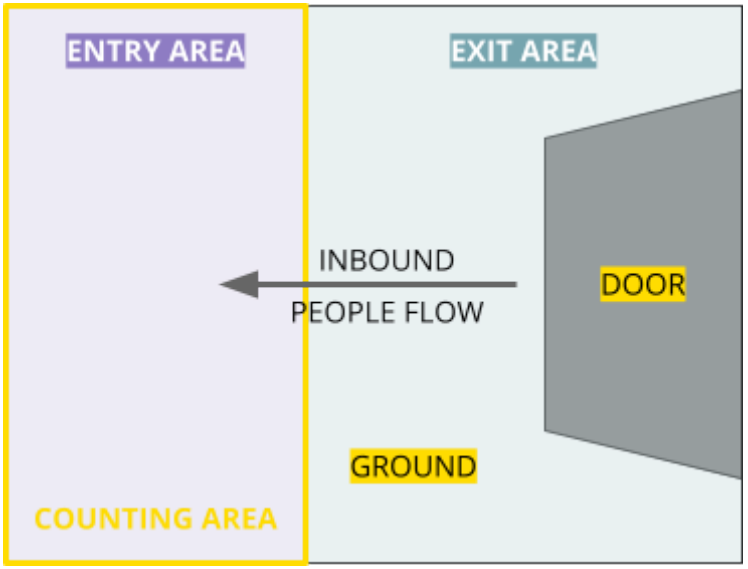
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# 5. Quick device setup

## 5.1. Guidelines and recommendations for set up

### 5.1.1. Counting area principle

The counts on the device are generated thanks to the counting area. A **closed** area creates two detection areas on the image, one “Entry” area, and one “Exit” area.




To be counted IN, people must:

1. Come from an Exit area
2. Move to an Entry area
3. Leave the device field of view from an Entry area

To be counted OUT, the converse applies.

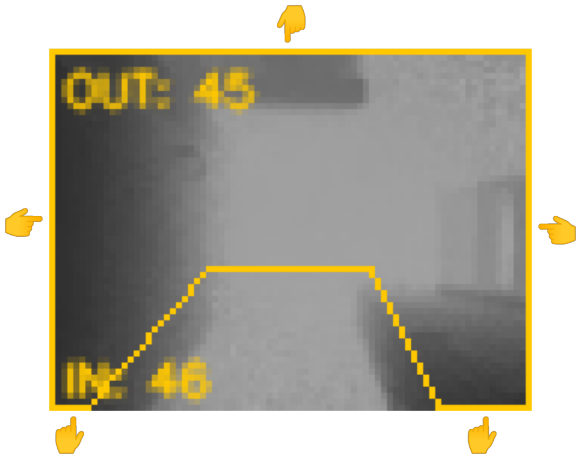
In the algorithm logic, if a person does a **U-turn,** meaning comes from an Exit area, goes to an Entry area without going out of the device field of view, and then comes back to the Exit area and leaves the field of view, **the person won’t be counted**.

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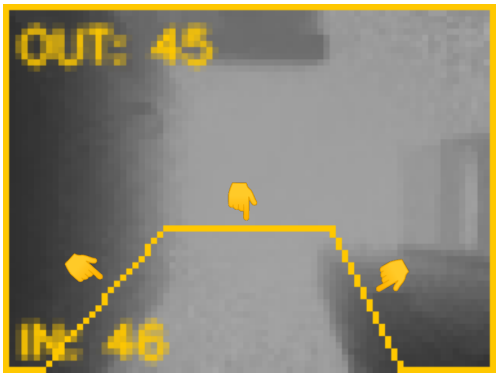
### 5.1.2. Drawing of the counting area by clicking on the image

To effectively draw a counting area, you have to consider the following points:

- Outer lines of the counting area must touch the border of the image to consider it inside
- Leave a bit of room in front of the entrance to maximize tracking area. Consider a minimum space for drawing the counting area between a third or a quarter of the image (see examples)
- Draw the area around the door swinging area if possible
- No need to draw around a static object as they will be removed automatically by the software



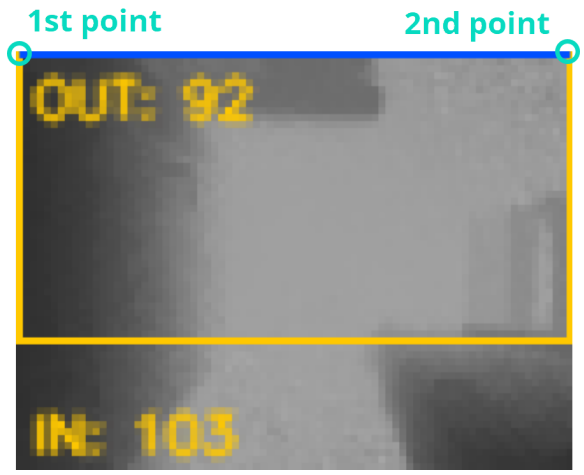

👍 Make sure the border of the counting area touch the image edges




👍 Make sure to leave a margin around the entrance

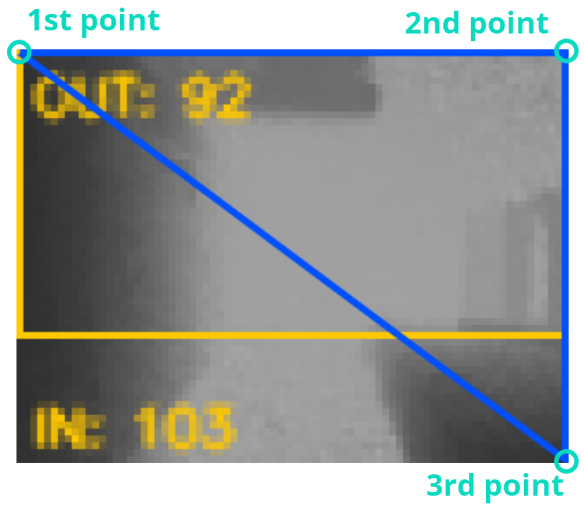
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Follow the below instructions to draw your counting area correctly:



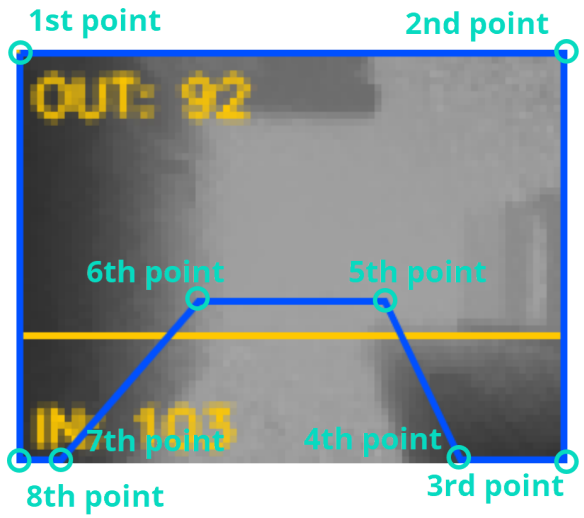

1. Click on the image to place the first point. Please note that **it will erase the previous list**. No line will appear yet

2. Click on another place in the image to place the second point. It will draw the first segment (in blue on the image)




3. Draw the third point. It will make another segment between the second and the third point

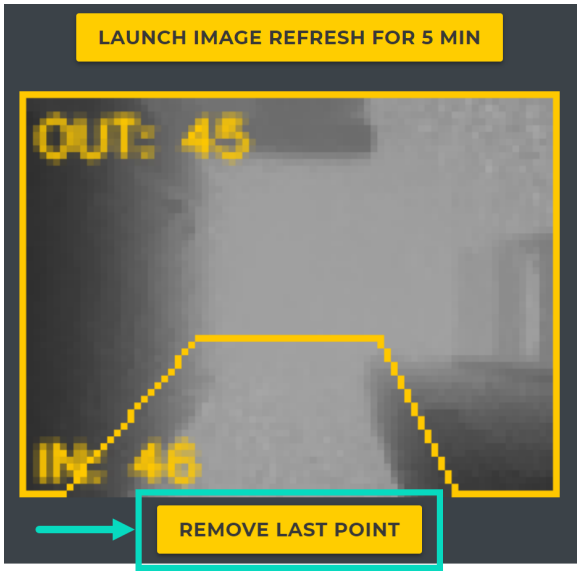
   Note: The third point will be automatically linked to the first one, and a new segment will be drawn. Each new point will automatically be connected with the previous and the first point because the zone needs to be closed




4. Continue to place the points to draw your “In” zone

Point list gives:
[[0,0],[79,0],[79,59],[59,59],[51,38],[19,38],[0,59]]

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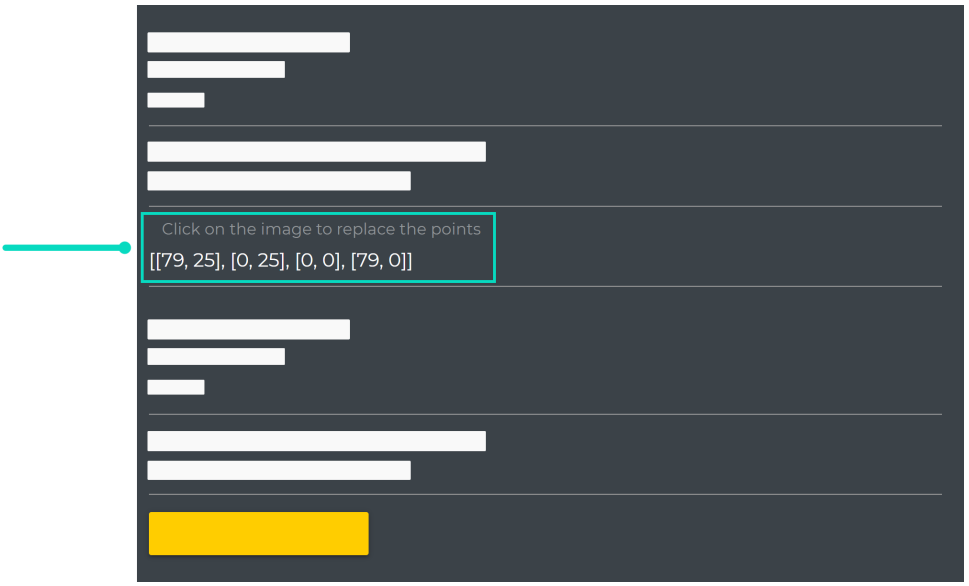

In case of a misplaced point, you can erase by clicking the “Remove last point” button under the image

To cancel your area edit you can refresh the webpage by pressing Ctrl+F5

### 5.1.3. Drawing the counting area by entering the points manually

The image is an 80 x 60 pixels image. X coordinates range from 0 to 79, and Y coordinates range from 0 to 59. The **point [0,0]** corresponds to the top-left corner of the image. **X** is the **horizontal axis** & **Y** is the **vertical axis**.

To define a point, you need both X and Y coordinates, defined this way: [x,y]
Each point of the area will be defined as such : [[x1,y1], [x2,y2] [x3,y3], [x4,y4], ...] and the last point will be linked automatically to the first one.



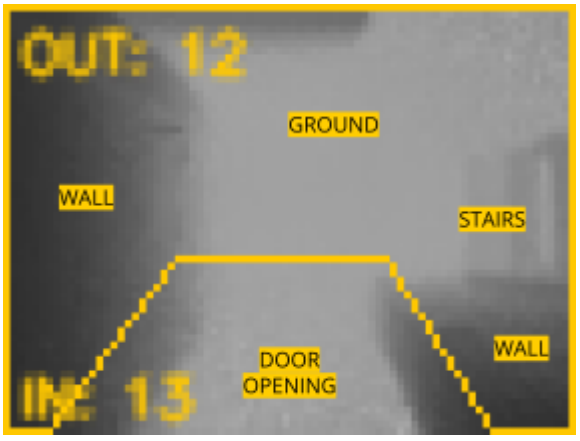

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### 5.1.4. Device image interpretation

Once your device is installed and connected to an RJ45 using PoE or 5 V - 2.5 A cable, you will be able to connect to the device.

An infrared image coming from the depth sensor sets the counting line. This image is in gray shades, and we will use some picture examples to indicate what we observe to clarify how you may interpret your image once your device is installed.

EXAMPLE 1






**Type of passageway:** corridor giving access to a cohesive area

**Key elements to consider:**

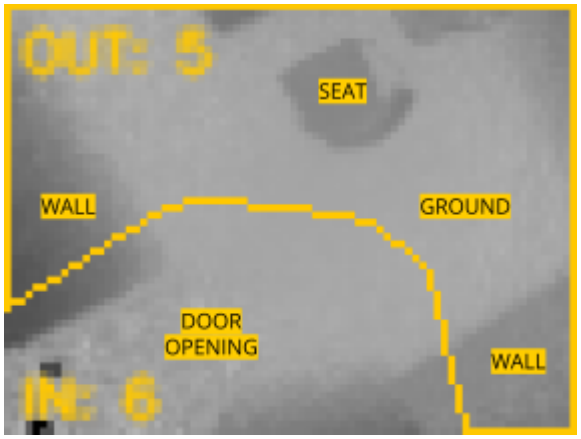
- Stairs
- Door swing blocked
- Several directions for the flow of people

**Counting area drawing:**
In this example, the flow of people can happen in several ways. It can come across the door, go up the stairs or go straight to the cohesive area. To draw an efficient counting area, we must consider that the flow is multidirectional. Thus, the area is drawn around the door with some margin.

**Entry and Exit area logic:**
Here, we consider the flow of people coming from the gate as **entering** the cohesive area, so we want to count the people coming from the door as IN. Then, the area drawn (in yellow) defines the cohesive area as an **Entry area** and the door opening as an **Exit area**.

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EXAMPLE 2






**Type of passageway:** Entrance inside a meeting room

**Key elements to consider:**

- Dynamic door swing
- Several directions for the flow of people
- People can stay in the device field of view

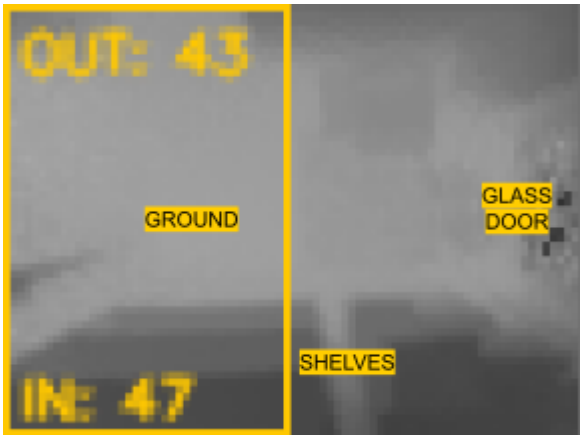
**Counting area drawing:**
In this example, the device is installed with a slight rotation, on the side where the door swings. As it is a meeting room, people will enter the room, sit below the device, and they don't go out of the field of view. So they will be counted once they are considered not moving for a certain time.

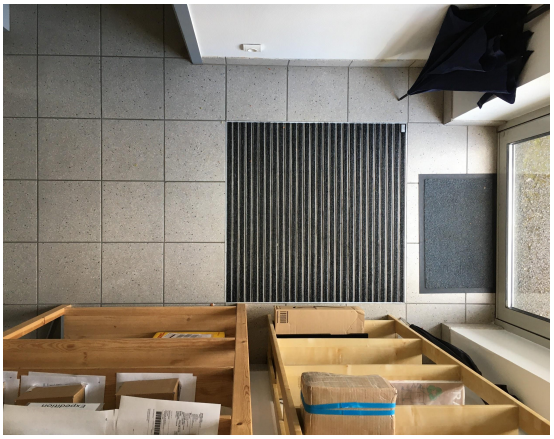
The counting area is drawn to avoid door movement that could cross the counting area line and generate false counts (considering people who may remain in the device's field of view). In this case, the device's rotation helps optimize the covered area.

**Entry and Exit area logic:**
People coming from the door **enter** the meeting room, so we want to count them IN. The drawing area defines the meeting room as an **Entry area** while the door opening and the door swing, an **Exit area**.

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EXAMPLE 3



**Type of passageway:** Building entrance

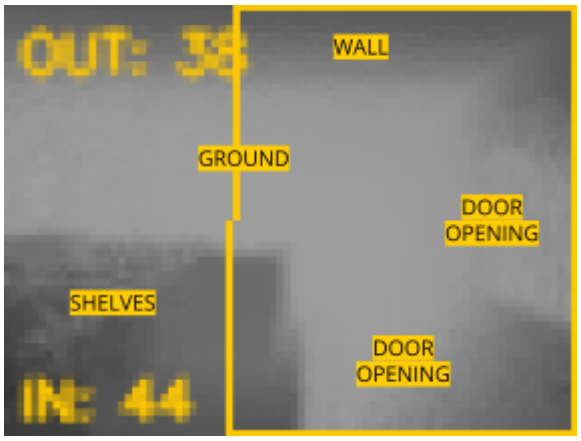
**Key element to consider:** Several directions for the flow of people

**Counting area drawing:**
In this example, people enter the building and can go straight or turn to the door located at the top of the image. The counting area is drawn as a rectangle related to the above door.

**Entry and Exit area logic:**
As it is a building entrance, people coming from the glass door must be counted IN. Here, since the flow is straightforward, we define the left half of the image as an **Entry area** and the other half as an **Exit area**.

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EXAMPLE 4






**Type of passageway:** Corridor to toilets and working area

**Key element to consider:** Several directions for the flow of people

**Counting area drawing:**
In this example, people pass in the corridor to come or go to the toilets or the working area.

**Entry and Exit area logic:**
People crossing the corridor and going to the toilets or the working area have to be counted IN. The **Entry area** is then defined on the right half of the image as an **Entry area** and the other half as an **Exit area**.

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## 5.2. Necessary tools and accessories

**Included accessories**

- People Counting L-XL **x1**
- People Counter ID card **x1**
- Terabee People Counting Setup App

**Not included**

- Smartphone or computer

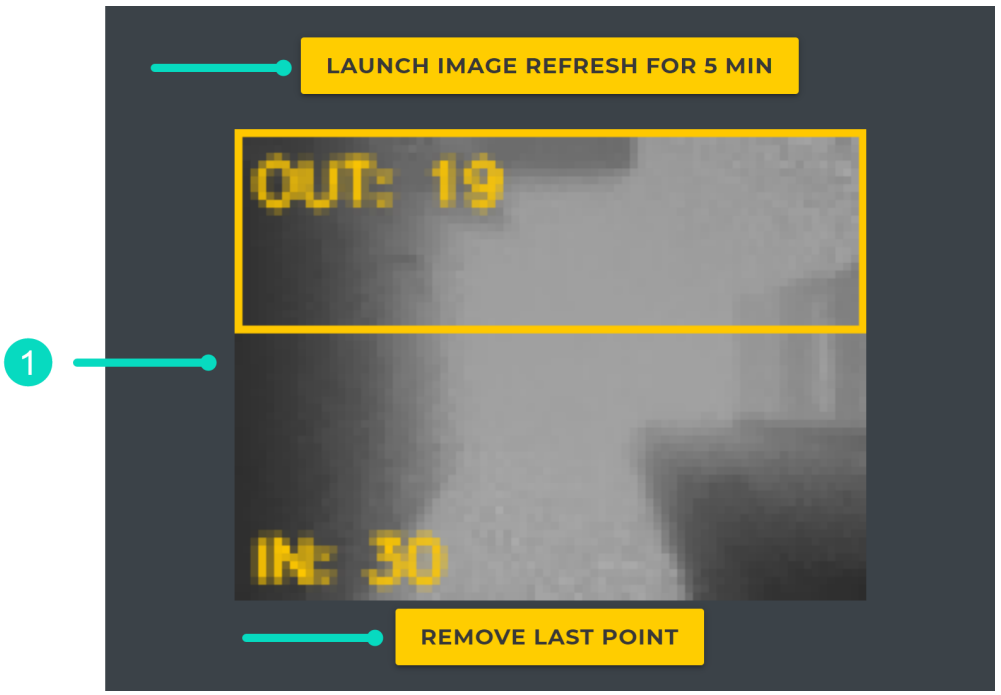
**Watch video tutorial**

- https://youtu.be/0-tvMGTF4Lc

## 5.3. Configuration steps

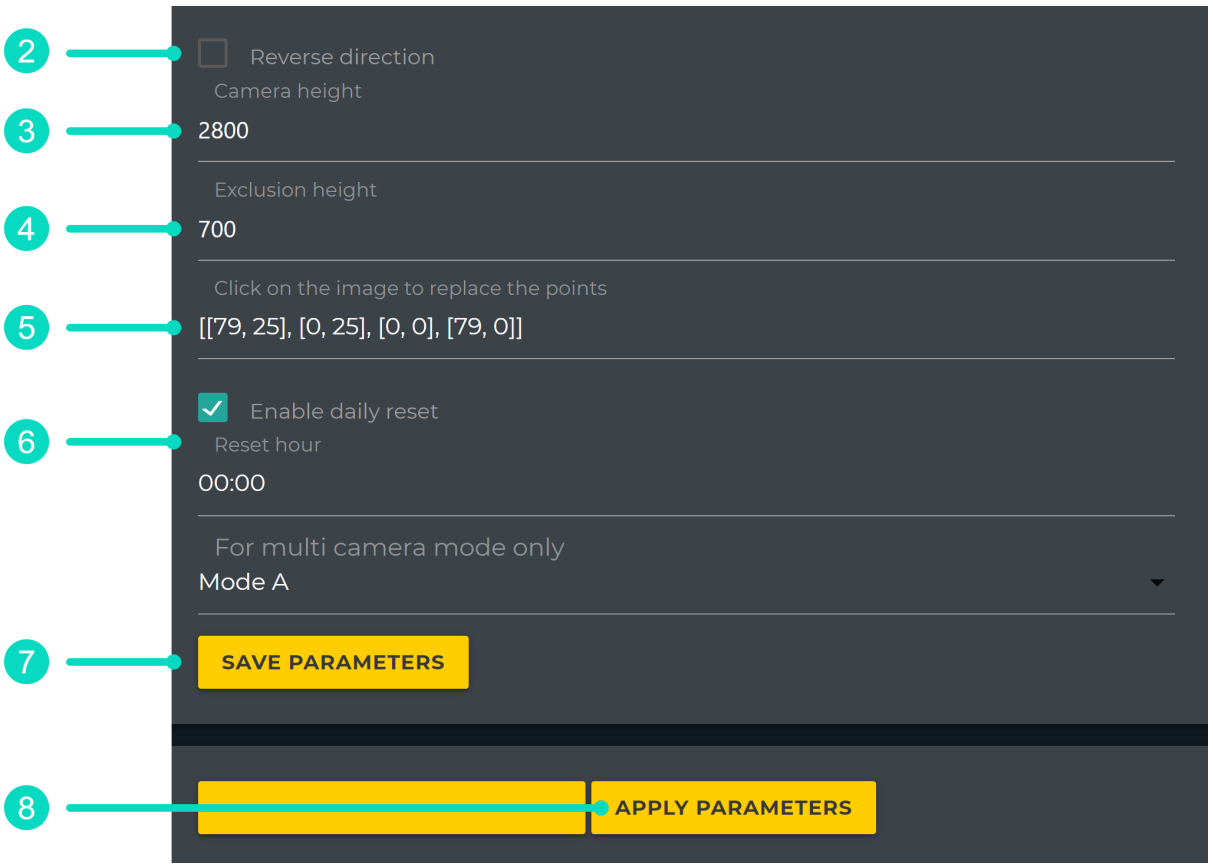
Once logged into the web GUI (see section 4. Web GUI access for how to login), you can start setting up your device under the **Standard Parameters page**.

👇 **To configure your People Counting L-XL follow these steps** 👇




1. Start by drawing the counting area. For more details, please refer to section 5.1 Guidelines and recommendations for setup or the following video tutorial https://youtu.be/Y9siwJePolk

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2 In case you have drawn an Exit area, tick the reverse direction. This parameter allows switching between an “Entry” and “Exit” area

3 Indicate the installation height of the device in **millimeters** (from 2400 to 4000 mm)

4 Indicate the exclusion height in **millimeters** below which there will be no detection (starting from the ground)

5 Counting area corners coordinates that you can modify directly after having defined the new area

6 Tick the daily reset box to activate, then set the time at which the device will reset the daily count in the format HH:MM and on a 24h basis. Usually, a time when the area is ordinarily empty (default value is midnight 00:00)

7 Click on the button to save the new settings

8 Finally, click on the “Apply Parameters” button to save all settings and restart the device

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## 5.4. Next step after setting up your device

Once you have completed the quick configuration of your device, it will restart and start to push the counting data to our IoT Platform by default (PoE version only).

Please contact your commercial representative if you are interested in testing the Terabee IoT Platform.

For direct data push to a third-party host or LoRa communication (LoRa version), please refer to section 6. Advanced settings.

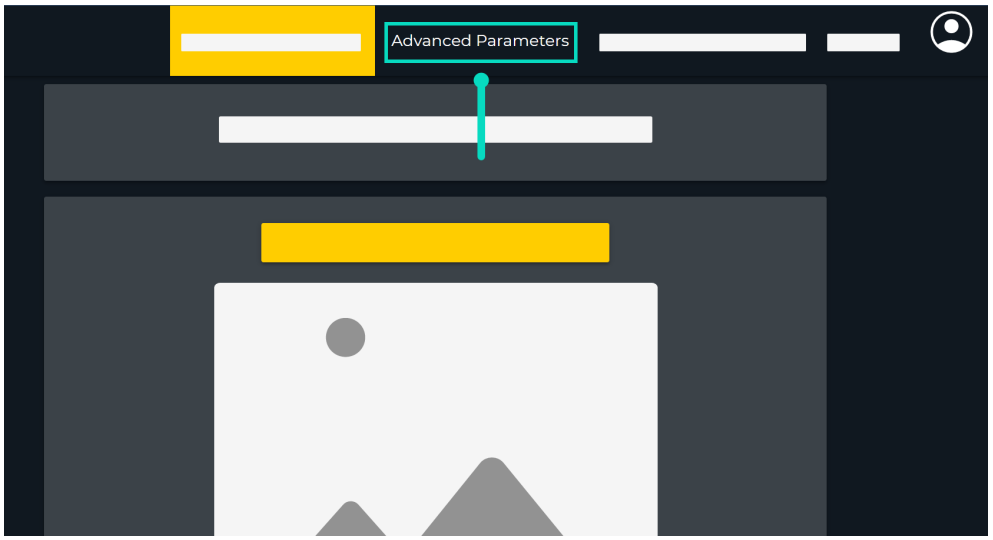
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# 6. Advanced settings

People Counting L-XL integrates advanced settings to

1. Communicate the counting data via MQTT or HTTP
2. Communicate the counting data via LoRaWAN (LoRa version only)
3. Set a fixed IP

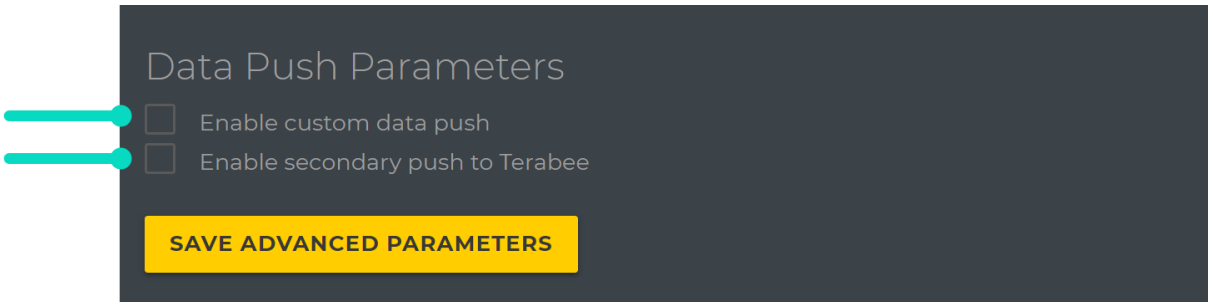
Access the **Advanced Parameters page** by clicking on the corresponding tab at the top under the web GUI.




## 6.1. Data transfer configuration

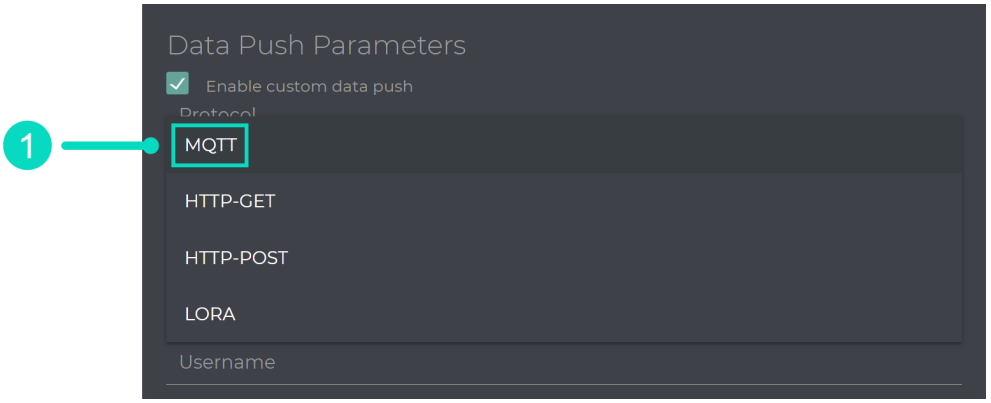
To communicate the counting data to a third-party host via MQTT or HTTP or to a gateway via LoRa, **tick the "Enable custom data push" box**.

To communicate the counting data to the Terabee IoT Platform, **tick the "Enable secondary push to Terabee" box**.

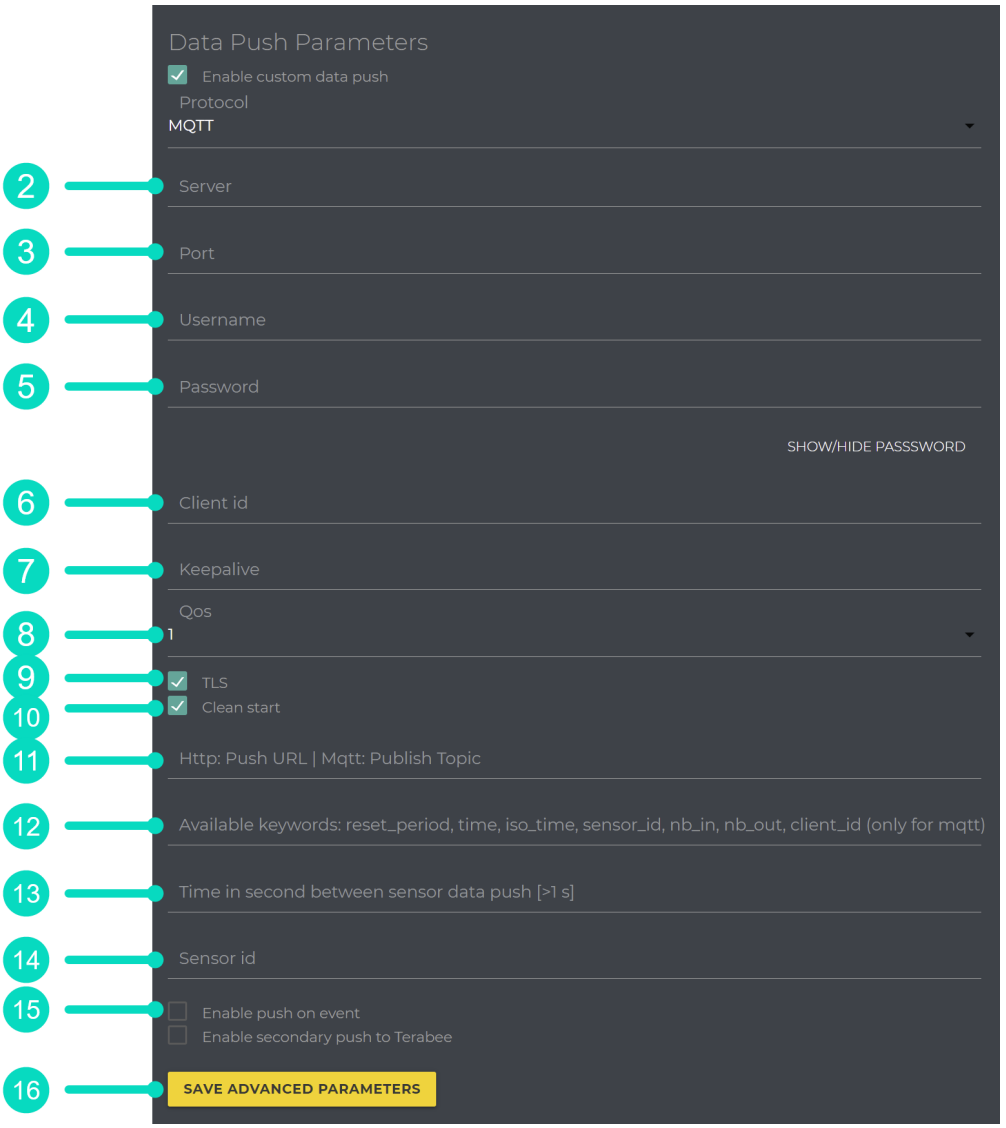



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### 6.1.1. MQTT configuration (PoE version)




1 Select the MQTT protocol




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2 **Server** MQTT broker/server domain, or address which can be in the following format (depending on the server location): *iot.terabee.com* or the direct IP address **without adding** “mqtt://” at the beginning

3 **Port,** TCP/IP port 1883 is reserved with IANA for use with MQTT
TCP/IP port 8883 is also registered for using MQTT over SSL/TLS

4 **Username** used for client authentication and authorization

5 **Password** used for client authentication and authorization

6 **Client_id** identifies each MQTT client that connects to an MQTT broker. The broker uses this information to identify the client and the current state of the client

7 **Keepalive** is a time interval in seconds that the MQTT client specifies and communicates to the broker when the connection is established

8 **QoS** (Quality of Service) level is an agreement between the sender of a message and the receiver of a message that defines the guarantee of delivery for a specific message. There are 3 QoS levels in MQTT:

- At most once (0)
- At least once (1) (recommended)
- Exactly once (2)

9 Tick the **TLS box** to enable TLS network encryption (has to be supported by the broker)

10 **Clean_start** (Clean session) indicates that the broker should discard any data for the client as soon as the underlying TCP connection breaks or if the client decides to disconnect from the broker

11 **Publish topic** field where the device should push data to, which can be in the following format: iot/dev/{client_id}/occupancy **without adding** “mqtt://” at the beginning

12 **Payload data format**: This parameter allows you to define your payload format, see section 6.1.4. String formatting for more details

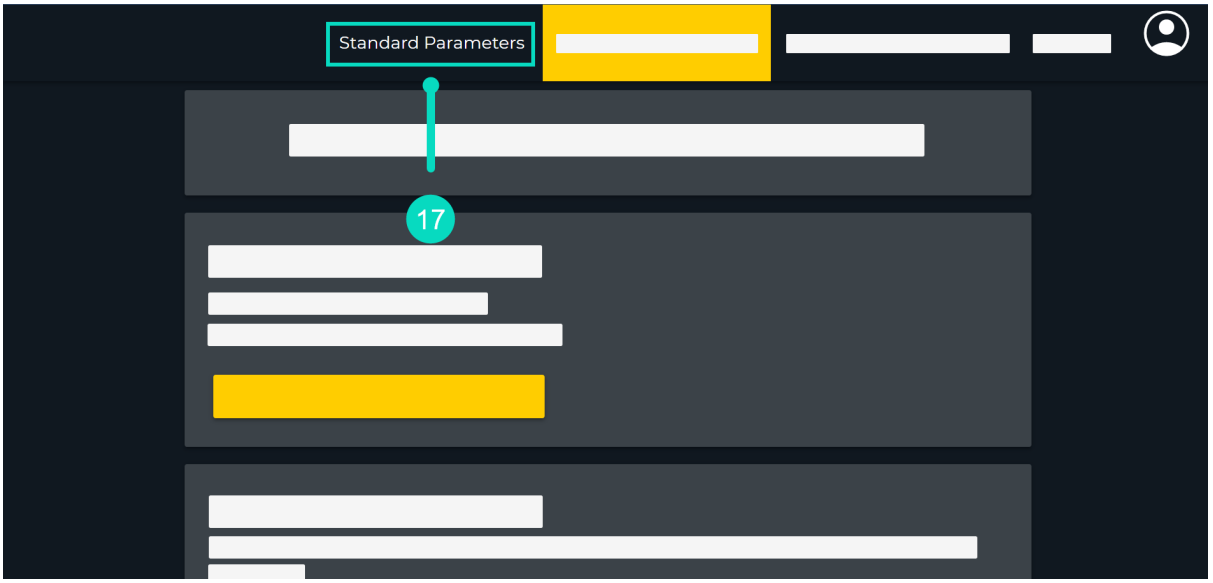
13 **Data push interval** in seconds

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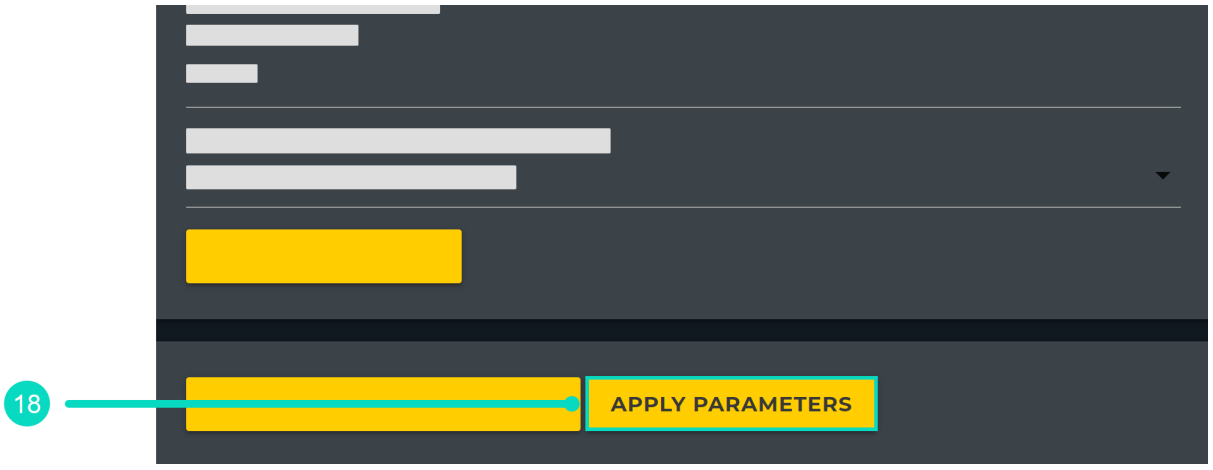
14 **Sensor ID** field: Arbitrary field used in string formatting

15 Tick box to enable the data push at every **counting event** (Entrance or Exit)

16 Once you have entered all the parameters, click on the “Save Advanced Parameters” button to save the data push settings



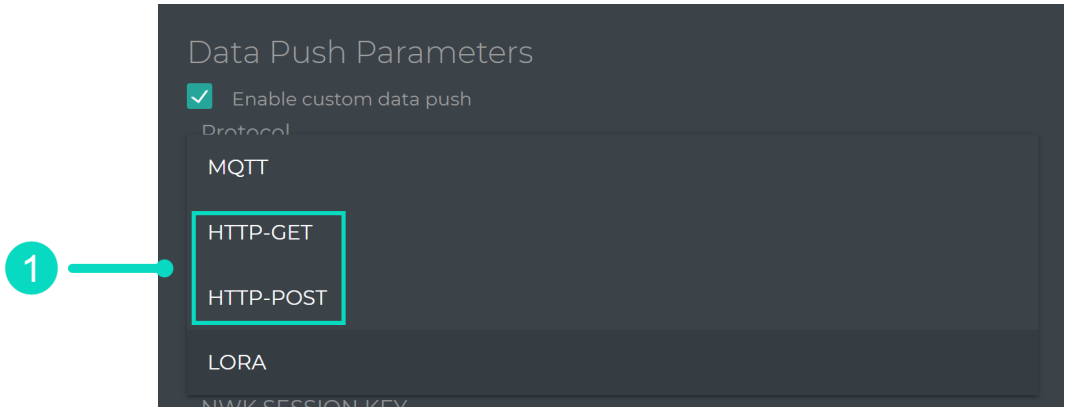

17 Click on the “Standard Parameters” button to come back to the **Standard Parameters page**



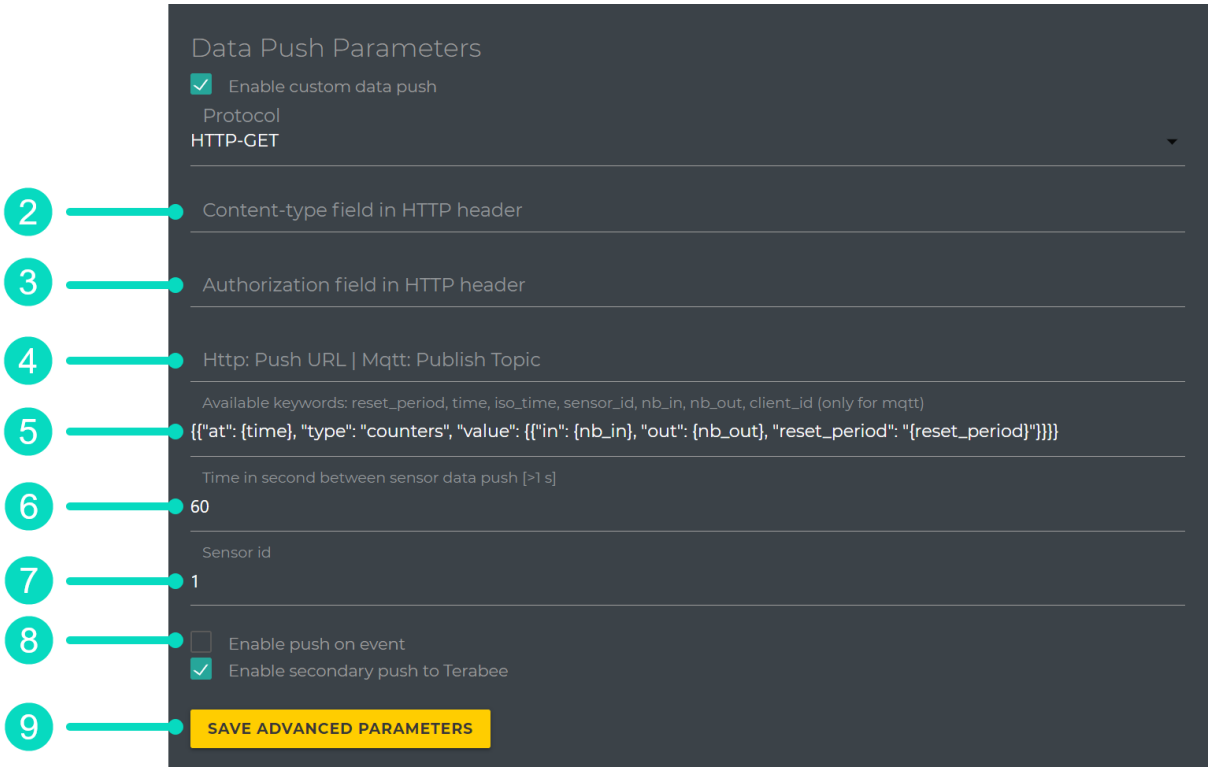

18 Finally, click on the “Apply Parameters” button to register all settings and restart the device

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### 6.1.2. HTTP-GET/HTTP-POST configuration (PoE version)




1 Select the appropriate HTTP protocol method (GET or POST)




2 **HTTP content-type**: String that will be put in the HTTP header field "content-type" when the device is sending data using HTTP POST or GET

3 **HTTP authorization field**: String that will be put in the HTTP header field "authorization" when the device is sending data using HTTP POST or GET

4 **Push URL** field where the device should push data to in the following format: "http://host_url" or "https://host_url" for a secured connection

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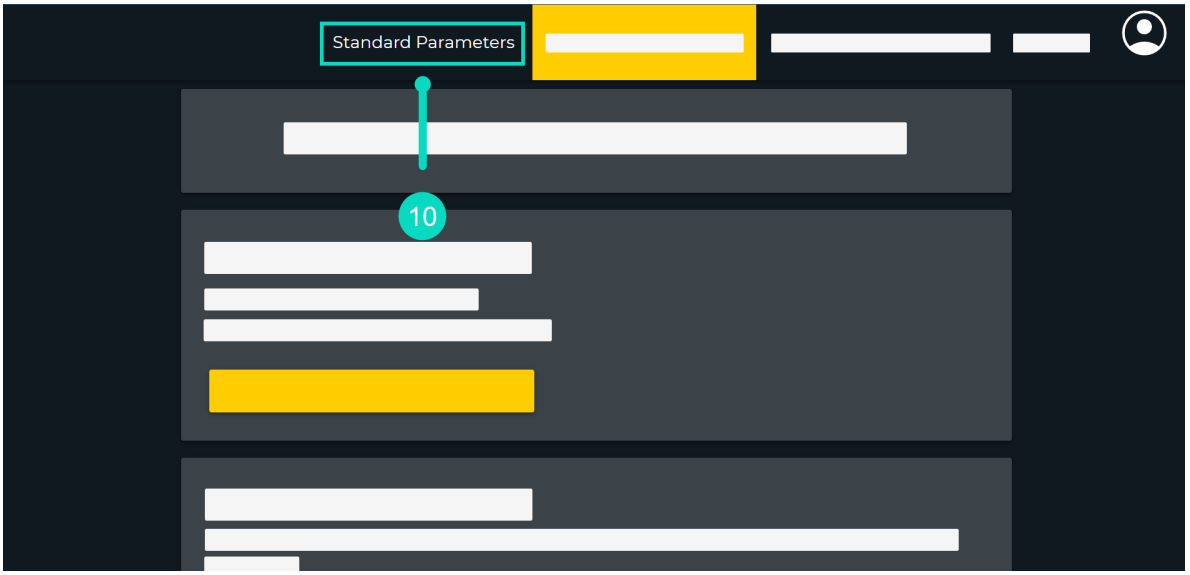
5 **Payload data format** (only relevant for HTTP-POST) is a parameter that allows you to define your payload format, see section 6.1.4. String formatting for more details

6 **Data push interval** in seconds

7 **Sensor ID** field: Arbitrary field used in string formatting

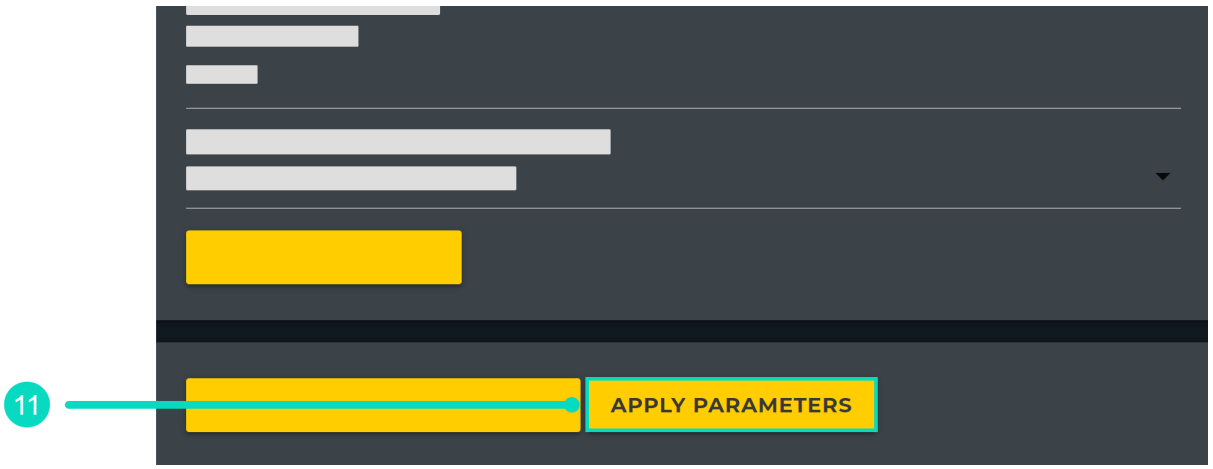
8 Tick box to enable the data push at every **counting event** (Entrance or Exit)

9 Once you have entered all the parameters, click on the “Save Advanced Parameters” button to save the data push settings



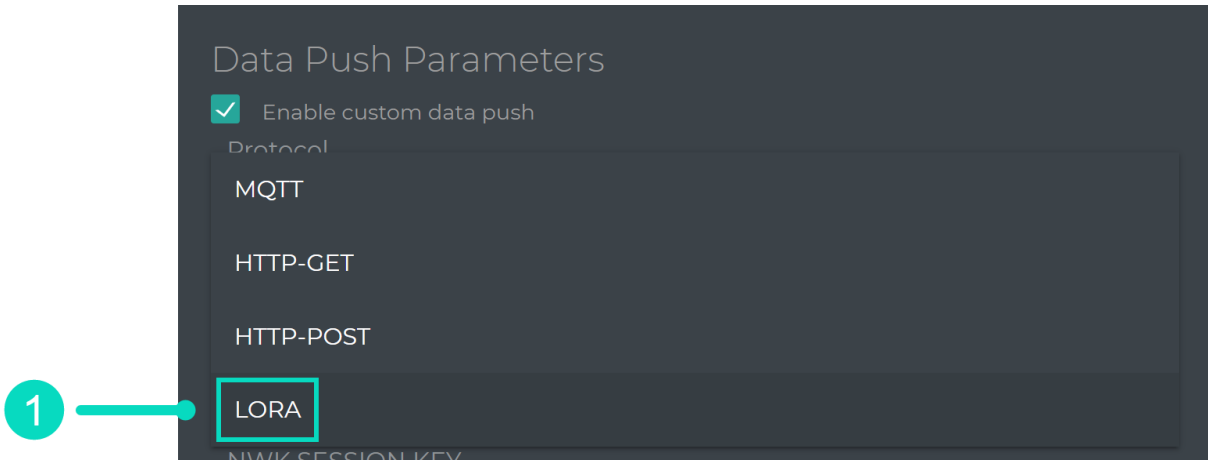

10 Click on the “Standard Parameters” button to come back to the **Standard Parameters page**

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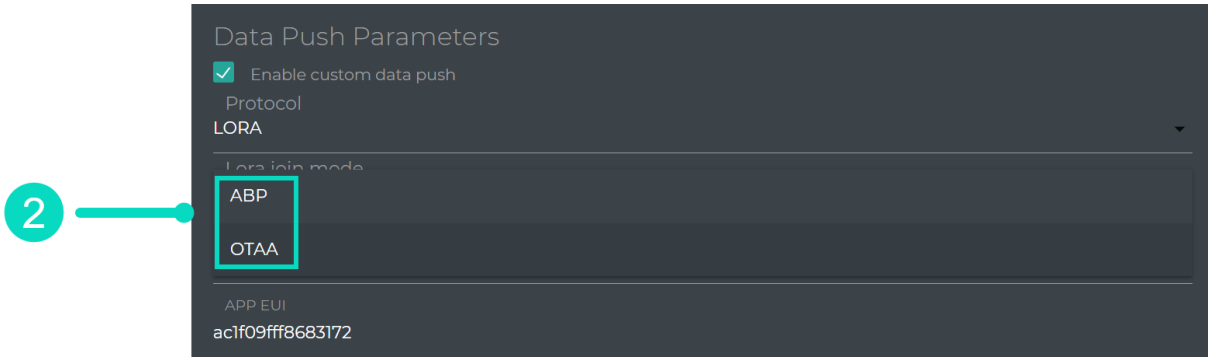



11 Finally, click on the “Apply Parameters” button to register all settings and restart the device

### 6.1.3. LoRa configuration (LoRa version)



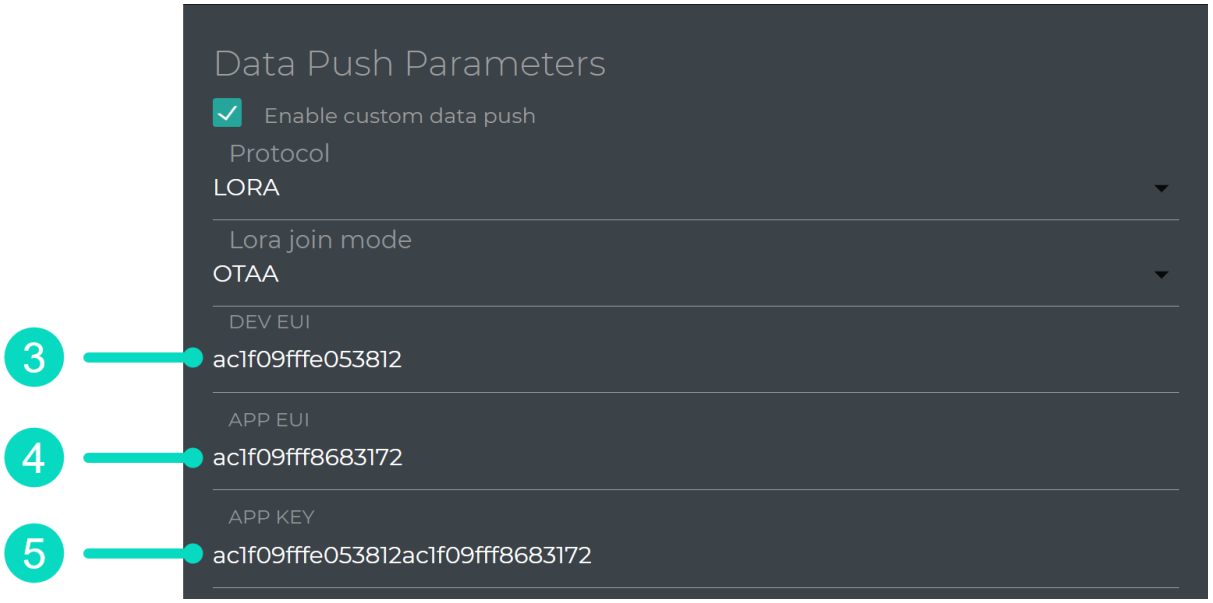

1 Select the LoRa protocol




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2 Select the LoRa join mode between **ABP** (Activation by Personalization) or **OTAA** (Over-the-Air Activation)

**For OTAA mode:**



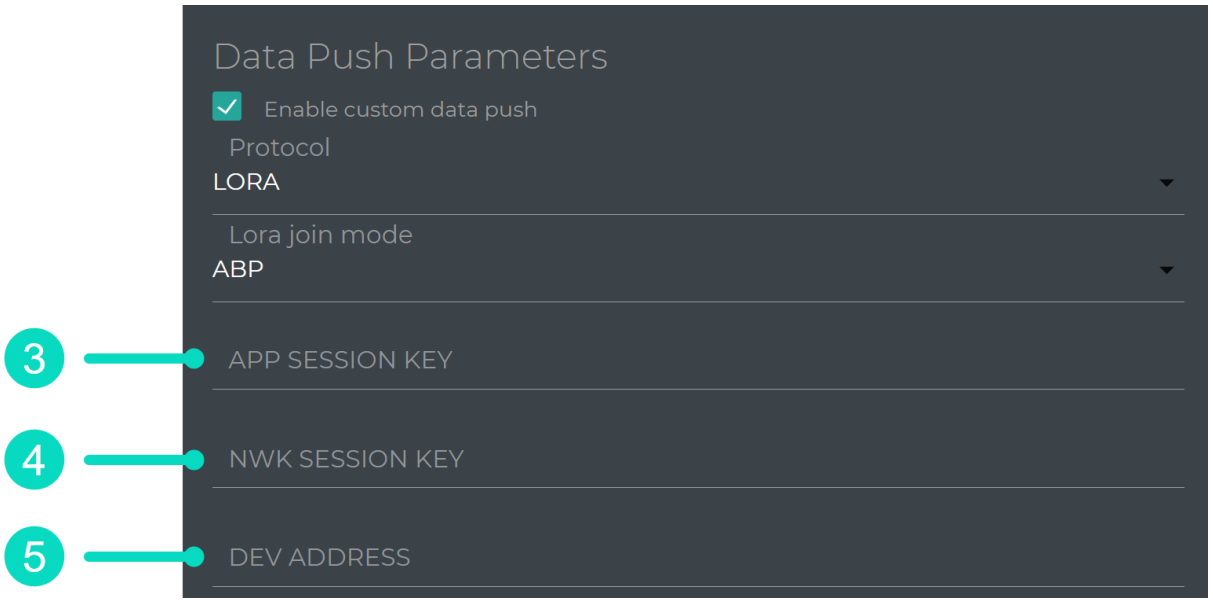

3 **Device EUI (DevEUI)** is a unique 64-bit end-device identifier in the network. DevEUI field is automatically pre-filled with device-specific code

4 **Application EUI (App EUI)** is a unique 64-bit code, enabling an extra identification layer. If the selected network server provider provides an application EUI code, please input this. AppEUI field is automatically pre-filled with device-specific code

5 **Application Key (AppKey)** is a 128-bit application encryption key to secure communication between the device and the network. AppKey field is automatically pre-filled with device-specific code

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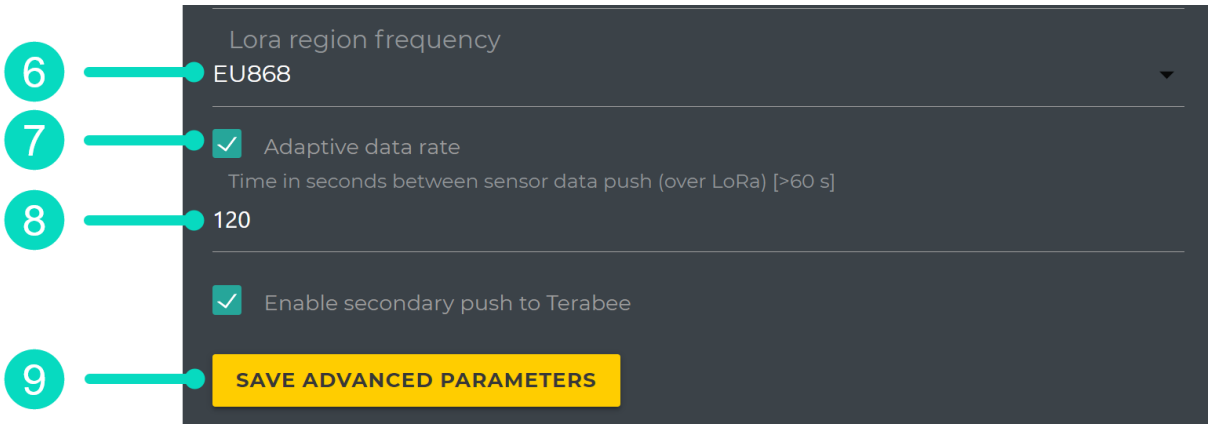
**For ABP mode:**




3 **Application Session Key (AppSKey)** is shared between the application and end-device, used for message payload encryption, unique per application

4 **Network Session Key (NwkSKey)** is shared between the LoRa network and end-device, unique per network.

5 **Device Address (DevAddr)** is a 32-bit code identifying the end device within the network




6 **LoRa region frequency**: Depending on the ordered Terabee device version, select between EU (868 MHz) or US (915 MHz) (not adjustable)

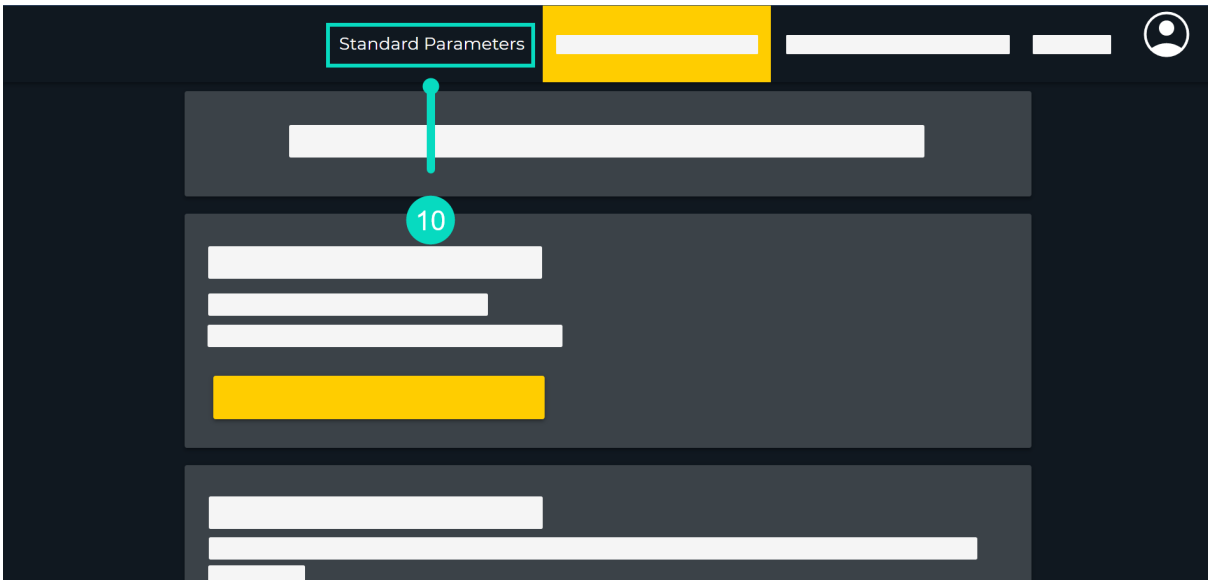
7 **Adaptive Data Rate**: Enables the system to set data rate and spreading factor for optimal performance automatically. By default, ADR functionality is

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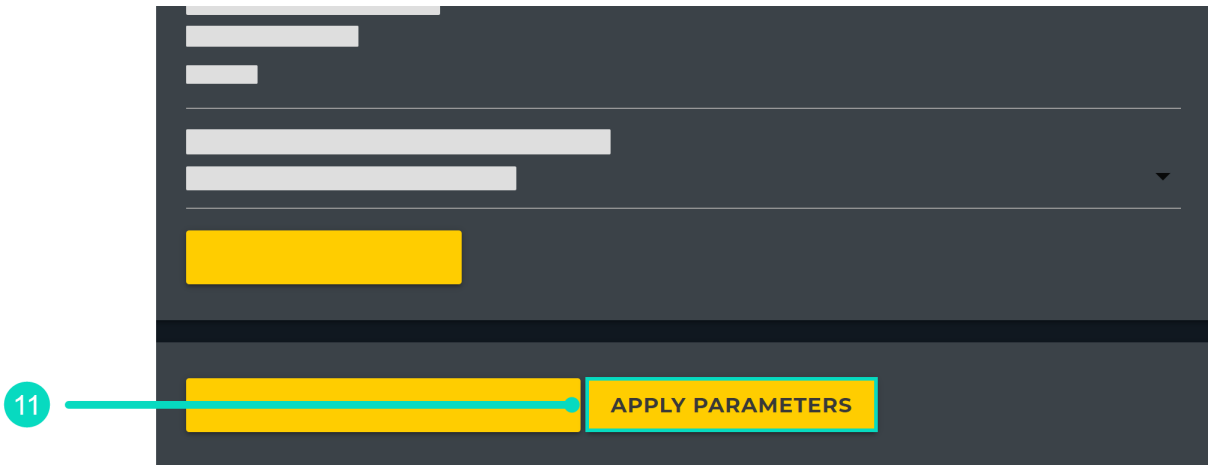
unticked. If the box is ticked, the option is selected, and the optimal spreading factor will be regularly evaluated and selected automatically by the device

8 **Time in seconds** between sensor data push (over LoRa): Enter a time in second superior as 60 (minimum time between two data push)

9 Once you have entered all the parameters, click on the “Save Advanced Parameters” button to save the data push settings




10 Click on the “Standard Parameters” button to come back to the **Standard Parameters page**




11 Finally, click on the “Apply Parameters” button to register all settings and restart the device

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### 6.1.4. String formatting

As seen above, you can customize the string values of **push_url** and **payload_format**. It works by replacing keywords between brackets with their dynamic value in a defined string. As brackets are special characters, in that case, you need to double them “{{“ or “}}” if you want brackets in your final payload (e.g., in JSON).

This open-format approach allows you to use common serialization such as JSON, YAML, XML, or CSV.

The list of available keywords is the following:

| Keyword | Value | Availability |
|---|---|---|
| time | Unix timestamp | Always |
| iso_time | ISO8601 DateTime format | Always |
| sensor_id | Sensor ID as defined in the web GUI | Always |
| nb_in | Total current number of entries for the day | Always |
| nb_out | Total current number of exits for the day | Always |
| client_id | MQTT client ID | Only in MQTT |

Example JSON payload format: *{{"type":"counters", "value":{{"in":{nb_in}, "out":{nb_out}}}}}*

Will result in the following payload: *{"type":"counters", "value":{"in":<number of entries>, "out":<number of exits>}*

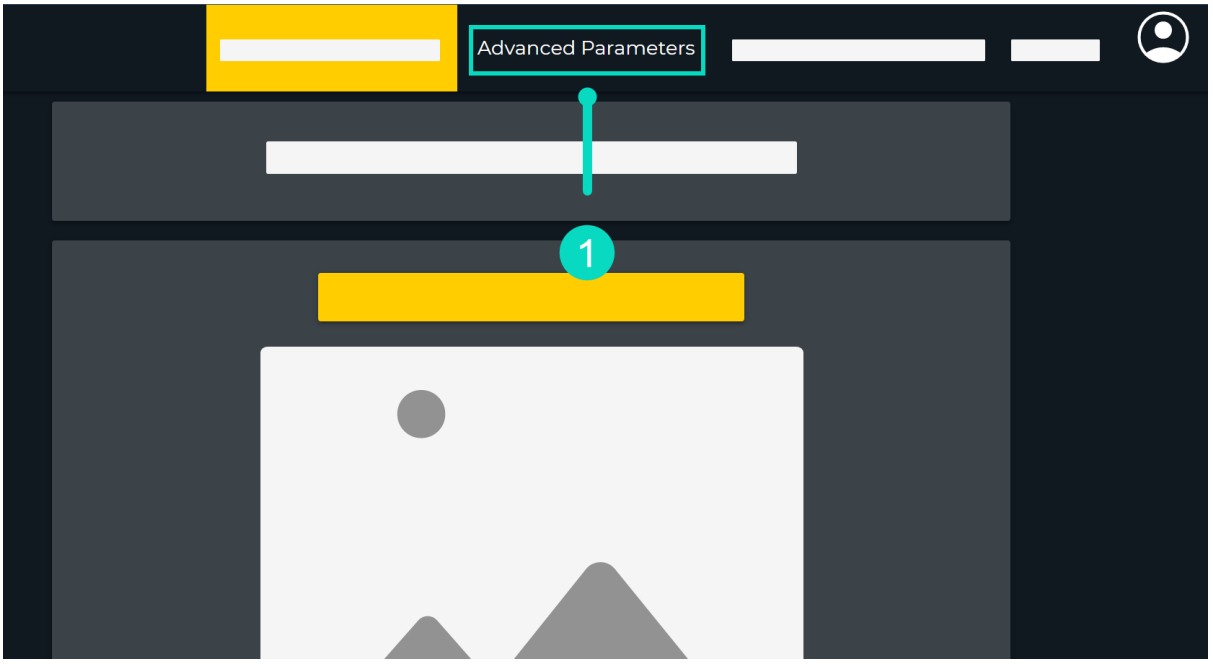
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## 6.2. Network settings (PoE version)

### 6.2.1. Setting up a static IP

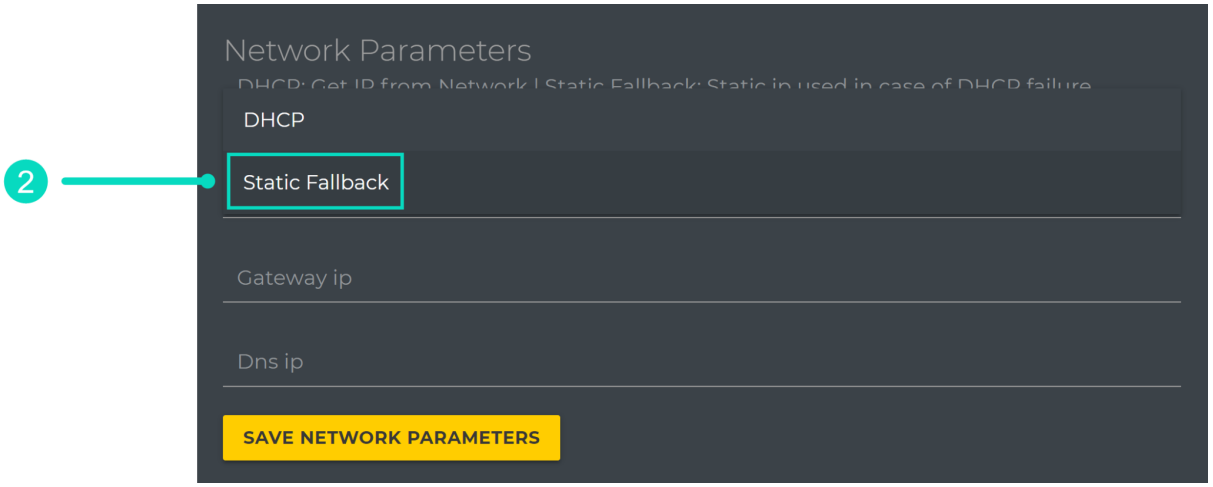
**By default**, the Terabee People Counting L-XL is configured in **DHCP mode**, meaning its IP address is automatically assigned by the DHCP server available on the local network.

In case no DHCP server is available on the local network, or if you don't want the device to acquire an IP address automatically, you can set up a static IP through the device's Web interface by following the following steps:

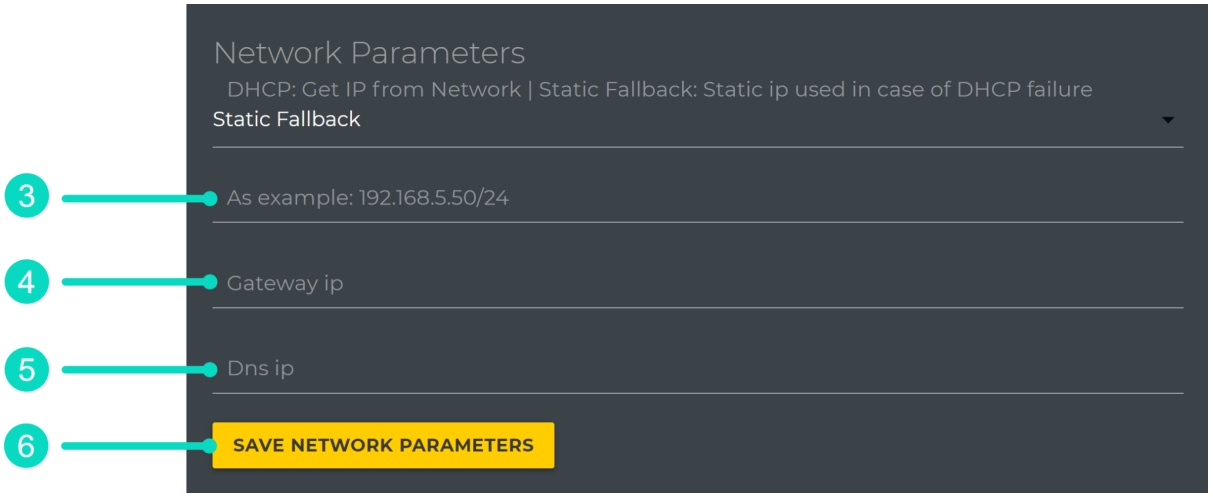



1. Access the network settings under the **Advanced Parameters page** by clicking on the button in the top left corner

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2 Select “Static Fallback” in the network mode field



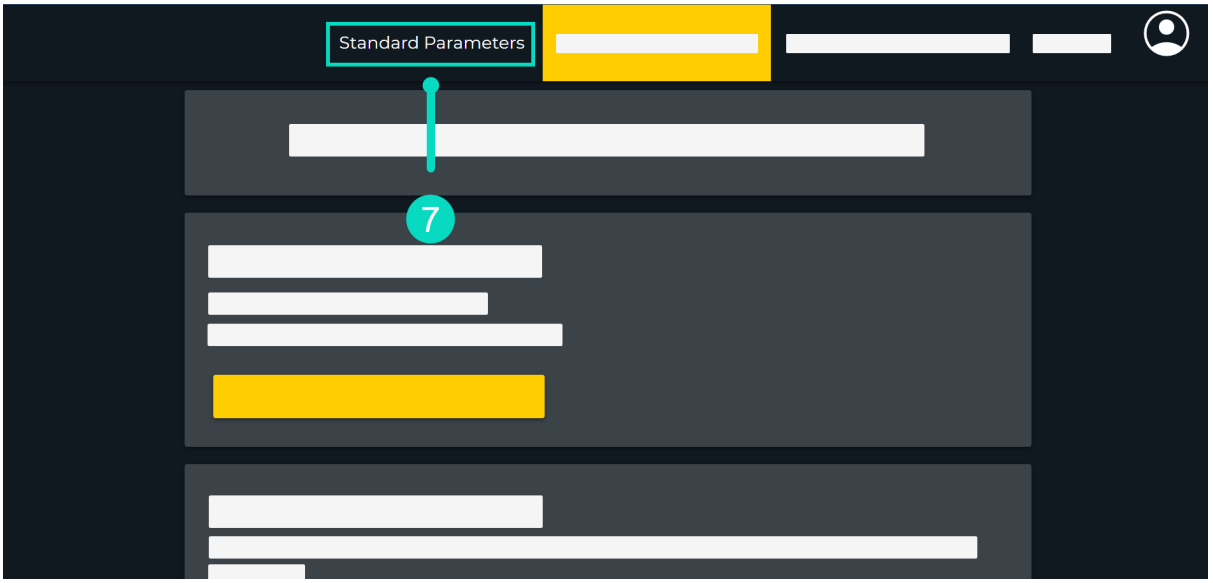

3 In the “Static ip” field, specify the desired IP address along with the CIDR representation of the subnet mask
*Example: 192.168.1.42/24, where 24 defines the 255.255.255.0 subnet mask*

4 Fill in the gateway IP address - Typical value is the first one of the range, but it is not always the case

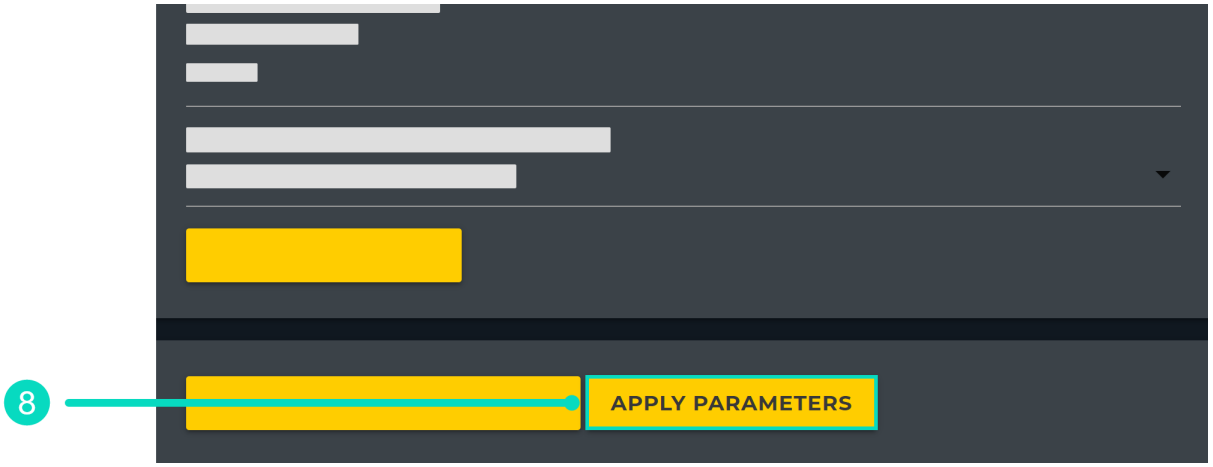
5 Fill in the IP address of the DNS server - Typical value is the same as the gateway, but you can always use public ones such as 1.1.1.1 or 8.8.8.8 if allowed

6 Click on the button “Save Network Parameters” to save the modifications

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7 Click on the “Standard Parameters” button to return to the **Standard Parameters page**



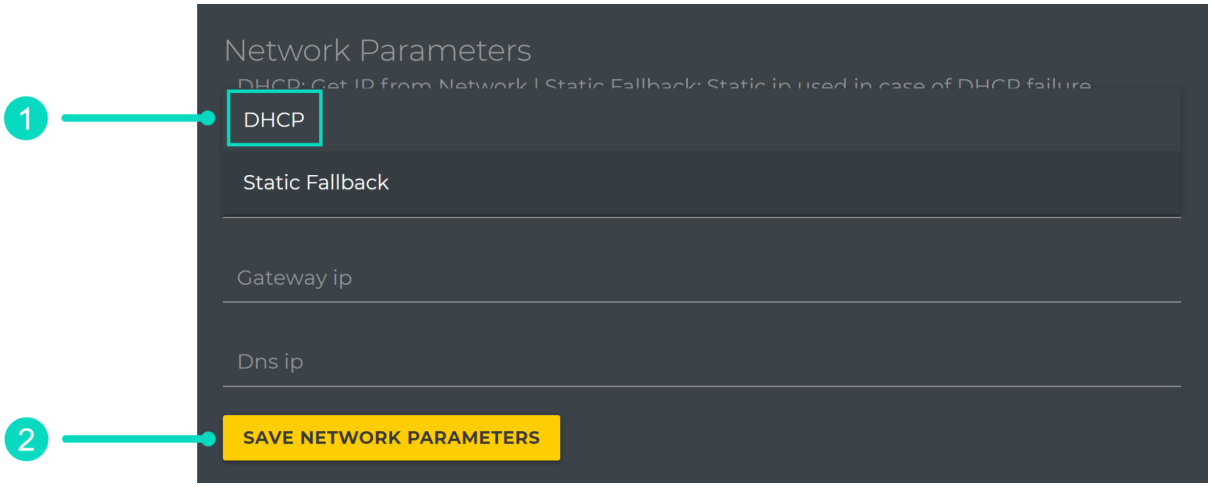

8 Finally, click on the “Apply Parameters” button to register all settings and restart the device

*Setting a static fallback configuration has no effect when a DHCP server is available. This fallback configuration only activates in case no DHCP server is present on the network.*

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### 6.2.2. Disabling static IP fallback

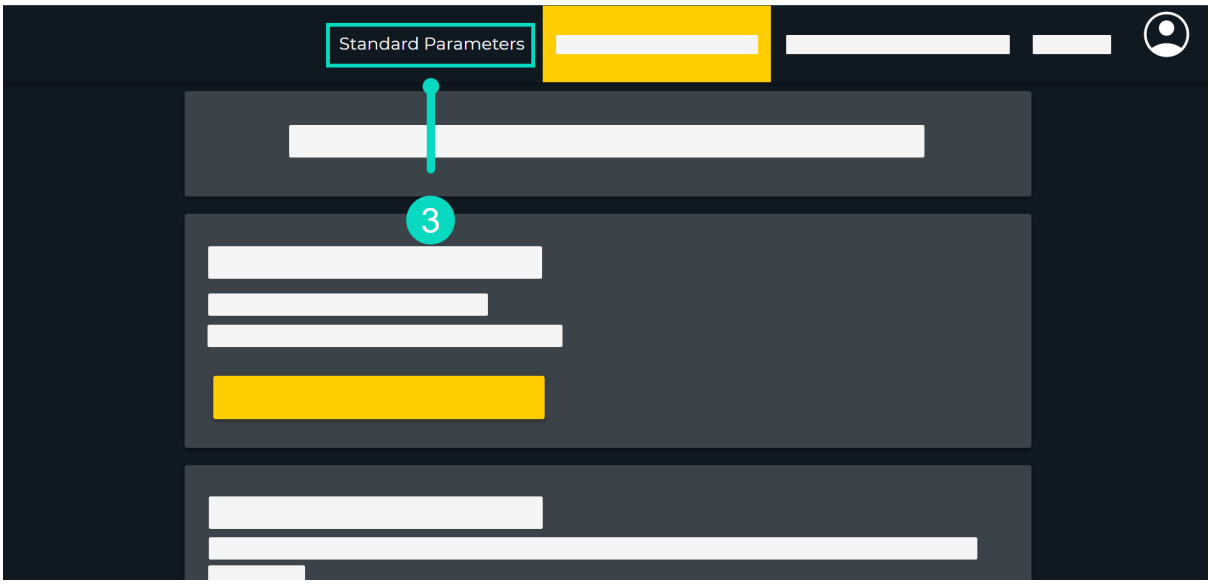
If you don't want the device to fall back on its static configuration, you can switch back to DHCP-only mode at any moment by following the following steps:



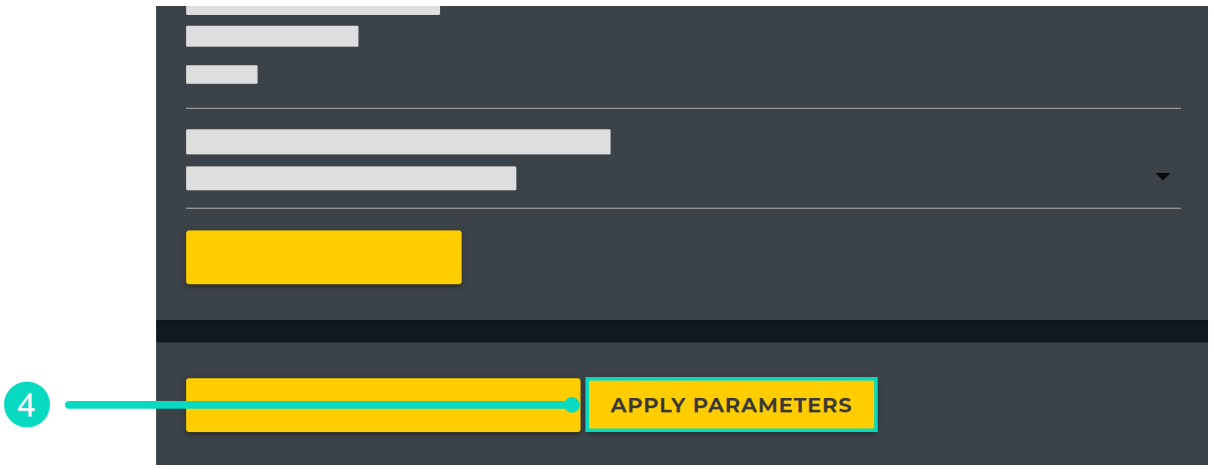

1. Select "DHCP" in the network mode field
2. Click on the button "Save Network Parameters" to save the configuration

*The values shown in the fields are the ones previously set by the user and don't reflect the currently active ones*

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3 Click on the “Standard Parameters” button to come back to the **Standard Parameters page**




4 Finally, click on the “Apply Parameters” button to register all settings and restart the device

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# 7. Multi-device installation and setup

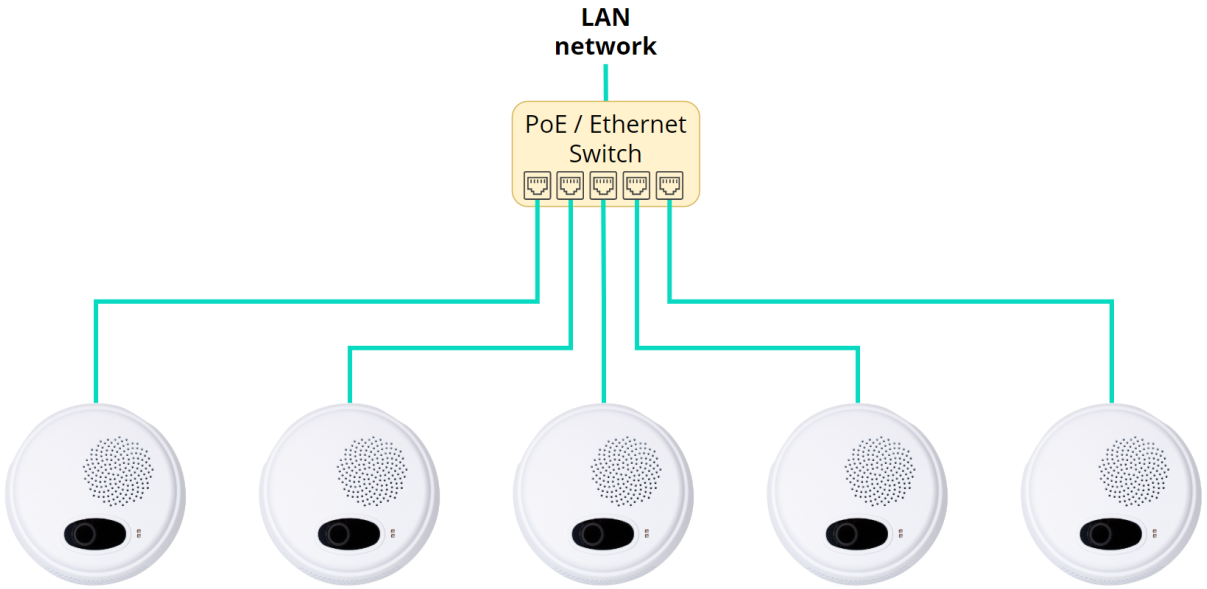
**ONLY AVAILABLE VIA POE OR ETHERNET CONNECTION**

## 7.1. General principle

Terabee uses the terms **Coordinator** and **Subordinate.** The "coordinator" device acts as the primary device. It receives information from "subordinate" devices, processes it, and sends the resulting data to the Terabee IoT Platform and/or a third-party server or cloud platform.

As a secondary device, the "subordinate" device communicates people's positions within its field of view to the "coordinator" device.

Coordinator and subordinate devices must be connected to the LAN network individually, just like a standard device. The multi-device connection and configuration are then handled under the device web GUI.



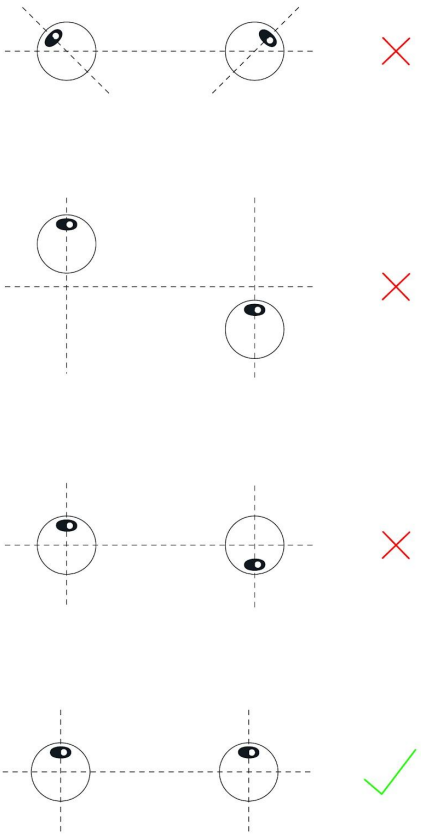

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## 7.2. Guidelines and recommendations

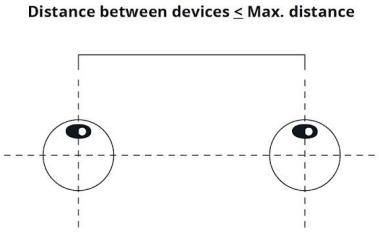
### 7.2.1. Multi-device installation

In some places where entrances or passageways are too wide to be covered by one single people counting device, two to five people counting devices can be installed and combined to extend the monitoring area.

When installing several devices that will work together, please follow the points below:



1. **Align the devices** and give the **same direction**




2. Respect a **maximum distance** between devices, considering the installation height

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The table below presents the maximum distances that apply for two or more devices working together.

| Installation height (m) | Max distance between devices (m) | Door coverage | | | | |
|---|---|---|---|---|---|---|
| | | 1 device | 2 devices | 3 devices | 4 devices | 5 devices |
| 2.40 | 0.80 | 1.50 | 2.30 | 3.10 | 3.90 | 4.70 |
| 2.50 | 0.90 | 1.55 | 2.45 | 3.35 | 4.25 | 5.15 |
| 2.60 | 1.00 | 1.60 | 2.60 | 3.60 | 4.60 | 5.60 |
| 2.70 | 1.10 | 1.70 | 2.80 | 3.90 | 5.00 | 6.10 |
| 2.80 | 1.20 | 1.80 | 3.00 | 4.20 | 5.40 | 6.60 |
| 2.90 | 1.35 | 1.90 | 3.25 | 4.60 | 5.95 | 7.30 |
| 3.00 | 1.50 | 2.10 | 3.60 | 5.10 | 6.60 | 8.10 |
| 3.10 | 1.65 | 2.20 | 3.85 | 5.50 | 7.15 | 8.80 |
| 3.20 | 1.80 | 2.30 | 4.10 | 5.90 | 7.70 | 9.50 |
| 3.30 | 1.95 | 2.40 | 4.35 | 6.30 | 8.25 | 10.20 |
| 3.40 | 2.10 | 2.50 | 4.60 | 6.70 | 8.80 | 10.90 |
| 3.50 | 2.25 | 2.60 | 4.85 | 7.10 | 9.35 | 11.60 |
| 3.60 | 2.40 | 2.75 | 5.15 | 7.55 | 9.95 | 12.35 |
| 3.70 | 2.55 | 2.90 | 5.45 | 8.00 | 10.55 | 13.10 |
| 3.80 | 2.70 | 3.05 | 5.75 | 8.45 | 11.15 | 13.85 |
| 3.90 | 2.85 | 3.20 | 6.05 | 8.90 | 11.75 | 14.60 |
| 4.00 | 3.00 | 3.40 | 6.40 | 9.40 | 12.40 | 15.40 |

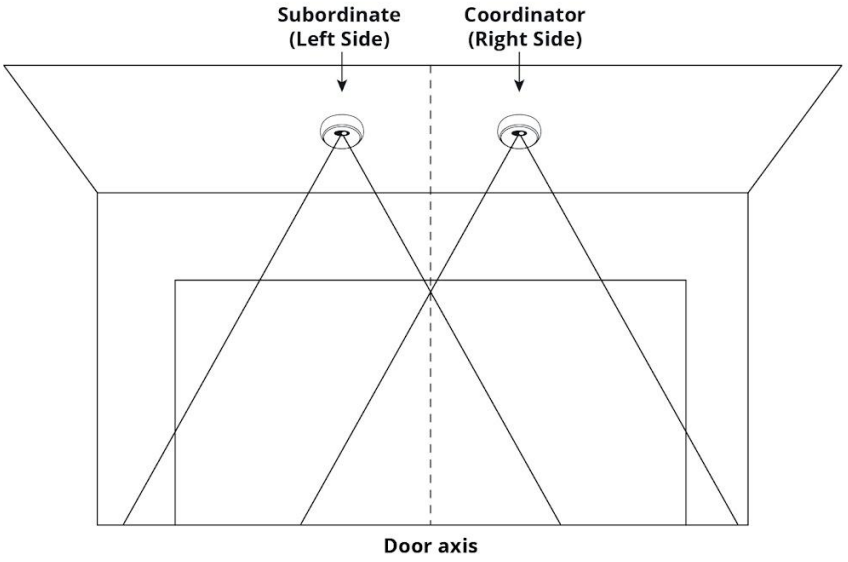
Considering the above information, you can proceed with the installation of each device by replicating the installation steps described in section 3.3. Mounting instructions.

*Please note that each device must be connected to the same ethernet network*

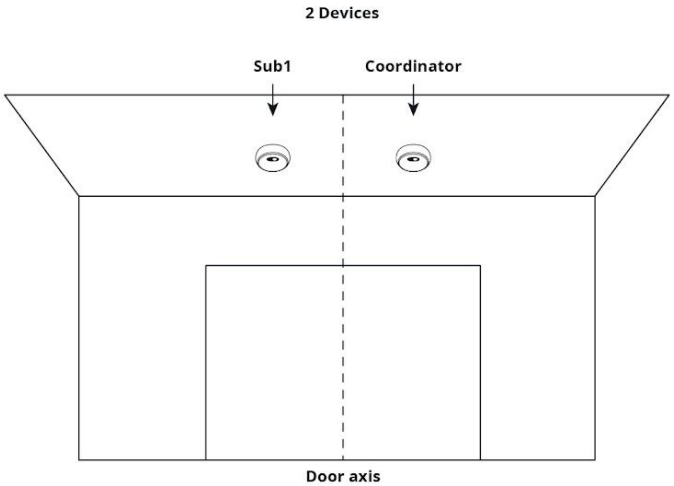
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### 7.2.2. Coordinator and subordinate principle

Once installed and ready to set up, the devices must be assigned roles. Please set **the primary People Counter device** as “coordinator” and **the other devices** connected to the “coordinator” device as “subordinate”.

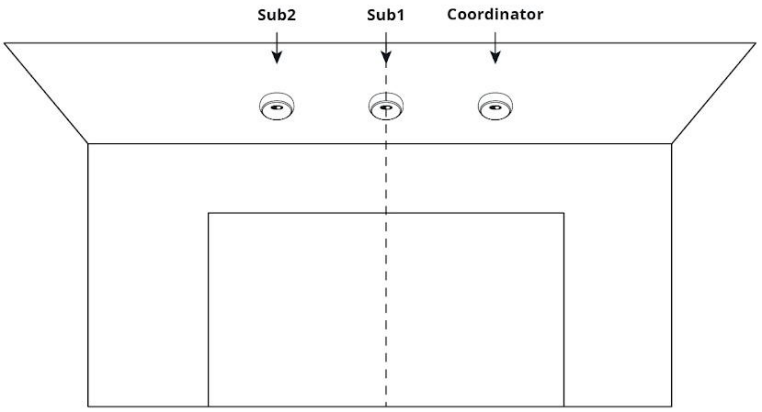



Install the coordinator on the right side of the entrance and the subordinates on the left side of the coordinator (side of the LED). **Please orientate the black optical part on the opposite side of the door** (as seen in the above picture).

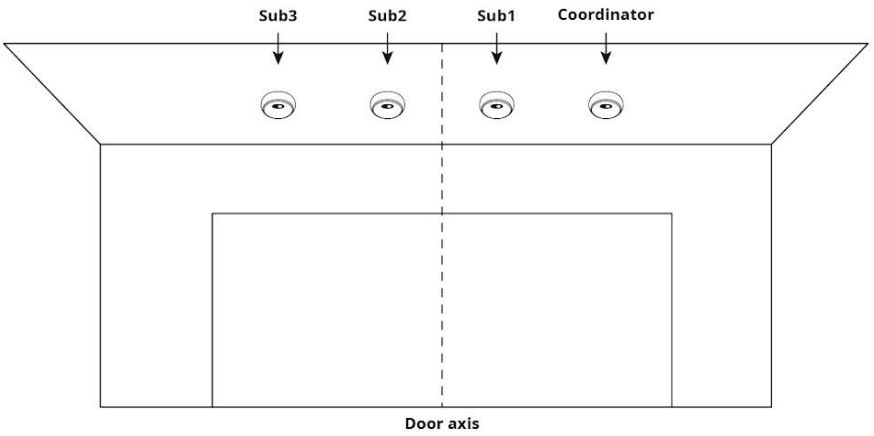



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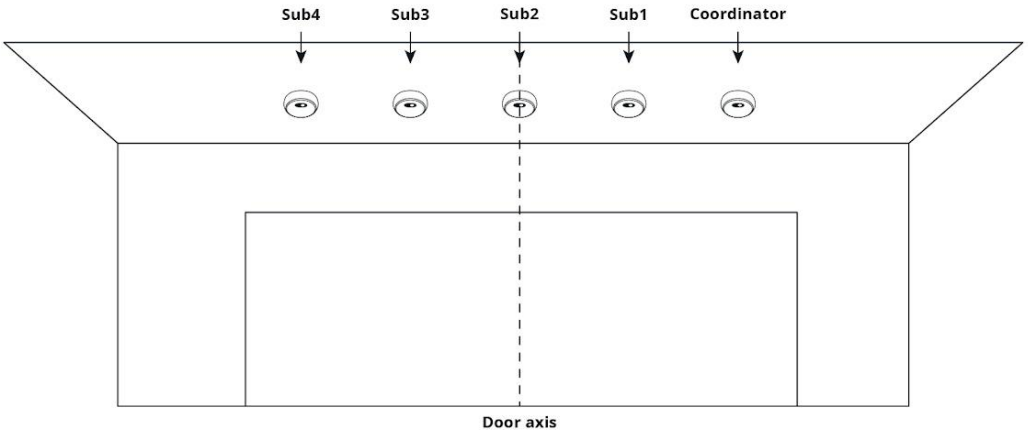
3 Devices




4 Devices



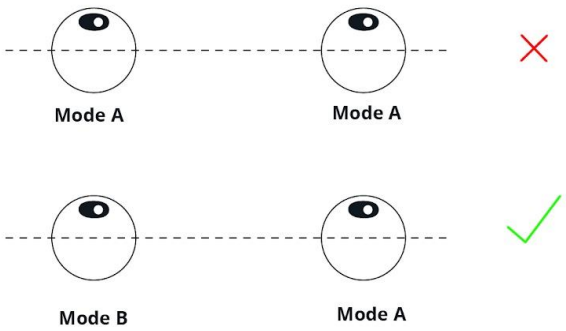

5 Devices



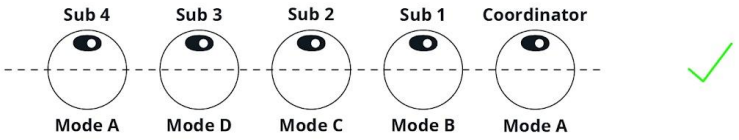

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### 7.2.3. Device camera mode

When setting up people counters in a multi-device configuration, it is essential to select different camera modes in each device to ensure that no interference happens between them. Four alternative modes – A, B, C, and D – are available to alternate between devices.




Terabee's recommendation is to set the coordinator device in Mode A, the first subordinate in Mode B, the second in Mode C, the third in Mode D, and the fourth in Mode A.



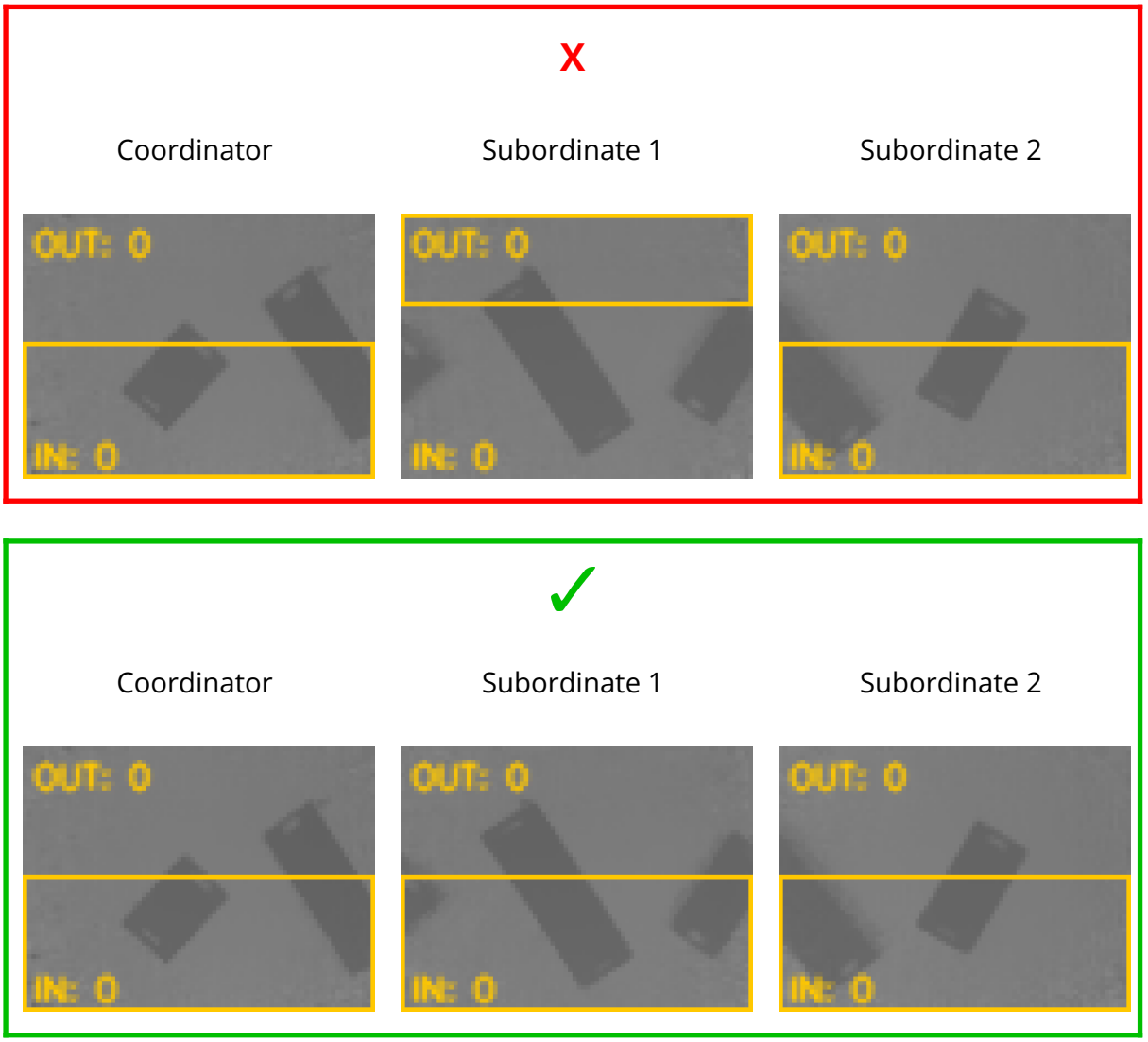

### 7.2.4. Counting principle

When the multi-device functionality is enabled, the counts operate on all devices. The coordinator device aggregates the data and pushes it to the Terabee IoT Platform (if the option is enabled) and/or to the configured platform or server. By default, a subordinate device does not push any data.

### 7.2.5. Design of the counting area

In a multi-device setup, the field of view of each device overlaps with the other devices, and the counting area becomes one common area. To get a correct global counting area, every particular area needs to be drawn so it can merge with the other areas. To achieve this result, the areas between the coordinator and the subordinates must touch the image's edges. See below for an example of a correct and incorrect configuration.

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*Please note that you must set the counting area in every image. The global area is computed by the coordinator device and can't be visualized.*

*The "reverse direction" parameter (which determines if the drawn area has to be interpreted as OUT or IN) only applies to the coordinator and the global area. The subordinates' areas are merged without considering their respective "reverse_direction" parameter.*

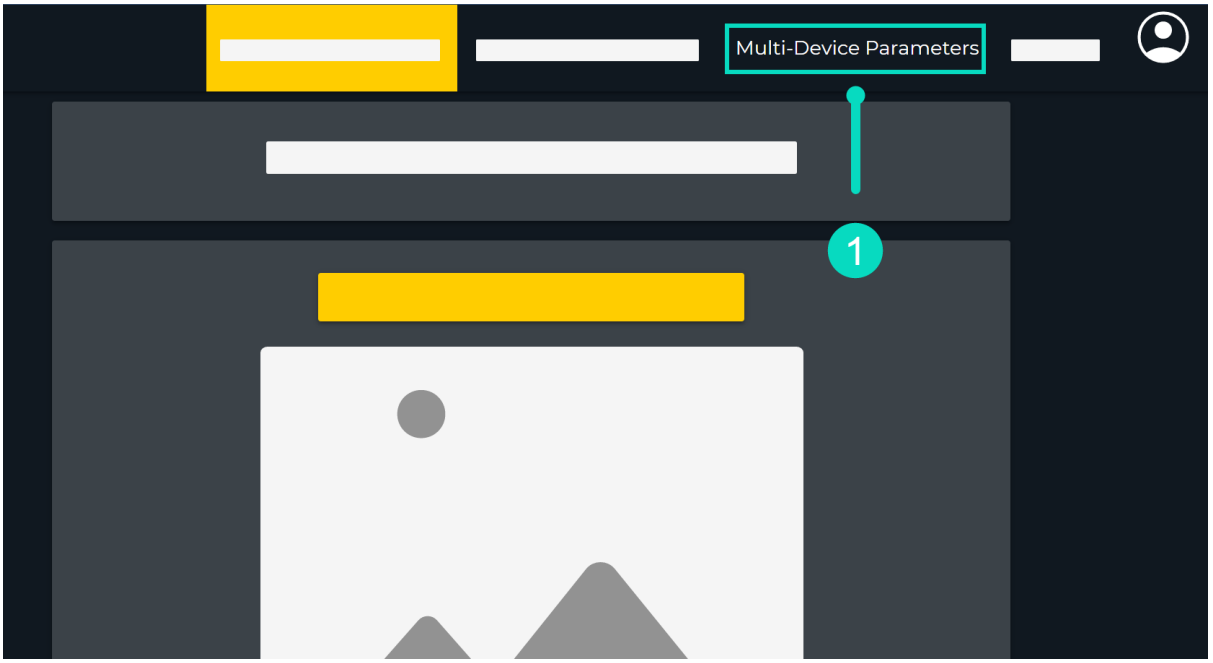
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## 7.3. Configure the coordinator device

**Video tutorial**

- https://youtu.be/I9pHDLqpm0o

To configure a **coordinator device**, use the following steps:

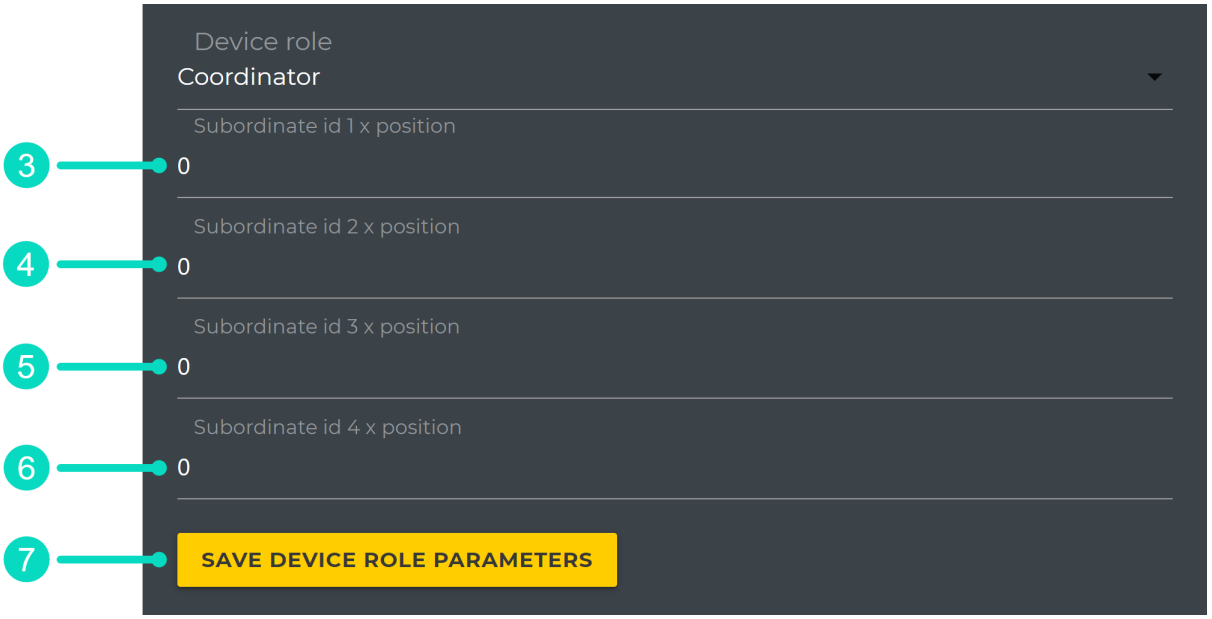



1 Access the **Multi-Device Parameters page** by clicking on the button in the top right corner



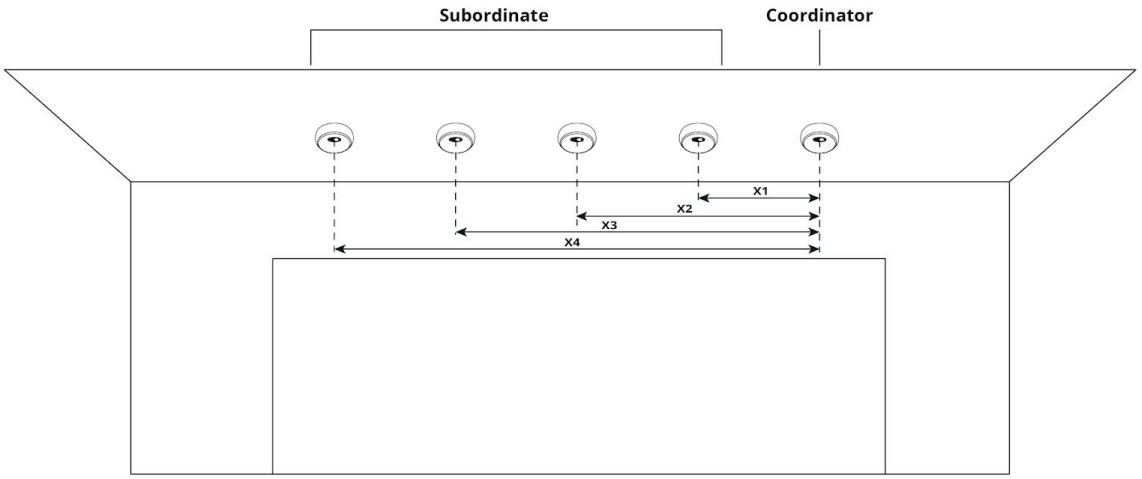

2 In the device role field, **select** "Coordinator" function to activate the functionality

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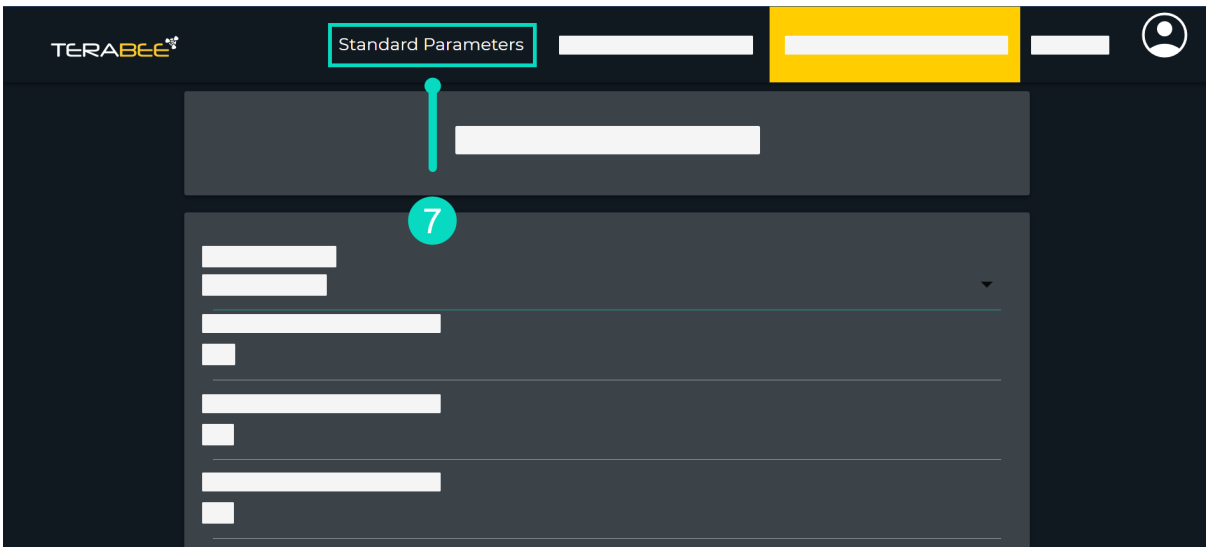

3 → 6 For every subordinate installed, indicate the offset distance in **millimeters** from the coordinator to the subordinate as described in the picture below

7 Click on the “Save” button to save the settings

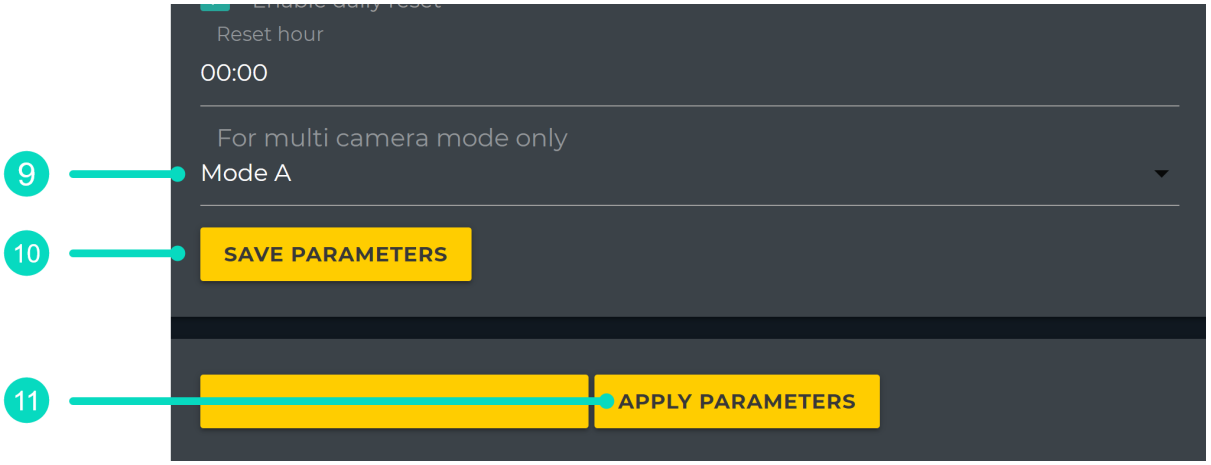



*Please note that once an offset distance has been registered for a subordinate, you need to set this offset distance to 0 to remove the associated subordinate from the multi-device setup.*

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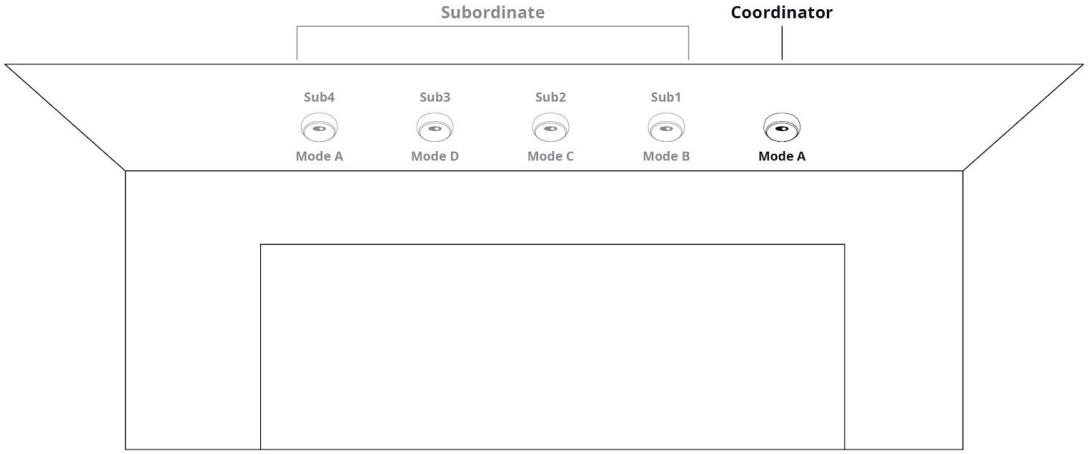



8 Click on the "Standard Parameters" button to return to the **Standard Parameters page**




9 Under the **Standard Parameters page**, set the **camera mode as A**

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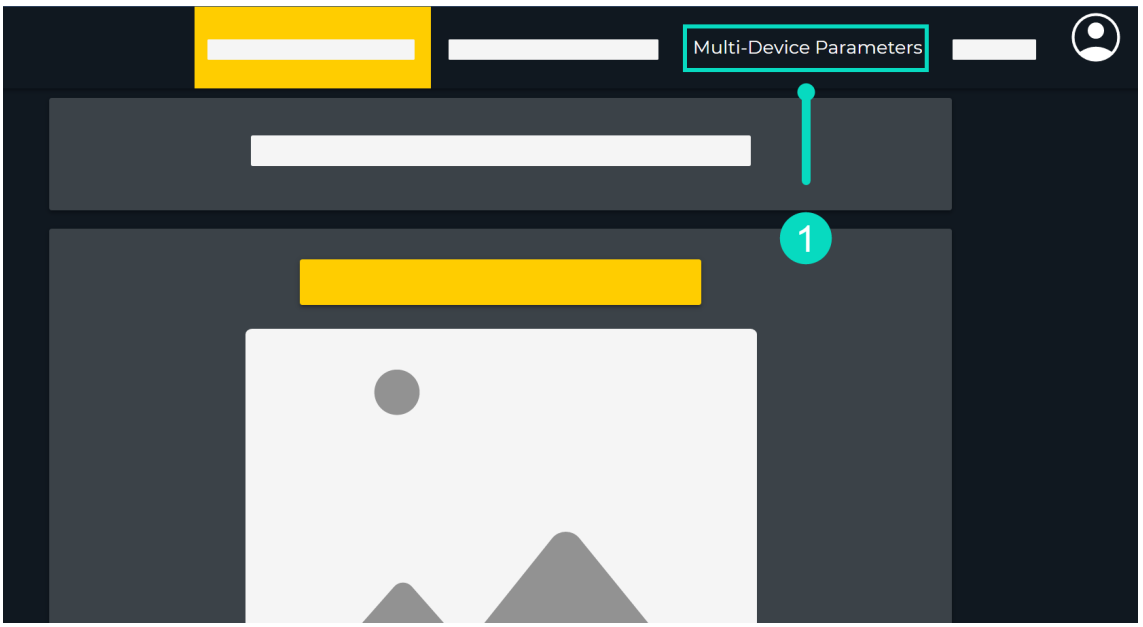

10 Click on “Save parameters” button to register the camera mode

11 Finally, click on the “Apply Parameters” button to save all settings and restart the device

## 7.4. Configure a subordinate device

**Video tutorial**: https://youtu.be/HxdhaaJqrd8

To configure a **Subordinate device**, use the following steps:

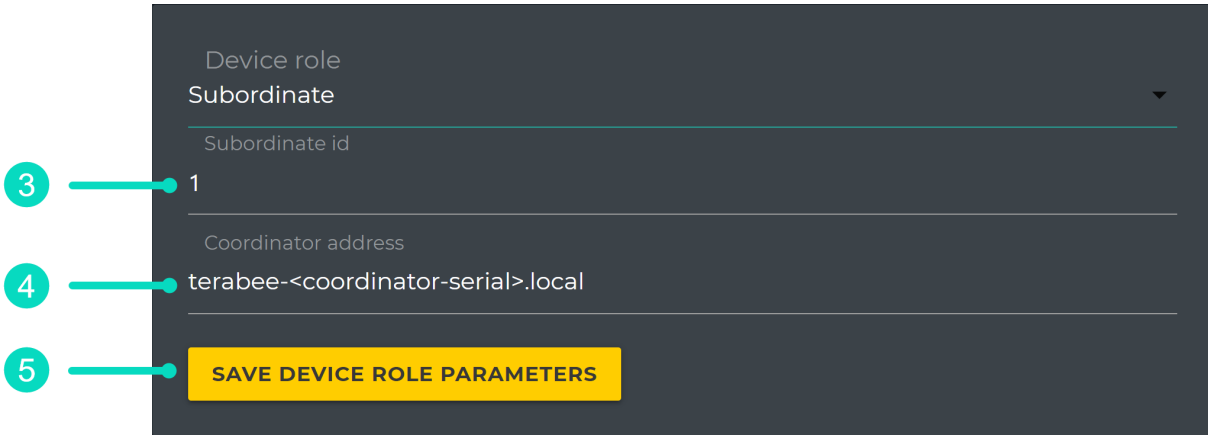



1 Access the **Multi-Device Parameters page** by clicking on the button in the top right corner

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2 In the device role field, **select** "Subordinate" function to activate the functionality

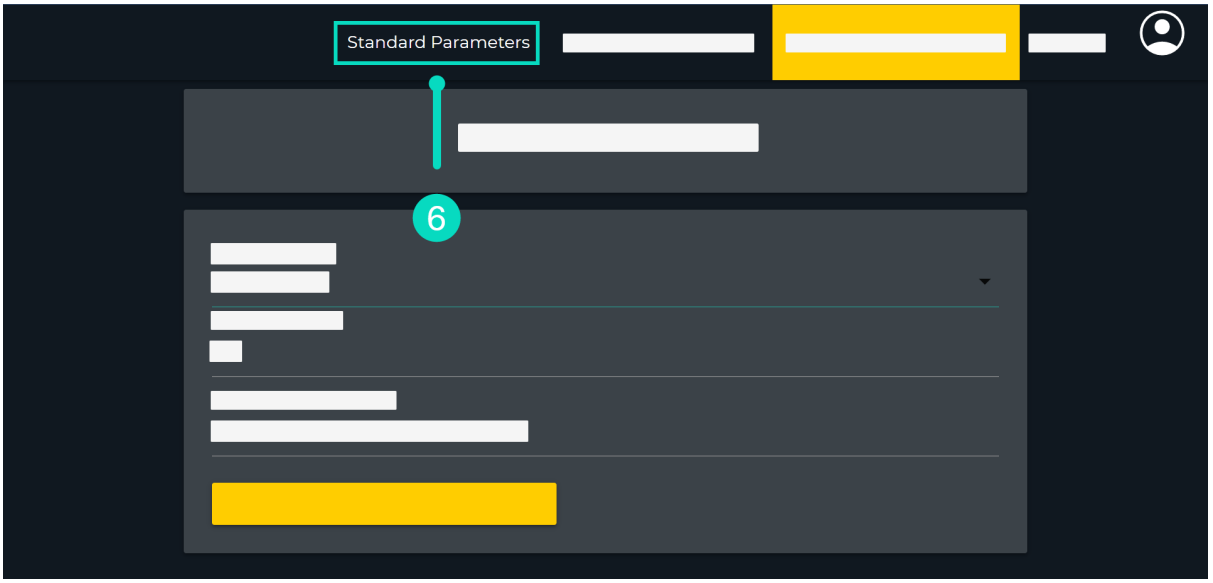



3 Indicate the device ID from 1 to 4, following the number of subordinates installed and as described in the picture below

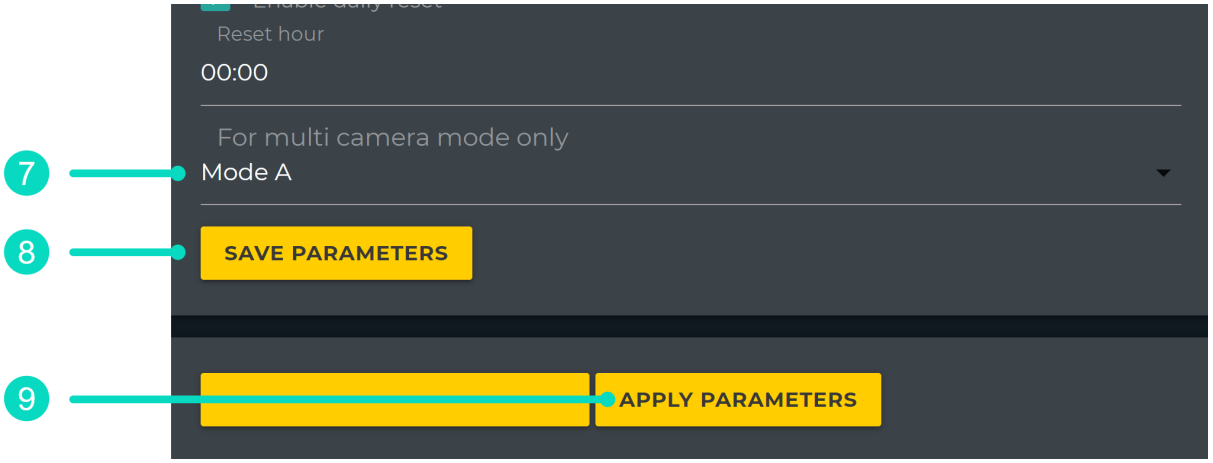
4 Enter the coordinator local address (same as the web GUI) or IP address

5 Click on the "Save Subordinate Parameters" button to save the settings

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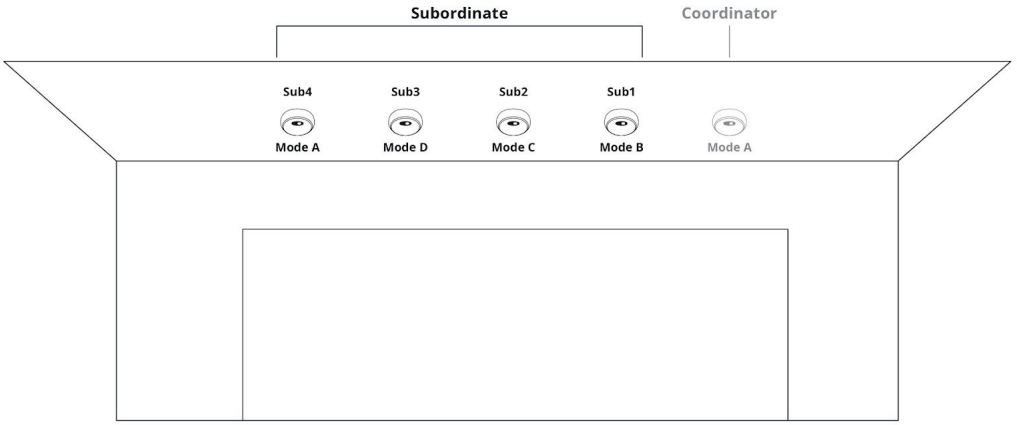



6 Click on the "Standard Parameters" button to return to the **Standard Parameters page**




7 Under the **Standard Parameters page**, set the camera mode **depending on the subordinate position** and as described in the picture below

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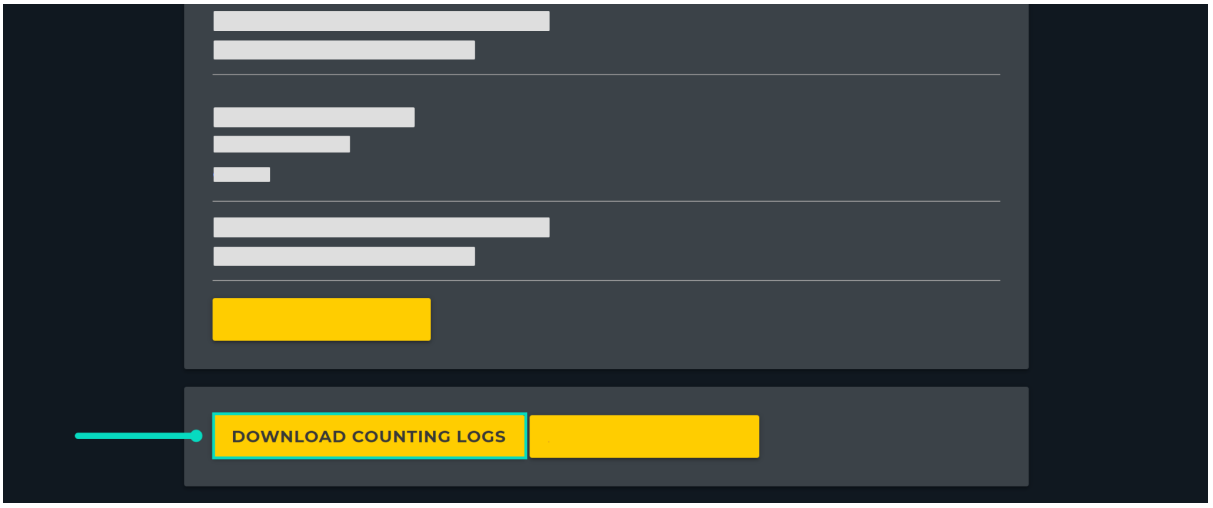

8 Click on “Save parameters” button to register the camera mode

9 Finally, click on the “Apply Parameters” button to save all settings and restart the device

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# 8. Local data download

Under the **Standard Parameters page**, there is the possibility to download all the counting logs recorded by the device by clicking on the “Download Counting Logs” button. The downloaded file is, by default, in the csv format.




| Time | In | Out |
|---|---|---|
| 1655360537 | 1 | 0 |
| 1655360542 | 1 | 1 |
| 1655360542 | 2 | 1 |
| 1655360585 | 3 | 1 |
| 1655362108 | 4 | 1 |

UNIX TIME

The downloaded file includes three fields:

- “Time” corresponds to the Unix timestamp, to be converted
- “In” corresponds to the entries
- “Out” corresponds to the exits

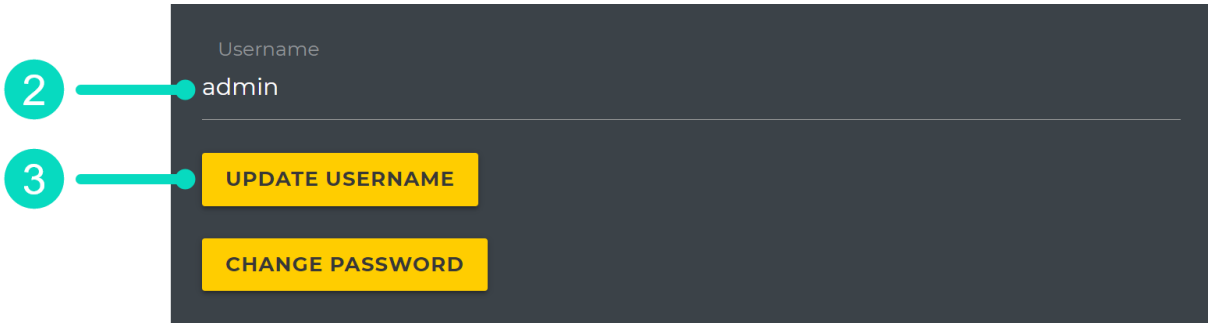
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# 9. Credentials modification

Under the username admin page, you can change the username and password access of the web GUI. To do so, follow the next steps.



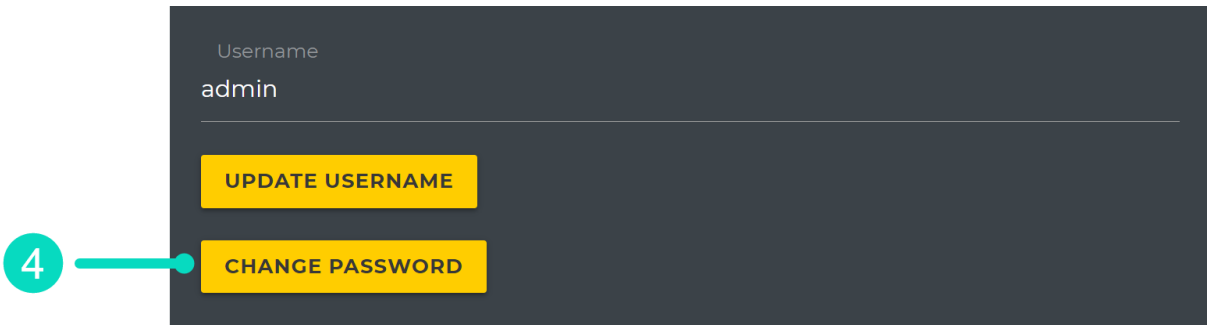

1 Access the credentials modification by clicking on the top right icon followed by the current username



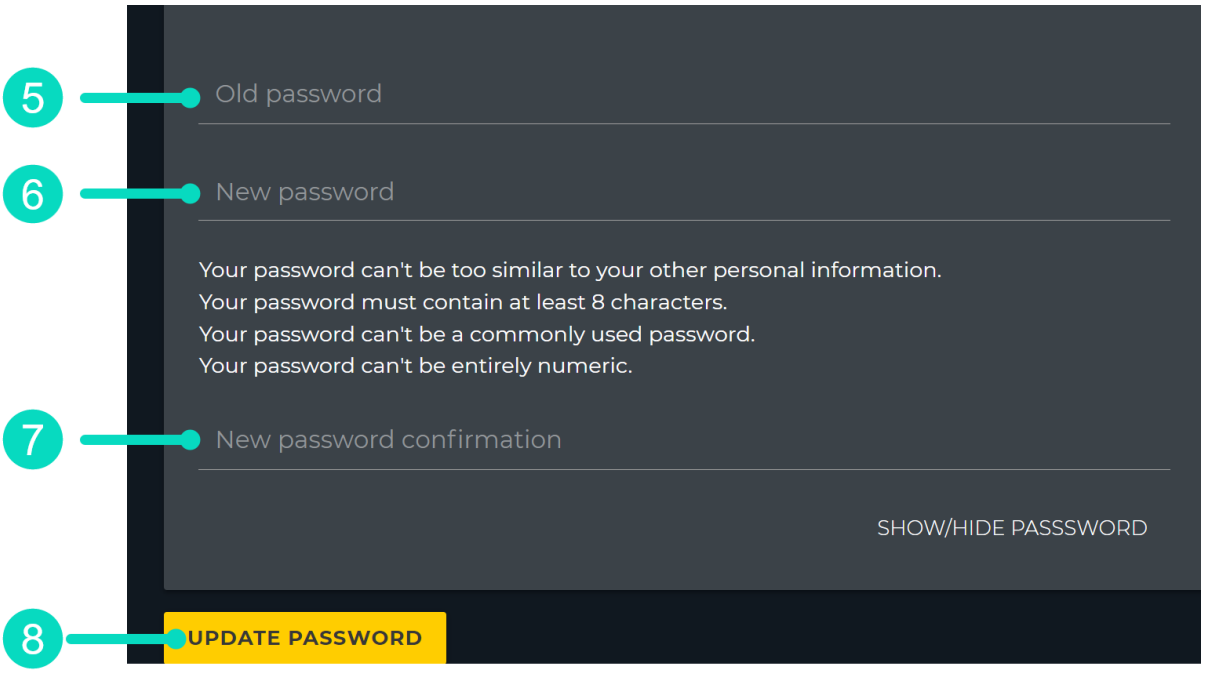

2 Fill the username fields with the username you want to log in with

3 Click on “Update Username”

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4 To change the password: Click on the “Change Password” button




5 Fill in your old password (default password of the People Counting L-XL device or last password updated)

6 Type your new password

7 Confirm your new password

8 Click on “Update Password” button

*Please note that you will be automatically logged out*

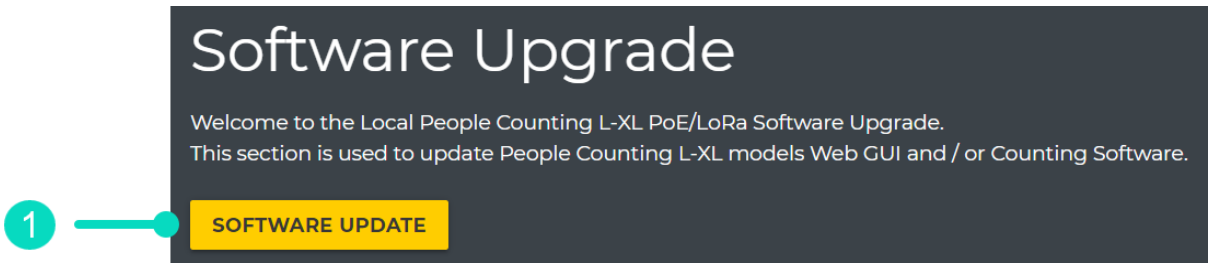
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# 10. Device update

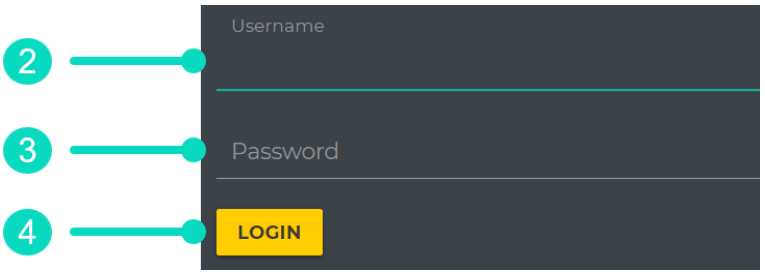
Each new device is up to date and doesn't have to be updated to operate correctly. If a device needs to be updated, we will inform you.

To access the Local Update web GUI, please enter the web GUI address and add "**:8000**" at the end for port redirection.

Example:
`http://terabee-<device_id>.local`
becomes :
`http://terabee-<device_id>.local:8000`




1 Click on "Software Update" Button

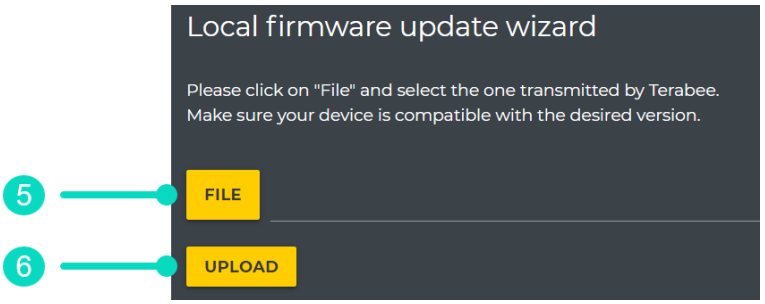



2 Fill the username field with the same username to connect to the web GUI

3 Fill the password field with the same password to connect to the web GUI

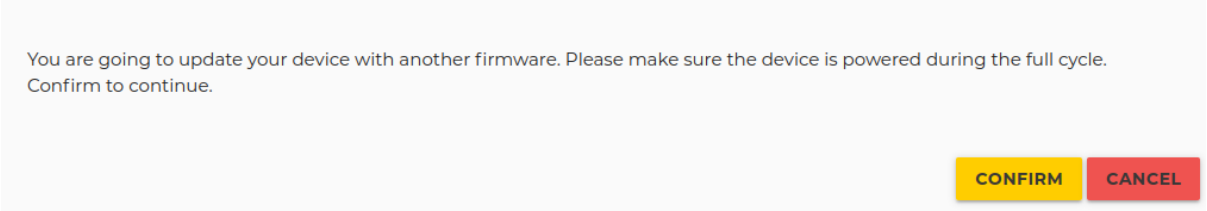
4 Click on "Login" button

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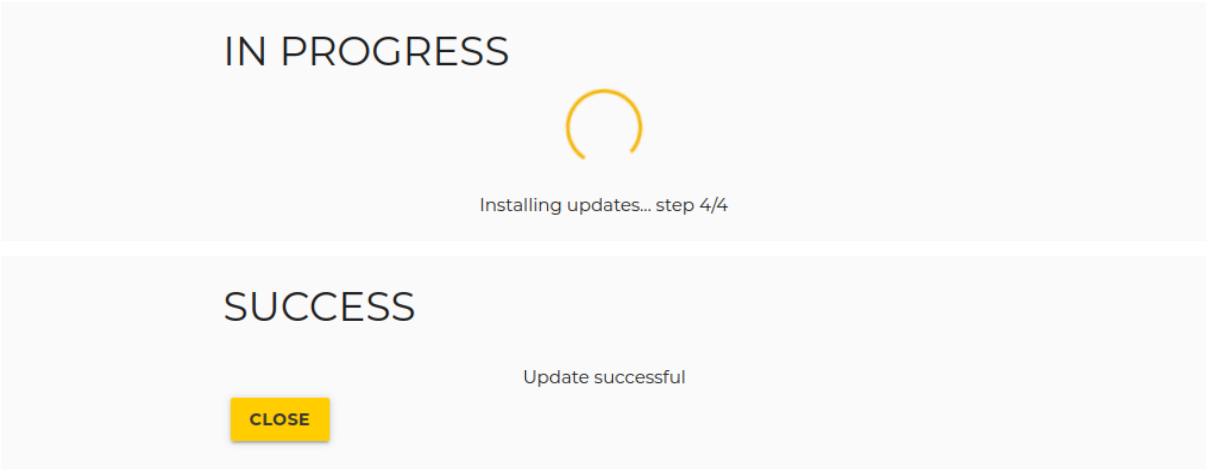



5 Click on the “FILE” button and select the update files provided by Terabee

6 Once the file is selected, click on upload, a new window will pop up




Click on “Confirm” to launch the process. **Do not power off the device during this process.**




Once you see the above, the update process is finished and successful.

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# 11. Local device management API on LAN network

## 11.1. List of features

The web GUI offers the following device management features:

- Get current counts
- Set counts
- Reset counts

These features are also callable directly by adding the following API URLs to **http://terabee-<device_id>.local**:

| Feature | URL | HTTP Type | Payload |
|---|---|---|---|
| Get counts | `/wizard/api/get_counts` | GET | Returns in_counts and out_counts |
| Set counts | `/wizard/api/set_counts` | POST | Content-type: application/x-www-form-urlencoded<br><br>Body: in_counts=<value>&out_counts=<value> |
| Reset counts | `/wizard/api/reset_counts` | GET | - |

Possible response codes are:

- 200 -> OK
- 400 -> Invalid request
- 403 -> Forbidden (See section 11.2. API authentication)
- 500 -> Error while processing request

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## 11.2. API authentication

These APIs are accessible only with authentication. The HTTP header needs to contain the login credentials using Basic Authentication to authenticate.

With Basic Authentication, the request header Key is **'Authorization'**. The Value is **'Basic** '+ the encoded base 64 of **username** and **password** values are the ones used to connect to the device web GUI.

The general format is the following:

| Key | Value |
|---|---|
| `Authorization` | `Basic BASE64_USERNAME_PASSWORD` |

For instance, given that the device's serial number is **b827eb6abb6f,** we have the following credentials:

```
people_counting_admin:b827eb6abb6f--admin
```

Which, in base 64, gives the following:

```
cGVvcGxlX2NvdW50aW5nX2FkbWluOmI4MjdlYjZhYmI2Zi0tYWRtaW4=
```

Then the final header would be formatted as follows:

```
Authorization: Basic cGVvcGxlX2NvdW50aW5nX2FkbWluOmI4MjdlYjZhYmI2Zi0tYWRtaW4=
```

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# 12. Javascript Decoder for LoRa Payload

Terabee offers an open-source javascript decoder for data payloads. The decoder is designed to be compatible with **TheThingsNetwork,** but the core decoding logic can be **reused for other environments**.

Uplinks can be divided into three main categories:

1. Main people counting data uplink
2. Acknowledgment of device management commands
3. Value answer to device management commands

Uplinks are determined by the corresponding frame port (FPort) they were received on. The table below summarizes available commands and their corresponding FPorts. The exact payload structure of each command is explained in the next section.

| FPort (int) | Command Type | Description |
|---|---|---|
| 1 | PEOPLE COUNTING DATA | A periodic uplink sent by a device with people counting data. |
| 2 | PEOPLE COUNTING DEVICE MANAGEMENT | A set of commands to manipulate the people counting data (SET, GET, RESET) on demand. |
| 3 | REBOOT | A set of commands to reboot the device or restart the counting software on demand. |
| 4 | SOFTWARE VERSION | Commands to get the different device software components versions. |
| 5 | ACCESS POINT | Commands to manipulate devices WIFI access point. |
| 6 | REJOIN | Commands forcing devices to RE-JOIN LoRa network on demand. |
| 7 | TIME SYNC | Commands forcing the device to synchronize the device's clock with the LoRa Network Server. |
| 100 | DEVICE PARAMETERS | A set of commands to change device-specific parameters, such as mounting height, push period, or counting direction. |
| 101 | GET COUNTING AREA | Commands allowing to get the points representing the counting area. |
| 102 | SET COUNTING AREA | Commands allowing to set the points representing the counting area. |

You will find further instructions here:
https://github.com/Terabee/pcl_lora_payload_decoder

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## 12.1. People counting data (Uplink only)

| FPort (int) |
|---|
| 1 |

This FPort is used for the people counting uplink messages.

| Byte 0-3 | Byte 4-7 | Byte 8 |
|---|---|---|
| Count in (uint32) | Count out (uint32) | Status flags byte |

**Status flags byte structure**
Certain status flags will be reported by the firmware using the last byte of the LoRa payload (byte 8). Each bit in the byte represents a status as described below:

| BITS 7-4 | BIT 3 | BIT 2 | BIT 1 | BIT 0 |
|---|---|---|---|---|
| RFU | WIFI_AP_ENABLED | MULTI_DEV_ISSUE | TPC_STUCK | TPC_STOPPED |

RFU = reserved for future use

**Status flags**: Informs/alerts the user about the current status of the device similar to the status LED. Status flags and their corresponding meaning are presented in the table below:

| Flag | Meaning |
|---|---|
| TPC_STOPPED | The counting software is currently not running. |
| TPC_STUCK | The counting software is started but not responding. |
| MULTI_DEV_ISSUE | The multi-device capability is not set up properly, or there is an issue with the coordinator or one of the subordinate devices. |
| WIFI_AP_ENABLED | The wifi access point is enabled. |

*One unique message containing the cumulative counts is sent per standard uplink*

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## 12.2. People counting device management

| FPort (int) |
| --- |
| 2 |

This FPort groups commands that manipulate current people counting counts.

### 12.2.1. Reset count

This command is used to reset the current counts.

| CMD downlink | Byte 0 |
| --- | --- |
| RESET COUNT | 01 |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
| --- | --- | --- | --- |
| RESET COUNT | FF | 01 | ACK = 00<br>NACK = FF |

### 12.2.2. Set counts

This command is used to set the counts to specific values. Specified as two unsigned big-endian 32-bit integers.

| CMD downlink | Byte 0 | Byte 1-4 | Byte 5-8 |
| --- | --- | --- | --- |
| SET COUNT | 82 | Count in (uint32) | Count out (uint32) |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
| --- | --- | --- | --- |
| SET COUNT | FF | 82 | ACK = 00<br>NACK = FF |

### 12.2.3. Get counts

This command is used to get the current count values. The device will answer with two unsigned big-endian 32-bit integers.

| CMD downlink | Byte 0 |
| --- | --- |
| GET COUNT | 02 |

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| CMD uplink | Byte 0 | Byte 1-4 | Byte 5-8 |
|---|---|---|---|
| GET COUNT | 02 | Count in (uint32) | Count out (uint32) |

## 12.3. Reboot

| FPort (int) |
|---|
| 3 |

This FPort regroups commands to reboot the device or restart the counting software on demand.

### 12.3.1. Device reboot

This command will make the device reboot. An acknowledgment will always be sent before rebooting to be sure that the device received the command.

| CMD downlink | Byte 0 |
|---|---|
| DEVICE REBOOT | 01 |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
|---|---|---|---|
| DEVICE REBOOT | FF | 01 | ACK = 00<br>NACK = FF |

### 12.3.2. People counting software restart

This command will restart the people counting software.

*This command is required to apply parameter changes. This is similar to the "apply changes" button of the web GUI.*

| CMD downlink | Byte 0 |
|---|---|
| PEOPLE COUNTING AGENT RESTART | 02 |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
|---|---|---|---|
| PEOPLE COUNTING AGENT RESTART | FF | 02 | ACK = 00<br>NACK = FF |

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## 12.4. Get software version

| FPort (int) |
| --- |
| 4 |

This FPort is dedicated to commands to get the different device software components versions.

| CMD downlink | Byte 0 |
| --- | --- |
| GET PEOPLE COUNTING SW VER | 01 |
| GET WEB GUI SW VER | 02 |
| GET LORA AGENT SW VER | 03 |
| GET ACCESS POINT SW VER | 04 |
| GET UPDATER WEB GUI SW VER | 05 |
| GET FAN SERVICE SW VER | 06 |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 | Byte 3 |
| --- | --- | --- | --- | --- |
| PEOPLE COUNTING SW VER | 01 | MAJOR (uint8) | MINOR (uint8) | PATCH (uint8) |
| WEB GUI SW VER | 02 | MAJOR (uint8) | MINOR (uint8) | PATCH (uint8) |
| LORA AGENT SW VER | 03 | MAJOR (uint8) | MINOR (uint8) | PATCH (uint8) |
| ACCESS POINT SW VER | 04 | MAJOR (uint8) | MINOR (uint8) | PATCH (uint8) |
| UPDATER WEB GUI SW VER | 05 | MAJOR (uint8) | MINOR (uint8) | PATCH (uint8) |
| FAN SERVICE SW VER | 06 | MAJOR (uint8) | MINOR (uint8) | PATCH (uint8) |

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## 12.5. Access point

| FPort (int) |
| --- |
| 5 |

This FPort regroups commands to manage the device's access point.

### 12.5.1. Get access point state

This command is used to get the current state of the access point.

| CMD downlink | Byte 0 |
| --- | --- |
| GET ACCESS POINT STATE | 01 |

| CMD uplink | Byte 0 | Byte 1 |
| --- | --- | --- |
| GET ACCESS POINT STATE | 01 | 00 - DISABLED<br>01 - ENABLED |

### 12.5.2. Set access point state

This command is used to enable/disable the access point.

| CMD downlink | Byte 0 | Byte 1 |
| --- | --- | --- |
| SET ACCESS POINT STATE | 81 | 00 - DISABLED<br>01 - ENABLED |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
| --- | --- | --- | --- |
| SET ACCESS POINT STATE | FF | 81 | ACK = 00<br>NACK = FF |

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## 12.6. Force rejoin

| FPort (int) |
| --- |
| 6 |

This FPort is dedicated to commands related to the OTAA (Over-the-Air Activation) join procedure.

This command forces the device to rejoin but has no effect when the device uses ABP.



*The ACK shouldn't be sent because of the architecture of the software; the device will immediately be unjoined. However, the device will send an OTAA join request right away.*

| CMD downlink | Byte 0 |
| --- | --- |
| FORCE REJOIN | 01 |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
| --- | --- | --- | --- |
| FORCE REJOIN | FF | 01 | ACK = 00<br>NACK = FF |

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## 12.7. Force time Synchronization

| FPort (int) |
| --- |
| 7 |

This FPort is dedicated to commands related to time synchronization.

This command is used to force the device to execute a time synchronization procedure. After acknowledging the command, the device will generate an uplink on FPort 202 to fetch the LoRaWAN network time.

| CMD downlink | Byte 0 |
| --- | --- |
| FORCE TIME SYNC | 01 |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
| --- | --- | --- | --- |
| FORCE TIME SYNC | FF | 01 | ACK = 00<br>NACK = FF |

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## 12.8. People counting device parameters

| FPort (int) |
| --- |
| 100 |

This FPort is dedicated to setting and getting various people counting parameters.

*It is required to restart the counting software to apply parameter changes. See section 12.3 Reboot*

### 12.8.1. Set mounting height

This command is used to set the mounting height in mm. Specified as one big-endian 16-bit integer. Valid range is from 2400 mm to 4000 mm.

| CMD downlink | Byte 0 | Byte 1-2 |
| --- | --- | --- |
| SET MOUNTING HEIGHT | 01 | HEIGHT in mm (uint16) |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
| --- | --- | --- | --- |
| SET MOUNTING HEIGHT | FF | 81 | ACK = 00<br>NACK = FF |

### 12.8.2. Set counting direction

This command is used to set the counting direction. If “normal” the counting area will be considered as inside, outside if “reversed”.

| CMD downlink | Byte 0 | Byte 1 |
| --- | --- | --- |
| SET COUNTING DIRECTION | 02 | 00 - NORMAL<br>01 - REVERSED |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
| --- | --- | --- | --- |
| SET COUNTING DIRECTION | FF | 82 | ACK = 00<br>NACK = FF |

### 12.8.3. Set push period

This command is used to set the push period in minutes. Specified as one big-endian 16-bit integer. Valid range is from 1 to 1440 minutes (1 day).

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| CMD downlink | Byte 0 | Byte 1-2 |
|---|---|---|
| SET PUSH PERIOD | 03 | Time interval between pushes in min (uint16) |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
|---|---|---|---|
| SET PUSH PERIOD | FF | 83 | ACK = 00<br>NACK = FF |

### 12.8.4. Get mounting height

This command is used to get the mounting height in mm. Specified as one big-endian 16-bit integer.

| CMD downlink | Byte 0 |
|---|---|
| GET MOUNTING HEIGHT | 01 |

| CMD uplink | Byte 0 | Byte 1-2 |
|---|---|---|
| GET MOUNTING HEIGHT | 01 | HEIGHT in mm (uint16) |

### 12.8.5. Get counting direction

This command is used to get the counting direction. If “normal” the counting area is considered as inside, outside if “reversed”.

| CMD downlink | Byte 0 |
|---|---|
| GET COUNTING DIRECTION | 02 |

| CMD uplink | Byte 0 | Byte 1 |
|---|---|---|
| GET COUNTING DIRECTION | 02 | 00 - NORMAL<br>01 - REVERSED |

### 12.8.6. Get push period

This command is used to get the push period in minutes, specified as one big-endian 16-bit integer.

| CMD downlink | Byte 0 |
|---|---|
| GET PUSH PERIOD | 03 |

| CMD uplink | Byte 0 | Byte 1-2 |
|---|---|---|
| GET PUSH PERIOD | 03 | Time interval between pushes in min (uint16) |

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## 12.9. People counting area

In this section, we will detail both commands to **get** and **set** the counting area. We will also explain the way the area is encoded.

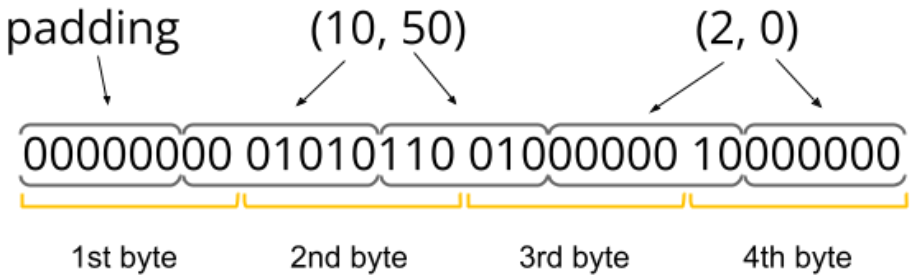
### 12.9.1. Area points encoding format

The area represents a list of points forming an area. This is the same area you can set up through the web GUI.

Points are represented as (X, Y) and are expressed in terms of pixels in the device image (80 x 60 pixels). X and Y correspond, respectively, to the pixel column from 0 to 79 and the pixel row from 0 to 59.

For the encoding, coordinates are respectively encoded with 7, and 6 bits unsigned integers. Points are packed in the minimum required number of bytes and padded with zeros.

For example, points (10, 50), (2, 0) will be represented as:




The resulting hexadecimal payload would then be: 00 56 40 80
Or as decimal: 0 86 64 128

### 12.9.2. Get people counting area

| FPort (int) |
| --- |
| 101 |

This FPort is dedicated to getting the current counting area.

| CMD downlink | Byte 0 |
| --- | --- |
| GET PEOPLE COUNTING AREA | 00 |

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| CMD uplink | Byte 0 | Byte 1 - X |
|---|---|---|
| GET PEOPLE COUNTING AREA | NUMBER OF (X, Y) COORDINATES<br>1 - 255 | POINTS |

| POINTS | X | Y |
|---|---|---|
| (X, Y) | 7 bits | 6 bits |

### 12.9.3. Set people counting area

| FPort (int) |
|---|
| 102 |

This FPort is dedicated to setting the counting area.

*It is required to restart the counting software to apply the new counting area. See section 12.3. Reboot.*

| CMD downlink | Byte 0 | Byte 1 - X |
|---|---|---|
| SET PEOPLE COUNTING AREA | NUMBER OF (X, Y) COORDINATES<br>1 - 255 | POINTS |

| POINTS | X | Y |
|---|---|---|
| (X, Y) | 7 bits | 6 bits |

| CMD uplink | Byte 0 | Byte 1 | Byte 2 |
|---|---|---|---|
| SET PEOPLE COUNTING AREA | FF | 00 | ACK = 00<br>NACK = FF |

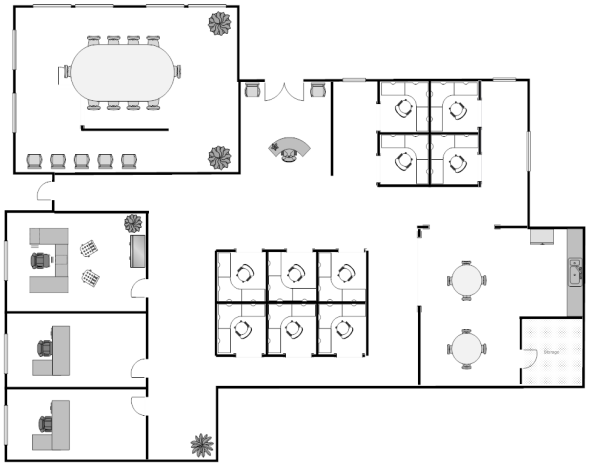
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# 13. Recommendations for device deployment

Here are a few tips and good practices during a device deployment. This can work for small as well as large deployments.

Please note that Terabee experts are here to help during each of these phases if you would like to have some help.

## 13.1. Study your building

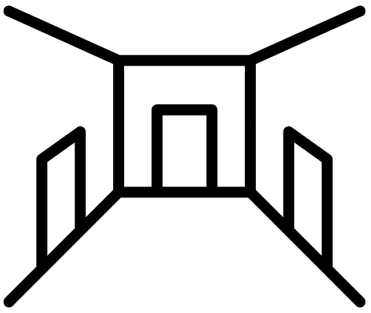


🔎 Study the floor map of the building to identify the people flow, points of passage, doors, and other elements relevant to where to place the people counting devices.

🚀 Pro tips: Note on the floor map where the people counting device should be located and start to create the ID installation names for each point of installation on another sheet.

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## 13.2. Check installation dimensions



🔎 Verify the passage and door dimensions and the ceiling height. If you don't have all this information at every point of installation, a quick survey measurement will be required. Once you have this information, you can verify if one or several people counting devices are needed to cover the doors and passageways.

🚀 Pro tips: in front of each point of installation, note the door width and ceiling height and indicate with a Y/N if one device covers the width correctly.

## 13.3. Before the installation



✍️ Once you know where each device is, you can pre-configure a few parameters, such as the installation height, reset hour, and counting zone. Take the opportunity to note the device serial number in front of each point of installation.

🚀 Pro tip: Before the installation, indicate the ID installation on the device with a sticker to save time during installation.

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## 13.4. After the installation



✓ Once the installation is complete, check every system and note that they are up and running, checked, configured, and sending data correctly.

🚀 Pro tips: along with all this information, you can record the IP address of each device, the device type (single, subordinate, or coordinator), the inter-device distance, the coordinator address, and which camera mode has been set.

## 13.5. Key elements to consider

In summary, the key elements to consider are the following:

1. **Building name** where the devices are installed
2. **IP address** of the devices
3. **ID installation** of the devices
4. **Serial number** of the devices
5. **Door width** at the point of installation
6. **Installation height** at the point of installation

Additional elements can be helpful for you to save time during installation:

1. **Device type** between standalone, coordinator, or subordinate device
2. **Inter-device installation distance** for multi-device setup
3. **Coordinator address** set on the subordinate devices
4. **Camera mode** set between A, B, C, and D

All these elements can be aggregated inside a global table.

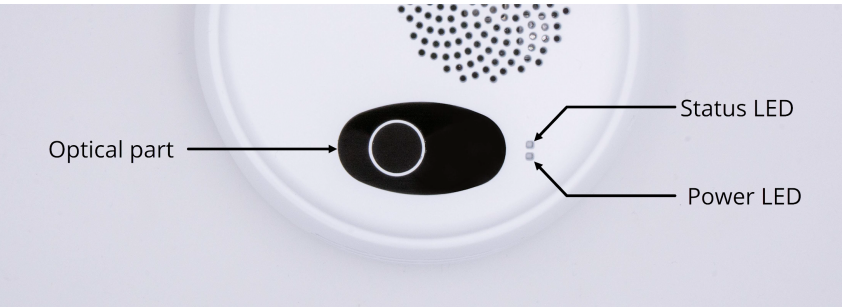
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# 14. Troubleshooting

This section will guide you through the most common issues and errors. You can check our Q&A article on our website for more general questions.

## 14.1. Information about LED states

The People Counting L-XL has two LEDs that indicate different states of the device. The **power LED** lights up in **green** once the device receives power, while the **status LED** blinks in different colors to indicate the device's state.




### 14.1.1. LED state for standalone device

| LED | Color | Status |
|---|---|---|
| Power | Off | The device is not powered |
| | **Green** | The device is powered |
| Status | Off | The device is starting or is off |
| | **Red** | Counting software is off (not yet started or stopped unexpectedly) |
| | **Yellow** | Counting software starting |
| | **Green** | Counting software started and is running |
| | **Blue** (brief blink) | The last data pushed successfully |
| | **Blue** (constant) | Failing to push data<br>PoE version: Server not reachable or push rejected<br>LoRa version: Device not joined yet |

Table 1: LED status indicators for standard operating mode

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### 14.1.2. Multi-device LED state for coordinator device

| LED | Color | Status |
|---|---|---|
| Status | **Green** | Counting software started and is running. But, multi-device is not enabled |
| | **Green**, with a series of **purple** blinks, every 20 sec | Counting software is running, and multi-device is set up correctly. (From 2 to 5 blinks, 1 per device in multi-device installation (including coordinator)) |
| | **Purple** (steady) | Error in multi-device setup. A non-exhaustive list of potential causes:<br>• Subordinate has not pinged its coordinator after configuration<br>• A subordinate sent an invalid counting line<br>• A subordinate stopped sending data |

Table 2: LED status indicators for coordinator

### 14.1.3. Multi-device LED state for subordinate device

| LED | Color | Status |
|---|---|---|
| Status | **Green** | Counting software started and running. But, multi-device is not enabled |
| | **Green**, with intermittent **purple** blinks, every 20 sec | Counting software is running, and multi-device is set up correctly |
| | **Purple** (steady) | Error in multi-device setup. A non-exhaustive list of potential causes:<br>• Coordinator is unreachable:<br>  ○ network issue<br>  ○ coordinator not running<br>  ○ wrong address<br>• Configuration rejected by a coordinator:<br>  ○ unregistered ID (position not set for this ID on coordinator)<br>  ○ invalid counting line |

Table 3: LED status indicators for subordinate

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## 14.2. The device doesn't seem to boot or is blocked

### 14.2.1. Power LED check

First, check that the power LED is on (**green** is the only color).

👍 **If the power LED is on,** the device has power, and you can check the status LED.

☝ **If the power LED is off**, check the following points:

👉 For the **PoE product version**

1. Check that you are using a PoE switch or an injector compatible with the **PoE IEEE 802.3af** norm (**minimum 15 W** output on each port)
2. Check that the ethernet cable is functional with another device
3. Check that the ethernet port used on the PoE switch or injector is functional with another device
4. If you have another PoE injector or PoE switch at your disposal, try to change them and power the device again

👉 For the **LoRa product version**

1. Make sure you use a **5 V** power supply with **2.5 A minimum**
2. Check that the power supply is functional with another device
3. If you have another power supply at your disposal, try to change it and power the device again

### 14.2.2. Status LED check

When the device boots up, the status LED passes through different colors in the following pattern: **Red** > **Yellow** > **Green**. It takes approximately **two minutes** for the LED to turn **green**. If not, check the following points:

1. **If the LED stays red,** the software could not start or has stopped unexpectedly. In this case, try to force the device to reboot
2. **If the LED stays yellow,** the software has started but could not start counting, or something obstructs the optical part.
    a. Wait a few moments more to see if the LED changes and if two red LEDs appear in the black optical part
    b. If not, try to force the device to reboot and wait a few minutes
3. **If the LED stays blue,** the device cannot send out its data, and you must check the push settings. Please refer to section 14.11. The device seems down; I don't receive data onto my server or platform
4. **If the LED stays purple,** there is a problem with the multi-device settings. Please refer to section 7. Multi-device installation and setup

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## 14.3. Force the device to reboot

In some cases, you will have to force the device to reboot to fully relaunch the system and internal services.

👉 To do so:

1. Unplug the power cable
2. Wait 10 seconds
3. Connect the power cable
4. Wait for the device to reboot for a couple of minutes

## 14.4. I am not able to access the web GUI

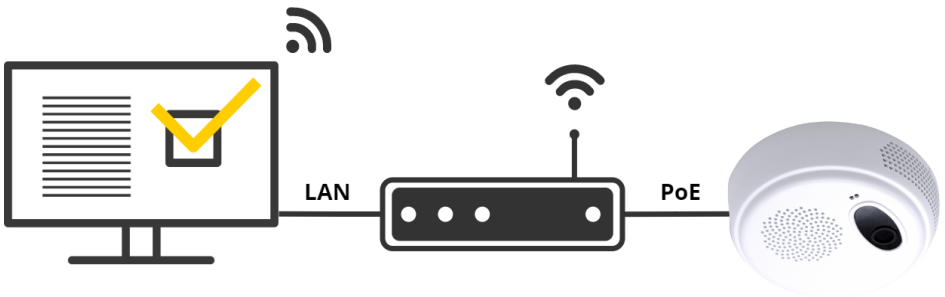
### 14.4.1. LED check

☝ First, check the device's LED colors as described in section 14.1.

1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If all the LEDs are **green**, check the following sections

### 14.4.2. LAN Network check

☝ The web GUI is accessible under the same LAN network. **Ensure your PC is connected to the same network as the device**.




Once connected to the network, open your web browser and access the device web GUI via the following local address:

👉 **http://terabee-<device_id>.local**

👉 or the **assigned IP address**

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*Make sure there are no restrictions on the network where the device is connected, such as on a guest network.*

### 14.4.3. Device IP check

☝ By default, the device expects a DHCP address. You can access the web GUI via the local IP assigned by the router.

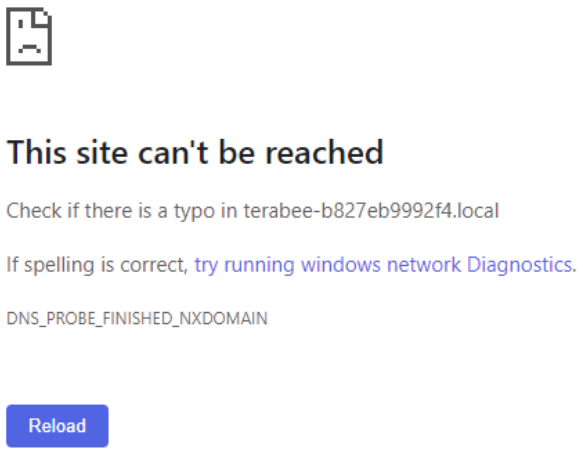
💡 To find the device IP, you can use a network scan application such as Fing to discover the device. It should appear with the following name: "*Terabee-<device_id>*". Once you have the IP address, you can type it in your web browser to connect to the web GUI.

### 14.4.4. DNS issue under windows

**DNS_PROBE_FINISHED_NXDOMAIN** is a web browser error on Windows. Sometimes it occurs; sometimes, it doesn't.

If this occurs, you can try the following:

1. Try to connect to the address using a different web browser; Firefox handles this issue better
2. If you have an Apple or Linux laptop, try to use these instead of a Windows laptop
3. You can connect via the device's assigned IP address if none of the above works. Check the IP on your router and enter it in your web browser.




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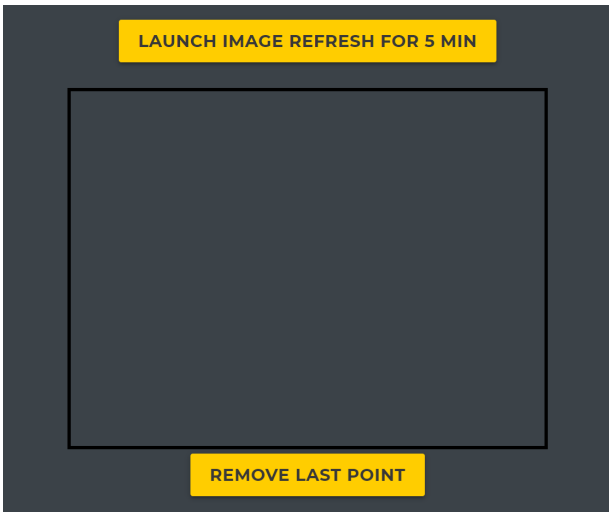
## 14.5. I cannot connect to the web GUI

☝ First, start to check the LED colors of the device as described in section 14.1.

1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If all the LEDs are **green**, check the following sections
3. Check credentials:
    a. The default username is **people_counting_admin**
    b. The default password is: **<device_id>--admin** (without the <>), for example, **b827eb6abb6f--admin**

If none of the above works, try to force the device to reboot and wait a couple of minutes, then try again to connect to the web GUI.

## 14.6. I can't see the device image under the web GUI



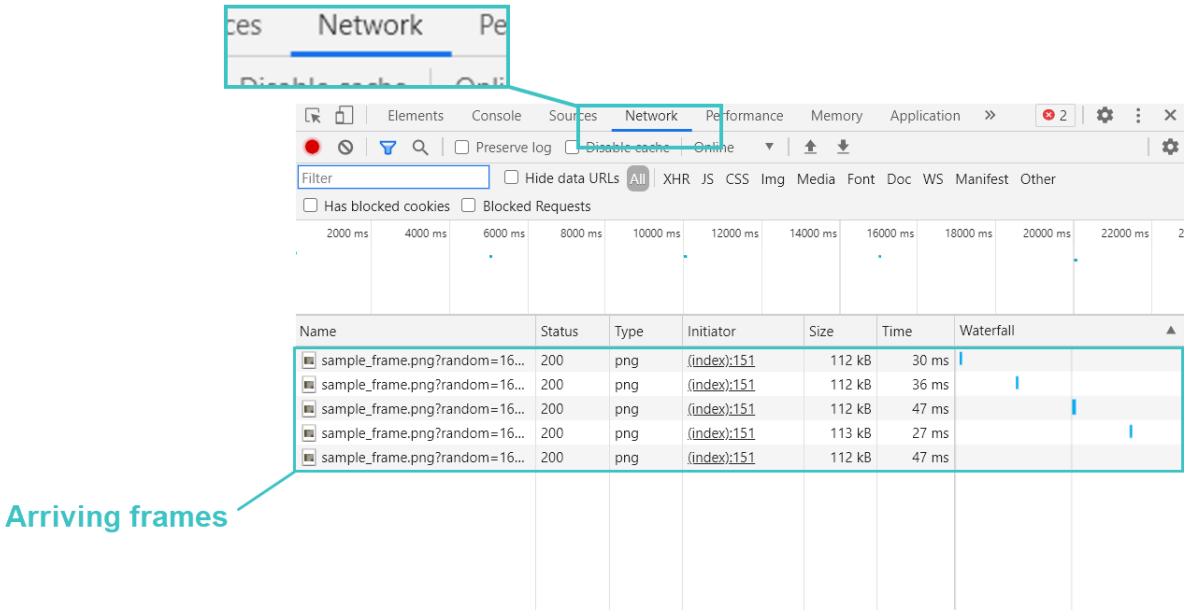

☝ First, check the device's LED colors as described in section 14.1.

1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If all the LEDs are **green**, check the next point
3. You might face some latency on your network. The device image is refreshed every second, and in some cases, it can be slightly longer. You can check the image transmission over the network by clicking on the F12 button on your keyboard and looking at the *Network* section

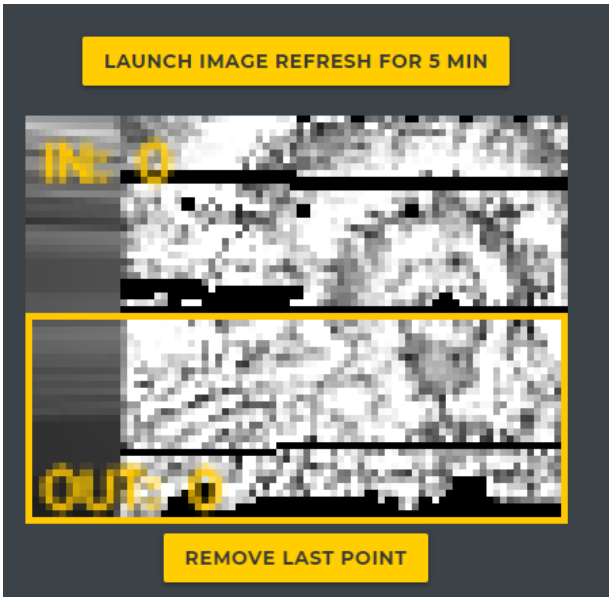
When you click the "Launch image refresh" button, you should see **frames arriving,** as shown in the picture below.

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If not, try to force the device to reboot and wait a couple of minutes, then try again to connect to the web GUI.




## 14.7. The device image seems strange




☝ First, check the device's LED colors as described in section 14.1.

1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If all the LEDs are **green**, check the next point

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3. Check that the plastic film has been removed from the device lens



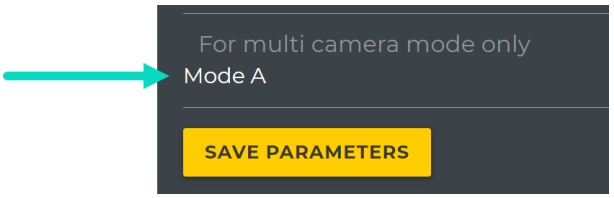
4. Check that there are no other infrared sources near the device (light barrier for sliding doors, lasers, strong halogen lamps ...)

If none of the above changes the situation, try to force the device to reboot and wait a couple of minutes, then try again to connect to the web GUI and check the device image.

## 14.8. The device image is blinking

If the image is blinking or seems very noisy, check all the points in section 14.7.

If none of the previous points help to resolve the problem, you may be experiencing "crosstalk" with your device. This behavior occurs when other People Counting L-XL are close, such as in a multi-device setup. To solve this problem, connect to the web GUI, go to the Standard Parameters page, and change the multi-camera mode to another. You can choose between four modes.

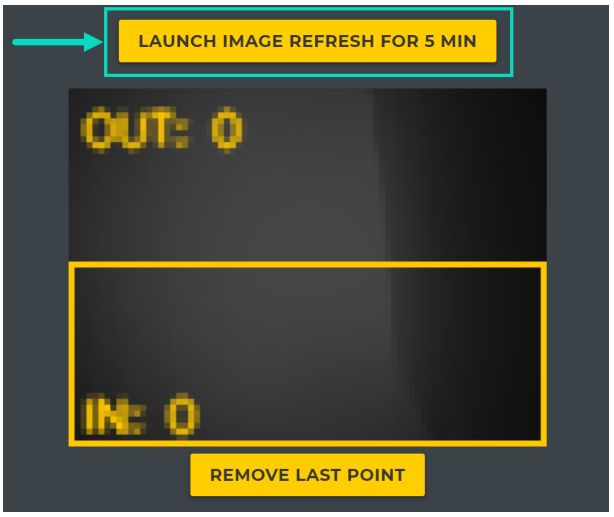



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## 14.9. The image on the web GUI is fixed; I can't see people passing below the device

When you are connected to the web GUI, the image **refreshes every second** for **5 minutes** and is not received as a continuous stream. Note that you can face a slight delay in the image reception depending on your network, see section 14.6. for more details.

If the image is fixed, the refresh period is over. Click on the "*Launch Image Refresh*" button to restart the refresh.




If the image seems to be blocked and doesn't refresh, ☝ start to check the LED colors of the device as described in section 14.1.

1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If all the LEDs are **green**, check the following sections.

If none of the above changes the situation, try to force the device to reboot, wait a few minutes, then try again to connect to the web GUI and check the device image.

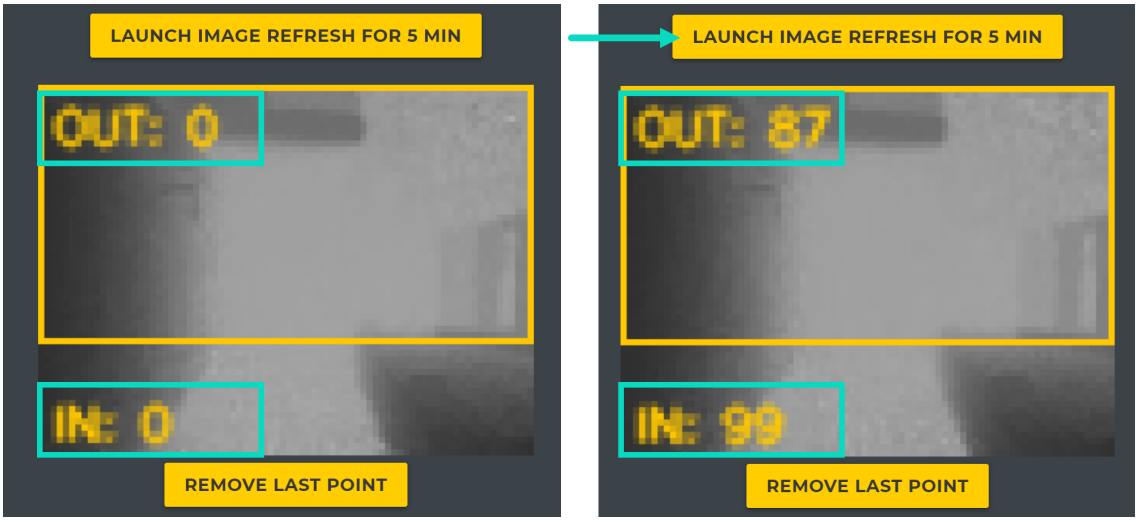
## 14.10. The counts are not updating on the web GUI

☝ First, check the device's LED colors as described in section 14.1.

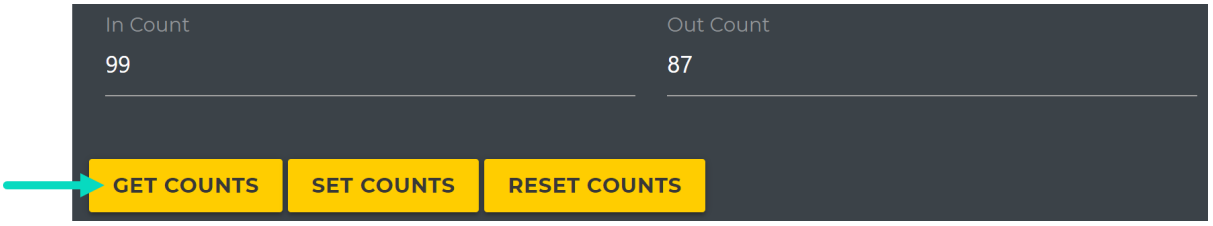
1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If all the LEDs are **green**, check the next point

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When connected to the web GUI, the IN and OUT values you see on the device image are fixed if the image is not refreshing. You must click the “Launch Image Refresh” button to see the last values.




You can also check the “counts” value by clicking on the “Get Counts” button:



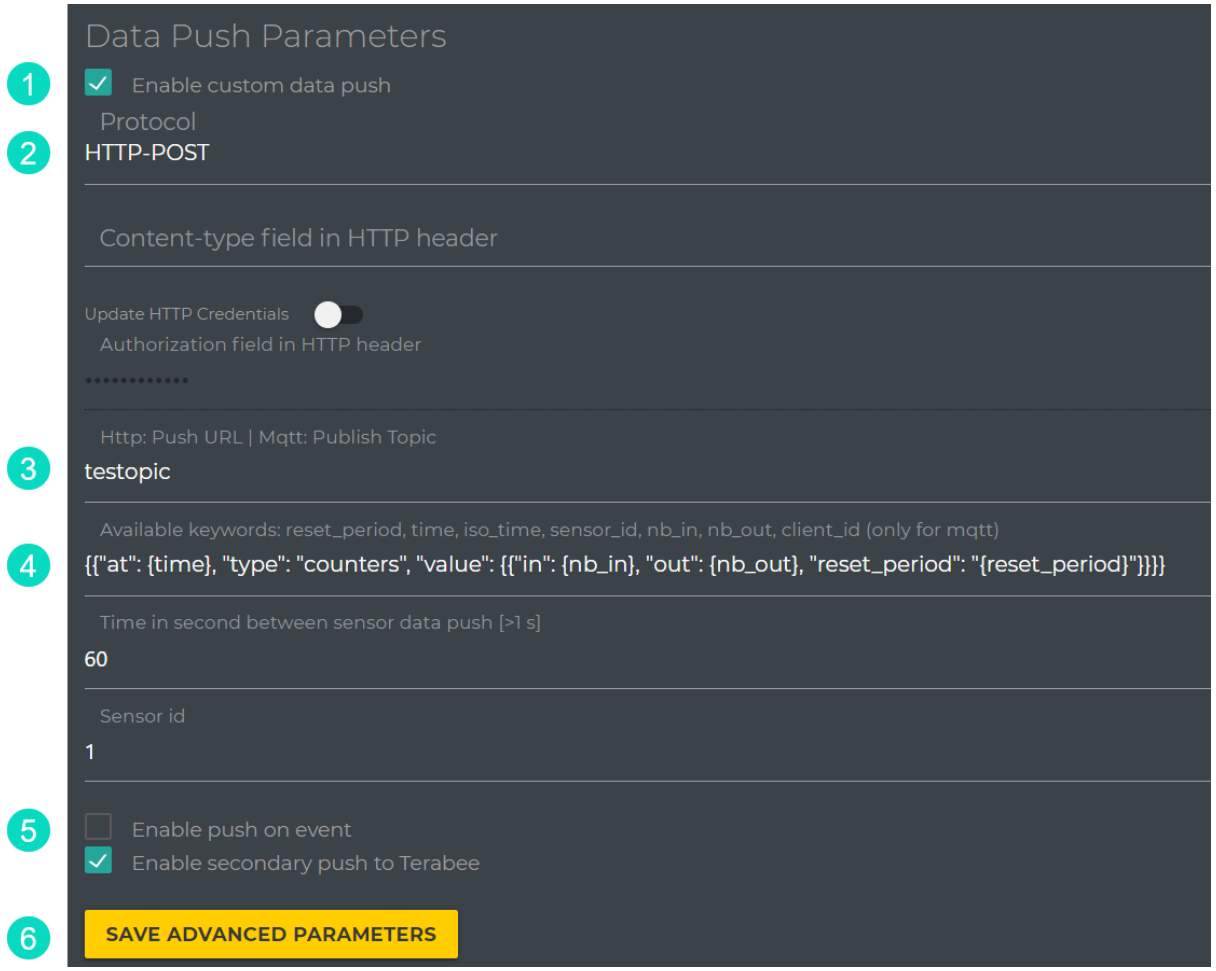

## 14.11. The device seems to be down; I don’t receive data onto my server or platform

This can be explained by a hardware problem or a configuration error.

☝ First, check the device's LED colors as described in section 14.1.

1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If one LED is **blue**, check the next point
3. Connect to the web GUI and verify your **HTTP push settings** (please refer to section 6.1.2. for more details):

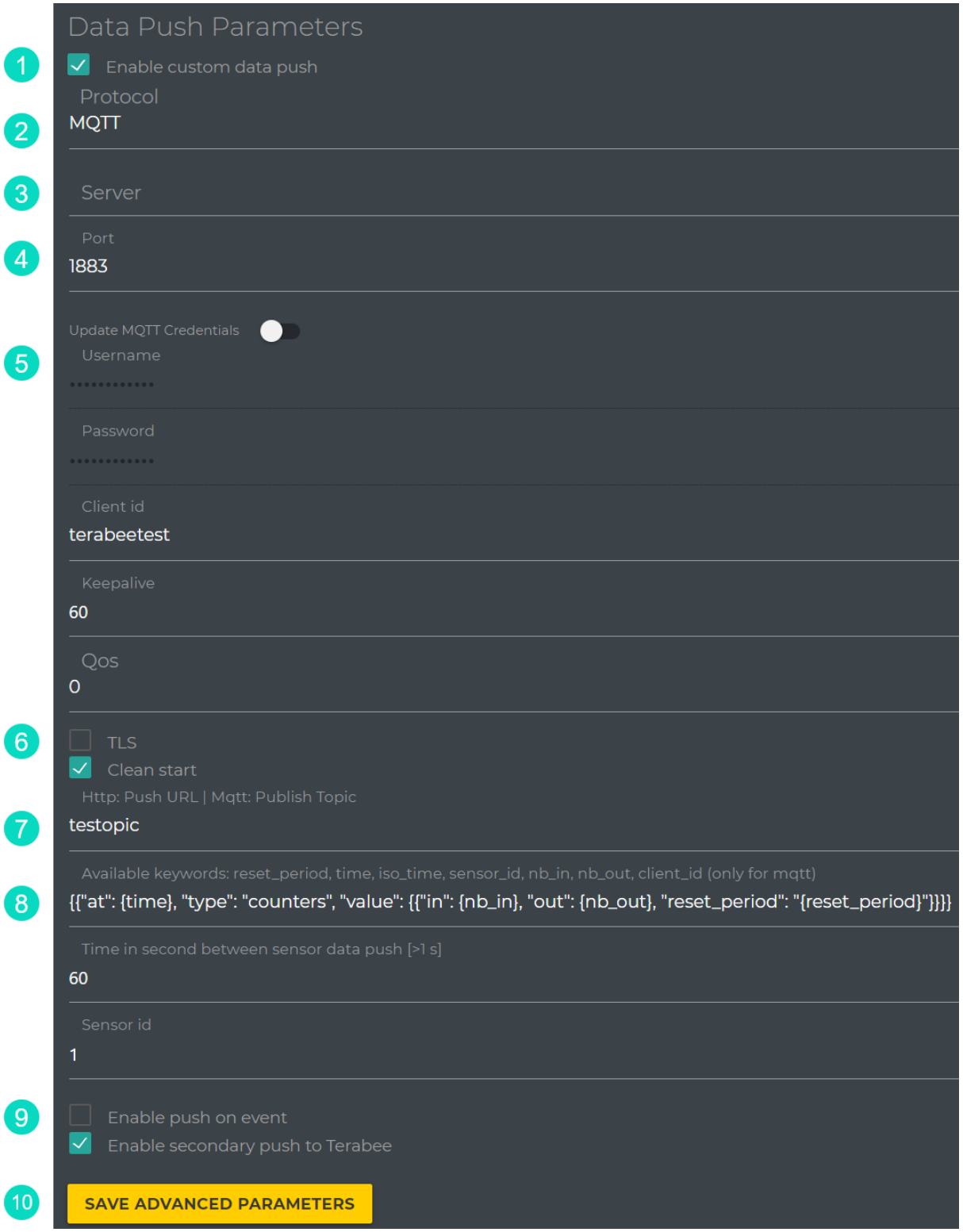
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1. Make sure the custom data push box is ticked
2. Verify that the required protocol to communicate is correctly chosen
3. Check that the push URL is correctly pointing to your web server or Cloud
4. Make sure the payload format answers the requirements of your database
5. If you use the push on event feature, make sure it is ticked
6. In case all the parameters are correctly set, click on the register button

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4. Connect to the web GUI and verify your **MQTT push settings** (please refer to section 6.1.1.):




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1. Make sure the custom data push box is ticked
2. Verify that the required protocol to communicate is correctly chosen
3. Check that the server information is correct
4. Make sure to use the correct MQTT port (1883 = non secured | 8883 = secured)
5. Verify your MQTT credentials
6. Make sure TLS is selected if your broker uses this option
7. Verify that MQTT topic is correct
8. Make sure the payload format answers the requirements of your database
9. If you use the push on event feature, make sure it is ticked
10. In case all the parameters are correctly set, click on the register button

💡 To test your MQTT connection you can use a software like MQTTX. ☝ During such tests, make sure not to have both the device and the test connection simultaneously, as the client ID is unique server-side.

👉 **If you don't observe any changes**, we recommend using network analysis software such as Wireshark to confirm that the payload is correctly sent to the network. You will have to monitor the protocol activated (HTTP post, HTTP get, MQTT) on the device's IP.

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## 14.12. I can't modify or record parameters on the device

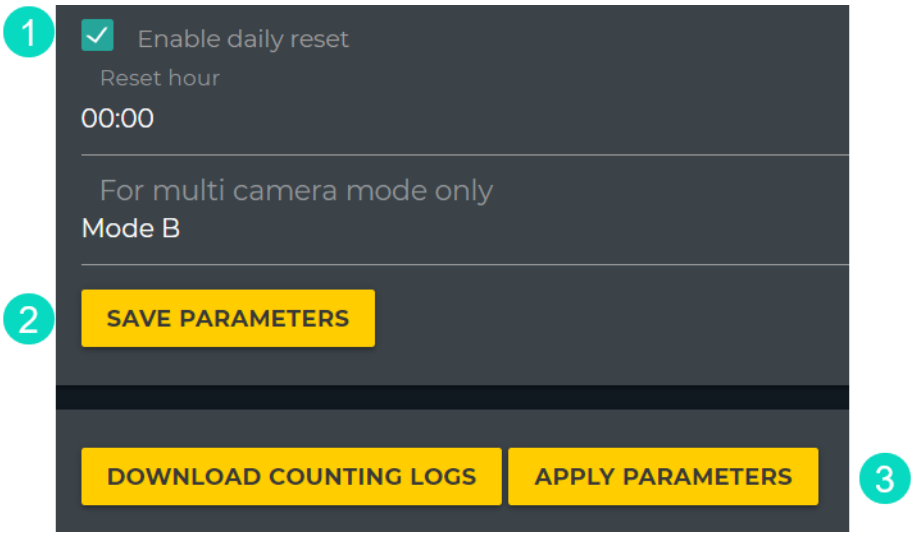
☝ First, start to check the LED colors of the device as described in section 14.1.

1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If all the LEDs are **green**, check the following points
3. Verify that you are connected to the same network and are correctly logged onto the web GUI. For that, check section 14.4.
4. Once correctly logged in, try to force a refresh of the web page with the **F5 button**. If you observe no changes, try to clean the cache memory of your web browser by pressing both **CTRL + F5** buttons

If none of the above changes the situation, try to force the device to reboot and wait a couple of minutes, then try again to connect to the web GUI and record the parameters.

## 14.13. The device reset does not occur at all or not at the right time

The device reset occurs daily and at a fixed hour when the parameter is activated and set.




1 Verify that the daily reset box is ticked and the reset hour is correct

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2. In case all the parameters are correctly set, click on the Save Parameters button

3. Make sure to click on the Apply Parameters button

*To keep up with time and date, the device uses an NTP server. If you do not give internet access to the device, it will keep the last recorded time and date, which may not correspond to the actual time and date. Nevertheless, if you can run a dedicated time server on your network, you could use the following NTP servers:*

- *0.debian.pool.ntp.org*
- *1.debian.pool.ntp.org*
- *2.debian.pool.ntp.org*
- *3.debian.pool.ntp.org*

## 14.14. The device does not seem to count correctly

☝ First, start to check the LED colors of the device as described in section 14.1.

1. If one LED is **yellow** or **red**, follow the steps in section 14.2.
2. If all the LEDs are **green**, check the following points

### 14.14.1. Installation checks

The People Counting L-XL device can count multiple INs & OUTs if set correctly.

👉 **Installation height and passageway coverage**

Ensure you have installed the device above a passageway whose width is in accordance with the table in section 3.1.1.

If the passageway is too wide compared to the device's coverage, you will likely miss some counts, and you should consider adding more devices together.

Try to find a good balance between installation height and the passageway coverage.

👉 **Sunlight exposure**

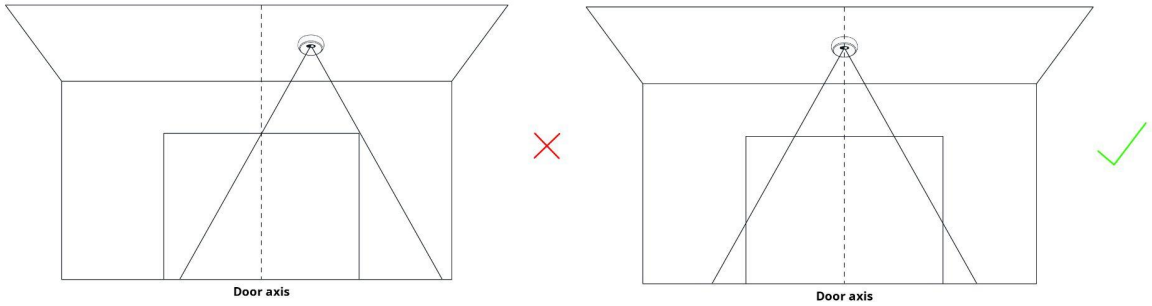
If the device is installed in a place where direct sunlight is exposed to the ground, it might affect the device's performance.

Install the device in a location where direct sunlight exposure can be avoided or minimized.

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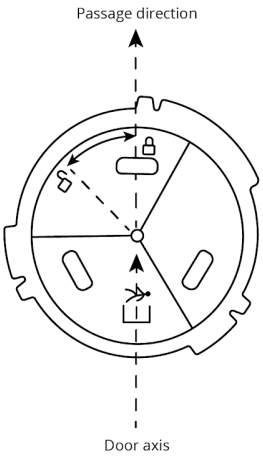
### 👉 Device installation

The device has to be installed above and at the center of doors or passageways.




### 👉 Device orientation:

The device has to be appropriately oriented to cover the monitored area correctly. The mounting plate is the basis of the device orientation, and a sign indicates how to orientate it correctly.




When installing the mounting plate, ensure the **lock axis is perpendicular to the door**

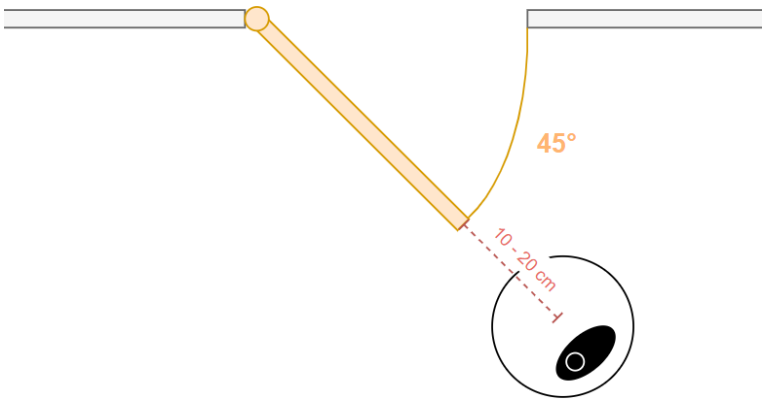
This axis is meant to be aligned with the direction of people flow

Check section 3.1.5. for more details

### 👉 Device installation above a door swing

In this specific case, when the device is installed on the side where the door swings, you need to consider installing the device the following way to leave some space to avoid counting the door and have enough margin to detect and count people. Check section 3.4. for more details.

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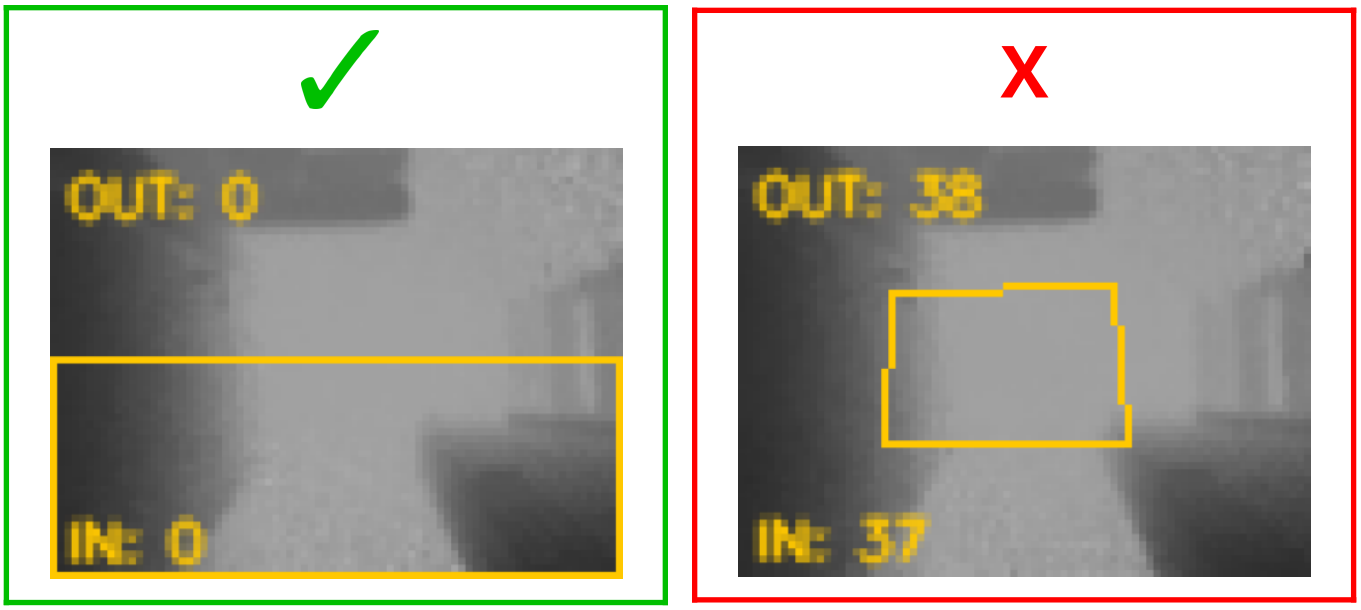



### 14.14.2. Configuration check

👉 **Counting area**

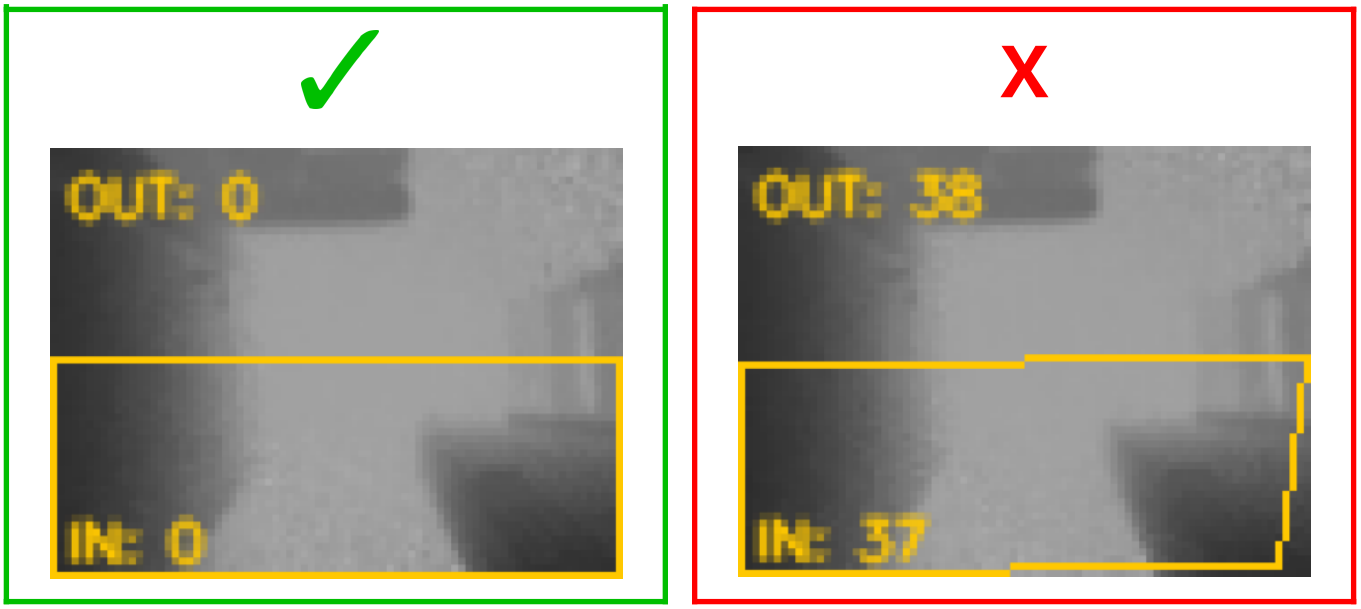
While drawing the counting area on the device image, make sure to respect the following indications:

Create two distinct zones - One Entry and one Exit area defined by the counting area you draw on the device picture:

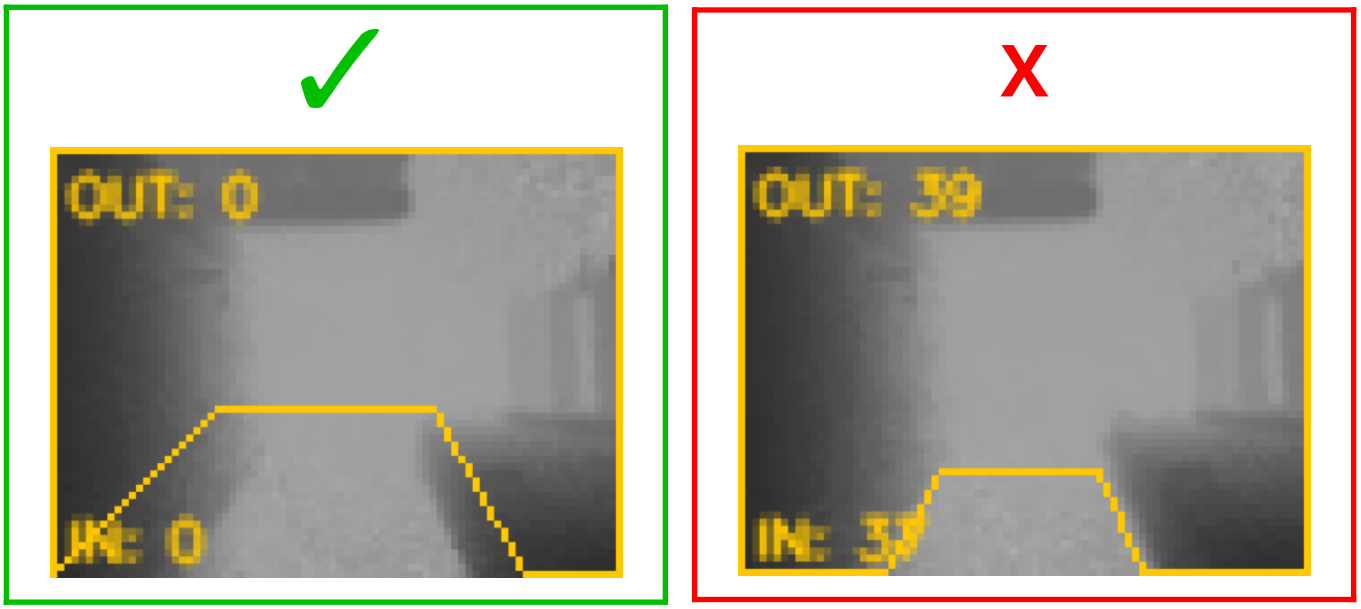



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Stick together the area and image edges:




Leave some margin around the door or passageway:

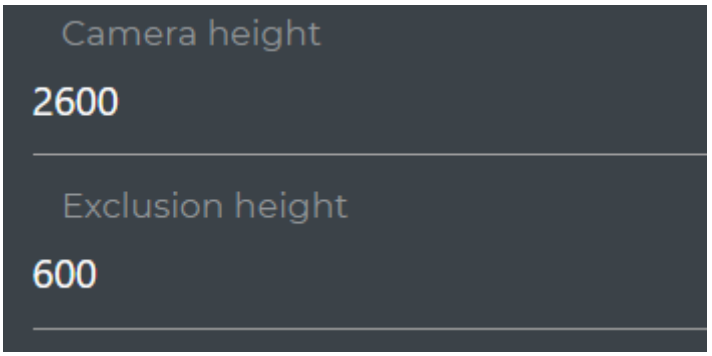



👉 **Camera height parameter**

Once you have installed the device onto the ceiling, measure the distance between the ground and the device. Indicate this value in the “Camera Height” parameter and in millimeters.

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👉 **Exclusion height parameter**
Make sure to respect a certain margin on this parameter. Do not set it up too high, like 1.1 or 1.5 meters; otherwise, you might exclude smaller people.




## 14.15. I can’t fix my issue

If none of the steps detailed in this documentation helps you resolve the situation, contact our technical support team 🚀 here: terabee.com/support and share the following details:

1. Describe the problem you are facing
2. Which points you have tried to resolve, and the results each time
3. The device serial number
4. Pictures of the device set up and the surroundings
5. Screenshots of the web GUI

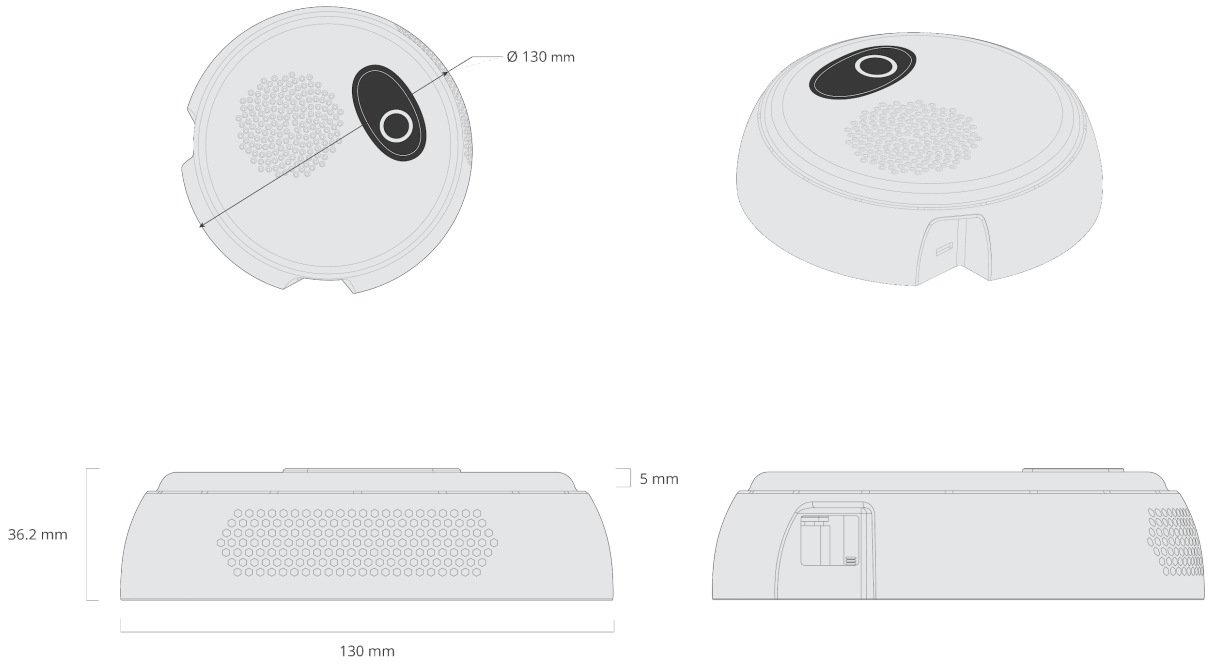
Make sure to have the following port open on your network so we can remotely connect to it:

- Outbound:
    - 53 (DNS)
    - 80/443 (HTTP)
    - 1883/8883 (MQTT)
- Inbound: None
- Domains to whitelist: *.terabee.com

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# 15. Technical data

## 15.1. Dimensions




## 15.2. Technical specifications

| | | |
|---|---|---|
| Product code | TB-PCL-XL | |
| **Performance** | **PoE model** | **LoRa model** |
| Technology | Infrared Time-of-Flight depth sensor | |
| Field of View | 74° x 57° | |
| Coverage area dimensions | 1.50 x 1.10 m at 2.40 m high with one device | |
| Multi-devices capability for wide passageways | Yes. Up to 5 devices | Yes. Up to 5 devices through Ethernet cables |
| Installation height range | From 2.4 m up to 4.0 m | |
| Use environment | Indoor | |
| Counting accuracy | 98% (1) | |
| People Counting data communication | Real-time or at predefined time intervals | Predefined time intervals (minimum of 2 minutes) |

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| Electronics | PoE model | LoRa model |
|---|---|---|
| Power source | RJ45 (PoE IEEE 802.3af) | Micro-USB (minimum 5V - 2.5A) |
| Power consumption | 10 W average | 10 W average (minimum recommended 12.5 W) |
| LED indicators | Two LEDs | |
| Initialization time | Approx. 1 min | |
| **Mechanics** | **PoE model** | **LoRa model** |
| Dimensions | Ø 130.0 mm x 36.2 mm | |
| Weight | 220 g | |
| Housing material | PU 8150 | ABS PA-757 |
| Color | White and Black (extra colors on demand) | |
| Operating temperature | 0° to 35°C | |
| Storage temperature | -20° to 60°C | |
| Installation | On-ceiling mounting with mounting plate, supplied | |
| **Networking** | **PoE model** | **LoRa model** |
| Communication interface | Gigabit Ethernet | WiFi Access Point for configuration and local upgrade.<br>LoRaWAN (1.0.3, Classe A) for data transmission.<br>Gigabit Ethernet [(2)] |
| Set up | Web GUI embedded on the device | |
| Ethernet communication | | |
| Recommended cabling | Cat 6 or later | |
| Addressing | DHCP, Static IP | |
| Device hostname | terabee-<serial_number> | |
| Data protocols | HTTP/HTTPS, MQTT/MQTTS | |
| Outbound traffic required on port | 53, 80/443, 1883/8883, 1194 | |
| Domain whitelisting | *.terabee.com | |
| LoRa communication | | |
| Supported LoRaWan frequencies | N/A | EU 863-870 MHz, US 902-928 MHz |
| LoRaWAN activation methods | N/A | OTAA, ABP |

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| | | |
|---|---|---|
| Antenna specification | N/A | '+0.8 dBi, VSWR ≤ 2 |
| Remote device configuration | N/A | LoRa Downlink commands |
| WiFi Access Point communication | | |
| Device hostname | N/A | terabee-<serial_number> |

| **Services** | **PoE model** | **LoRa model** |
|---|---|---|
| Extended warranty | 1-Year and 2-Years | |
| Terabee IoT Platform for data visualization | Yes, optional | Not available through LoRa, possible through Ethernet |
| Terabee Device Management Services | Yes, optional | Not available through LoRa, possible through Ethernet |
| Data hosting | Cloud hosting (Datacenter in Amsterdam, Europe) Data storage for up to 2 years | |

| **Conformity** | **PoE model** | **LoRa model** |
|---|---|---|
| Reference standard | CE, FCC, RoHS | CE, FCC, RoHS, UKCA |

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