TAGGABLE - LOCALIZATION

SICK LOCU1 – UWB TAG

SICK
Sensor Intelligence.

Intended use

SICK LOCU components constitute the UWB (ultra-wide band) hardware part of SICK's localization system solution. The SICK LOCU hardware is well suited for precise indoor tracking of tagged objects of various kinds. LOCU hardware comprises LOCU1xx tags, which are mounted on the assets to be tracked and infrastructure-mounted LOCU2xx antennas, called anchors. LOCU tags can be localized in all areas covered by a set of LOCU anchors.
SICK LOCU hardware is a part of complete solution, SICK offers a comprehensive portfolio of services for LOC systems, from consulting to support. SICK RTLS (real time locating system) solutions LOC facilitate full transparency of your supply chain processes by creating a digital twin of your assets - in your factory, warehouse and beyond. Key use cases include automation and optimization of processes in logistics and production, from manual to fully automated processes. With LOC, SICK provides a system solution which integrates several localization technologies and further sensors into a software platform, called *Asset Analytics*, which acts as middleware.

About this document

This Quickstart document describes the how-to setup LOCU hardware components.
Before starting to work with LOCU, read this Quickstart document carefully and make sure that you are familiar with the device. The information on correct and safe operation of the system presented here will help you avoid personal injury or damage to property.
Tags not suited for personal safety (unless stated otherwise by SICK).

You can also obtain support from your sales partner.

For your safety

It is essential that LOCU units are transported, stored, installed and used in accordance with its intended use in order to ensure error-free, safe operation.
LOCU hardware can only be installed, operated, used and maintained by appropriately trained, authorized specialist personnel. Specialist personnel are individuals who possess the technical training, knowledge and experience necessary in order to understand the tasks entrusted to them, evaluate these and identify possible hazards.
Precautions:
-Do not use deformed or damaged product or battery.
-Do not expose the devices to extreme heat, pressure or humidity.
-Do not charge or use the product if liquid has entered.
-Do not use or store the devices in dusty or dirty areas.
-Protect the product from excessive moisture.
-Do not expose the devices to water, rain, splashing water or spilled drinks.
-Do not spray anything on and inside the device.
-Dropping, knocking, violently shaking and any rough handling may damage the device.
-Do not transport or store flammable gas, liquid or explosives in the vehicle compartment where the device is installed.
-In case of malfunction, contact your sales partner.
-Do not modify the product.

CAUTION

LOCU hardware do not contain any user-serviceable parts and are not allowed to be opened by unauthorized personnel! Opening the screws of the device housing will invalidate any warranty claims against SICK AG. For further warranty provisions, see the General Terms and Conditions of SICK AG.

NOTE: Performance of tags might be affected by materials like metal or water in the vicinity of the tag, shielding or absorbing signals.

Maintenance and cleaning

Maintenance

LOCU hardware do not contain any user-serviceable parts.

Cleaning

Clean the housing with a soft, dry or slightly moistened cloth. Do not use any solvents or high-pressure cleaners

Installation and commissioning

Scope of delivery

Every tag package consists of:

- **Tag LOCU** (different models of device are available)

Figure 1. Tag dimensions in mm

***dimension of tag with rechargeable battery**
****dimension only for tag with M8 connector (LOCU111-0x20)**
*****left LED only on rechargeable tags (charger LED)**

Turning the tag ON / activation

All tags are delivered in inactive state to avoid battery draining and activity during transport and storage.
Activation of LOCU101-0x00 tags is done by pulling out plastic foil from the tag. The plastic foil must be pulled out slowly and with care.

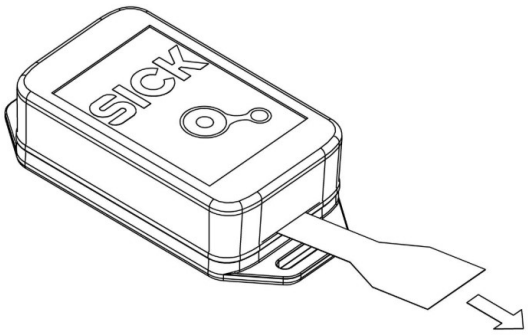


Figure 2. Direction of pulling out plastic foil

Activation of LOCU101-0x10/LOCU111-0x10 tags is done by placing them on Qi compatible wireless charger.
Charging procedure

- Place the tag on the Qi charger pad.
- Charger should indicate charging status via LED within a few seconds, the same should be indicated on the tag' s charger LED.
- Charging time is approximately 5,5 hours. (charging current set to 73 mA)
- After the charging is done, charger will indicate the ready status via LED (depending on charger model; for example: LED blinking or LED off)
- Tags were tested with the following Qi chargers: Samsung Fast Charge (EP-PN920), Samsung (EP-PA510), Adata (CW0050).

Tags have to be fully charged before first use to avoid battery damage.

Activation of LOCU111-0x20 tags is done by connecting them to power supply (7-35V).

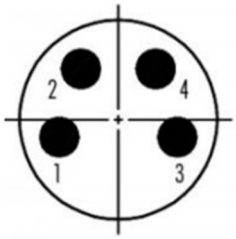
Technical data

LOCU Tag Models	Size (mm)	Weight	Power supply
LOCU101-0x00	90.2 x 42.9 x 23.2	50 g	Coin Battery CR2477, 1000mAh
LOCU101-0x10 LOCU111-0x10	90.2 x 42.9 x 17,5	45 g	Li-Pol 300 mAh, wireless charging
LOCU111-0020	90.5 x 42.9 x 23.2	43 g	External 7-35 VDC[1)], Power 1W

Operating conditions	Indoor −20 °C ... +60 °C 20 % ... 85 % humidity without condensation	
Warm-up time	Immediate	
Sensors	LOCU101-0x00 LOCU101-0x10	3-axis accelerometer
	LOCU111-0x10 LOCU111-0x20	3-axis accelerometer, 3-axis gyroscope, 3-axis magnetometer
Battery management	Using accelerometer	
Charging[2)]	**(Only LOCU1x1-0x10)** Charging Temperature: 0 ~ 45 °C Charging Device: Only Qi compliant charger. Charging Time / Current: 5.5 h / 73 mA	
UWB	Channel 5, Band: 6240 MHz – 6748 MHz Center Frequency: 6490 MHz -41.3 dBm/MHz	
WPAN	2400 MHz (SICK service interface only)	
NFC	13.56 MHz	
MTBF	Depending on environment in which the devices are used, life expectancy is predicted for 10+ years.	
Pushbutton	LOCU101-0100, LOCU101-0110 and LOCU111-0110	
Enclosure material	ABS (Acrylonitrile Butadiene Styrene)	

[1)]Connect max cable length of 30 meters (recommended) that are grounded properly and never connect power cables with reverse polarity

[2)] Do not over-discharge the tag's battery, below 2.75V. Over-discharging can damage the performance of the battery. To avoid over-discharging by self-discharge, charge tags periodically.



1	DC
2	Not connected
3	GND
4	Not connected

Figure 3. Connection diagram for LOCU111-0x20 tags (view towards the tag)
With a standard cable, e.g. SICK no 2094791, pin 1 (DC) corresponds to brown color wire and pin 3 (GND) to blue color wire.

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LOCU1

TECHNICAL INFORMATION

Regulatory Compliance Information
These products may only be operated in countries for which approval has been granted.

No.	Country	Type
1	European Union	LOCU101-0000 LOCU101-0100 LOCU101-0010 LOCU101-0110 LOCU111-0010 LOCU111-0110 LOCU111-0020
2	United States and Canada	LOCU101-0000 LOCU101-0100 LOCU101-0010 LOCU101-0110 LOCU111-0010 LOCU111-0110 LOCU111-0020

Please observe the country-specific information for operation below.

1 European Union

CE

Simplified EU declaration of conformity
Hereby, SICK AG declares that the radio equipment type LOCU101-0000, LOCU101-0100, LOCU101-0010, LOCU101-0110,LOCU111-0010, LOCU111-0110 and LOCU111-0020 is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address:
https://supportportal.sick.com/products/localization/tag-based-localization/locu/

WARNING
Limit human exposure to electromagnetic fields. During operation, the human exposure regulations covered by EN/IEC 62311 must be observed. Suitable safety distances must be maintained during both short-term and long-term work in the radiation range of the antennas. The minimum distance to be maintained between the device and the human body during long-term transmission is 20 cm.

2 United States and Canada

FCC ID: WRMLOCU1
IC: 10066A-LOCU1

NOTICE:
This device complies with Part 15 of the FCC Rules and contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS standard(s).
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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

NOTICE
Changes or modifications made to this equipment not expressly approved by SICK AG may void the FCC authorization to operate this equipment.

RF Exposure Information
The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.