



liwari Master Base Station, MBS

User Manual

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Contents

1. Safety	3
2. Introduction	4
3. Positioning system	4
Architecture	4
4. Using MBS	5
Installation guide	5
5. Product Information	8
Mechanic dimension	8
Connectors, reset and status LEDs	9
Connect to Power Supply	9
Connect to the Network	9
Technical Specifications	10
Packing and storage	11
Care and maintenance	11
6. Recycle and disposal	11
7. FCC Regulatory Statements	12
8. CE Regulatory	13
9. Disclaimer	13



1. Safety

Please pay close attention to these guidelines. Ignoring these instructions could lead to dangerous situations or illegal activities and will result in the loss of warranty coverage. Should you have any inquiries, contact support@iiwari.com.

WARNING:

ENSURE SAFETY BEFORE APPLYING POWER

Do not operate the device in areas where the use of wireless devices is prohibited or may cause interference or dangerous situations.

INTERFERENCE

Please note that wireless devices can be sensitive to interference that can affect performance.

EXPERTISE REQUIRED

Installation or configuration of this product should only be performed by persons with sufficient know-how.

USE APPROVED ACCESSORIES ONLY

Ensure that you use only accessories that have been officially approved. Connecting devices that are not compatible is not advised.

Before connecting this device to another, make sure to review the user manual of the other device for specific safety instructions. Avoid connecting with incompatible devices.

Always remember safety. When installing Iiwari Master Base Stations devices all the needed safety regulations and instructions must be followed. Remember safety gear like safety boots, reflecting clothes, helmets, safety glasses, hearing protection and dust masks. Installation often requires working in heights, using only approved lifts or ladders.



Installation instructions for the Iiwari Master Base Stations devices are available in the installation guide section of this document. Additionally, detailed instructions can also be found on the website at <https://www.iiwari.com/technical-documentation/>.

2. Introduction

The Master Base Stations, MBS, device is used as a base station for the Iiwari indoor positioning system. The MBS devices are at fixed positions in the site, typically in the ceilings. The device is designed for indoor use only. Depending on the facility, one MBS device can cover an area between 50 m² to 1000 m². The mobile Iiwari CloudTag device is located using the fixed MBS network.

3. Positioning system

Architecture

The Iiwari positioning system consists of an on-site positioning network, cloud-based management software and a user interface (Dashboard). There are two different options for Iiwari's positioning network.

In Option_1, the positioning network consists of MBS devices, BS devices, local area network and GW devices. MBS and BS devices form cells. Each cell is managed by one MBS device and supported by 1-8 surrounding BS devices. Figure 1 illustrates the positioning system according to Option_1.

In Option_2, the positioning network consists of MBS devices, local area network and GW devices. Figure 2 illustrates the positioning system according to Option_2.

All MBS devices are connected via a local area network to a gateway (GW) device, which is also connected to the Iiwari cloud through an internet connection. The Iiwari system's cloud environment includes system management software, a dashboard user interface, and possibly connections to external software systems.

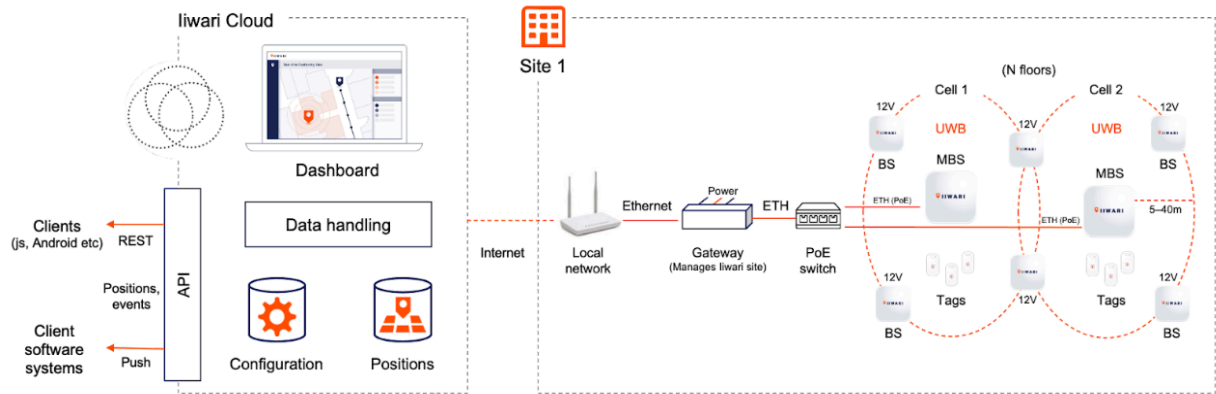


Figure 1. Iiwari positioning system architecture, option_1.

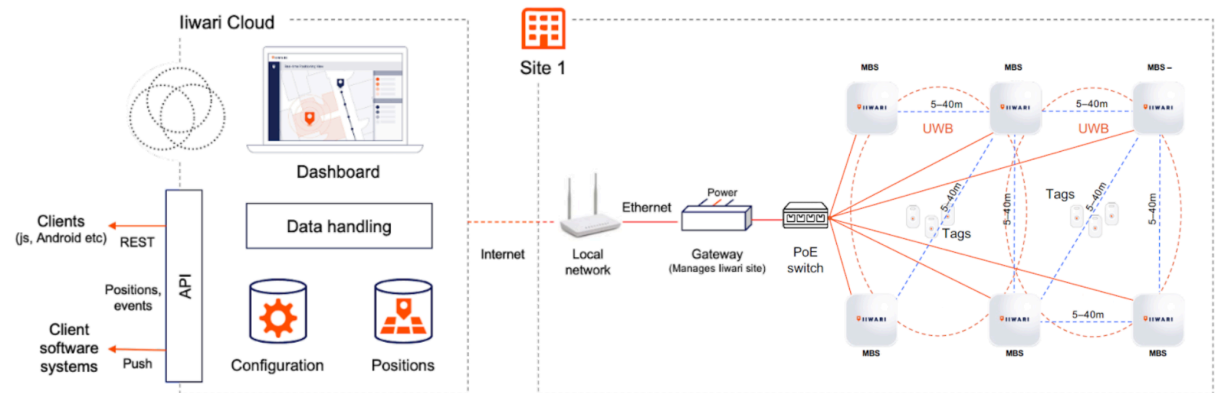


Figure 2. Iiwari positioning system architecture, option_2.

4. Using MBS

Installation guide

The installation of the Iiwari positioning system is planned for the site before the installation begins. During the planning phase, the locations for the MBS devices are determined. Based on the site information, suitable mounting brackets for the MBS device are selected. There are four different mounting brackets options, shown in the image below. During installation, only the mounting bracket provided by Iiwari may be used. The MBS device can be attached to the ceiling or wall using a mount bracket. The material of the wall/ceiling determines

how the mounting bracket is installed in place. Screws or zip ties are commonly used.

The installation requires the following tools:

1. Installation tablet with Iiwari software.
2. Necessary mounting tools for the brackets, screws, screwdriver, zip ties, etc.
3. Ladders or a personnel lift.

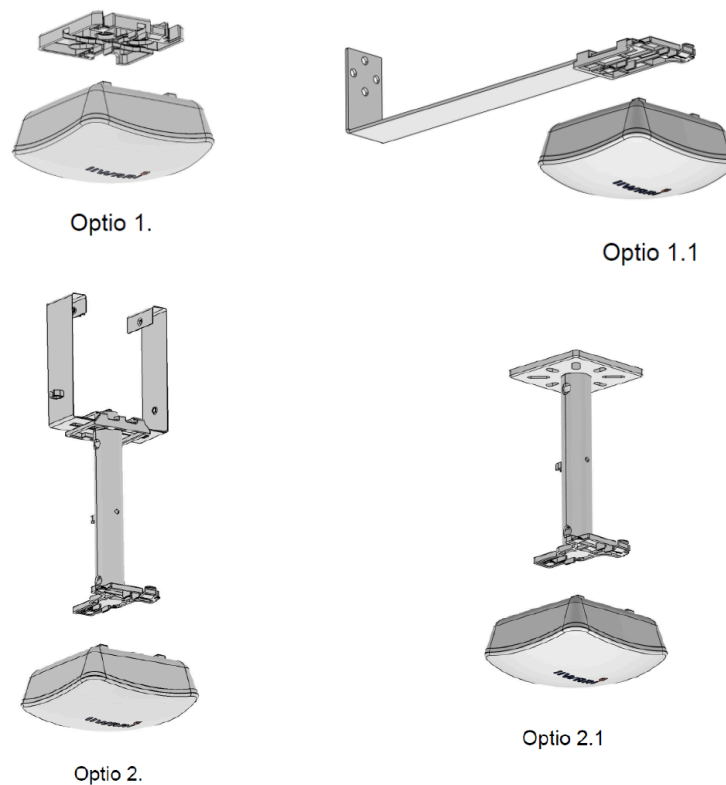


Figure 3. Mounting brackets options of MBS.

The installation is performed step by step as follows:

1. Look at the installation location plan.
2. Install the selected mounting bracket to the ceiling / wall.
3. Read the device's ID code from the bottom of the MBS device's label by installation tablet.
4. Attach the ethernet cable to the MBS devices.
5. Attached the MBS devices to the mounting bracket.



6. Measure the height of the device from the floor and record it in the system via the installation tablet user interface.
7. Measure the locations of the devices using a handheld laser ranging device and record it in the system via the installation tablet user interface.
8. Check that all the Master Base Stations are within an inch or couple of centimeters from the real position.

Installation tips:

- Note that MBS must be installed with the **logo facing down**.
- Check position, the accuracy of the installation is important for precise positioning results!
- During installation, only the mounting bracket provided by Iiwari may be used.

Detailed instructions for installing the Iiwari positioning system can be found at <https://www.iiwari.com/technical-documentation/>

If necessary, contact Iiwari through the support channel: support@iiwari.com

5. Product Information

Mechanic dimension

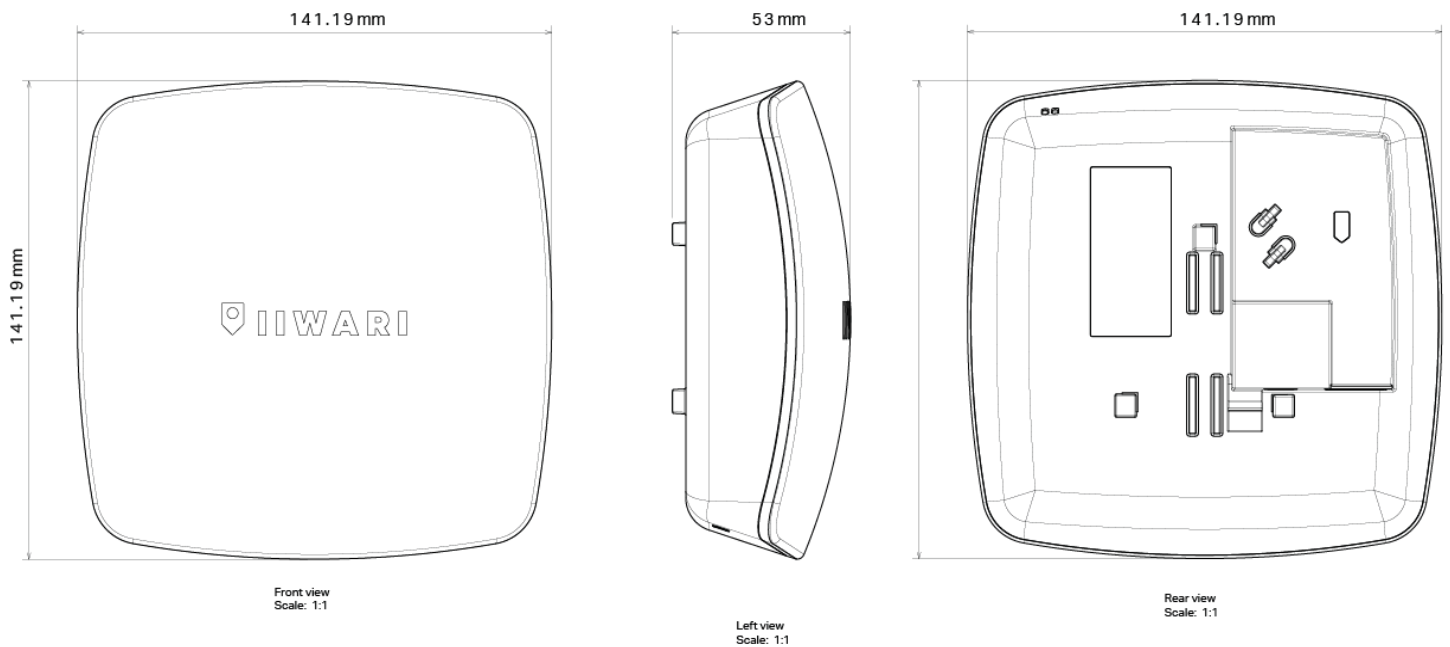


Figure 4. Mechanic dimension of MBS.

Connectors, reset and status LEDs

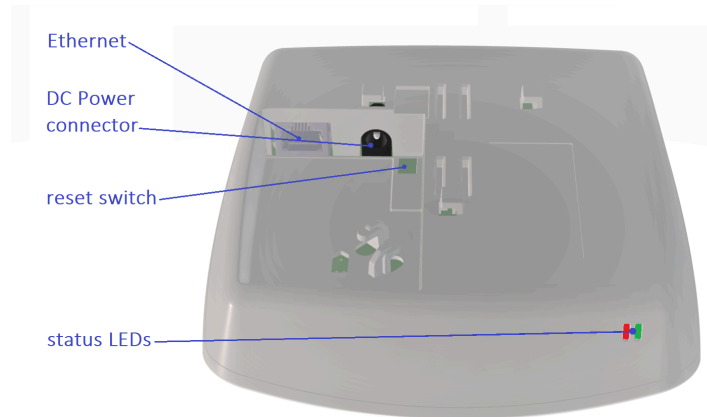


Figure 5. Connectors, status leds and reset switch.

Connect to Power Supply

Option 1: Use Power over Ethernet (PoE)

The MBS device operates with the IEEE802.3at type-2 powered device (PD) PoE standard, so it receives its operating power from PoE switches and power injectors. Use only PoE devices that comply with the standard with the MBS device. When PoE is used, an optional power source is not required.

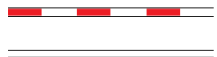
Option2: DC Plug connection

If PoE is not in use, connect a 12 - 48V DC voltage to the DC Plug connector.

When the power source is connected to the device, it turns on automatically. The red and green LEDs remain on during the device's startup time.

Connect to the Network

The MBS device is connected to the network via an Ethernet cable with an RJ-45 Ethernet socket connector. A standard-compliant connector must be used with the MBS device to prevent damage. When the device is connected to the network, the device's connection to the network and the Iiwari gateway device can be seen through the red and green LEDs. Below are the different states of the device indicated by the LEDs.

LED Colour and sequences	LED sequences	Device's mode
	red led static on green led static on	During device boot on.
	red led static on green led static off	Wait for a physical network connection or wait for an IP address.
	red led toggle: on 1 sec, off 1 sec. green led static off	Connect to the network and wait for GW to connect.
	red led static off green led static on	Connection to GW and wait configuration from GW.
	red led static off green led a blinking 2sec period.	MBS in positioning mode.
	green and red led are on alternately	Firmware upgrade in progress
	red led blinking green led static off	Device status not valid.

Technical Specifications

Dimensions	142.0 mm x 142.0 mm x 53.0 mm
Weight	210.0 grams
Power supply	48V POE, IEEE802.3at type-2 or 12V - 48V DC plug
Power consumption	2 watts (max.)
Operating temp. Range	-30°C ... +70°C
Storage temp. Range	-40°C ... +80°C
Ingress Protection Rating	Indoor Use Only
Humidity (non-condensing)	0%~90% typical
UWB Radiated Power (CH2), (3774 – 4243.2MHz)	-41.3 dBm/MHz
FCC ID	2BFQ6MBS101

Packing and storage

MBS devices are packed in a cardboard box. A maximum of 6 MBS devices are placed in a single layer. Below is the image of the packaging.



Figure 6. Device's packing.

Care and maintenance

The Iiwari MBS device is designed to last for several years under normal operating conditions. The following instructions should be taken into account to avoid causing damage to the device and will help you protect your warranty coverage.

- Do not try to open the case of the device
- Keep the device dry. Do not wet it with any liquid.
- Do not use or store the device in extremely dirty and dusty conditions.
- Do not use or store the device in excessively hot or cold conditions.
- Do not paint the device.
- Exposing the device to actions such as dropping, knocking, violently shaking, or any form of harsh treatment can lead to damage.
- Do not clean the device with harsh solvents or other chemicals. Use only a clean and dry cloth when cleaning the device.
- Do not modify the product.
- Keep the device out of reach of small children.

6. Recycle and disposal

MBS device's disposal and recycling

Your MBS device should not be disposed of with household waste. Dispose of your MBS device in accordance with local environmental laws and guidelines.



European Union—Disposal Information

The symbol above means that according to local laws and regulations your product and/or its battery shall be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. The separate collection and recycling of your product and/or its battery at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.



7. FCC Regulatory Statements

Please take attention that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment should be installed and operated with a minimum distance 20cm between the radiator & your body.

This device is also in compliance with part 15.517 of the FCC Rules. This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties

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.

This equipment must be installed with the logo facing down.



8. CE Regulatory

Iiwari Tracking Solutions declares that this device is in compliance with the essential requirements and other relevant provisions of EU Radio Equipment Directive (RED) 2014/53/EU.

A copy of the Declaration of Conformity can be found at:
<https://www.iiwari.com/platform/>



9. Disclaimer

The content of this document is subject to modifications at any time without prior notification. Iiwari Tracking Solutions Oy disclaims any responsibility for inaccuracies or missing information and expressly denies any liability for loss, damages, or risks, whether personal or otherwise, incurred directly or indirectly from the utilization or implementation of any content within this document. For the most current version of the documentation, please reach out to Iiwari Tracking Solutions Oy.