

IR Tracker 2 for Mimic

# User Manual

Tracker Specific Manual

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Warranty void if products are opened. The warranty further excludes failure resulting from improper use or installation, normal wear and tear, abuse, accidents, neglect, fire, water, lightning, or other acts of nature, causes external to the product, or other factors beyond Nordbo Robotics' control.

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# 1. Before you Begin

## 1.1. Intended Use

This document serves as a guide for the installation of Nordbo Robotics' Mimic joystick for a manipulator. This guide does not provide any information about risk assessment which must be carried out before initiating any robot movements.

## 1.2. Prerequisites

It is required that the person executing the instructions of this manual has a basic knowledge of working with software related to the specific manipulator being used. Furthermore, it is expected that the person using this manual understands the risks related to working with robots.

## 1.3. Safety Warnings

Following instructions must be read thoroughly by anyone intending to use this product.



### **WARNING!**

This symbol indicates that potentially hazardous, dangerous, or unwanted situations can arise from not following the instructions correctly. If safety instructions are not followed properly it may result in personal injury, or equipment damage.

Before attempting to connect the hardware to the robot, it is important to ensure that the robot cannot move unintentionally. For maximum safety, the **robot must always be powered off before attempting to connect wires to the robot's controller**, or when connecting cables between any of Nordbo Robotics' products.

The product may be damaged if dropped on hard surfaces. Be aware that connectors can break if pulled or the cables are over tightened.

The IR Tracker can be used within the specified measurement range. Using the IR Tracker outside of its specified range may create unexpected results (see Figure 3). Nordbo Robotics is not liable for any damage or injury resulting from the use of the product.

## 2. Getting to Know Mimic with IR Tracker

—

Mimic with IR Tracker consists of a standard joystick with a Tracker that can be mounted into it. The Tracker uses infrared (IR) light for recording human motions and transferring them to a robot (Figure 2).

Mimic IR Tracker is a wireless tracking system. It provides the Mimic software with the joysticks position and orientation in 3D-space as well as the inputs of up to four buttons (Figure 1).

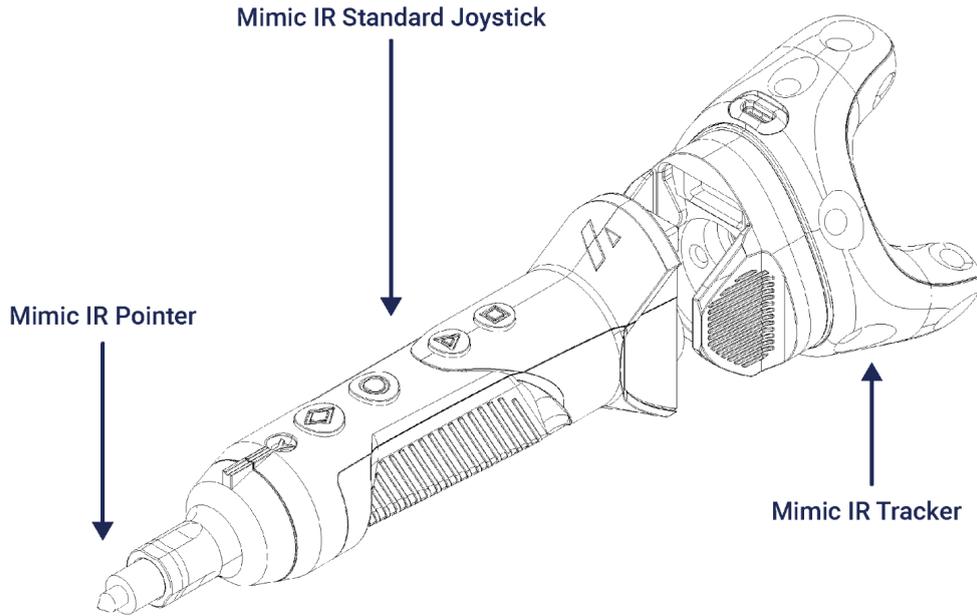


Figure 1 - Mimic IR Standard Joystick with Mimic IR Tracker

Record with Joystick

Robot repeats exact movement

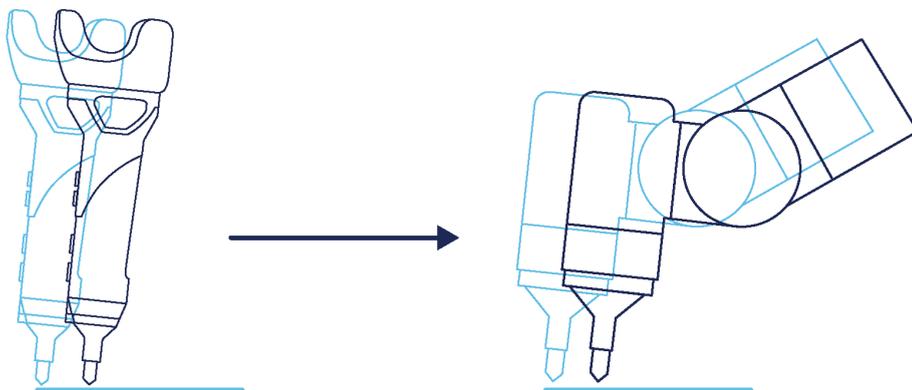


Figure 2 - Recording a movement with Mimic IR

## 3. IR Tracker Information

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## Content

Component	Referenced as	Description
	Nordbo Controller	Contains and runs the Mimic Software needed to use Mimic with IR Tracker.
	Power Supply for Nordbo Controller	Powers the Nordbo Controller.
	1x USB Flash drive	Contains documentation and URCap (only for Mimic UR)
	1x HTC Tracker 3.0 (Referred to as Tracker) (Additional can be purchased if needed)	The Tracker is the object that captures position and movements.
	Including x1 Tracker Mount  (Mounted onto Tracker with a 1/4" Camera screw with 1.27 mm pitch (following ISO 1222:2010))	Used to mount the Tracker on a Joystick.
	1x HTC Dongle (Referred to as Dongle)	Communicates wirelessly with the Tracker.
	1x HTC Dongle Cradle (Referred to as Dongle Cradle)	Cradle for the Dongle.
	1x USB Type-C cable	Connects the Dongle Cradle to the Controller. Also used to charge the Tracker.



1x HTC Base Station 2.0  
(Referred to as Lighthouse)

Emits the infrared light that the Tracker uses to track.



1x Power Supply for Lighthouse

Powers the Lighthouse.



1x Mimic IR Standard Joystick including

A Joystick to mount the Tracker on is used as a tool to record movements.



1x Joystick Pointer

This is used as a tool to calibrate.



1x Reference Frame Kit

Including 1x Reference Plate and 1x Robot Pointer with 2 flanges.

Used to calibrate the Reference Frames.



4x M6-10 mm stainless-steel bolts (for Robot Pointer)

Used to mount Robot Pointer.



1x LAN-cable, 2 m

Used to connect Nordbo Controller and robot.

## 4. How to Setup Hardware

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The diagram below shows the complete hardware setup of the IR Tracker also found in the Mimic IR quick guide that comes in the packaging.

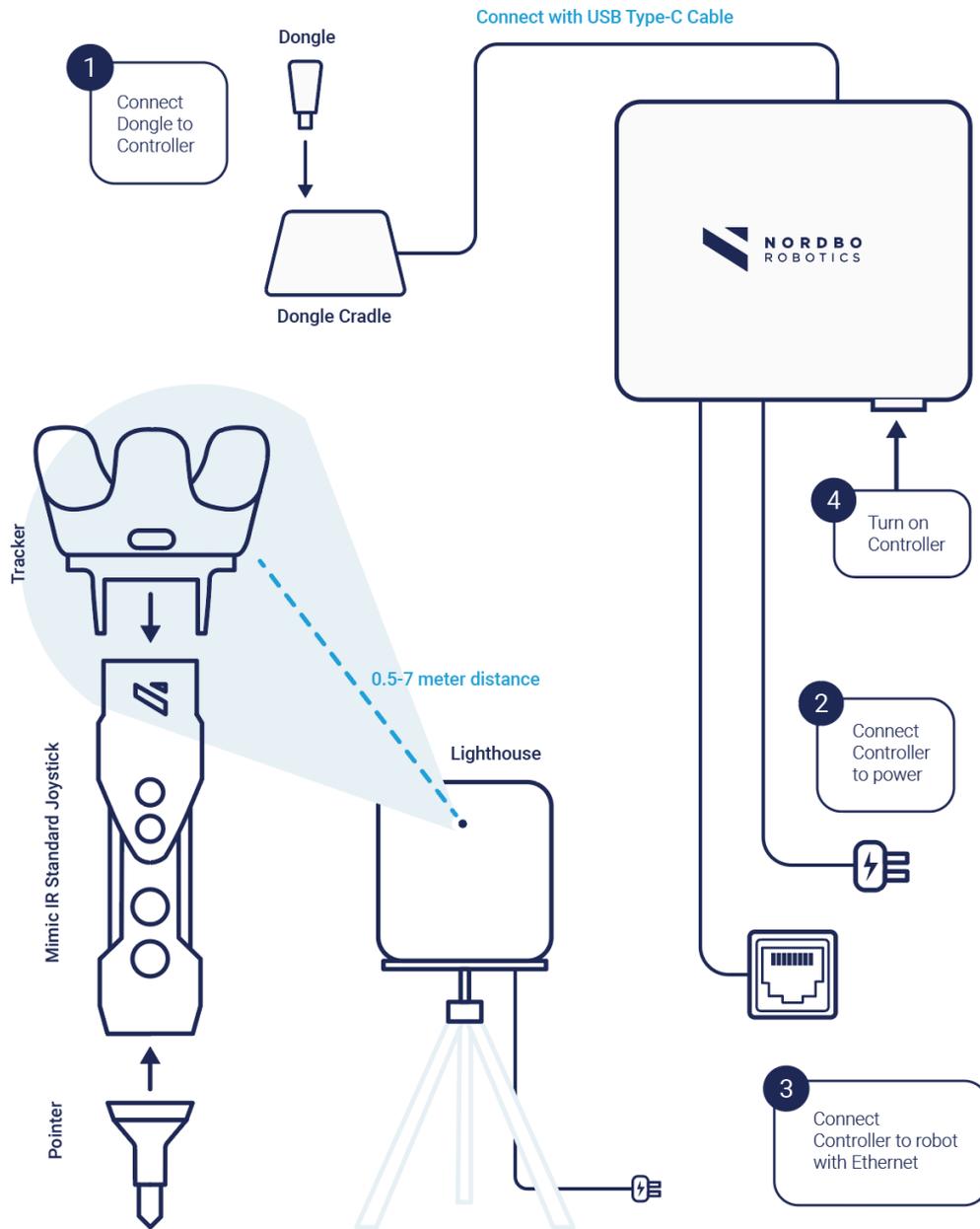


Figure 3 - Mimic IR Tracker Setup



**NOTE:**

If the setup allows for it, it is recommended to place the Lighthouse in the ceiling for optimal setup. See section [4.2 Lighthouse](#) for more information.

## 4.2. Lighthouse

The Lighthouse only needs to be plugged into power using the supplied power supply. The Lighthouse works by emitting infrared light. This light is used by the Tracker to determine its position. The Tracker must therefore be within line of sight of the Lighthouse to work (Figure 4).

The range of the Lighthouse is up to 7 meters, though using the full range may reduce the accuracy of the tracking. For more information and tips on how to set up the Lighthouse to achieve the best results, please refer to “VIVE Pro User Guide”. Make sure that the Tracker is always only visible from one Lighthouse while using the IR Tracker. Only one Lighthouse can only be connected to one Lighthouse at a time.

For more detailed information on the guidelines to use the Lighthouse check the “Lighthouse Guidelines” section on the quick guide that follows with the Mimic IR kit, or see HTC’s documentation on the VIVE tracker (IR Tracker).

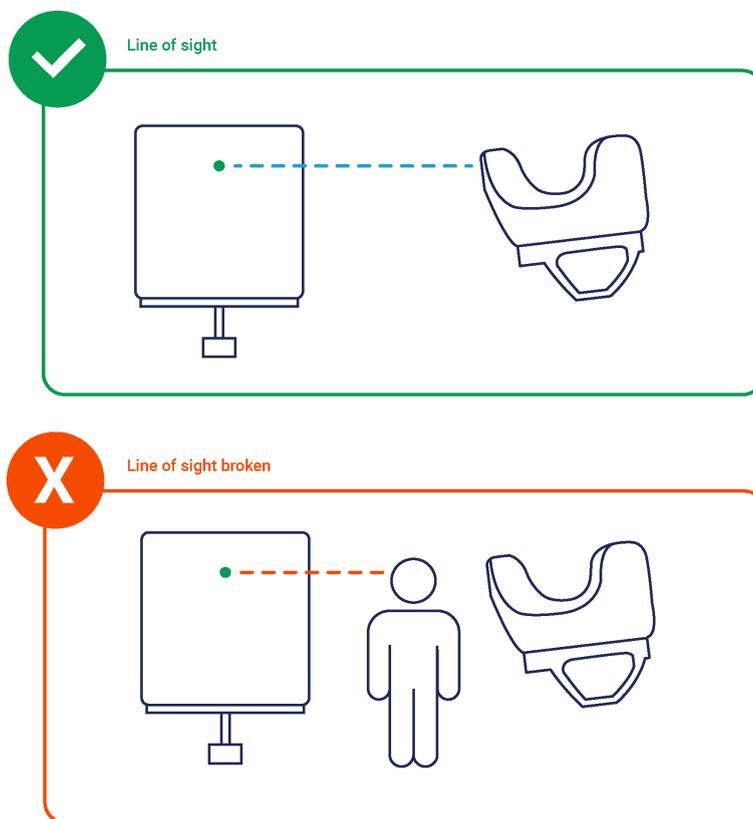


Figure 4 - Line of sight illustrated



### **WARNING!**

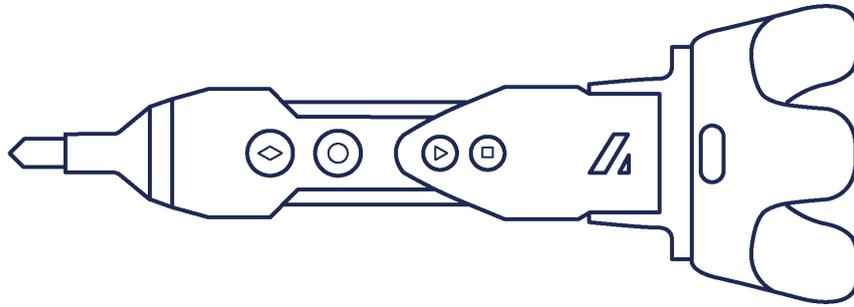
Moving the Lighthouse while powered on may damage the product and reduce accuracy

### 4.3. Tracker and Dongle

The Tracker uses the light from the Lighthouse to determine its position. This information is then transmitted to the Nordbo Controller through the Dongle using Bluetooth. For more information about how to use the Tracker and Dongle, please refer to HTC's "VIVE Tracker (3.0) User Guide".

### 4.4. Joystick and Tracker Mount

The default Nordbo Joystick for Mimic IR can be seen below (figure 5). Each button is mapped to an input on the Tracker.



ID				
Default Server Input	0	1	2	3
Tracker Pin	3	4	5	6

Figure 5 - Default mapping of the joystick

### 4.5. Nordbo Controller

Connect the Nordbo Controller to power and the Dongle



**NOTE:**

For optimal performance, it is recommended to place the Dongle at least 45 cm away from the Mimic Controller.

## 5. How to Configure the Software

—

## Web Interface

The web interface is the main user interface for the Mimic IR Controller. It can be reached by connecting a computer and the Nordbo Controller with an ethernet cable and typing the IP address of the Nordbo Controller into a browser.

**Default IP: 192.168.1.101**

To the left of every page is a menu with links to every configuration page as well as an overview showing information about the system (Figure 6).

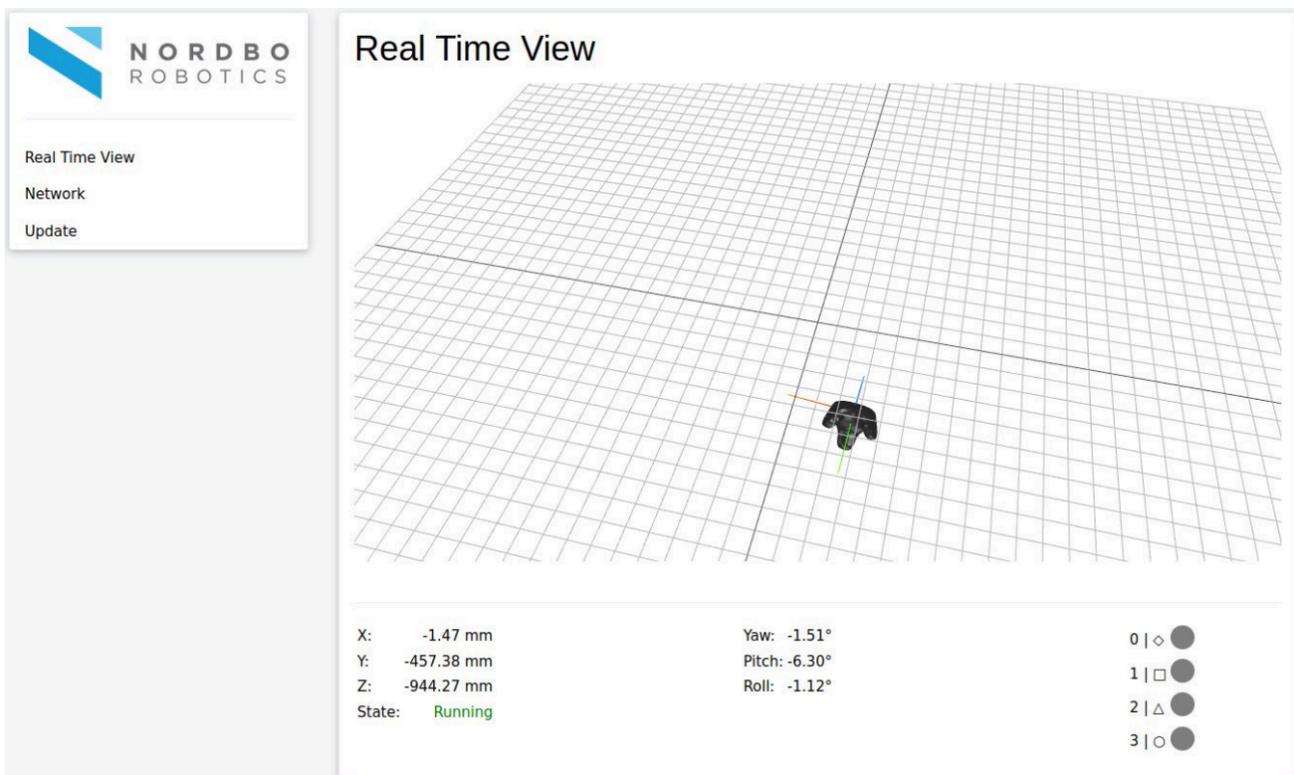


Figure 6 - Example of Web Interface (Real Time View)

Before the Nordbo Controller can be accessed, the network settings may need to be configured. The following section explains how to connect to the Nordbo Controller using a Windows PC.

**Step 1.** Turn on the Controller and connect to a PC using an ethernet cable.

**Step 2.** Open Network & Internet settings by right-clicking on the Wi-Fi/LAN icon in the menu.  
(figure 7)

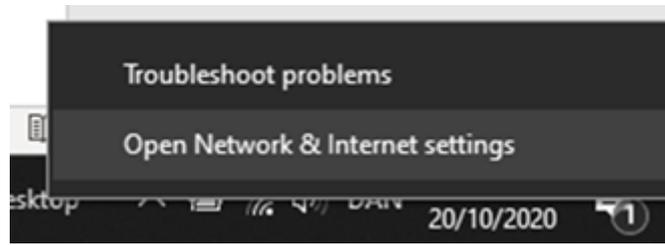


Figure 7

**Step 3.** Click “Change adapter options”. (figure 8)

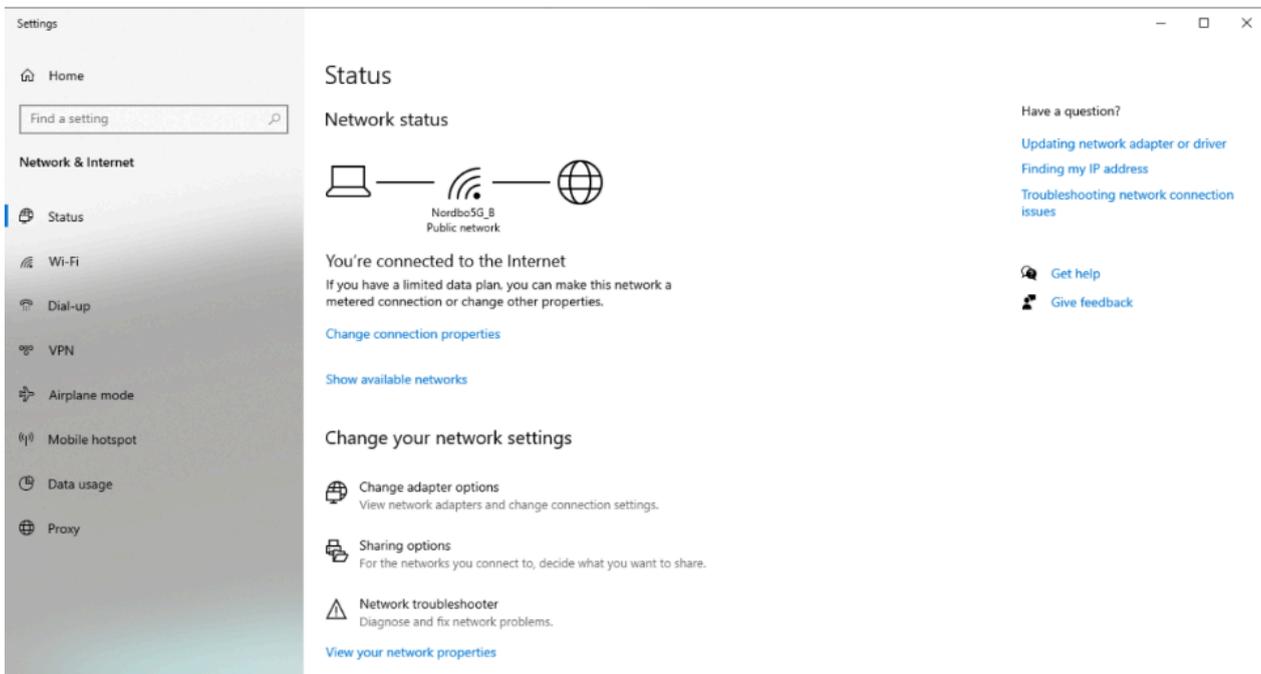


Figure 8

**Step 4.** Right-click on “Ethernet 3” and select “properties.” (figure 9)

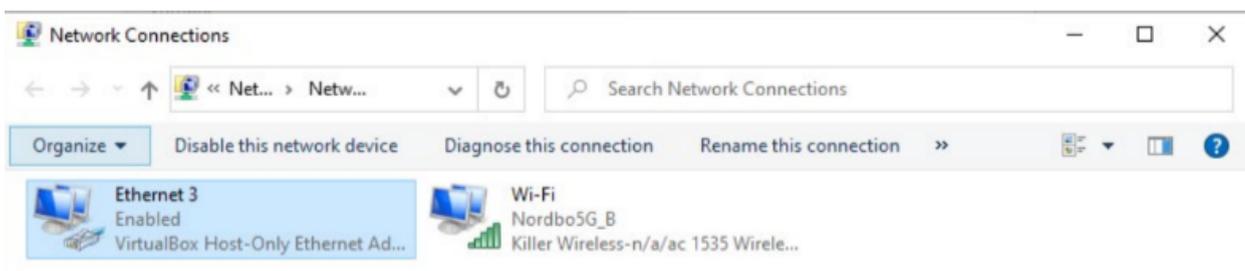


Figure 9



**NOTE:**

“Ethernet 3# may have a different number than “3”.

**Step 5.** Select Internet Protocol Version 4 (TCP/IPv4) and click “Properties”. (figure 10)

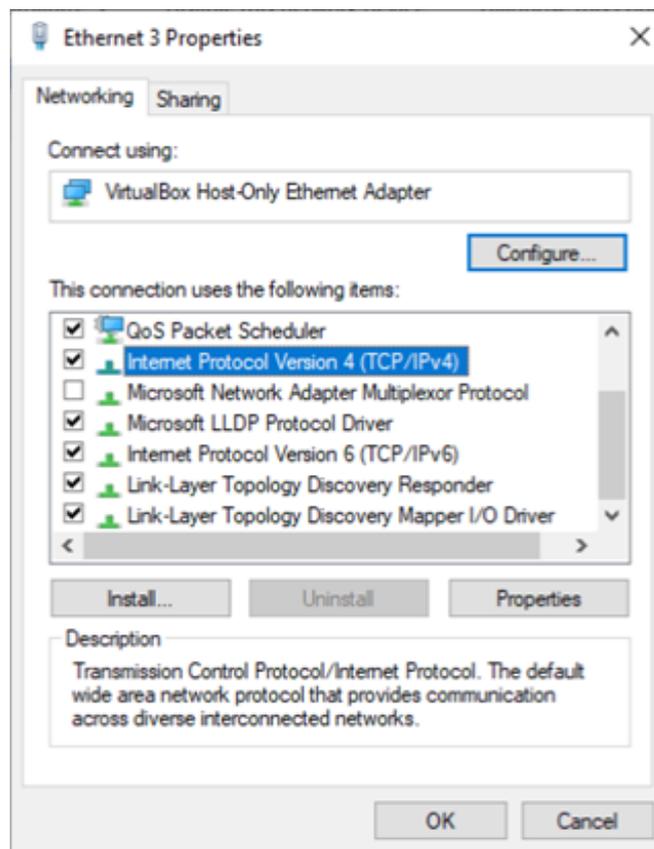


Figure 10

**Step 6.** Set the Ip address

Set the IP address to 192.168.1.98

Set the Subnet mask to 255.255.255.0

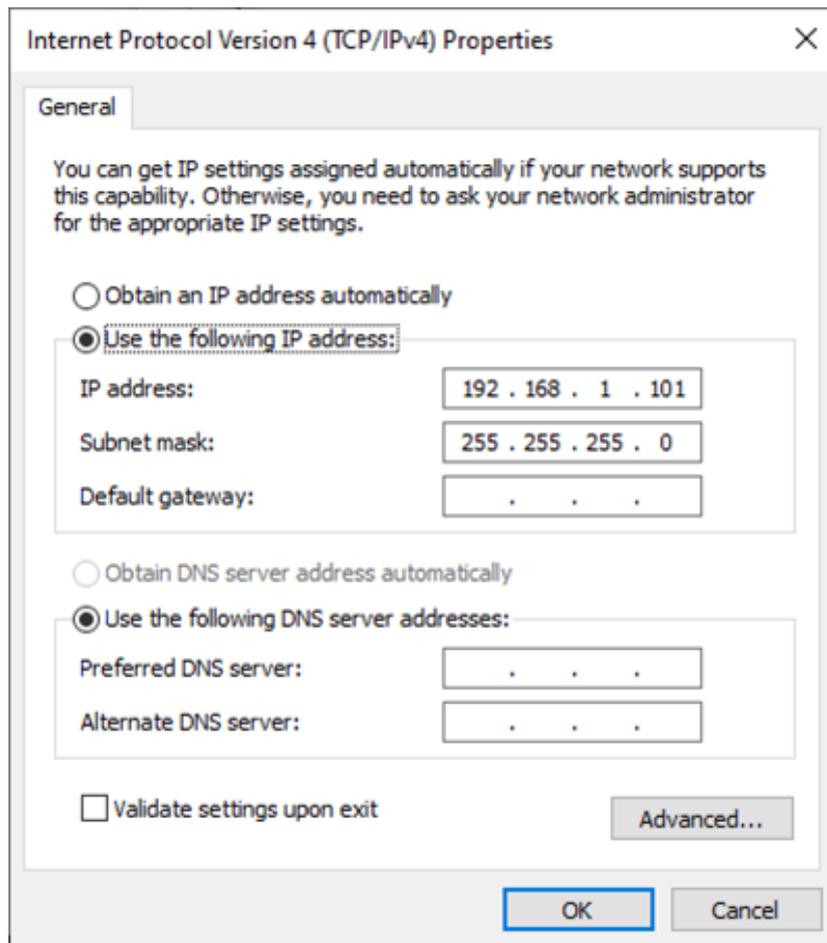
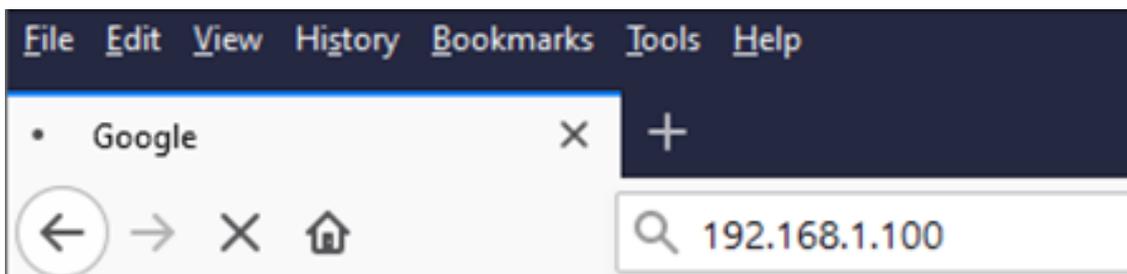


Figure 11

**Step 7.** Access the real-time view using a browser by typing the IP address 192.168.1.98.

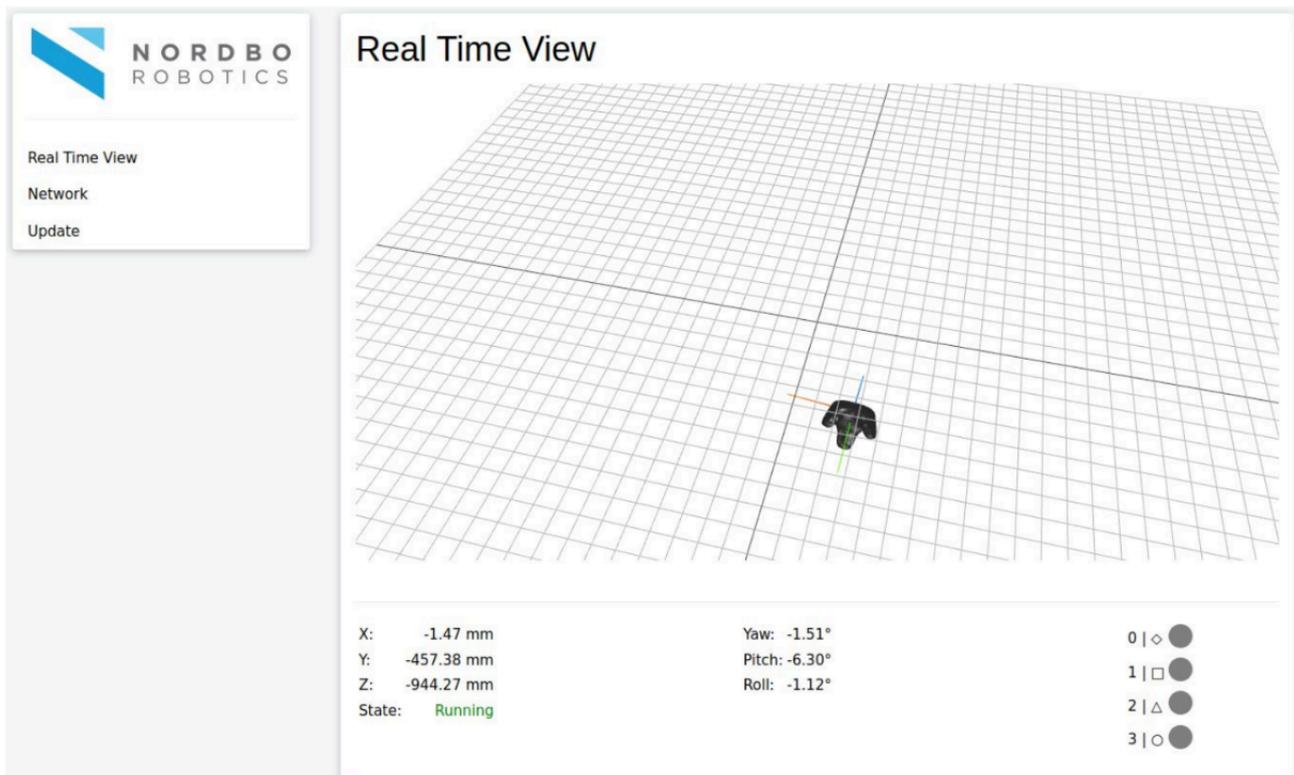


## 5.2. Real Time View

The landing page of the web interface is the Real Time View. This page allows the user to determine whether the Mimic IR Controller system is functioning correctly. A live 3D view of the Tracker can be seen. Moving the Tracker will show an identical movement in the 3D view.

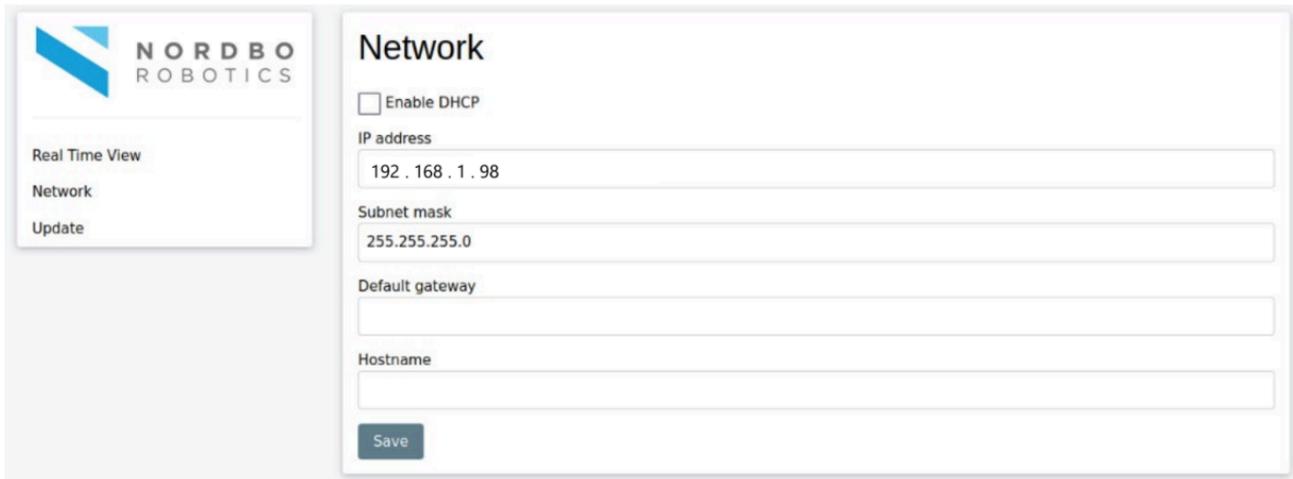
Below the 3D view is the:

- Current position of the Tracker
- Current state of the Nordbo Controller
- Current state of each button



## 5.3. Network

The Network page allows configuration of network settings for the Nordbo Controller. By default, DHCP is disabled and the IP address is 192.168.1.101. Enabling DHCP will disallow configuration of the IP address, Subnet mask and Default gateway. Click Save once complete to apply the configuration.





Real Time View

Network

Update

## Network

Enable DHCP

IP address  
192 . 168 . 1 . 98

Subnet mask  
255.255.255.0

Default gateway

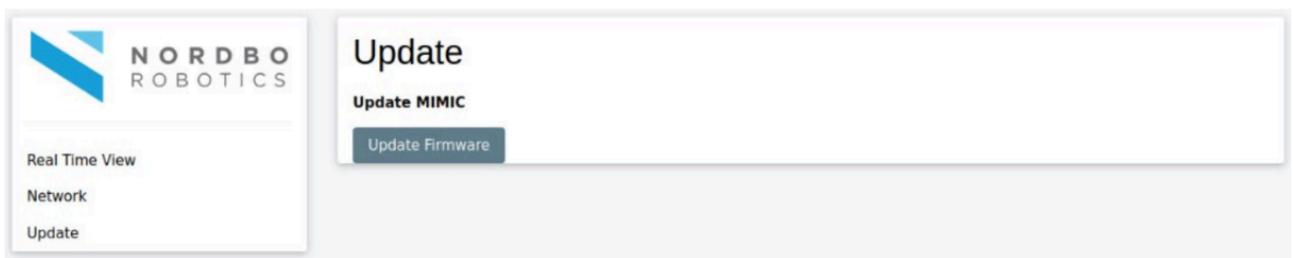
Hostname

**Save**

## 5.4. Update

The Update page is used to update the software of the Nordbo Controller. To update:

1. Click "Update Firmware"
2. Click "Browse"
3. Select the provided .deb package (nvr-server\_x.x.x\_amd64.deb)
4. Click "Update"
5. Wait for the green confirmation message. This may take a few minutes.
6. Restart the Nordbo Controller by turning it off and on.





Real Time View

Network

Update

## Update

**Update MIMIC**

**Update Firmware**

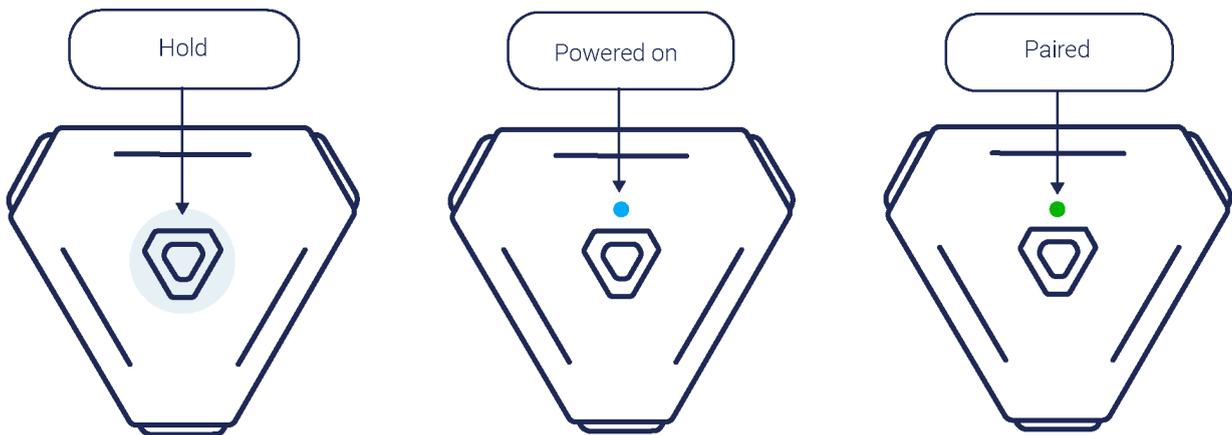
## 6. How to Use Mimic with IR Tracker

Tracker Specific Manual

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After setting up the tracker (see [4.1 Setting Up the Tracker](#) of this user manual), you are ready to start the software and use mimic.

To do so, after the tracker is set up, turn on the tracker and ensure that it is paired.



**NOTE:**

If the steps were followed and Mimic IR has started successfully, the position and movements of the Tracker can be seen in the Web Interface.

## 6.2. Using Mimic IR

The IR Tracker is meant to be used together with the Mimic software platform.

Once started, the Tracker is tracked continuously while in line of sight of the Lighthouse. If at any point the Tracker cannot be seen from the Lighthouse, the tracking will stop. Once within line of sight again, the tracking will automatically continue.

The status of the buttons on the Joystick are transmitted wirelessly to the Nordbo Controller.

## 7. Specifications

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## 7.1. Technical Specifications

### Joystick

The TCP (Tool Center Point) is illustrated below (figure 12). The Y and X values are 0. The TCP of the Joystick is measured from the TCP of the Tracker (see below).

- Without Joystick Pointer: Measured to the center of the magnet in the end of the Joystick
- With Joystick Pointer: Measured to the tip of the Pointer

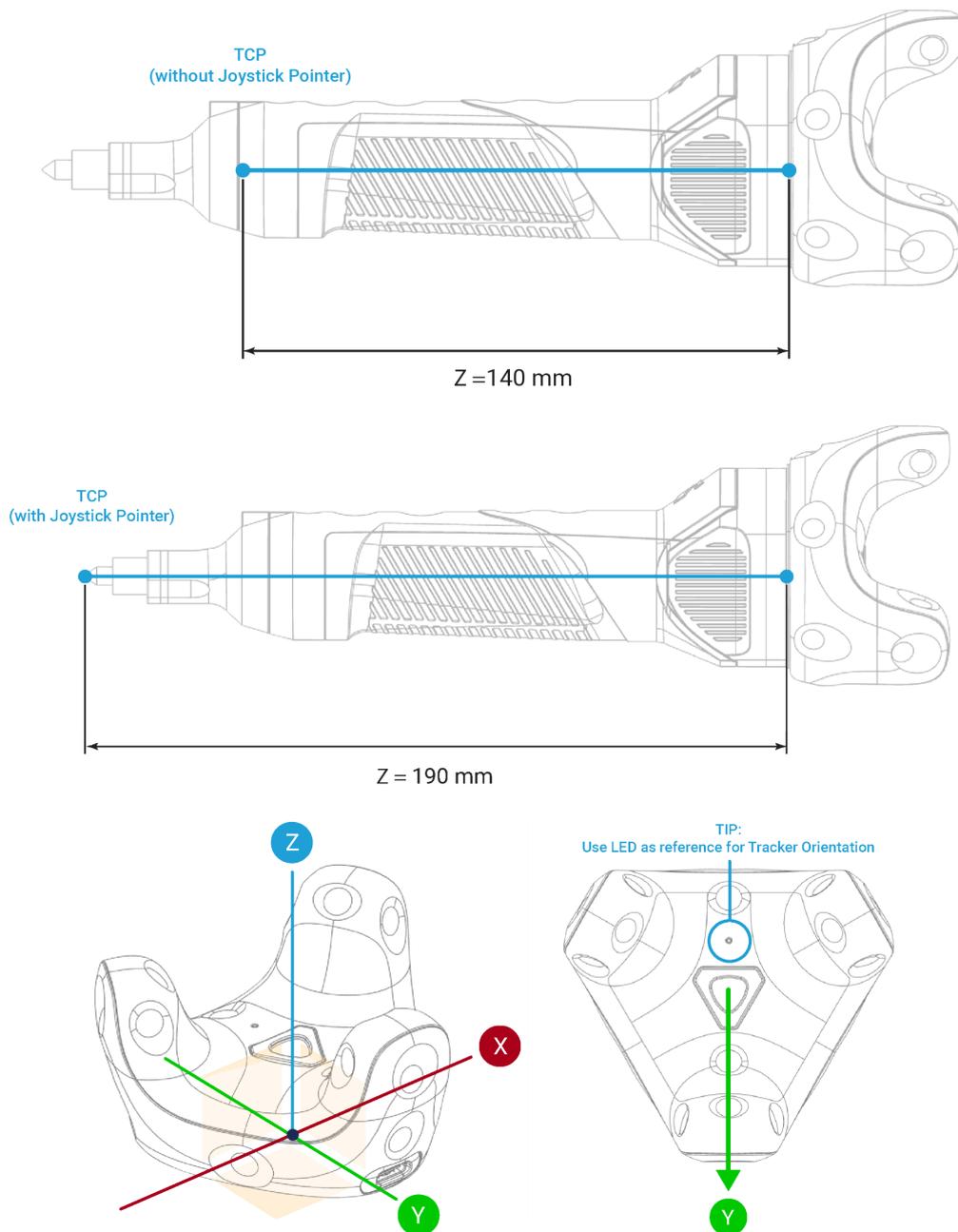


Figure 12 - IR Tracker TCP

## Tracker

Description	Metric	Note
Storage Temperature	0°C to 40°C	Avoid using the product after a dramatic change in temperature
Radio Type	2.4GHz wireless	-
Transmitter Frequency	2402 – 2480 MHz	-
Maximum Declared Output Power	4.5 dBm	-
Maximum Power Supply	5 Volts DC 1 Amp	-

The setup of the pins on the Tracker can be seen in figure 13.

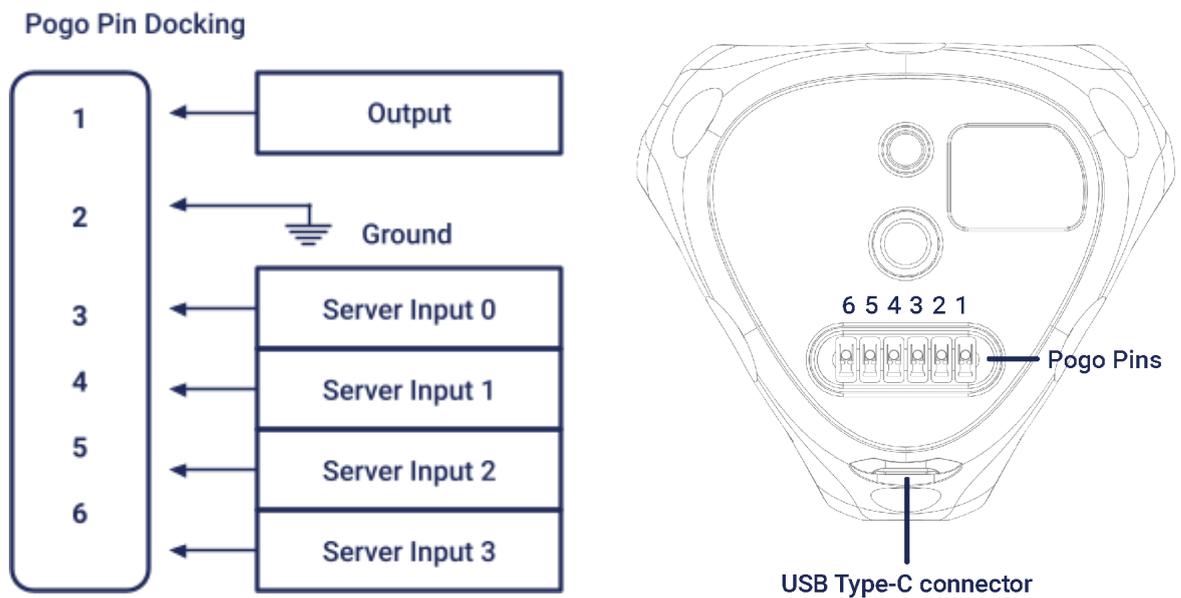


Figure 13 - Tracker Pin Setup

## Dongle

Description	Metric	Note
Storage Temperature	0°C to 40°C	-
Radio Type	2.4GHz wireless	-
Transmitter Frequency	2402 – 2480 MHz	-
Maximum Declared Output Power	0.94 dBm	-

## Lighthouse

Description	Metric	Note
Radio Type	2.4GHz wireless	-
Operating Frequency	2400 – 2483.5 MHz	-
Max EIRP	6.24 dBm +/- 1.5 dBi	-
Laser	Class 3B laser	Mitigated to Class 1 laser
Safety Distance While operating	20 cm	-
Horizontal Field of View	150°	-
Vertical Field of View	110°	-
Minimum Tracking Distance	0.5 m	-
Maximum Tracking Distance	7.0 m	-

## Tracker

Description	Metric	Note
Length	79.0 mm	-
Width	70.9 mm	-
Height	44.1 mm	-
Weight	75 g	-

## Dongle

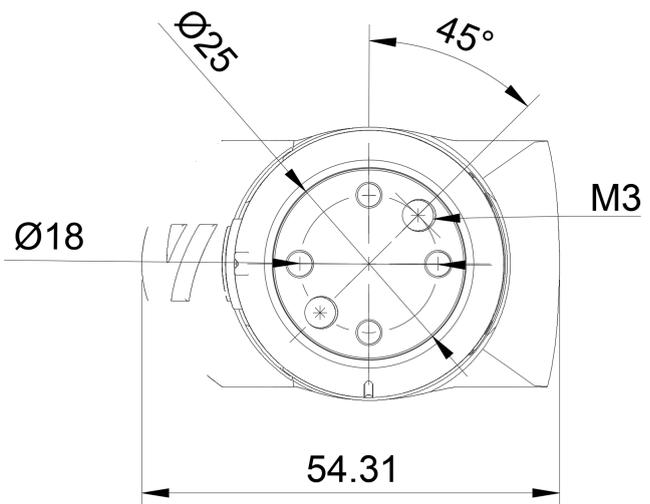
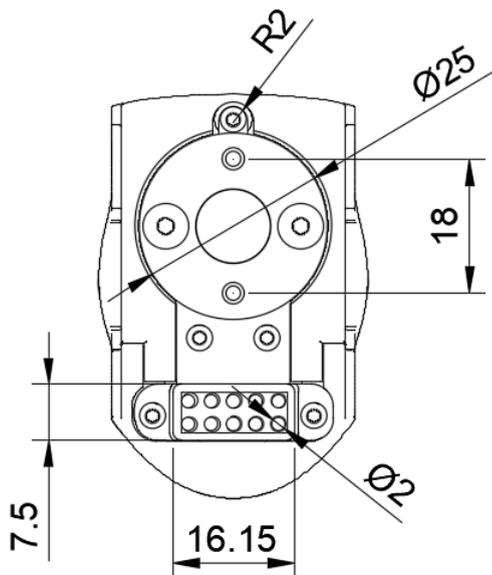
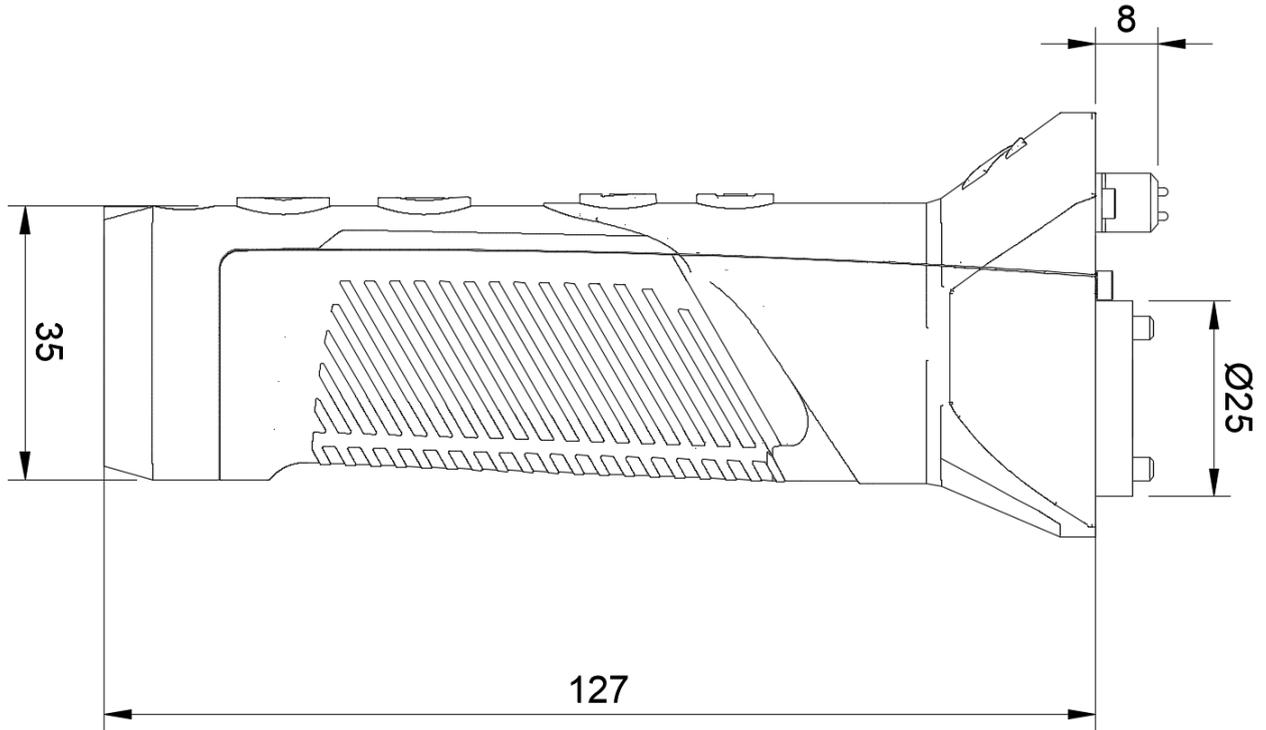
Description	Metric	Note
Length	46.8 mm	-
Width	28.0 mm	-
Height	47.2 mm	-
Weight	37.5 g	-

## Lighthouse

Description	Metric	Note
Length	74.7 mm	-
Width	63.0 mm	-
Height	77.4 mm	-
Weight	0.64 kg	-

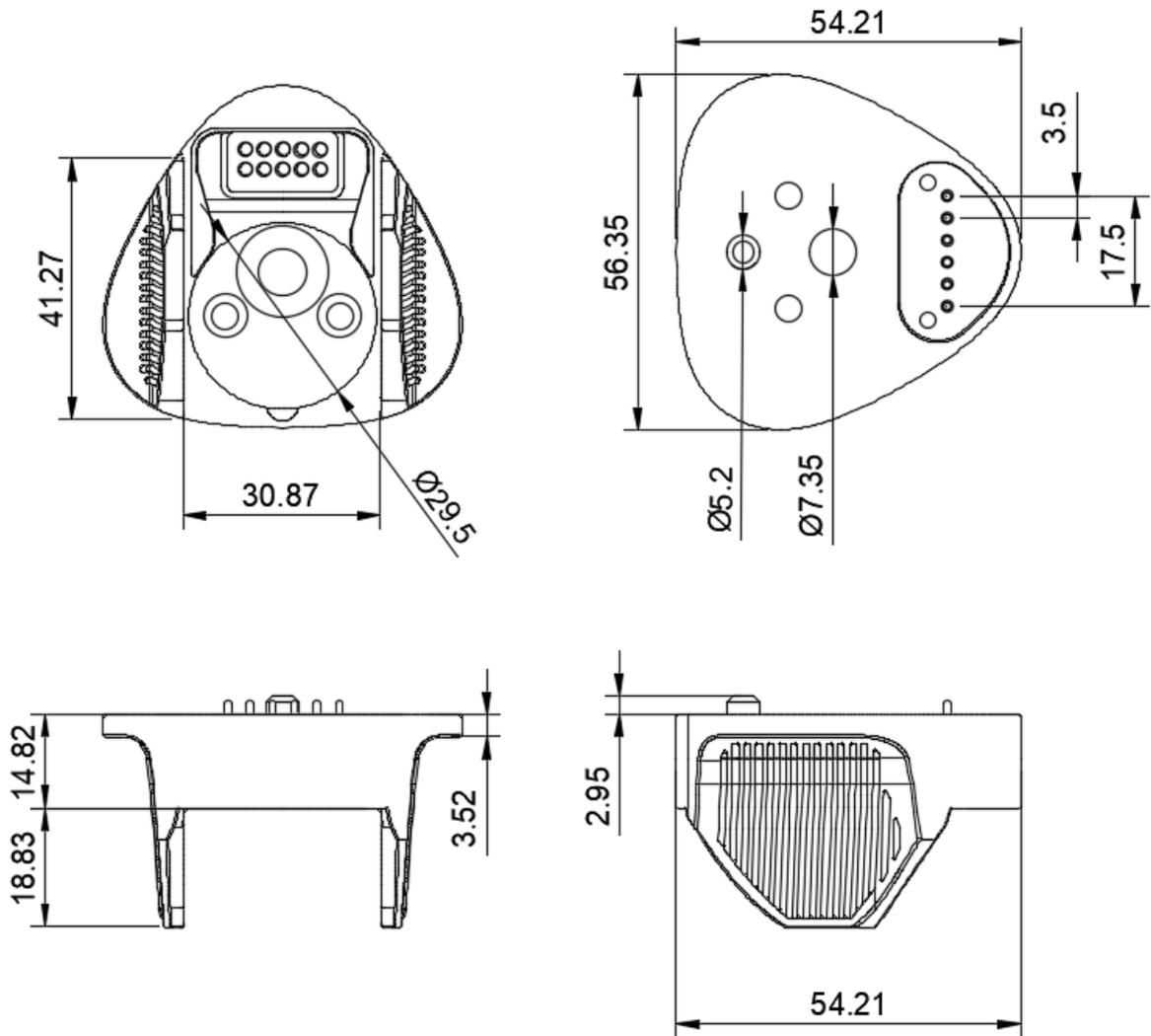
### Mimic IR Standard Joystick

General dimensions of Joystick. Side, top and bottom view.



## Tracker Mount

General dimensions of Tracker mount.



## 8. Support and Troubleshooting

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## 8.1. FAQ

Type	No.	Question	Answer
Common	1	Why does the tracking sometimes become imprecise or noisy?	<p>If the tracking becomes imprecise or noisy, it could be one of the following reasons:</p> <ul style="list-style-type: none"> <li>• The Tracker is close to shiny materials. Reflections can affect the light-based tracking.</li> <li>• The dots (sensors) on the Tracker are visually blocked from Lighthouse, by a hand or another object.</li> <li>• The Tracker can be seen by two or more</li> <li>• Rotating the Tracker can cause less precise tracking.</li> <li>• The larger distance between the Lighthouse and the Tracker, the less precise the tracking. The distance between the Lighthouse and the Tracker is 0.5-7 meters.</li> <li>• The Lighthouse is fixed to an element that vibrates or moves. Any vibrations will disrupt tracking.</li> </ul>
	2	Why does the tracking sometimes suddenly stop?	<p>If the tracking suddenly stops, it could be one of the following reasons:</p> <ul style="list-style-type: none"> <li>• The Tracker is turned off.</li> <li>• The Tracker runs out of battery.</li> <li>• The Tracker is no longer visible from any Lighthouses.</li> <li>• If you remove the Tracker from the joystick, be aware that if you block too much of the Tracker with your hand the line of sight can also be broken</li> <li>• The Tracker is closer than 0.5 m to the Lighthouse.</li> <li>• The Tracker is further than 7.0 m away from all Lighthouses.</li> <li>• Try resetting the Tracker by powering it off, inserting the USB-C cable and holding the power button for 10 seconds.</li> </ul>

<b>Tracker</b>	1	How does the Tracker work?	The Tracker uses the infrared light from the Lighthouse to estimate its position. The light is captured by the small circular dots on the Tracker.
	2	How do I connect the Dongle to the Nordbo Controller?	<ol style="list-style-type: none"> <li>1. Connect one end of the supplied USB cable to the Dongle cradle, and then attach the Dongle to the cradle.</li> <li>2. Connect the other end of the USB cable to the Nordbo Controller.</li> </ol>
	3	How do I charge the Tracker?	<p>When the Tracker battery is low, the status light will blink red. It is recommended that you charge the Tracker.</p> <p>Charge the Tracker using the USB Type-C cable that came in the box. Connect the USB cable to a power adapter or connect the cable to a Nordbo Controller's USB port to charge the Tracker. When the Tracker is fully charged, its status light either shows white when off or green when on.</p>
	4	How do I pair the Dongle with the Tracker?	<p>Make sure the Dongle is connected to the Nordbo Controller.</p> <ol style="list-style-type: none"> <li>1. In SteamVR, Click  &gt; Devices &gt; Pair Controller.</li> <li>2. Select "HTC Vive Tracker".</li> <li>3. Press the Power button for around two seconds. The status light will blink blue.</li> <li>4. Wait for the status light to turn green.</li> <li>5. In the Controller Pairing window, click Done.</li> </ol>
	5	What does the status light on the Tracker mean?	<p>The status light shows:</p> <ul style="list-style-type: none"> <li>• Green when the Tracker is in normal mode.</li> <li>• Blinking red when the battery is low.</li> <li>• Blue when the Tracker is turned on, but not paired.</li> <li>• Blinking blue when the Tracker is ready to pair with the Dongle.</li> <li>• Orange when charging.</li> </ul>

	6	Why does the Tracker automatically turn off?	<p>If the Tracker turns off by itself, it could be one of the following reasons:</p> <ul style="list-style-type: none"> <li>• The battery is drained.</li> <li>• Pairing has timed out after being idle for more than 30 seconds.</li> <li>• No movement has occurred for more than 30 minutes.</li> </ul> <p>You can set how long the Tracker waits idle before turning off. In SteamVR, click Settings &gt; Startup/Shutdown, and then set the time in "Turn off controller after".</p>
	7	Can the Tracker be used while charging?	Yes, the Tracker can be used while being charged.
<b>Dongle</b>	1	How do I best place the Dongle?	<ul style="list-style-type: none"> <li>• The Dongle should be inserted into the Cradle and placed at least 45 cm away from the Controller or other electronic devices that might cause interference.</li> <li>• The Dongle should not be hidden away in a metal cabinet or blocked by large metal objects.</li> </ul>
<b>Lighthouse</b>	1	How do I best place the Lighthouse?	For most applications the best point of view is somewhere above the workspace, looking down. It can also be placed at an angle that is not perpendicular or parallel with the floor.
	2	How many Lighthouses can be used in a single setup?	One Lighthouse should be used in a single setup.
	3	How do I change the channel of a Lighthouse?	<p>To change the channel of a Lighthouse:</p> <ol style="list-style-type: none"> <li>1. Power on the Lighthouse.</li> <li>2. Press the pinhole button on the backside of the Lighthouse.</li> <li>3. If SteamVR is on, restart it for the changes to take effect.</li> <li>4. Hover the mouse over the Lighthouse icon in SteamVR to see the current channel of the Lighthouse.</li> </ol>

<b>Nordbo Controller</b>	1	What is the password for the computer?	The default password is "nordbo".
	2	What is the IP of the computer?	The default IP is 192.168.1.98

## 8.2. Support Requests

For questions, feature requests, and general support, please visit [support.nordbo.io](https://support.nordbo.io) and create a ticket. We highly value feedback on our products and you can help us improve the product by sharing your experience.

## 9. Declarations and Certifications

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# CERTIFICATE OF CONFORMITY

Certificate No.: LTC240730-APN-056  
 The Certification Body of LTC CERTIFICATION LIMITED

Certifies that

<b>Applicant:</b>	NORDBO ROBOTICS A/S
<b>Address:</b>	Noatunvej 2, 5000 Odense, Denmark
<b>Manufacturer:</b>	Hangzhou Amphenol Phoenix Telecom Parts Co., Ltd.
<b>Address:</b>	No. 98-5 (South), Road 19, Baiyang Sub-district, Qiantang District, Hangzhou, Zhejiang, China
<b>Product Name:</b>	IR Tracker
<b>Model No.:</b>	Mimic Core with IR Tracker 2, Mimic UR with IR Tracker 2, IR Tracker 2 for Mimic Core, IR Tracker 2 for Mimic UR
<b>Rating(s):</b>	50-60Hz, INPUT: 100-240V AC 2A; OUTPUT: 20V DC 6A
<b>Standard(s):</b>	EN IEC 62368-1:2020+A11:2020, EN IEC 55014-1:2021, EN IEC 55014-2:2021, EN IEC 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A1:2019+A2:2021.
<b>Report No.:</b>	DN20240806-APN22-CE-S, DN20240806-APN21-CE-E

Technical documentation of the company and the product above have been observed and audit has been completed successfully by us. The **Low Voltage Directive 2014/35/EU (LVD)** and **Electromagnetic Compatibility Directive 2014/30/EU (EMC)** have been taken as references for these processes.

The validity of the certificate can be checked through our website [www.ltcfr.com](http://www.ltcfr.com). The CE mark shown below can only be used under the responsibility of the manufacturer with the completion of EU Declaration of Conformity and necessary technical documentation for all the relevant directive(s). This certificate only covers the product stated above and LTC must be noticed in case of any changes on the product.

Signature: *Lazare Martin*

Lazare Martin

Date of issue: August 07, 2024

Expiry Date: August 06, 2029



**LTC CERTIFICATION LIMITED**

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