



AXIS

USER MANUAL

AXIS User Manual 1.2
August 2023

Hardware involved:

- AXIS nodes
- AXIS dongle/devkit
- AXIS charging dock

Software Involved:

- AXIS Control Center
- AXIS Hub App

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AXIS Software/Drivers Checklist

- ☐ Download [AXIS Control Center](#) on your computer
- ☐ Download and update [AXIS Firmware](#) for nodes and dongle
- ☐ Download [SteamVR drivers](#) (to play any SteamVR games with AXIS)
- ☐ Download [AXIS Hub](#) app on Android Phone Hub (Android APK)
- ☐ Download [AXIS Unity SDK](#) (to use AXIS within Unity Engine applications)
- ☐ Download [AXIS Unreal SDK](#) (to use AXIS within Unreal Engine applications)

Safety information

Electrical Safety

- AXIS charging dock is rated at 5Vdc, 8A.
- Any 3rd party chargers may result in damage to the hardware.
- When charging, please ensure components are not near any exposed heat sources or flames.
- Do not store AXIS near any magnetic devices (i.e. Magnets, speakers, etc.) as it may cause sensor damage over time.
- Do not submerge AXIS in water. If this occurs, dry immediately to prevent damage to the system.
- Always use AXIS authorised chargers when charging nodes.
- Place charging dock on an even surface during charging.
- Avoid impact with hard surfaces to prevent internal damage to AXIS electronic components.
- When the wireless dongle/receiver is attached to a PC, avoid contact with conductive surfaces to prevent electrical damage.
- Do not wet, bend or apply pressure to the wireless dongle.
- After usage, store your ESP32 devkit receiver in the anti-electrostatic bag provided*.

*Devkit users only.

Operation Safety

- Ensure straps are tightened before use to prevent nodes from slipping out of the node holders.
- Do not over-stretch node holders to prevent tearing of the silicon material.
- Always use AXIS as intended. Extreme or unintended forms of usage may result in bodily injuries to the user, and damage to the system.
- Do not cover the AXIS charging dock while charging the nodes.

FCC Compliance

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.

Any changes or modifications not expressly approved by Refract Technologies Pte Ltd, could potentially lead to the cancellation of their operating privileges for the equipment.

AXIS 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. AXIS 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 AXIS does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, Users are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiver (AXIS Dongle)
- Increase the separation between the affected equipment and receiver (AXIS Dongle)
- Connect the affected equipment into an outlet on a circuit different from that to which the receiver (AXIS Dongle) is connected
- Consult Refract Technologies [consumer support](#) for help.

Nodes

FCC ID: 2BBRNNODE-AN-001

Dongle

FCC ID: 2BBRNDONGLE-AD-001

Contains Transmitter Module

FCC ID: 2AC7Z-ESPC3MINI1

About this guide

This user guide contains information you need when installing and configuring AXIS.

Where to find more information

For additional information on AXIS, you can visit the:

1. AXIS Website
Visit <https://AXISxr.gg/> for official product updates, information and support.
1. AXIS Control Center
Check out your AXIS Control Center for latest patches and product updates.
1. Refract Technologies Website
Visit <https://refract.gg/> for business announcements and updates.

Conventions used in this guide

To ensure optimal performance and safety when using our product, please take note of the following symbols used throughout this manual.



CAUTION: Information to prevent damage to the components and injuries to yourself when trying to complete a task.



IMPORTANT: Instructions that you **MUST** follow to complete a task.



NOTE: Tips and additional information to help you complete a task

System requirements

You will need the following to run AXIS applications:

Computer specifications:

- Intel® HD Graphics 2000 +
- Intel i7-2600 equivalent or greater
- 8GB+ RAM
- 1x USB 2.0 port
- Windows 10 and above

Your computer must also meet the requirements for other applications or games that you intend to run.

Phone specifications:

- Android 8.0 (Oreo) or later
- Working main (back) camera

If you are using AXIS Nodes and AXIS Hub together, please ensure your computer and phone are connected to the same wireless network.

When using AXIS nodes with a HMD (head-mounted display), a router is required for the devices to communicate.

AXIS contents

Your AXIS set consists of the following items.

AXIS Standard

AXIS Hardware	9 x AXIS nodes 1 x AXIS charging dock 1 x AXIS dongle / ESP32 Devkit
AXIS Accessories	9 x Node holders 4 x Short straps 4 x Medium straps 2 x Long straps 1 x Phone holder 1 x Waist belt
Accompanying Hardware	1 x AC charger with adapter
Additional Component	1 x USB-A to USB-C*

*Devkit users will receive an additional 1 x USB-A to USB-C cables and 1 x storage pouch

AXIS Content Creator

AXIS Hardware	18 x AXIS nodes 2 x AXIS charging dock 2 x AXIS dongles / ESP32 Devkits
AXIS Accessories	18 x Node holders 8 x Short straps 8 x Medium straps 4 x Long straps 1 x Phone holder 1 x Waist belt 1 x Y-strap
Accompanying Hardware	2 x AC chargers with adapters
Additional Component	1 x USB-A to USB-C*

*Devkit users will receive an additional 1 x USB-A to USB-C cable and 2 x storage pouches

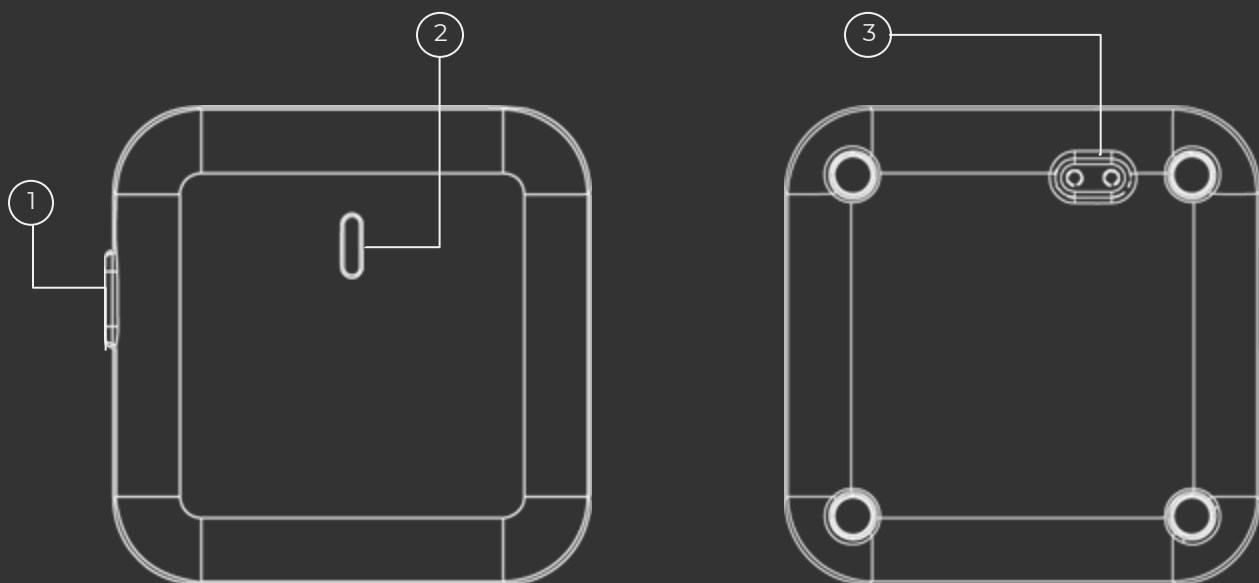


If any of the above items are damaged or missing, please get in touch with us via <https://support.AXISxr.gg/>.

Getting Started

1

1.1 AXIS Nodes

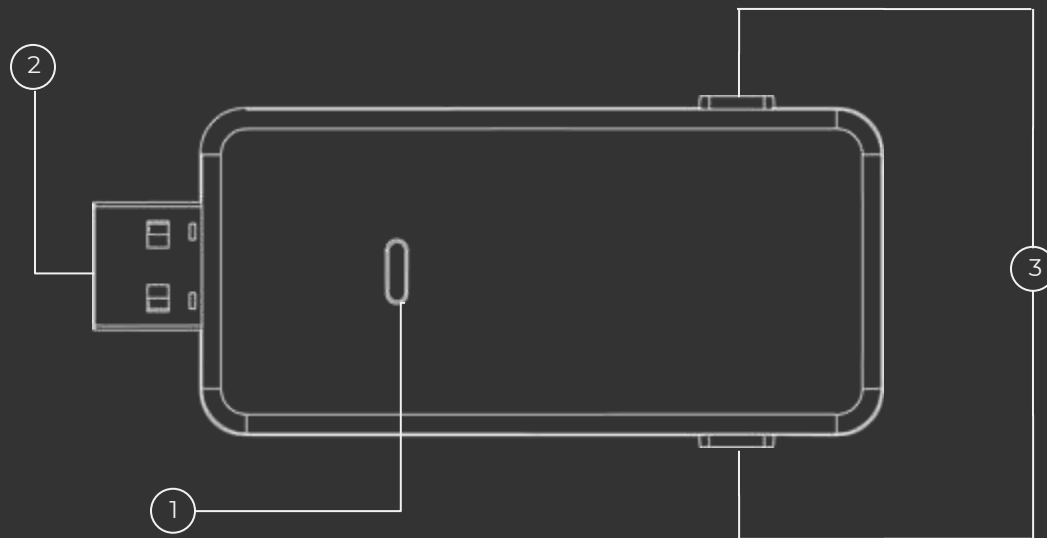


- ① Node button
- ② Status indicator
- ③ Charging pin

1.1.1 Status indicator legend

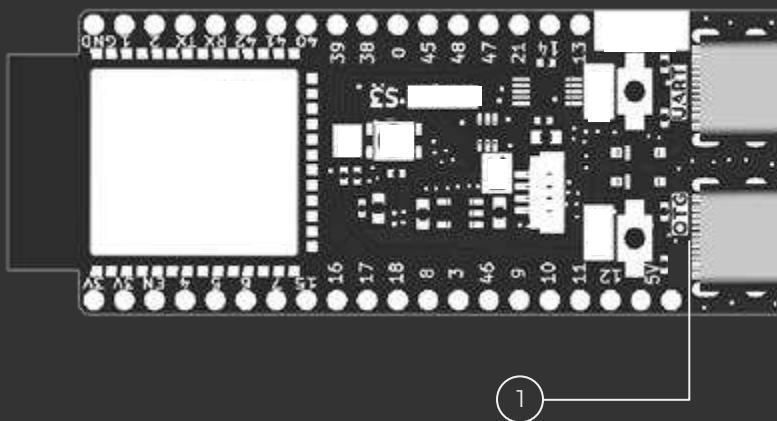
Red: Charging
Yellow: Starting up
Teal: Standby/paired
Teal flashing: Receiving of information
Blue flashing: Pairing mode
Off: Sleeping/powered off

1.2 AXIS Dongle



- ① Status indicator
- ② USB-A Connector
- ③ Buttons (to be assigned)

1.2.1 Devkit receiver



- ① OTG Port

1.3 Charging of AXIS nodes

Place the nodes in the charging tray with the status indicator facing up and the charging pins at the back of the node aligned with the charging tray's pins.

It is recommended to fully charge the nodes before using them for the first time.



When charging the nodes for the first time, the nodes will vibrate with the status indicators flashing red and blue for a few minutes before a solid red



Do not cover the AXIS charging dock while charging the nodes.

1.4 Installation of AXIS Hub Application

Download **AXIS Hub** app apk from our website and sideload onto your phone.

To sideload the app, follow these steps:

1. Enter <https://downloads.AXISxr.gg/> in the URL bar of your browser.
2. Click on the 'Download' button to download the '.apk' file.
3. Download/Transfer the '.apk' file onto your android phone.
4. Locate the '.apk' file on your phone and tap to install the app.



You may need to allow permission to install the app from an unknown source.

After installing AXIS Hub on your phone, view the app info via your phone's Settings > Apps > AXIS Hub. to view the app info and check on the following settings:

- Under 'Permissions', ensure that the permission for camera access is set to "Allow only while using the app".
- Under 'Battery', ensure that the battery usage is set to "Unrestricted".

1.5 Installation of AXIS Control Center

Download **AXIS Control Center** software on your computer via our website.

1. Enter <https://downloads.AXISxr.gg/> in the URL bar of your browser.
2. Click on the 'Download' button.
3. Double-click on "AXIS Control Center-X.X.X Setup.exe*" to install.
4. Once installed, AXIS Control Center will load automatically.

*X.X.X in here represents the software version at the point of download



More instructions on how to operate the AXIS Control Center can be found on the AXIS Control Center User Manual.

1.6 Connecting AXIS dongle

Insert the dongle via its USB-A to a USB port on the computer that you are connecting AXIS to.



1 dongle can support up to 16 nodes

1.6.1 ESP32 Devkit receiver

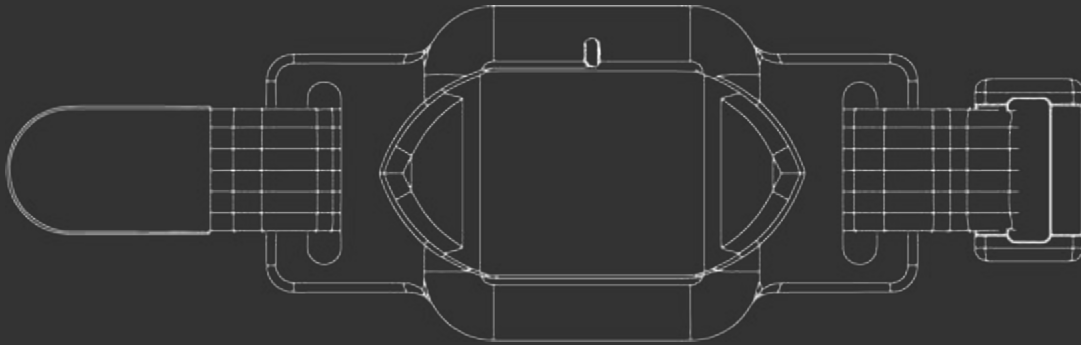
For Kickstarter backers who opted for the ESP32 Devkit receiver instead of the AXIS dongle, use the given USB-C to USB-A cable and connect the USB-C end to the devkit receiver, and the USB-A end to the computer that you are connecting AXIS to.



Ensure that you connect the USB-C end to the port labeled 'OTG' on the devkit receiver.

1.7 Setting up AXIS straps and belt

1. Attach a node holder to an AXIS strap as shown below:
2. Repeat above step for
 - a. AXIS Standard: 8 of the node holders and AXIS straps (4 short and 4 medium length straps)
 - b. AXIS Content Creator: 12 of the node holders and AXIS straps (8 short and 4 medium length straps)



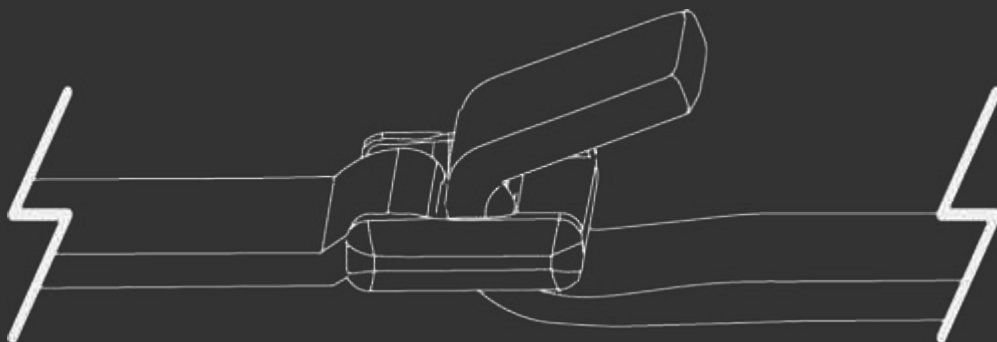
Ensure that the status indicator of the node is facing up when inserted, aligned with the top of the node holder.



When inserting straps into node holders, please ensure the wavy silicon grips are facing down against your skin.

1.7.1 Chest strap

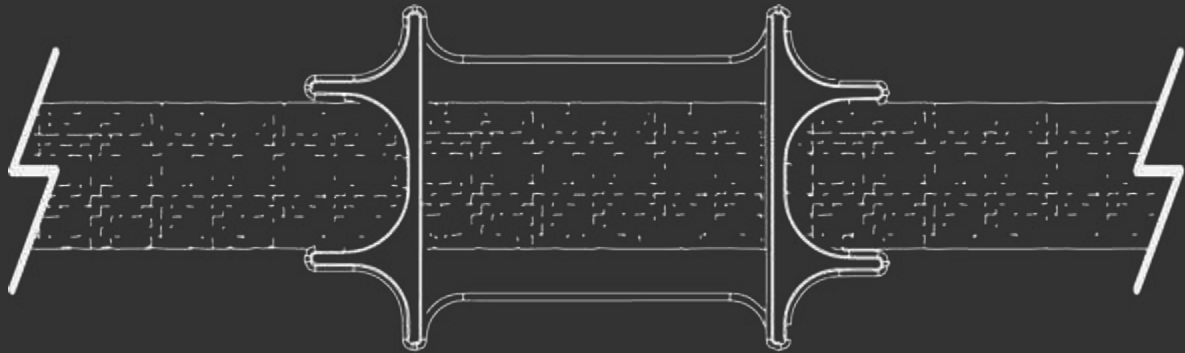
1. Combine 2 long AXIS straps together as shown below:
2. Attach 1 node holder to this combined strap.



If this is your first experience with AXIS, we recommend that you wear the straps before you proceed to setup and calibration.

1.7.2 AXIS belt

1. Attach the phone holder to the belt as shown below:
2. Ensure that the position of the phone holder is located on your waist, at the back of your spine.



1.7.3 Android Phone

1. Ensure the phone holder is already attached to the waist belt, as per 1.7.2.
2. Pair your mobile phone with the **AXIS Hub** app (Section 2.2).
3. Insert the phone into the phone holder as shown below:



Phone should be positioned with the main/rear camera facing outwards, and camera position to the right of the body (as shown in the image above).



If this is your first experience with AXIS, we recommend that you wear the straps before you proceed to setup and calibration.

1.7.4 Y-strap (AXIS Content Creator Set only)

1. Attach 3 node holders to the Y-strap, as shown in the picture below.
2. Secure the hanging tail of the Y-strap to the waist belt.



If this is your first experience with AXIS, we recommend that you wear the straps before you proceed to setup and calibration.

2.1 AXIS nodes setup

2.1.1 Turning on

Press and hold the node's button and release once you feel a haptic feedback (light buzz) or when the status indicator turns yellow.

2.1.2 Pairing mode

When the node is off, press and hold the node's button until you feel the 2nd haptic feedback. The status indicator will flash blue when it is in pairing mode.

2.1.3 Standby/play mode

The status indicator should show teal once the node is turned on and paired.

2.1.4 Turning off

Press and hold the node's button till you feel a haptic feedback or when the status indicator turns off.



When turning off, only release the button after the haptic feedback stops.

2.2 Pairing of AXIS nodes

1. Using the computer:
 - a. Boot up **AXIS Control Center**
 - b. Select 'My Devices' tab on the left
 - c. Click on 'Node Manager'
2. Follow instructions in 2.1.2 to enter Pairing Mode.



If you are unable to click on 'Node Manager', try reconnecting the dongle or devkit to the computer.

2.2.1 Initial pairing:

1. The nodes that are in pairing mode will appear on the **AXIS Control Center** nodes drawer, located below the silhouette.
2. Identify the nodes by either one of the following method:
 - a. Clicking on the node icon twice will vibrate the node
 - b. Pressing the node's button twice will shake the node icon
3. Drag and drop the nodes from the nodes drawer into the square on the silhouette that corresponds with where the node will be worn at.
4. Click on the 'Save' to save the current configuration.
5. When the nodes are successfully paired, the status indicator of the nodes will display a teal light.

2.2.2 Re-pairing of nodes:

Nodes that are already linked to a body part will appear in the squares on the silhouette. To re-pair the nodes to a different body part:

1. Drag and drop the node icons to the nodes drawer.
2. Identify the nodes by either one of the following method:
 - a. Clicking on the node icon in AXIS Control Center twice will make the node buzz
 - b. Pressing the physical button on the node twice will cause the corresponding icon in the Control Center to shake
3. Drag and drop the nodes from the nodes drawer into the square on the silhouette that corresponds with where the node will be worn at.
4. Click on the 'Save' button to save the current configuration.
 5. When the nodes are successfully paired, the status indicator of the nodes will display a teal light.



It is recommended for first time users to first pair the nodes before putting them on.

2.3 Pairing of AXIS Hub

1. Ensure that your computer and AXIS Hub (android phone) are connected to the same wireless network.
2. Using the AXIS Hub (android phone), open **AXIS Hub** application and tap on the 'Start Pairing' button.
3. Using the computer:
 - a. Boot up **AXIS Control Center**
 - b. Select 'My Devices' tab on the left
 - c. Click on '+ Add New Hub'
4. Select AXIS Hub to connect.

2.3.1 Manual pairing

In the situation where the **AXIS Control Center** is unable to locate your AXIS Hub, use the following steps to connect your AXIS Hub:

1. Select 'My Devices' tab on the left.
2. Click on '+ Add New Hub'.
3. Click on 'Pair Hub manually'.
4. Enter the IP address and port shown on the phone's **AXIS Hub** screen.
5. Click on 'Submit'.

2.4 VR mode setup

To allow AXIS to run smoothly with VR applications, creations of profiles on the AXIS Control Center is required. Profiles allow users to scale the character model of the application according to their real world measurements*. This allows better mapping of movements to virtual characters with different physical proportions.

* Only for applications that support this feature.

2.4.1 Adding new user profile

1. Open AXIS Control Center application on your computer.
2. Click on “Profiles” at the right tab of the control center.
3. Click on the '+' icon found on the bottom right corner of the page.
4. A new profile will appear at the top of the list (with green borders).
5. Type in the length of your Height, Neck, Shoulder, Torso, Upper Arm, Forearm, Thigh and Calf in their respective fields.
6. Click on the 'Save' icon button to save the profile

2.4.2 Editing existing user profile

1. Open AXIS Control Center application on your computer.
2. Click on “Profiles” at the right tab of the control center.
3. Click on the 'Edit' button on the profile you wish to edit. The border of the profile card will turn blue.
4. Edit the field(s) you intend changes for.
5. Click on the 'Save' icon to save the edits.

Once user profiles have been created, user may proceed to suit up and calibrate for AXIS either via the computer or through the HMD via the “Virtual Desktop” mode*.

* Only for HMD that support this feature.



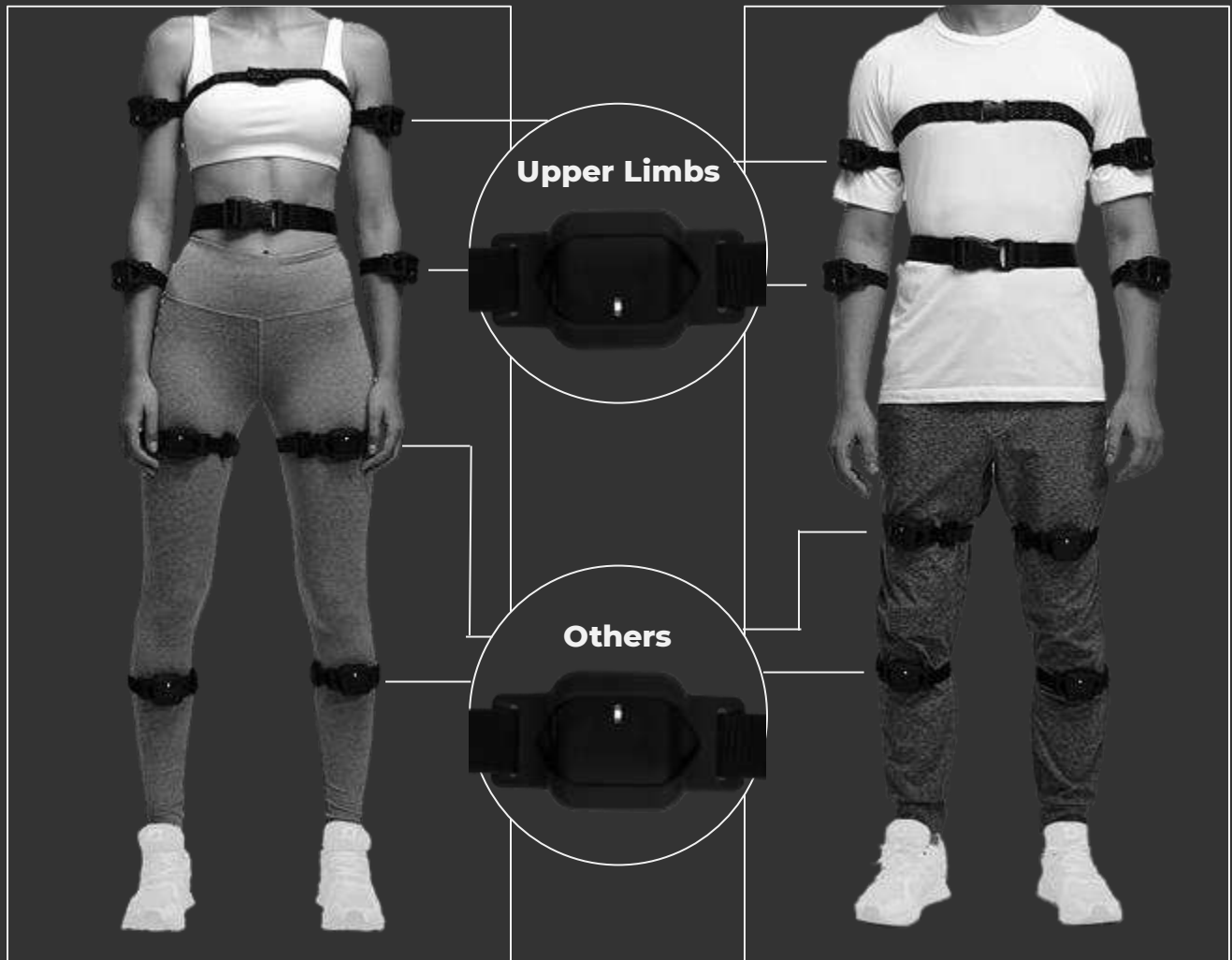
Download the AXIS Control Center Manual at <https://downloads.AXISxr.gg/> for more information on setting up of user profiles.

3.1 AXIS Configurations

Depending on your usage for AXIS, follow the guidelines below to suit up:

3.1.1 AXIS Standard

The AXIS Standard configuration consists of 9 nodes (located at the upper spine, upper arms, forearms, thighs, and calves) and 1 Android phone (AXIS Hub) at the waist.



Suggested strap positions:

- Short straps - forearms; calves.
- Medium straps - upper arms; thighs.
- Chest strap - across the chest with node placed on user's spine



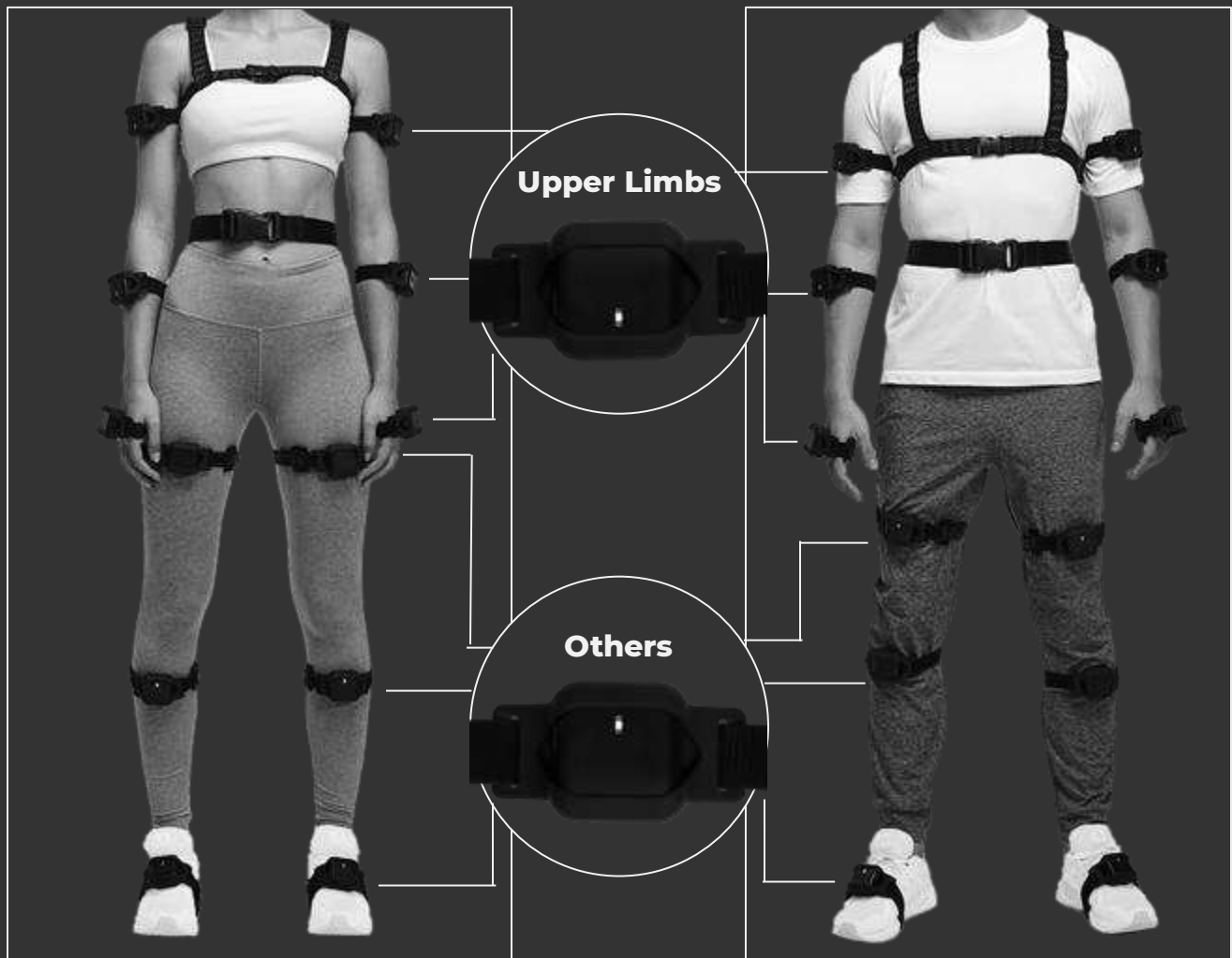
Ensure that the nodes on the forearms and upper arms are pointing downwards. All other nodes should point upwards.



Ensure that the main camera of the Android phone used as the AXIS Hub is not blocked by the phone holder.

3.1.2 AXIS Content Creator

The AXIS Content Creator configuration consists of 16 nodes (located at the upper spine, upper arms, forearms, thighs, calves, head, hands, shoulders, and feet) and 1 Android phone (AXIS Hub) at the waist.



Suggested strap positions:

- Short straps - hands; forearms; feet; calves.
- Medium straps - upper arms; thighs.
- Chest strap - across the chest with node placed on user's spine



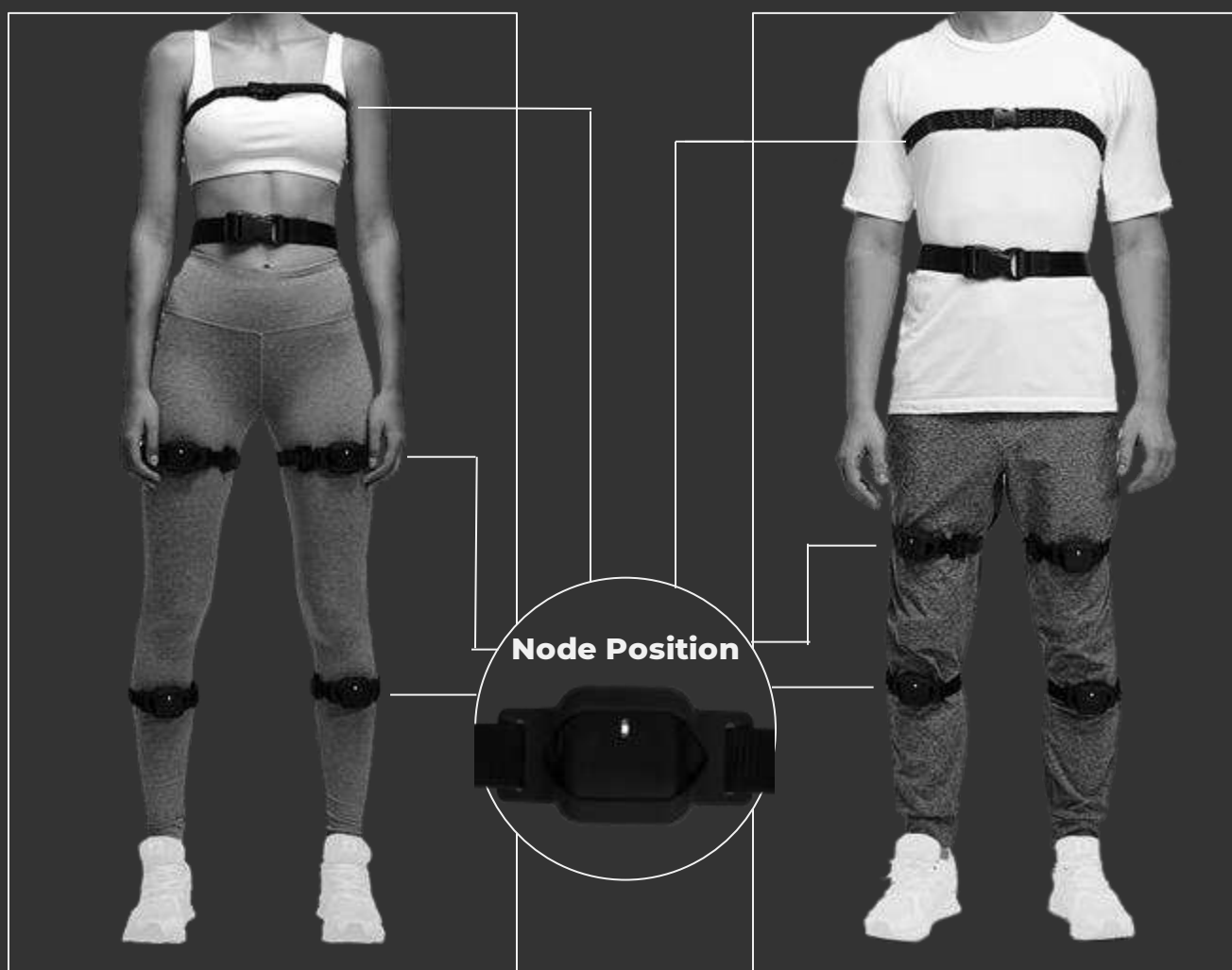
Ensure that the nodes on the hands, forearms and upper arms are pointing downwards. All other nodes should point upwards.



Ensure that the main camera of the android phone used as the AXIS Hub is not blocked by the phone holder.

3.1.3 AXIS x VR mode

The setup for AXIS VR mode configuration consists of 5 nodes (located at the spine, thighs, and calves) and 1 android phone (AXIS Hub) at the waist.



All nodes have to be worn pointing up.



Ensure that the main camera of the android phone used as the AXIS hub is not blocked by the phone holder.

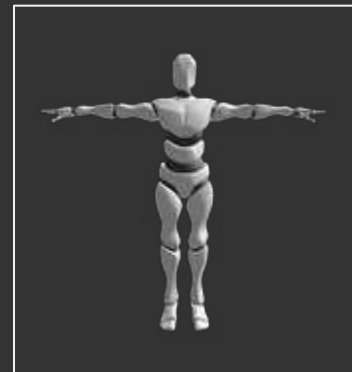
3.2 Calibrating AXIS

After pairing and suiting up of the AXIS nodes and hub:

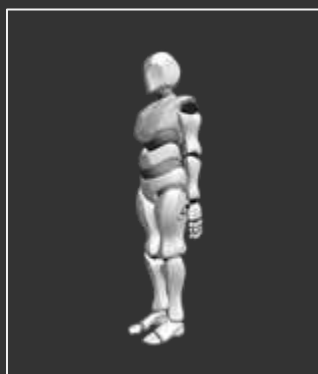
1. In **AXIS Control Center**, select 'My Devices' tab on the left.
2. Click on 'Calibration Manager' under 'Hub'.
3. On the top right of the 3D world, there will be 3 buttons to click for calibration:
 - a. Body Calibration (S-pose)



- a. Zero Calibration (T-pose)



- a. Reset Position (Stand upright, arms down by the side)



1. Prepare yourself for the various calibration poses.
2. Click on the button you are calibrating for and hold still in the pose whilst the timer counts down.
3. Once you finish all 3 calibrations, the avatar in the 3D world will reflect your movements



Download the AXIS Control Center Manual at <https://downloads.AXISxr.gg/> for more information on calibrating, troubleshooting and enhancing the experience of AXIS system.

Using AXIS

For gaming

AXIS works with your existing HMD (head-mounted display), and is compatible with any SteamVR/OpenVR games that support full body tracking. Simply launch the game and enjoy a new experience with AXIS!

For content creation

AXIS comes with an Unreal Engine SDK plugin and a sample scene that you can experiment with.

For motion capture

You can record a simple animation set within AXIS Control Center and export it for use in other applications. The feature can be found under Studio in AXIS Control Center.



Performing activities such as playing games or motion capture can involve rapid or vigorous motion. Make sure the nodes are secured properly in their holders and the straps are securely fastened to your body. This is to help prevent the node from slipping out and causing damage to the node and surrounding objects, or injury to other people.

Allow adequate room around you during gameplay. Make sure objects and other people are out of your range of movement to help prevent damage or injury.

AXIS Contact Information

Join our AXIS community on [Discord](#) to get to know other AXIS users, get help, or just hang out with us! You can also find us on [Facebook](#), [Twitter](#), [YouTube](#), and our website at <https://support.AXISxr.gg/>.

Service & Support

If you need help with AXIS, connect with us over on our [Discord](#) channel, or reach out to customer support through our website at <https://support.AXISxr.gg/>.