smart eye

Aurora

User Guide

Version 15.0

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Contents

1 Introduction

The Smart Eye Aurora is an eye tracker designed to deliver insights wherever you are. The small size of the Aurora makes it easy to switch between different displays and projects, without compromising on the performance. If your needs change in the future, the existing Aurora can be upgraded to deliver higher framerate.

This manual contains useful information about the Aurora eye tracker, ranging from safety and compliance to product care. It also contains information about the mounting procedure and software setup. If any questions or difficulties arises, do not hesitate to contact the support.

1.1 Intended use

The Aurora is primarily designed for fixation-based eye tracking on displays, such as laptops. The Aurora works well in all indoor illumination conditions, and offers precise and accurate tracking on displays up to 24”. In addition to eye tracking, the Aurora also delivers precise head tracking and eyelid tracking.

The Aurora is designed for collaboration, and can be integrated with other sensors and bio-measuring systems.

Smart Eye Aurora eye tracker

2 Software and System Requirements

2.1 System requirements

Operating System	Windows 10 Creators Update (version 1703) or higher
RAM	4 GB
CPU	Quad core 6th generation Intel Core or Intel Xeon processor or newer
Camera Interface	USB-C
Maximum Display Size	24” (16:9 aspect ratio)

2.2 Compatible software

iMotions	www.imotions.com
PST E-Prime 3.0	www.pstnet.com

3 Aurora Hardware

3.1 What's in the box

Aurora eye tracker
Two Chem Pad™ wipes for cleaning the mounting area
Two mounting brackets with tape
Safety and setup info note
Textile travel bag
USB-C cable, 2 m

3.2 Product care

The front glass of the eye tracker needs to be clean in order to ensure optimal tracking. If dirt or dust ends up on the front glass, the eye tracker has to be cleaned in a correct manner.
To clean the front glass use a dry microfiber cloth intended for cleaning cameras, camera lenses, or eyeglasses and carefully wipe the front glass. If unsupported cleaning methods are used the eye tracker might be damaged.

Warning! Do *not* use alcohol to clean the front glass, as it may damage the eye tracker!

4 Setup

This section describes the steps needed to setup your eye tracker. Install required software, mount the eye tracker and create a setup in the Smart Eye Setup tool.

4.1 Software installation

The software installation procedure differ slightly if the Aurora is used together with any of the compatible softwares (see 2.2) or together with the Smart Eye XO.

4.1.1 Installation for using compatible software

The software Smart Eye Tracker needs to be installed before using your eye tracker. Follow the installation steps below.

1. Launch the Smart Eye Tracker installer by double clicking it.
2. Click the *Install* button to start the installation.
3. A *User Account Control* window will be opened, click *Yes* to continue.
4. A *Windows Security* window will be opened, click *Install* to install eye tracker drivers. The installation may take a while.
5. Click the *Close* button when the installation has finished to exit the installer.

4.1.2 Installation of Smart Eye XO

The software Smart Eye XO needs to be installed before using your eye tracker. Follow the installation steps below.

1. Launch the Smart Eye XO installer by double clicking it.
2. Click the *Install* button to start the installation.
3. A *User Account Control* window will be opened, click *Yes* to continue.
4. A *Windows Security* window will be opened, click *Install* to install eye tracker drivers. The installation may take a while.
5. Click the *Close* button when the installation has finished to exit the installer.
6. Start Smart Eye XO.
7. When starting Smart Eye XO the first time, you will be prompted to provide a license file. If you need help, contact your sales representative.

4.2 Mounting the eye tracker on a display

The magnetic mounting bracket and Chem Pad™ wipe can be found in the box.
This document contains installation instructions for two mounts - the metallic bracket and the monitor mount. Please refer to the section corresponding to your mount.

4.3 Metallic Bracket Mount

The metallic bracket mount is designed to be attached to the center of the display frame, just under the display area. To make sure a suitable display is used with the bracket, please consider the following:

- The bracket does not fit on displays with a curved surface.
- The frame area on the display where the bracket is to be attached must be flat, not rounded.
- The frame area on the display should be at least 1.5 cm in height to make sure there is enough material to fasten the bracket.
- If possible, avoid displays with a label/text on the frame area where the bracket is to be attached.
- If the bracket is used on a laptop, it might be in the way of closing the lid.
- For laptop mounting, the distance from the lower middle of the image display to the top part of the keyboard frame needs to be at least 2 cm to allow for a bracket and eye tracker to fit.

4.3.1 Installation of the Metallic Bracket

To mount the eye tracker, follow the steps below:

1. Find the center of the lower display edge by marking manually or by using the center marker in the Smart Eye Setup Tool.

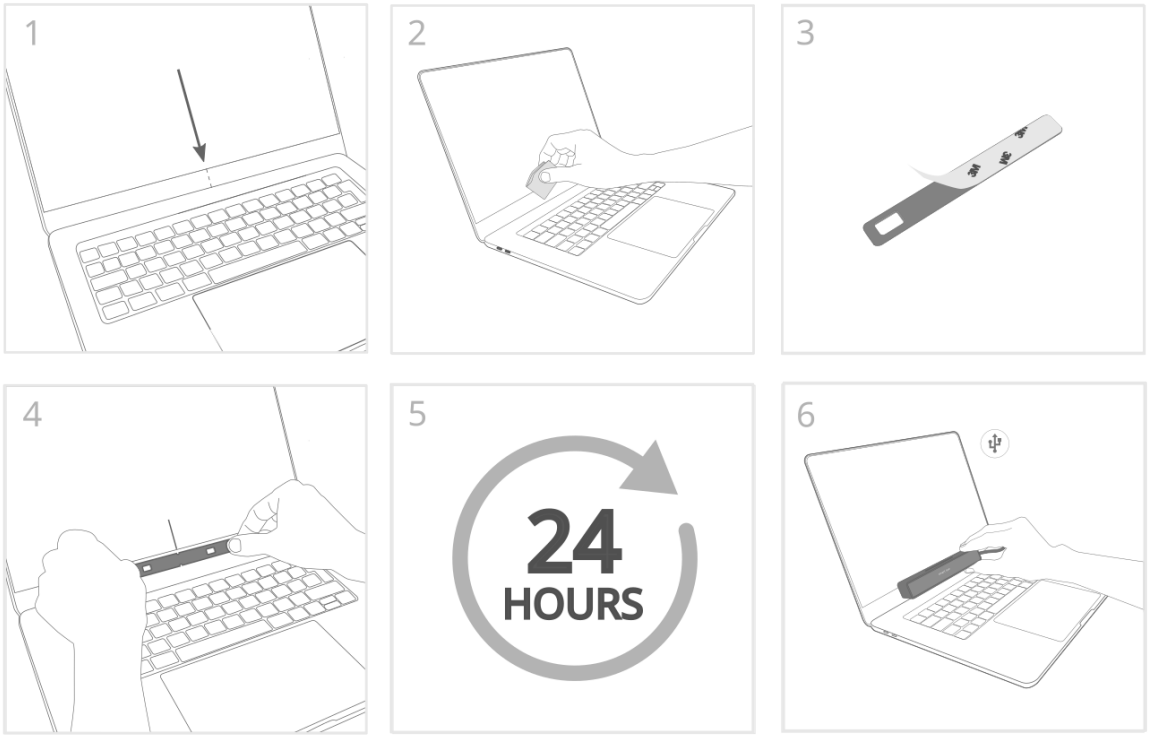
2. Clean the mounting area around the center thoroughly with the Chem Pad™ wipe.

3. Remove the adhesive tape cover from the bracket.

4. Align the center of the bracket with the center of the lower display edge. Make sure the bracket is straight. Press and hold for 30 seconds.

5. Wait for 24 hours to allow the tape to harden.

6. Attach the eye tracker to the bracket and connect the eye tracker to the computer using the supplied cable. If the cable is of type USB-A, make sure to connect it to a USB 3.0 port on the computer.



4.4 Monitor Mount

The monitor mount is designed to be attached to the sides of the display frame via the arms of the mount, while the attachment point for the eye tracker is located at the bottom center of the display frame. Please note that the mount does not fit on displays with a curved surface and that the sides of the display frame where the mount is to be attached must be flat, not rounded.

4.4.1 Installation of the Monitor Mount

To install the monitor mount, follow the steps below:

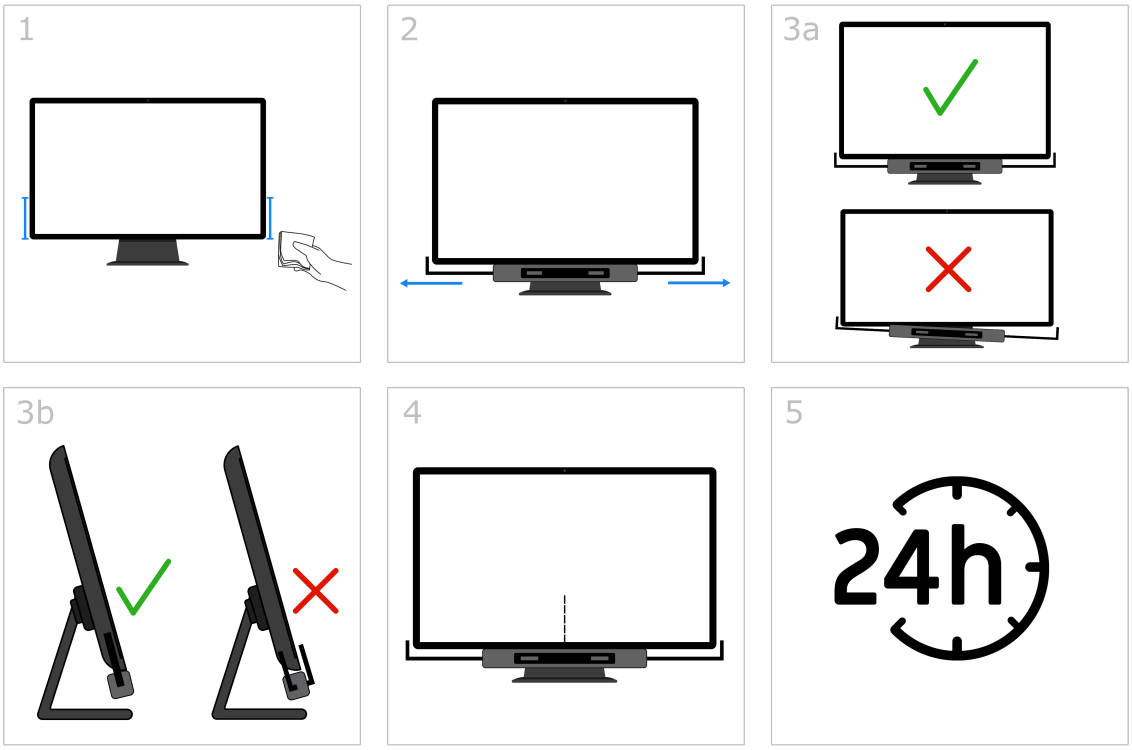
1. Clean the lower outer sides of the display thoroughly with the Chem Pad™ wipe.

2. Peel off the adhesive covers on the side arms and extend the side arms and position the base of the mount to the underside of the display and the arms along the display sides.

3. Ensure the mount is aligned with the display when viewed from both the front and the side.

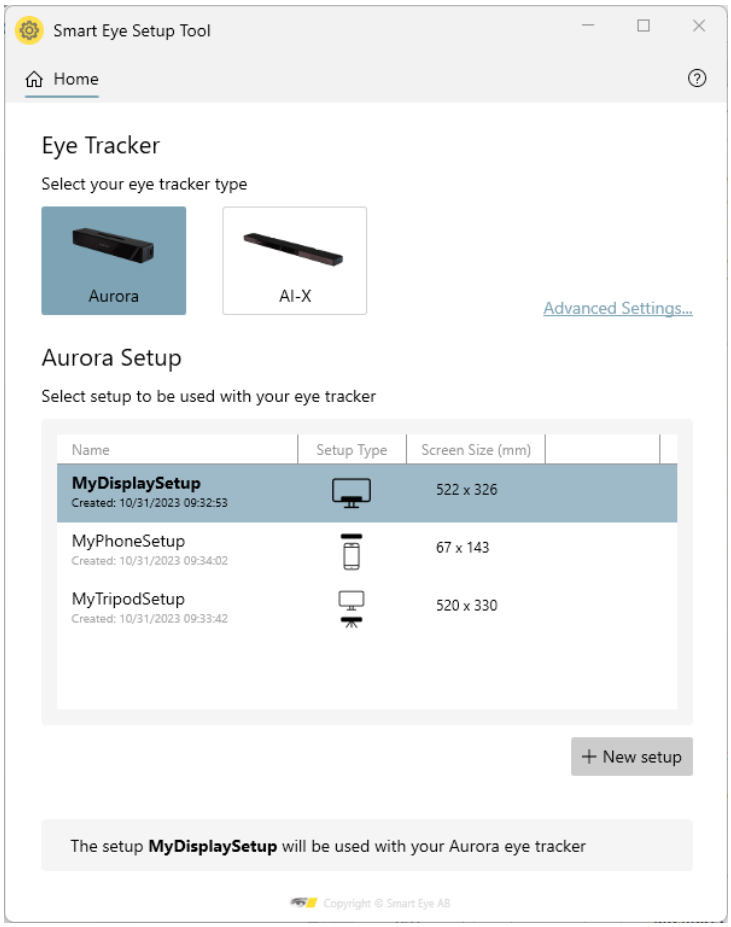
4. Center the mount below the display by measuring or by using the center marker in the Smart Eye Setup Tool.

5. Wait for 24 hours to allow the adhesive to cure.



4.5 Create an eye tracker setup

1. Run the Smart Eye Setup Tool. The Smart Eye Setup Tool is found in the Windows Start Menu.

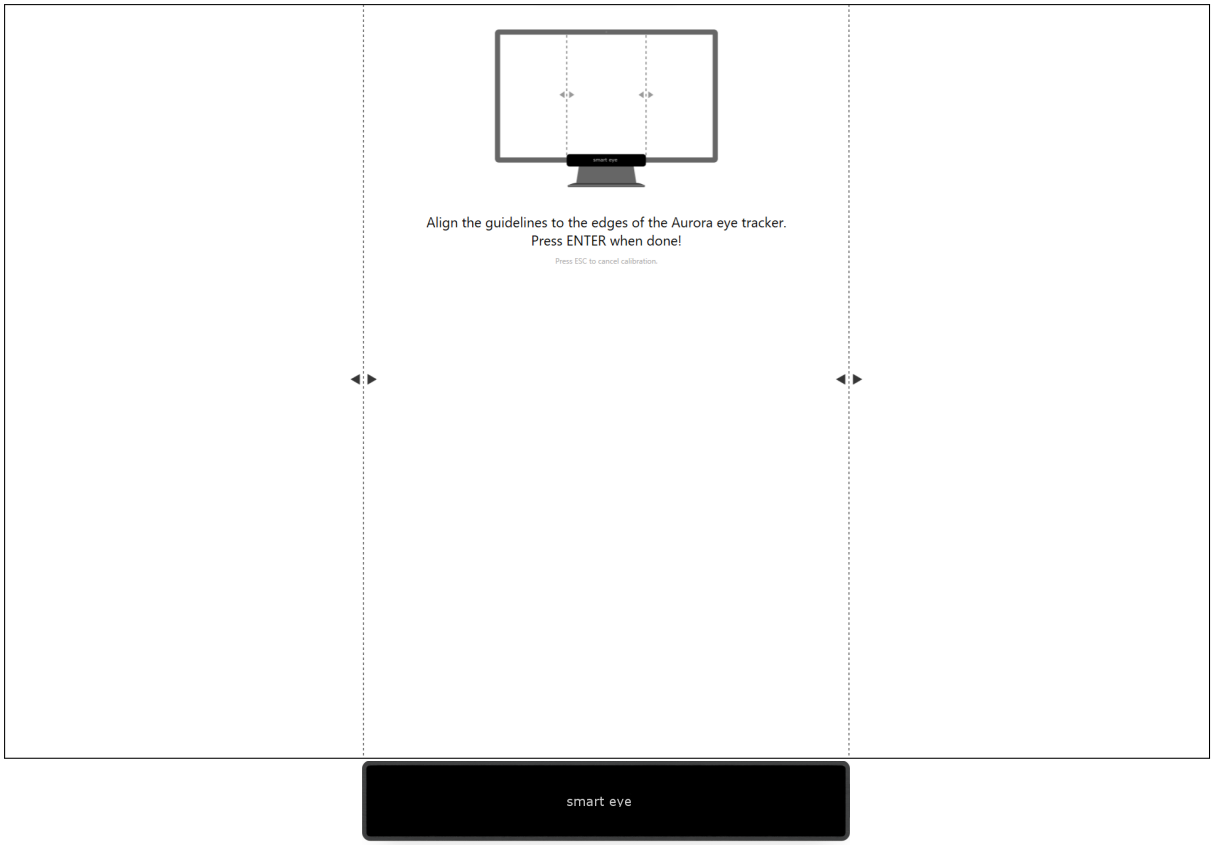


Smart Eye Setup Tool

2. Select your eye tracker.
3. Create a new setup by pressing the *New Setup* button.
4. Select your setup type and press *Next*. Follow the steps in the section of the chosen setup below.

4.5.1 Display setup

1. Specify on which display your eye tracker is mounted (if you have a single display setup, this step is not necessary). Click the *Identify* button if you are not sure which display your eye tracker is mounted to. To be able to identify your display a unique letter will be shown on each display connected to your computer.
2. Click the *Next* button. A full screen window will be opened on the display that your eye tracker is mounted to.



Setup window

3. Setup your eye tracker by aligning the dashed lines to the edges of the eye tracker. Confirm the setup by pressing *Enter*.

4. Check that the size in the setup summary matches the size of the selected display.

5. Enter a file name for your setup and press *Finish*. The setup has now been saved and the Smart Eye Setup Tool can be closed.

6. If you are using Smart Eye XO, set WCS to Aurora WCS in the Smart Eye XO software.

4.5.2 Phone setup

1. Select your phone orientation and press *Next*.

2. Mount the eye tracker on the mobile stand, press *Next* when done.

3. Mount the phone on the mobile stand according to instructions, press *Next* when done.

4. Enter measurements of your phone setup and press *Next*.

   Phone in Portrait Mode Note that the bezel size is the distance between the top of the phone and the top most edge of the screen (not including any indentations in which the front-facing camera is positioned).

Phone in Landscape Mode Note that the vertical offset is the distance between the top edge of the holder and the top most edge of the screen.

5. Check that the size in the setup summary matches the measurements of your phone setup.
6. Enter a file name for your setup and press *Finish*. The setup has now been saved and the Smart Eye Setup Tool can be closed.

4.5.3 Tripod setup

1. Mount the eye tracker on the tripod, press *Next* when done.
2. Follow the instructions for positioning the tripod correctly. Press *Next* when done.
3. Control the subject position in your eye tracking application by following the instructions. Press *Next* when done.
4. Check that the eye tracker and display are aligned according to instructions.
   Note that the tripod can not be moved after this step of the setup!
   Press *Next* when done.
5. Enter the measurements of the display.
   If you are using Smart Eye XO and tracking is done on the same display as Smart Eye XO runs on, enter the display resolution. Press *Next* when done.
6. Enter the tilt angle measurements of the eye tracker and display. Press *Next* when done.
7. Enter the measurements of height and length difference between the eye tracker front and the lower front of the display area. Press *Next* when done.
8. Check that the measurements in the setup summary matches your setup.
9. Enter a file name for your setup and press *Finish*. The setup has now been saved and the Smart Eye Setup Tool can be closed.

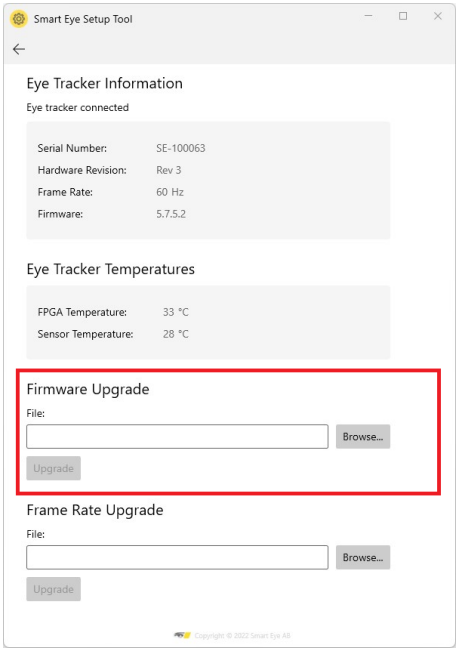
> **Note:** Please note that if the tripod is moved after the setup has been saved a new tripod setup needs to be done in the Smart Eye Setup Tool!

5 Maintenance

5.1 Upgrade firmware

The firmware of the Aurora eye tracker may at times require upgrading to improve performance and stability of the Aurora eye tracker. Aurora firmware images are provided as *.auimg* files, and are written to the eye tracker using the Smart Eye Setup Tool. To perform a firmware upgrade, follow the steps below.

1. Open the Smart Eye Setup Tool (found in the Windows start menu).
2. Select Aurora as eye tracker and open the *Advanced Settings...*
3. Connect the Aurora eye tracker to a USB-C port on the computer (if not already done so). Verify that eye tracker information is updated with values from the eye tracker.



Advanced Settings: Firmware Upgrade

4. Select the firmware file (*.auimg*) containing the new firmware and press the Upgrade button.
5. Wait for the firmware upgrade to complete. Note that this may take several minutes.

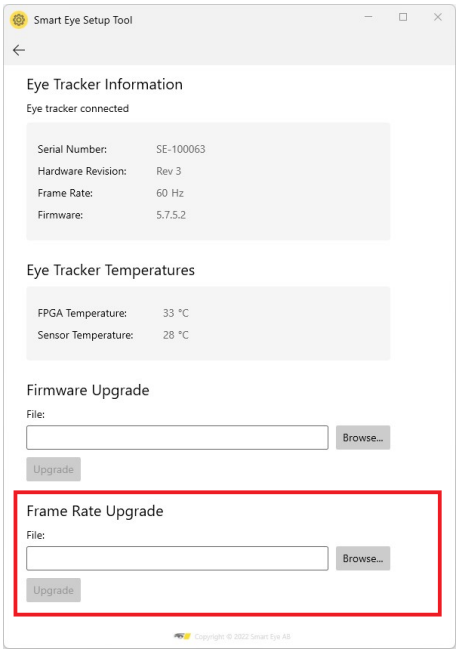
> **Warning! DO NOT** unplug the Aurora eye tracker during the firmware upgrade! Doing so may render the eye tracker unusable.

5.2 Upgrade frame rate

The Aurora eye tracker can be upgraded to deliver a higher frame rate. If you are interested in upgrading your Aurora to a higher frame rate, please contact your sales representative. To

perform a frame rate upgrade, follow the steps below.

1. Open the Smart Eye Setup Tool (found in the Windows start menu).
2. Select Aurora as eye tracker and open the *Advanced Settings...*
3. Connect the Aurora eye tracker to a USB-C port on the computer (if not already done so). Verify that eye tracker information is updated with values from the eye tracker.



Advanced Settings: Frame Rate Upgrade

4. Select the frame rate upgrade file (*.aulock*) and press the Upgrade button.
5. Wait for the frame rate upgrade to complete.

Warning! DO NOT unplug the Aurora eye tracker during the frame rate upgrade! Doing so may render the eye tracker unusable.

6 Support

In this section you will find information about troubleshooting and support.

6.1 Troubleshooting

This section presents solutions to problems that you may encounter when using the eye tracker. If your problems persist or if you don't find any solution here, please contact support.

I can't install Smart Eye Tracker or Smart Eye XO software.

Make sure you have admin rights on the computer where you attempt to install the software.

The laptop goes to sleep when I connect the eye tracker to the bracket.

The eye tracker contains a magnet to make sure it attaches to the magnetic holder. Some laptop models also have a magnet in the lid to make sure the computer sleeps when the lid is closed. Change the setting so the computer stays awake even when lid is closed. This setting is found in the *Hardware and Sound* $\rightarrow$ *Power Options* menu in the *Control Panel*.

There seems to be problem with the connection to the eye tracker.

Try unplugging the eye tracker and plugging it in again. Other programs might interfere with the eye tracker connection. Make sure Microsoft Teams and similar programs are not running.

The framerate is low or fluctuates.

Make sure that the computer is connected to a power source and that a high performance Windows power plan is used. The power plan can be set in the *Power Options* menu in the *Control Panel*. Create a new power plan and make sure the high performance option is chosen.

6.2 IR light interfering with other systems

The infrared illumination emitted from the IR-flashes of your eye tracker may interfere with other systems that contains infrared sensors such as video cameras, motion capture systems, fNIRS equipment and others. There are measures that can be taken to eliminate or reduce the interference. Please consult Smart Eye support if you are experiencing this issue.

6.3 Customer support

If you need any help or support with your eye tracker, please contact your sales representative or retailer.

Appendix A Safety and Compliance

A.1 Compliance

The statements in this section apply to the Aurora eye tracking device.

Safety standards:	IEC 62368 IEC 62471
Declaration of conformity:	EU Directive 2014/30/EU (EMC) EU Directive 2011/65/EU (RoHS)

A.2 Operating Temperature

The Aurora eye tracker has been tested at normal operating conditions during a 24 hours period with an ambient temperature of 25 degrees. After approximately one hour of use the device reaches a stable temperature which is maintained until the tracker is turned off. The maximum temperature on the outside of the device was T degrees during the test. The Aurora eye tracker is designed with a good margin to operate at a temperature of T degrees and neither the function nor the lifespan of the product is adversely affected. The temperature T degrees is not harmful to the user, although the device may be experienced as unexpectedly warm to the touch.

Eye tracker sampling rate	**T** *(maximum temperature)*
60 Hz	40 degrees
120 Hz	43 degrees
250 Hz	54 degrees

Appendix B Technical Specifications

Sampling Rate	60, 120 and 250 Hz
Headbox (Freedom of head movement)	50 x 40 cm at 65 cm distance
Operating Distance	50 - 80 cm
Accuracy	0.3 degrees (typ.)
Precision	0.1 degrees (typ.)
Output Data	Gaze origin, gaze point, pupil diameter, eyelid opening, head position and rotation, camera-time and real-time time stamp All outputs as binocular data with associated quality index
Time Stamp Precision	1 µs
Gaze calibration	Both eyes or single eye
Synchronization	8-bit markers*
Head Pose Recovery Time	1 frame (immediate)
Blink Recovery Time	1 frame (immediate)
Gaze Recovery Time	1 frame (immediate)
Latency	25 ms (60 Hz), 17 ms (120 Hz), 12 ms (250 Hz)
Eye Tracking Principle	Dark pupil and corneal reflection
Maximum Display Size	24” (16:9 aspect ratio)
Operating Environment	Indoor (all illumination conditions)
Size	146 x 24 x 27 mm (width x height x depth)
Weight	162 g
Cable Length	2 m (up to 8 m with additional hardware**)
Camera Interface	USB-C
Mount Type	On display (with mounting plate)
Operating System	Windows 10 and 11
Processor Architecture	x64
Accessories	External Processing Unit, Aurora Expansion Box

* Requires Aurora Expansion Box Accessory
** Cable length limited to 2 m for Aurora 250 Hz connected to Expansion Box