OXTS

WayFinder Hub

USER MANUAL

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WayFinder Hub

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

LM808 USB Wi-Fi module

FCC RF Exposure Information and Statement

This device meets the government's requirements for exposure to radio waves.

The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health. The SAR limit of USA (FCC) is 1.6 W/kg averaged.

Device types: LM808 WiFi USB Adapter 433Mbps (FCC ID: VVX808-04XX) has also been tested against this SAR limit. SAR information on this and other pad can be viewed online at http://www.fcc.gov/oet/ea/fccid/. Please use the device FCC ID number for search. This device was tested simulation typical 5 mm to body.

FCC Warning

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
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE 1: 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.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC RF Exposure Information and Statement

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health. The SAR limit of IC is 1.6 W/kg averaged. Device types: LM808 WiFi USB Adapter 433Mbps (IC: 10531A-80804XX) has also been tested against this SAR limit. This device was tested simulation typical 5 mm to body. The highest reported SAR value for body condition is 0.262W/kg respectively.

Ce matériel est conforme aux limites de dose d'exposition aux rayonnements ic rss-102 énoncées pour un autre environnement. Les lignes directrices sont fondées sur des normes qui ont été élaborées par des organisations scientifiques indépendantes périodiques et évaluation approfondie des études scientifiques. Les normes prévoient une marge de sécurité importante visant à garantir la sécurité de toutes les personnes indépendamment de leur âge ou à la santé. La limite de das d'ic est de 1,6 W/kg en moyenne. Les types d'appareil: LM808 adaptateur WiFi USB 433Mbps (ic: 10531a-80804xx) a également été testé contre cette limite de das. Ce dispositif a été testé typique de 5 mm de simulation. La valeur de r-s pour la condition corporelle plus élevée rapportée est 0.262 W/kg respectivement.

IC Warning

This device complies with Industry Canada’s licence-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie 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'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC 5G Statement

LE-LAN devices are restricted to indoor operation only in the band 5150-5250 MHz.

Soracom Onyx LTE USB modem

FCC Statement

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
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE 1: Class B Digital Device Compliance

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.

NOTE 2: Modifications Warning

Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Specific Absorption Rate (SAR) Information

The exposure standard for wireless transmitter employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg. The highest SAR value for the EUT as reported to the FCC when used next to body, as described in this user guide, is 1.17 W/kg.

Introduction

The WayFinder Hub (WF Hub) is a powerful edge computing and connectivity system to link and sync your INS and external sensors. Pre-installed with the OXTS WayFinder OS, take advantage of LiDAR Boost in real-time to augment and enhance localisation in GNSS-denied environments with state-of-the-art sensor fusion algorithms.

This document covers the technical information, hardware set up and configuration steps to enable you to successfully integrate and operate the device.

Important information is highlighted throughout this manual in these boxes.

Intended use

The WF Hub is designed to be used with OXTS inertial navigation systems to process LiDAR data in real-time and generate aiding data for use alongside the GNSS and IMU measurements in the INS sensor fusion engine.

Safety Notices

- Read these instructions carefully before you install, operate, or transport the system.
- Install the system at a sturdy location free from dust and moisture.

- Install the power socket outlet near the system where it is easily accessible.
- Secure each system module(s) using its retaining screws.
- Place power cords and other connection cables away from foot traffic. Do not place items over power cords and make sure they do not rest against data cables.
- Shutdown, disconnect all cables from the system and ground yourself before touching internal modules.
- Ensure that the correct power range is being used before powering the device.
- Should a module fail, arrange for a replacement as soon as possible to minimize down-time.
- If the system is not going to be used for a long time, disconnect it from mains (power socket) to avoid transient over-voltage.

Scope of delivery

Standard kit

Each WF Hub is supplied as a standard kit that includes the device itself as well as cables and external USB dongles for wireless connectivity.

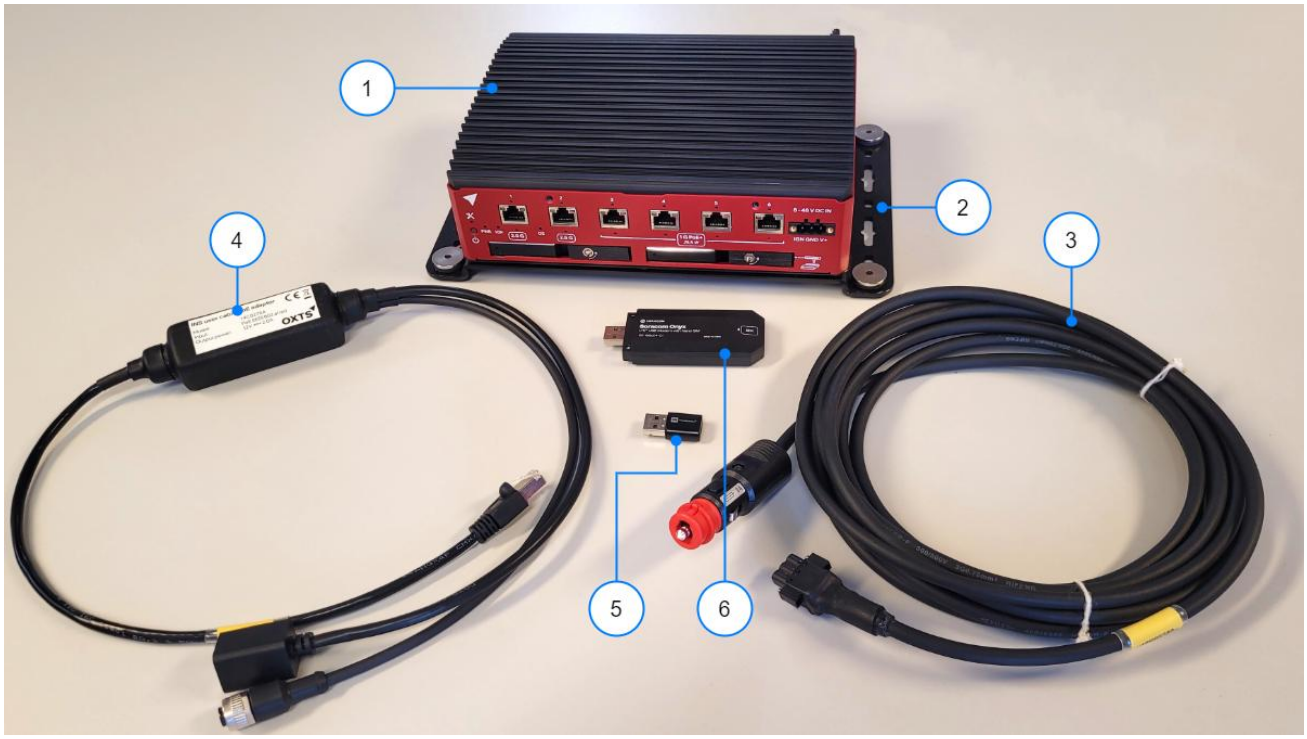


Figure 1: WayFinder Hub standard kit items

Label	Item	Description	Qty
1	WayFinder Hub device	Edge computing and connectivity system.	1
2	Mounting plate	Anti-vibration mounting plate. Comes pre-fitted to the Hub.	1
3	WF Hub cigarette power cable (5 m) - 14C0274	Car cigarette lighter plug to 3-pin terminal block for powering the WF Hub device.	1
4	INS PoE cable (1 m) - 14C0275	RJ45 to M12 + RJ45 socket for power and data between WF Hub and OXTS INS devices.	1
5	Wi-Fi module	Wi-Fi USB module for remote access to WayFinder web interface.	1
6	4G module	4G USB module for providing internet connection to a connected INS to receive NTRIP corrections.	1
	Quick Start Guide		1
	Transit case		1

Table 1: WayFinder Hub standard kit scope of delivery

LiDAR kit add-on

An optional LiDAR kit add-on is available that includes a Hesai XT32 LiDAR and mount for use with LiDAR Boost.

Item	Description	Qty
Hesai XT32M1X	High precision 360-degree LiDAR.	1
Hesai PoE cable (5 m) - 14C0277	RJ45 to Lemo connector for power and comms between WF Hub and Hesai XT32 LiDAR.	1
LiDAR suction cup roof mount	Suction roof mount, adaptor plate, and safety strap for quick LiDAR installation. Compatible with Hesai XT32M1X and Ouster OS1.	1
Transit case		1

Table 2: LiDAR kit add-on scope of delivery

You may need

In addition to the items included in the standard kit, for full operation you may also require the following items:

- PC/tablet with internet browser.
- Windows PC with NAVsuite 3.15 or later.
- FTP application such as FileZilla.
- Power supply capable of 8-48V DC.
- Ethernet cable (Cat 5e or above recommended).
- (Optional) nano-SIM card for 4G USB module.
- OXTS RT3000 v4, RT3000 v3, or RT1003 v2 and associated cables.
- 360° LiDAR scanner, e.g. Hesai XT32M1X, Ouster OS1-128.

- LiDAR power and Ethernet cables. For Hesai XT32 and Ouster OS-1, LiDAR PoE cables are available (sold separately). For other LiDAR models user must provide their own cables.

Ordering information

In addition to the WayFinder Hub Standard kit, there are a number of optional add-on accessories available:

Product grouping	Name	SKU	Product description
Accessories - LIDARs	Hesai XT32M1X LiDAR Kit	109-01314	Includes Hesai XT32M1X, Hesai PoE cable, LiDAR suction cup roof mount, connection box, mains power cable, and transit case.
Accessories - Struts	RT-Strut Clamp Pair WF Hub	109-01313	Used to mount a WayFinder Hub to the RT-Strut. Includes 2x clamp brackets. Attaches to WF Hub mounting plate.
User Cables	WF Hub bare power cable (5 m) - 14C0279	109-01318	3-pin terminal block to bare +ve/-ve wires to power WF Hub. Appropriate fuse should be added. Made with multiple conductors per power line for higher power requirements.
User Cables	Hesai PoE cable (5 m) - 14C0277	109-01315	RJ45 to Lemo connector for power and comms between WF Hub and Hesai XT32 LiDAR.
User Cables	Ouster PoE cable (5 m) - 14C0278	109-01316	RJ45 to Ouster connector for power and comms between WF Hub and Ouster OS1 LiDAR.

Table 3: Optional accessories

Extras and spares of items included in the WF Hub Standard kit and LiDAR kit are also available:

Product grouping	Name	SKU	Product description
User Cables	WF Hub cigarette power cable (5 m) - 14C0274	109-01308	Car cigarette lighter plug to 3-pin terminal block to power WF Hub.
User Cables	INS PoE cable (1 m) - 14C0275	109-01309	RJ45 to M12 + RJ45 socket for power and comms between WF Hub and OXTS INS devices.
Accessories	LiDAR suction cup roof mount	109-01317	Suction roof mount, adaptor plate, and safety strap for quick LiDAR installation. Compatible with Hesai XT32M1X and Ouster OS1.
Feature code bundle	LiDAR Boost bundle	108-01464	Includes LiDAR Boost Odometry, LiDAR Boost Map Matching, PTP, gPTP, gx/ix RTK and Hot-start initialisation feature codes

Table 4: Extras and replacement items

The WF Hub Standard kit includes a feature code bundle that is applied to a corresponding INS to unlock the required features for utilising LiDAR Boost functionality so it can be used with the

WF Hub. Additional feature code bundles can be purchased to unlock compatibility with additional INS devices.

Specifications

System core	
Processor	NVIDIA Jetson AGX Orin
Memory	32GB LPDDR5 @ 3200 MHz
OS	NVIDIA JetPack Linux base with OXTS WayFinder OS
eMMC	64GB eMMC 5.1
Storage	1 TB M.2 NVMe PCIe Gen4 SSD

Table 5: System core specifications

Physical	
Dimensions	230 x 173 x 66 mm
Mass	2.6kg (excluding mounting bracket)
Input voltage	8 - 48 Vdc
Total output	160 W max. (including 100 W PoE)

Table 6: Physical specifications

Interfaces	
Ethernet	2x 2.5 Gigabit 4x Gigabit
PoE	4x IEEE 802.3at PoE+ (100 W total power budget)
USB	1x USB 3.2 Gen2 2x USB 2.0 1x USB Type-C (Debug only, not user accessible)
CAN	2x CAN 2.0 (support coming in future update)
Serial	2x RS232, 1x isolated RS485 (support coming in future update)

Table 7: Interface specifications

Environmental	
Operating temperature	-25° - 70°C (30 W TDP mode)
Storage temperature	-40° - 85°C
Humidity	10% - 90%, non-condensing
Vibration	Operating, MIL-STD-810H, Method 514.8, Category 4
Shock	Operating, MIL-STD-810H, Method 516.8, Procedure I

Table 8: Interface specifications

LiDAR Boost performance[1]					
GNSS outage duration	60 s		600 s		3600 s
LiDAR Boost aiding	Odometry Real-time[2]	Odometry Post-process[2]	Odometry Real-time[2]	Odometry Post-process[2]	Map matching[3]
Position 3D	0.30 m	0.18 m	2.04 m	0.89 m	0.07 m
Position 2D (horizontal)	0.25 m	0.12 m	2.01 m	0.87 m	0.05 m
Heading	0.07°	0.04°	0.57°	0.43°	0.03°
Roll/pitch	0.013°	0.008°	0.036°	0.024°	0.004°
Speed	0.015 m/s	0.010 m/s	0.022 m/s	0.018 m/s	0.004 m/s
Altitude	0.19 m	0.15 m	0.50 m	0.34 m	0.06 m
3D distance travelled	318.3 m	318.3 m	3116.1 m	3116.1 m	18,882.9 m
Error over distance travelled	0.10%	0.06%	0.06%	0.03%	-

Table 9: LiDAR Boost performance specifications

[1] Representative data based on RT3000 v4 and Hesai XT32 with typical land vehicle dynamics
[2] RMS values of peak incremental error vs GNSS-aided reference during outage window samples
[3] RMS values of difference between GNSS-aided reference and LMM through entire outage window

Hardware description

Overview

The WayFinder Hub is an industrial edge-computing system powered by an NVIDIA Jetson AGX Orin, providing real-time processing capabilities and data logging. It offers four 802.3at PoE+ ports sharing 1 Gigabit bandwidth, with each port capable of supplying up to 25.5 W of power for your INS, LiDAR, and other sensors. Two additional 2.5 Gigabit ports are available for high-speed data transfer.

In addition to the 64GB eMMC on the Orin module, the WF Hub comes pre-installed with a 1TB M.2 NVMe SSD for user data logging and storage. It is also equipped with two front-accessible 2.5" SSD trays for removable storage expansion.

NOTE: additional storage using the front expansion bays is not currently supported. Software support for this functionality will come in a future update.

The WF Hub features a fanless design and wide temperature operation capability, making it ideal for industrial applications. With the included damping bracket design, ignition power control, and 8-48 V wide-range DC power input, it is also ideal for in-vehicle deployment.

Included with the WF Hub is a connectivity kit providing additional wireless connectivity with USB modules for WiFi and 4G LTE communications.

Front panel layout

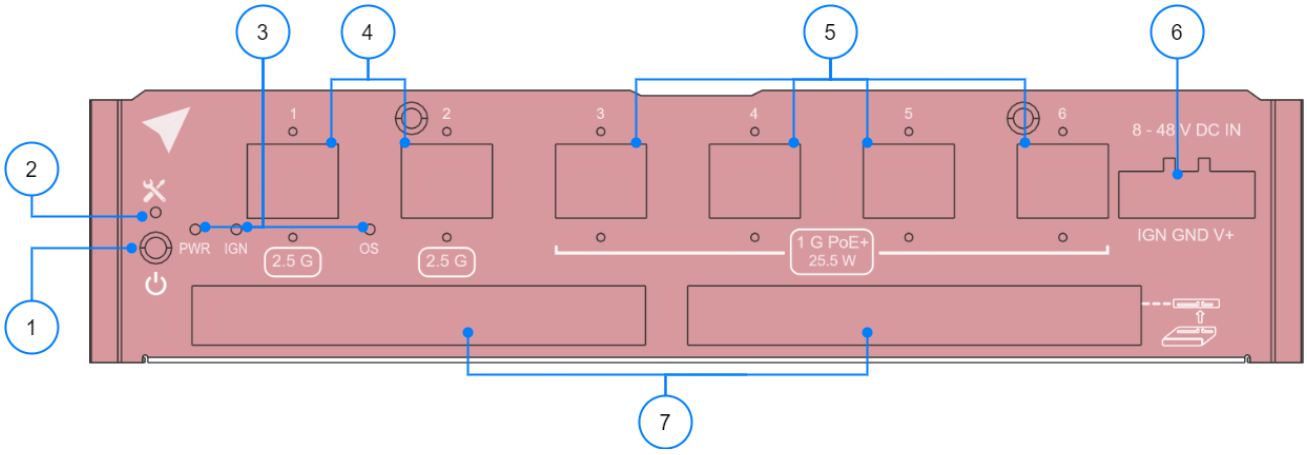


Figure 2: Front panel labels

Label number	Name
1	Power button
2	Recovery button
3	System status LEDs
4	2.5Gb Ethernet ports
5	1Gb Ethernet ports with Power over Ethernet (PoE+)
6	3-pin terminal block power input
7	Storage drive expansion bays

Table 10: Front panel descriptions

Power button

The power button is a non-latched switch for ATX mode on/off operation. Depending on the mode setting of the ignition power control rotary switch, the system may power on automatically without needing to press the power button. To turn off, a shutdown command can be issued in the OS. In case of system halts, you can press and hold the power button for 5 seconds to force-shutdown the system. Please note that there is a 5 seconds interval between two on/off operations (i.e. once turning off the system, you will need to wait for 5 seconds to initiate another power-on operation).

Recovery button

Reserved for engineering, system recovery, or reflash purposes. Should not be used without OXTS guidance.

System status LEDs

The three LED indicators on the front panel provide some basic information on the operation status of the system.

LED	Colour	Description
PWR	Green	Power indicator, lit when the processor is powered on.
IGN	Yellow	Ignition power control, lit when IGN signal is applied.
OS	Red	Operating system indicator, lit when system is powered on and booted. Flashes while OS update in progress.

Table 11: System status LEDs

2.5 G Ethernet ports

Ethernet ports 1 and 2, labelled as 2.5 G, offer 2.5 Gigabit Ethernet transfer with panel screw-lock fix holes for a firm and secure connection. Each port has two LEDs to indicate the status and speed of Ethernet traffic.

LED colour	Status	Description
Orange	Off	Ethernet port is disconnected
	On	Ethernet port is connected and no data transmission
	Flashing	Ethernet port is connected and data is transmitting/receiving

Table 12: Active/link LED (left)

LED colour	Status	Description
Green or Orange	Off	10/ 100 Mbps
	Green	1000 Mbps
	Orange	2500 Mbps

Table 13: Speed LED (right)

1 G PoE+ Ethernet ports

Ethernet ports 3-6 share a total of 1Gbps bandwidth with panel screw-lock fix holes for a firm and secure connection. The four ports each provide Power over Ethernet (PoE) to supply electrical power and data on a standard CAT-5/CAT-6 Ethernet cable. The ports are compliant with IEEE 802.3at (PoE+), with each port capable of delivering up to 25.5 W to a connected device. The system has a 100 W total power output budget.

The PoE ports can automatically detect and determine if the connected device requires power or not, so are compatible with standard Ethernet devices too without risk of electrical damage. Each port has two LEDs to indicate the status and speed of Ethernet traffic.

LED colour	Status	Description
Orange	Off	Ethernet port is disconnected
	On	Ethernet port is connected and no data transmission
	Flashing	Ethernet port is connected and data is transmitting/receiving

Table 14: Active/link LED (left)

LED colour	Status	Description
Orange	Off	10/ 100 Mbps
	Orange	1000 Mbps

Table 15: Speed LED (right)

3-pin terminal block power input

The system allows an 8 to 48 V DC power input via a 3-pin pluggable terminal block. In addition to DC power, this terminal block also accepts ignition signal input (IGN).

WARNING: Ensure to check the voltage of DC power is correct before connecting it to the system. Supplying a voltage over 48V will damage the system.

2.5" storage drive expansion bays

There are two front-accessible 2.5" HDD/SSD trays for additional easy-access data storage. The bays are secured by a lock. These bays are not currently supported in the software. Support will be added in a future update.

NOTE: When installing, the SSD/ HDD is to be inserted with the label facing downwards. Each tray supports up to 7.5mm HDD/ SSD.

Rear panel layout

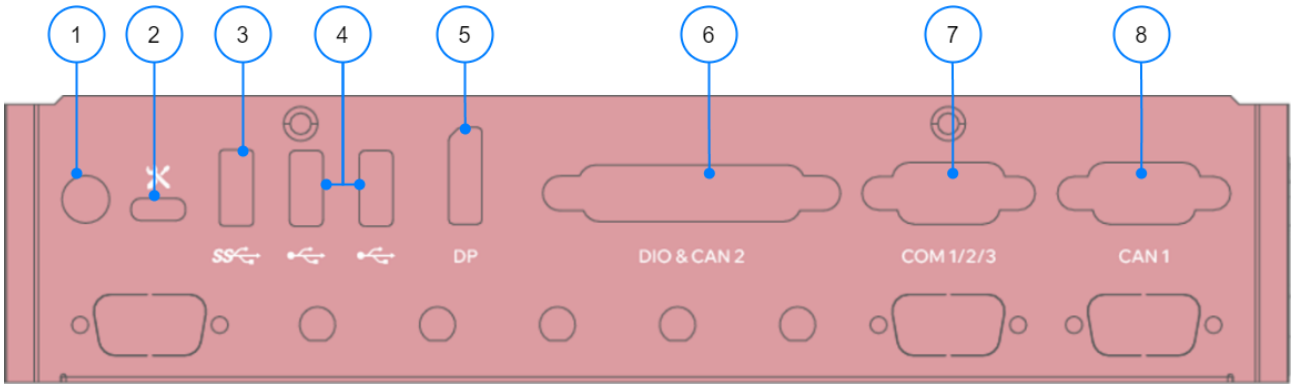


Figure 3: Rear panel labels

Label number	Name
1	Rotary ignition switch
2	USB Type-C debug port. Reserved for debugging purposes.
3	USB3.2 Gen2 port
4	USB2.0 port
5	DisplayPort
6	Digital I/O and CAN bus (2) port
7	COM 1/2/3 port
8	CAN bus (1) port

Table 16: Rear panel descriptions

Rotary ignition switch

The rotary switch is used to configure the operation mode. By default, the system will be set to Mode 0 which is the ATX mode, requiring the power button to be pressed to turn on the system. There are 16 operation modes (0-15) available with different power-on/power-off delay configurations. See section "Powering on using ignition power control" for more details.

USB3.2 Gen2 port

The USB3.2 port offers up to 10 Gbps bandwidth for data transfer. It is backwards compatible with USB2.0, USB1.1, and USB1.0 devices. The WiFi or 4G LTE USB modules supplied may be used in this port. It can also be used for software updates via USB storage device.

USB2.0 ports

The USB2.0 ports offers up to 480 Mbps of bandwidth for data transfer, and are backward compatible with USB 1.1 and USB 1.0 devices. The WiFi or 4G LTE USB modules supplied may be used in these ports. They can also be used for software updates via USB storage device.

DisplayPort

The system has a DisplayPort (DP) output which is a digital display interface that mainly connect video source and carry audio to a display device. Currently there is no functionality in the WF Hub that makes use of the DisplayPort as the system runs a headless OS and interaction with the system is performed through the web applications (see section "Accessing the WayFinder interface" for more details).

Digital I/O and CAN bus (2)

This port is not currently supported in the software. Support will be added in a future update.

COM 1/2/3

This port is not currently supported in the software. Support will be added in a future update.

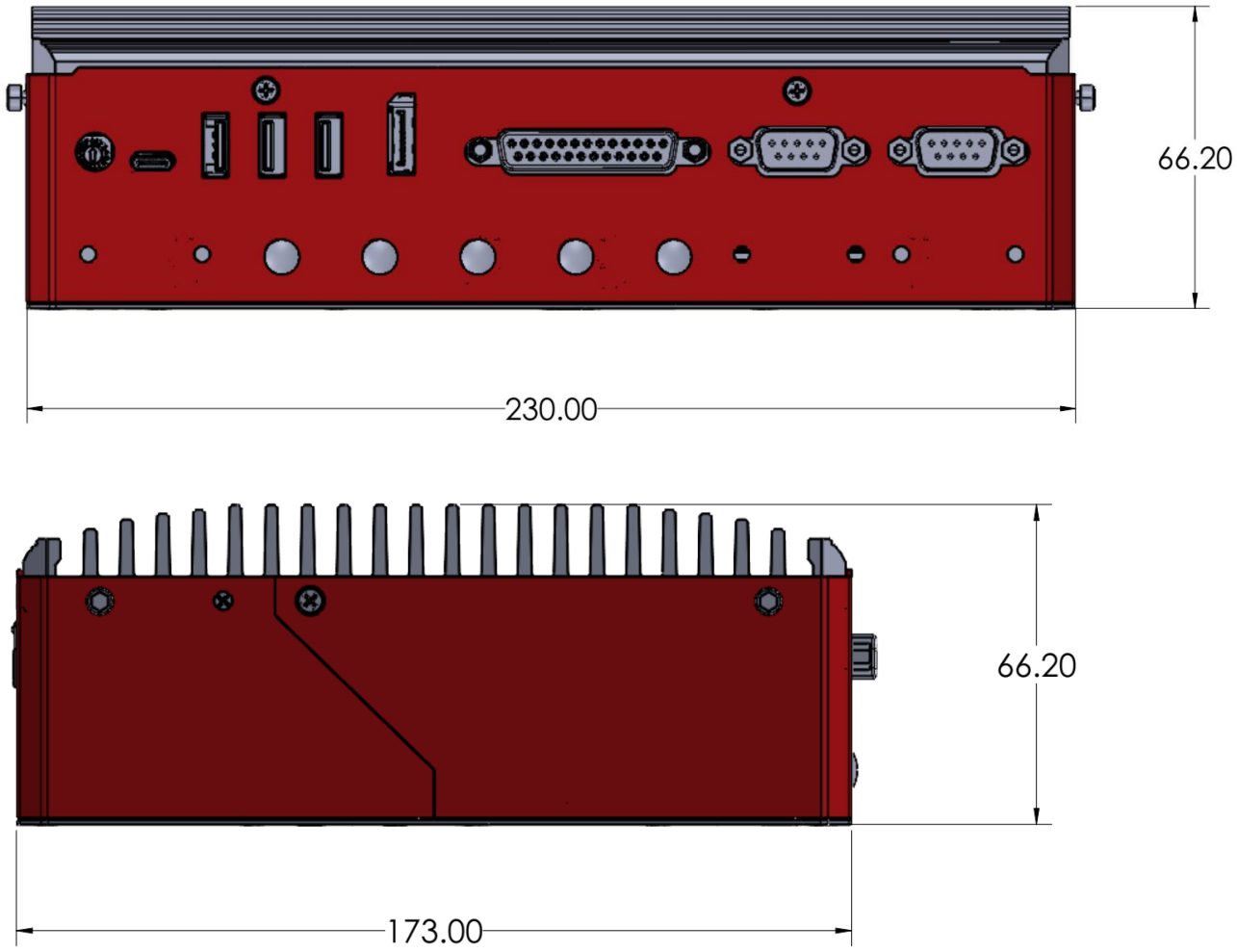
CAN bus (1)

This port is not currently supported in the software. Support will be added in a future update.

Dimensions

WayFinder Hub

Figure 4 shows the outer dimensions of the WF Hub. The measurements are given in mm.



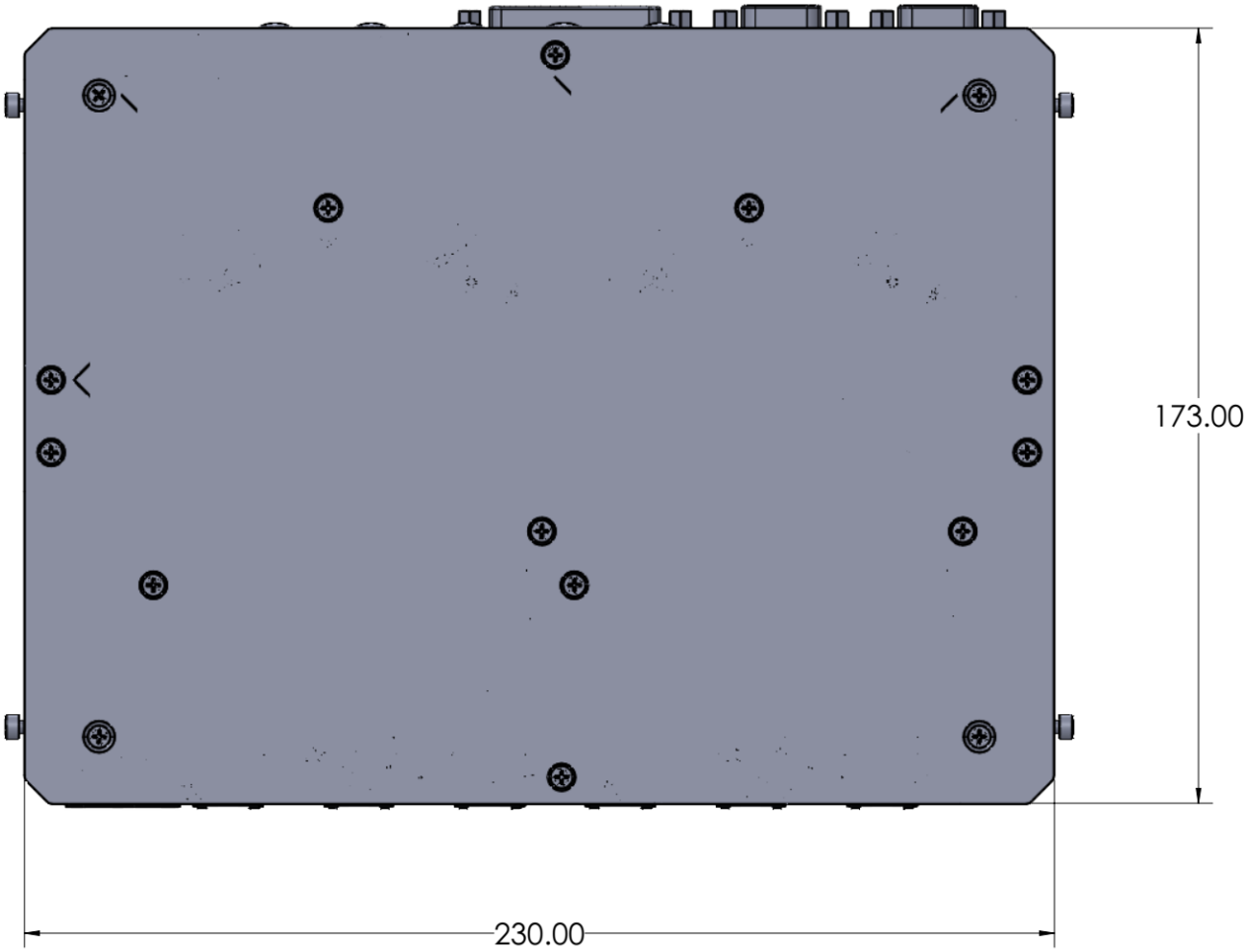


Figure 4: WF Hub outer dimensions

Mounting plate

Figure 5 shows the outer dimensions and mounting points of the mounting plate. All measurements are given in mm.

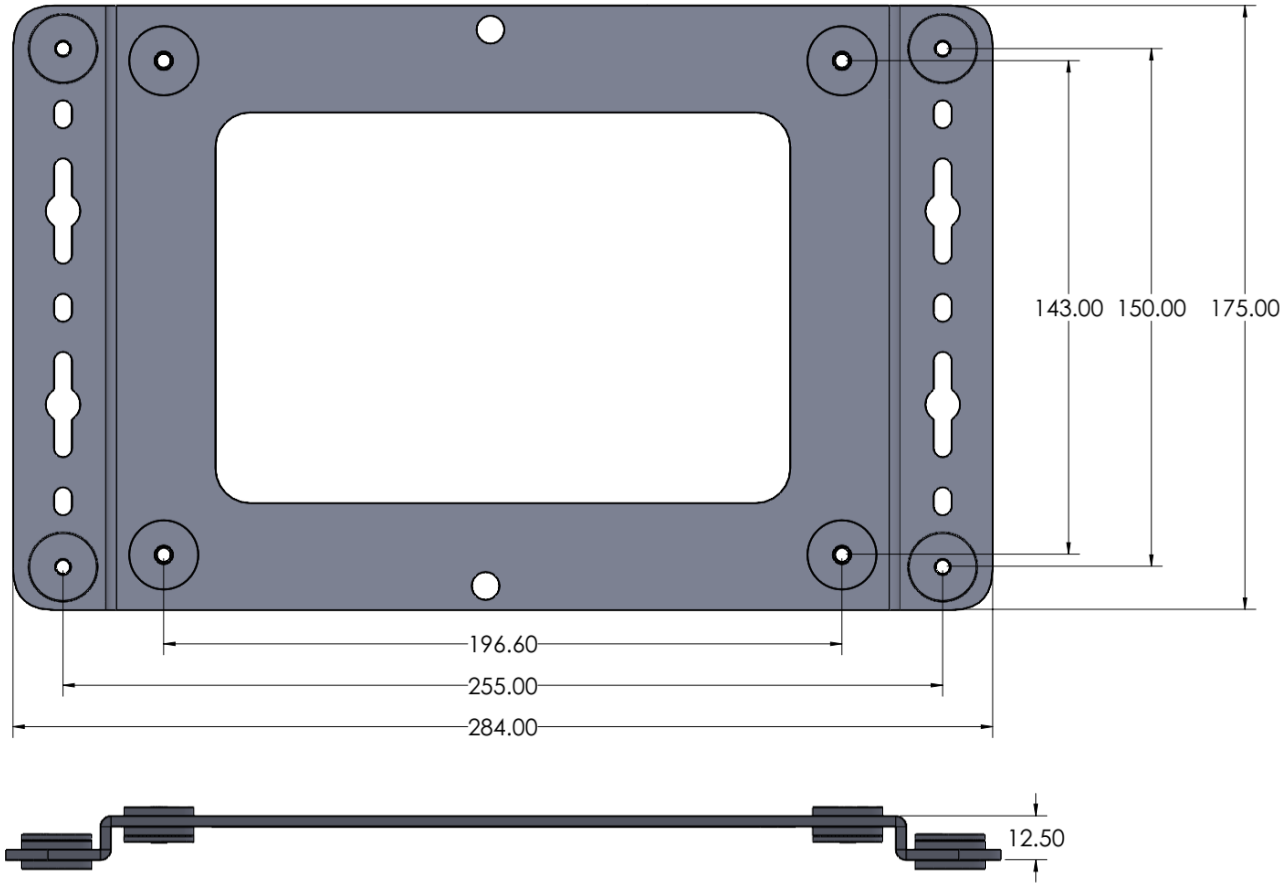


Figure 5: WF Hub mounting plate dimensions

Installation guidelines

Mounting the hardware

WF Hub mounting

The mounting plate comes pre-installed on the WF Hub. This plate includes anti-vibration grommets and should be used when installing the WF Hub in vehicles to help dampen vibrations. Four M4 screws are used to fix the plate to the WF Hub.

RT-Strut brackets are available (sold separately) for the WF Hub that attach to the mounting plate and can be used to secure the system on the RT-Strut.

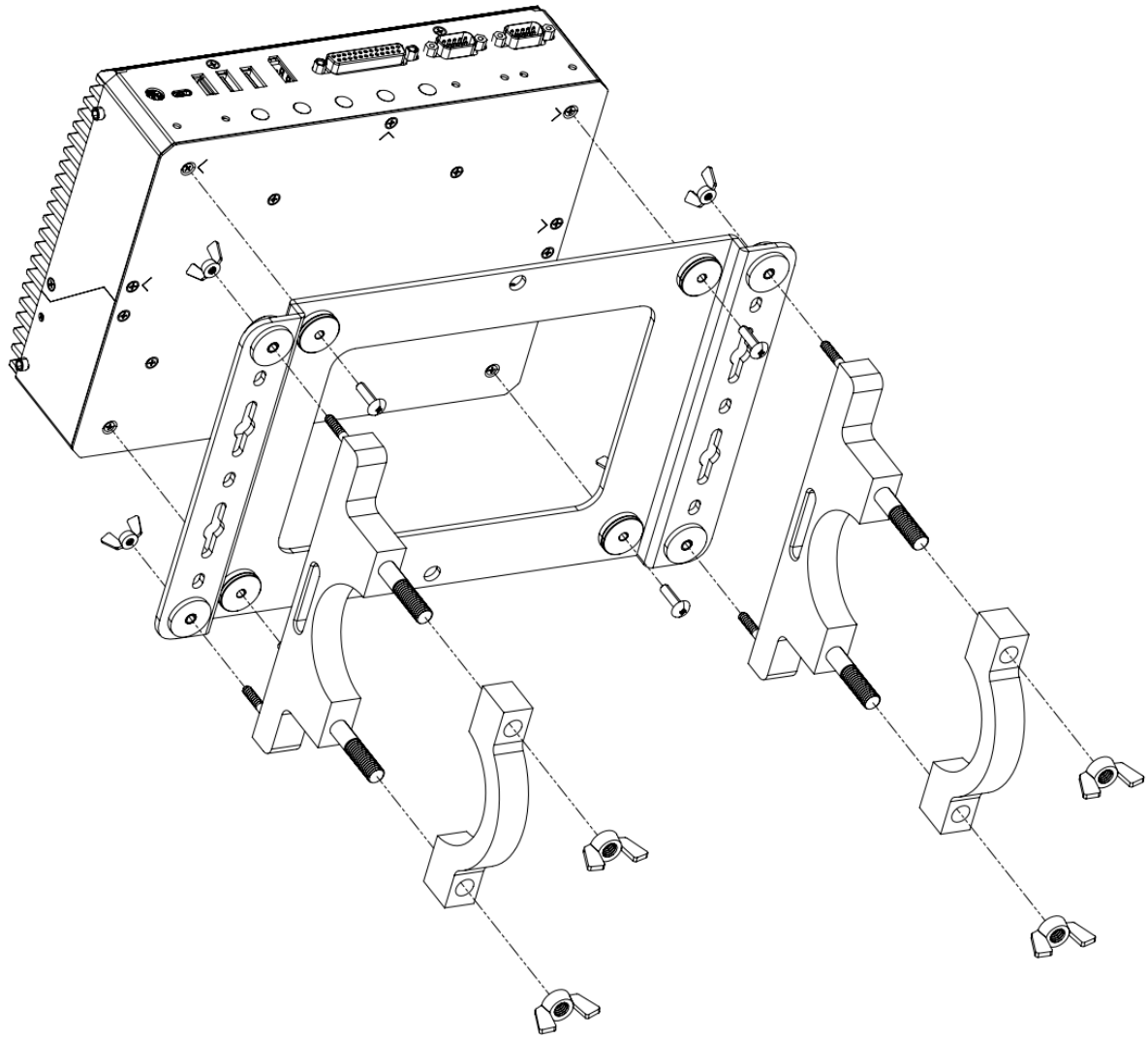


Figure 6: WayFinder Hub mounting plate and RT-Strut backets

Attach the brackets to the plate by passing the threaded studs through the outer mounting holes of the plate and fixing with wing nuts. The brackets then clamp to the RT-Strut pole with the top half of the bracket and are fixed using wing nuts.

When attached to an RT-Strut, mounts should be regularly checked for any signs of damage or warping, and the fitment should be checked to ensure excessive movement of the brackets is not possible.

If the WF Hub is not going to be mounted flat, it should be oriented with the heatsink fins perpendicular to the ground for better heat dissipation efficiency.

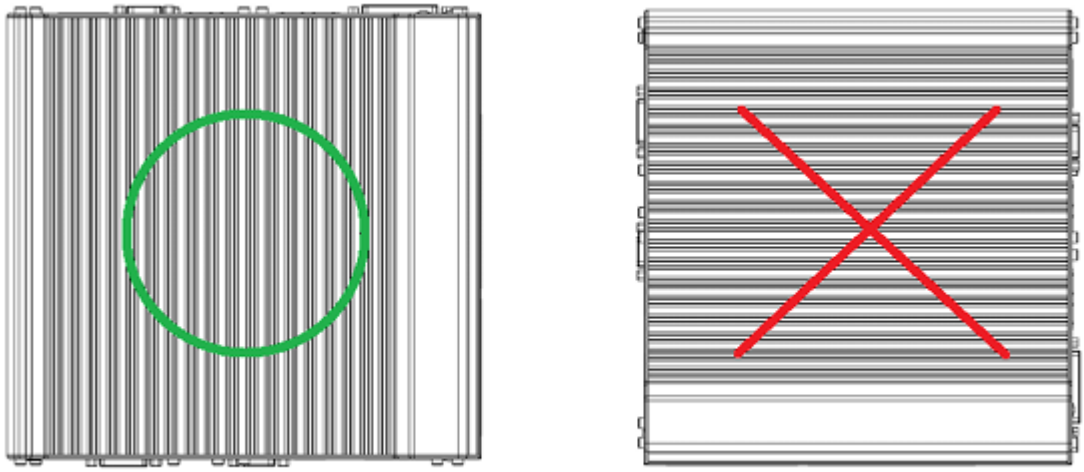


Figure 7: Optimal heat sink orientation

WARNING: Installing the device in direct sunlight may cause the enclosure's internal temperature to rise significantly. In hot environments, this can cause the case to exceed its maximum temperature rating. To prevent this, avoid prolonged exposure to direct sunlight or ensure constant airflow across the enclosure.

LiDAR mounting

The LiDAR should be attached securely and safely to the vehicle. It should not be able to move relative to the INS or GNSS antennas. Refer to the LiDAR manufacturers guidelines for proper mounting.

If using the OXTS LiDAR suction cup roof mount, refer to "Appendix A – LiDAR suction cup mount guide" for a full installation guide.

For best performance with LiDAR Boost, it is recommended to mount the LiDAR flat on the vehicle roof away from obstructions in order to give the LiDAR a full 360° field of view of the surroundings. Mounting the LiDAR at a steep angle or with its field of view partially obstructed will mean it is less able to see features in the environment and LiDAR Boost performance may be affected.

INS mounting

The INS should be attached securely and safely to the vehicle. It should not be able to move relative to the LiDAR or GNSS antennas. Refer to the INS documentation for full guidelines on mounting.

Generally, the INS can be mounted in any location on the vehicle in any orientation. However for ease of setup it is recommended to try to roughly align the IMU axes with the vehicle axes so there are no large offsets to the rotations. In particular for the LiDAR Boost boresight process, one of the IMU axes should be aligned with the vehicle's vertical axis.

Connecting the hardware

The figure below shows a typical set up with the WF Hub and connected devices including RT3000 v4 INS, Hesai or Ouster LiDAR, and wireless connectivity USB modules.

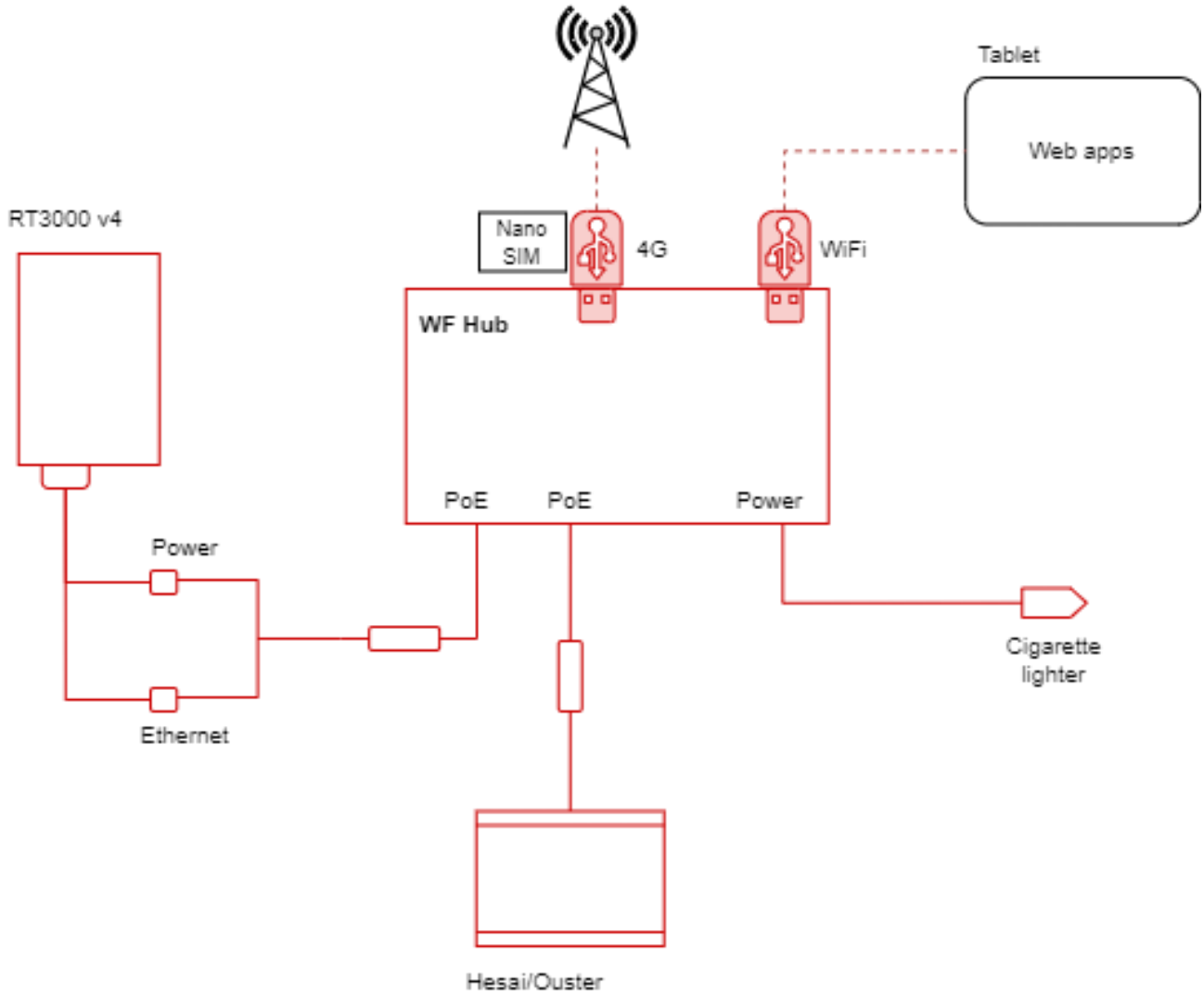


Figure 8: Block diagram of typical WF Hub setup

Cable	Hub connector	External connector	Function
WF Hub cigarette power cable - 14C0274	3-pin terminal block (J2)	Cigarette lighter plug (J1)	Power input
INS PoE cable - 14C0275	Ethernet RJ45 plug (J1) (PoE port)	5-way M12 (J2) Ethernet RJ45 socket (J3)	Power an INS via the WF Hub and transfer data
Hesai PoE cable - 14C0277 (supplied separately)	Ethernet RJ45 plug (J1) (PoE port)	Hesai XT32 Lemo connector (J2)	Power a Hesai XT32 via the WF Hub and transfer data
Ouster PoE cable - 14C0278 (supplied separately)	Ethernet RJ45 plug (J1) (PoE port)	Ouster OS1 connector (J2)	Power an Ouster OS1 via the WF Hub and transfer data
Wi-Fi USB module	USB-A		Wireless hotspot for web app remote access
4G LTE USB module	USB-A		Mobile internet connection for receiving NTRIP corrections

Table 17: Connections descriptions for WF Hub and connected devices

NOTE: The recommended maximum power draw while using the cigarette power cable is 60W for a 12V system due to the voltage drop across the cable. For configurations with higher power requirements, the WF Hub bare power cable (14C0279) (sold separately) should be used.

NOTE: For optimal timing performance when using PTP synchronisation, it is recommended to connect both the INS and LiDAR to the PoE ports (3-6) on the WF Hub.

Cable drawings with full details of the connectors are available in “Appendix C – Drawing list”.

Connecting the INS

Cable 14C0275 can be used to power the INS via the WF Hub and transmit data between the two devices.

1. Connect the J1 Ethernet RJ45 plug of 14C0275 to one of the PoE ports on the WF Hub.
2. Connect the J2 M12 connector of 14C0275 to the J7 M12 plug on the INS user cable 14C0038.
3. Connect the J3 Ethernet RJ45 socket of 14C0275 to the J6 to the Ethernet RJ45 plug on the INS user cable 14C0038.

Connecting the LiDAR

Optional cables 14C0277 and 14C0278 are available to enable simple PoE connections with Hesai or Ouster LiDAR to the WF Hub. For other LiDAR models, the user will need to power them separately or create their own custom PoE cable.

Wiring ignition signal

The ignition power control module for in-vehicle applications is an MCU-based implementation that monitors the ignition signal and reacts to turn on/off the system according to predefined on/off delay. See "Powering on using ignition power control" for more details on the operation modes for ignition power control.

To have ignition power control for in-vehicle usage, you need to supply IGN signal to the system. The IGN input is located on the 3-pin pluggable terminal block (shared with DC power input). For in-vehicle ignition control wiring, please do the following:

1. Connect vehicle battery + line (12V for car, 24V for bus/truck) to V+.
2. Connect vehicle battery -/ GND line to GND.
3. Connect ACC line to IGN

WARNING: Please make sure your DC power source and IGN signal share the same ground.

IGN input accepts 8-48VDC. Supplying a voltage higher than 48VDC may damage the system.

Operation

Default network and system settings

WF Hub IP address	192.168.1.200
System username	user
System password	user
Recovery key	See bottom label
Wi-Fi SSID	WayFinderHubXXXX[1]
Wi-Fi password	password

Table 18: Default credentials

[1]The XXXX in the Wi-Fi SSID will be the last four digits of the device's serial number. The IP address, SSID, and Wi-Fi password can be changed in the network management settings on the WayFinder Home page.

The system username and password are used to access the WayFinder interface through the web applications and the data storage through FTPS. On first-time login to the WayFinder web interface, you will be prompted to change the system password. The recovery key is used to reset the system password in cases where it is lost or forgotten.

Powering on the system

Powering on using the power button

The power button on the front panel is a non-latched switch and behaves as the ATX-mode on/off control. With DC power connected, pushing the power button will turn on the system and the PWR LED indicator will light up.

When the rotary switch on the rear panel is set to mode 0, the power button must be used to turn on the system.

Powering on using ignition power control

The ignition power control module for in-vehicle applications is an MCU-based implementation that monitors the ignition signal and reacts to turn on/off the system according to predefined on/off delay.

The operation mode of the ignition power control is defined by the rotary switch on the rear panel. The system offers 16 operation modes with different power-on/power-off delay configurations.

Mode 0

Mode 0 is the ATX mode without power-on and power-off delay. User can only use the power button on the front panel to turn on or turn off the system.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
0	N/A	N/A	N/A

Table 19: Mode 0 ignition control description

Mode 1

Mode 1 is AT mode without power-on and power-off delay. The system automatically turns on when DC power is applied. A retry mechanism is designed to repeat the power-on cycle if the system fails to boot up.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
1	N/A	N/A	N/A

Table 20: Mode 1 ignition control description

Mode 2

Mode 2 is designed to have a very minor power on/ off delay of 160ms for applications that requires the system to start up almost at the same as the rest of the equipment it is working in collaboration with.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
2	160ms	160ms	10 minutes

Table 21: Mode 2 ignition control description

Mode 3 - Mode 12

Mode 3 - Mode 12 have various power-on delay and power-off delay. Each mode supports a hard-off timeout of 10 minutes.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
3	10 seconds	10 seconds	10 minutes
4	10 seconds	1 minute	10 minutes
5	10 seconds	5 minutes	10 minutes
6	30 seconds	1 minute	10 minutes
7	30 seconds	5 minutes	10 minutes
8	30 seconds	10 minutes	10 minutes
9	3 minutes	1 minute	10 minutes
10 (A)	3 minutes	10 minutes	10 minutes
11 (B)	3 minutes	30 minutes	10 minutes
12 (C)	10 minutes	30 minutes	10 minutes

Table 22: Mode 3-12 ignition control description

Mode 13 (D) / Mode 14 (E)

Mode 13 and Mode 14 are ignition power control modes with very long power-off delay. Both modes support the feature of “smart off-delay”, which automatically detect system status

during power-off delay duration and cut off system power if system is off in prior to power-off delay expired.

Mode	Power-on Delay	Power-off Delay	Hard-off Timeout
13 (D)	30 seconds	2 hours	10 minutes
14 (E)	3 minutes	2 hours	10 minutes

Table 23: Mode 13/14 ignition control description

Mode 15 (F)

Mode 15 is reserved.

Accessing the WayFinder interface

Configuration and control of the connected devices and applications running on the WF Hub are controlled through a web interface hosted on the WF Hub and accessed via a web browser either through a wired Ethernet connection or a Wi-Fi hotspot using the included Wi-Fi USB module.

NOTE: The WF Hub uses HTTPS to encrypt communication. Because it operates offline, its certificate cannot be verified by a public authority. Your browser may display a security warning; this is expected behaviour. To proceed to the home page, click "*Advanced > Proceed anyway*".

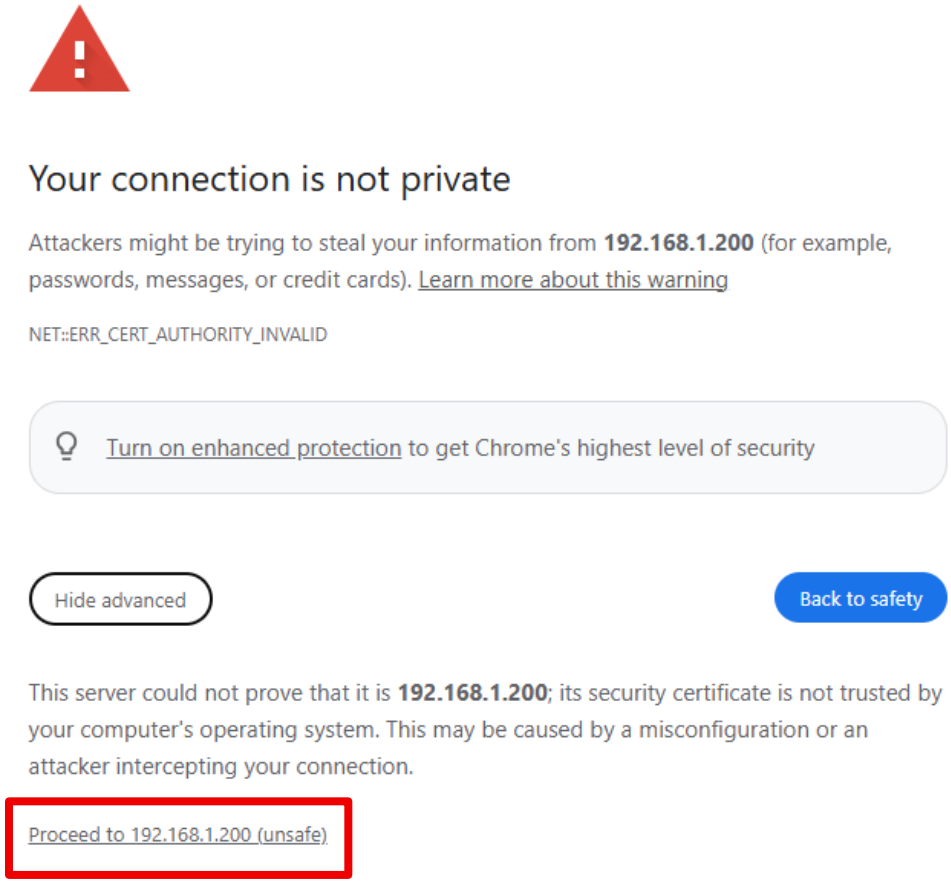


Figure 9: HTTPS warning when connecting to WF Hub web interface

Wired connection & first-time boot

1. For a first-time connection, connect to the Hub with a PC via a wired Ethernet connection.
2. Setup the user PC Ethernet port IP address to be statically assigned as follows:
    a. IPv4: 192.168.1.XXX (or similar in the same subnet)
    b. Subnet mask: 255.255.255.0
3. Power on the WF Hub and wait ~60 seconds for it to boot. The OS LED will turn solid red when booted.
4. Open an internet browser on the user PC and enter the WF Hub IP address (192.168.1.200 by default) into the URL bar.

5. A window will prompt you to change the system password from the default.

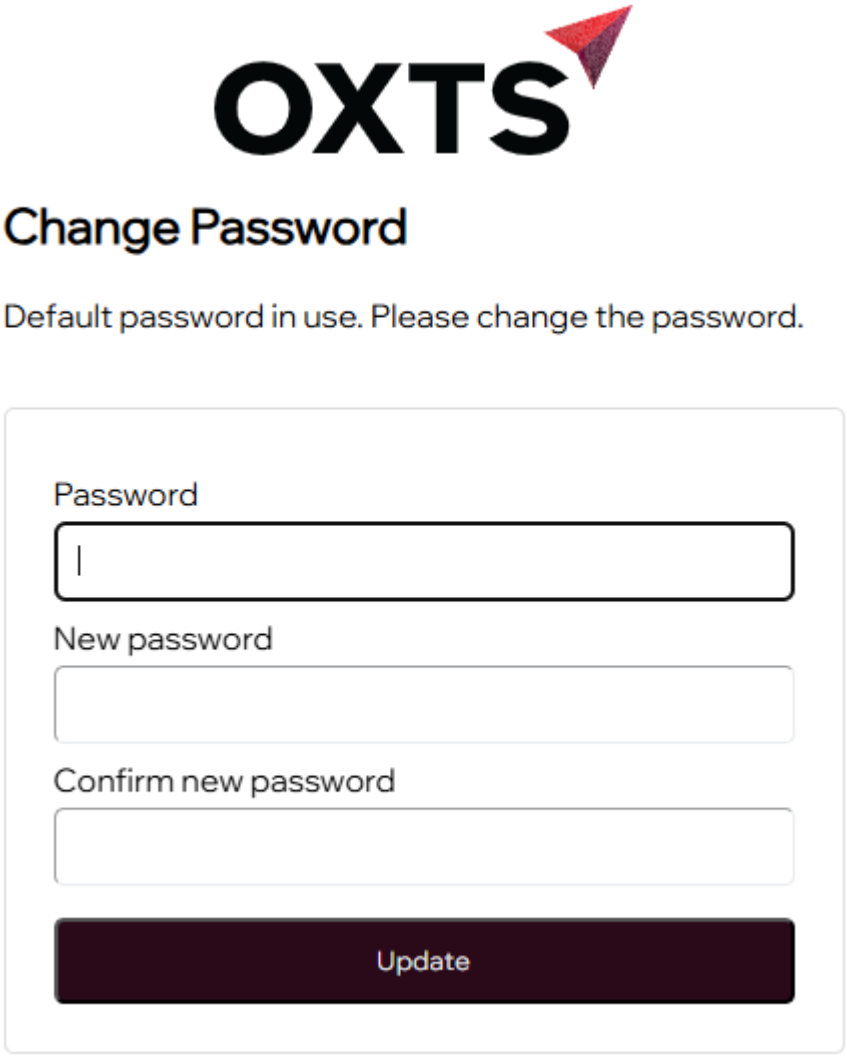


Figure 10: Changing the system password from default

6. Enter the default password "user" and then enter your new password and login to access the WayFinder Home page.
7. For future connections, entering the WF Hub IP address into a browser will show the login screen where you enter the password previously set to access the WayFinder Home page.

Enabling the Wi-Fi hotspot

1. To access the WayFinder interface wirelessly, you can use the included Wi-Fi USB dongle to create a hotspot on the Hub.
2. Insert the Wi-Fi dongle into one of the USB-A ports on the rear panel.
3. On the WayFinder Home page, click "Manage" in the "Network Devices" section to expand the configuration section and navigate to "Connections".

8. Click the Wi-Fi hotspot toggle button to turn on the hotspot.

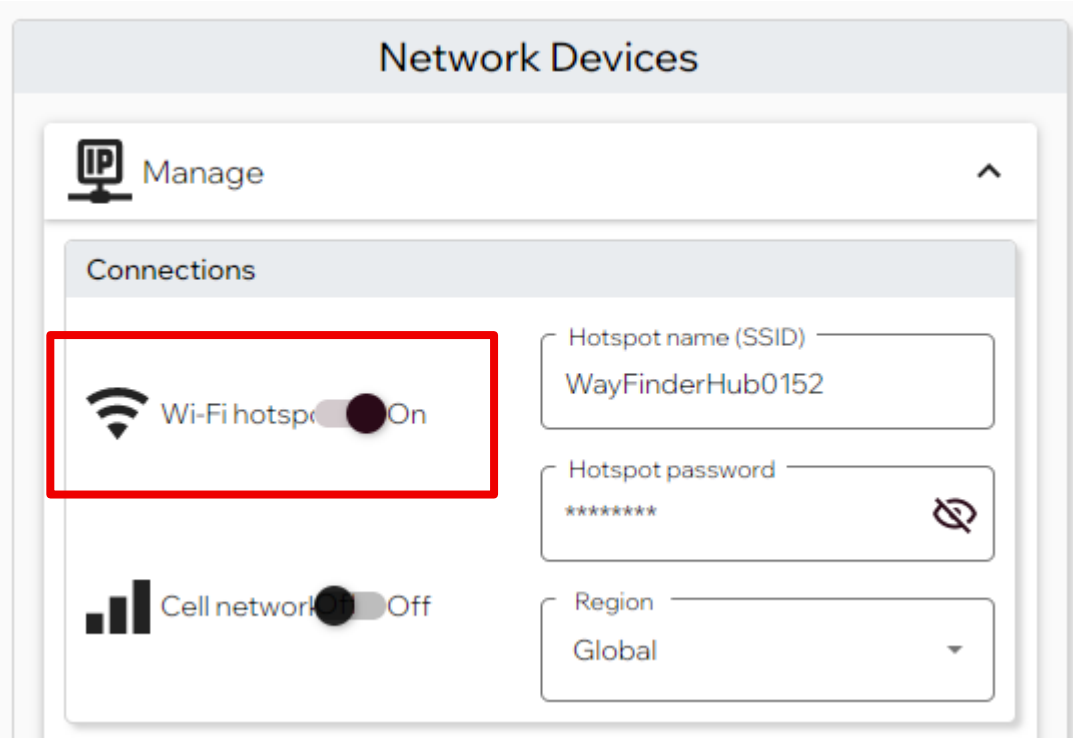


Figure 11: Enabling Wi-Fi hotspot

4. The hotspot SSID and password can be changed here. The default settings are shown in "Default network and system settings" above.
5. The Wi-Fi region settings can also be changed here. The system defaults to "Global" settings for compatibility in most regions, but you may experience better connection performance by selecting your local region from the dropdown list.
6. Ensure to click the “Save changes” button to save any modifications to the settings.

Wireless connection

1. Ensure the Wi-Fi dongle is inserted and the hotspot has previously been enabled in the WayFinder Home page.
2. Connect the 3-pin terminal connector of the power cable (14C0274) to the Hub, and the cigarette lighter connector to a suitable power source capable of supplying 8-48V DC.
3. Power on the WF Hub and wait ~60 seconds for it to boot. The OS LED will turn solid red when booted.
4. On the User device, open the Network & Internet settings and select the Hub SSID from the list of available networks.
5. Enter the Wi-Fi password to connect to the hotspot. The default SSID and password are shown in "Default network and system settings" above.
6. Open an internet browser on the user device (Chrome recommended) and enter the Hub IP address into the URL bar.

Initial configuration

The WayFinder Home page allows you to manage devices connected to the WF Hub and access additional web applications for supporting functionality.

The WF Hub needs to know the IP addresses of connected devices in order to send and receive data. To add a new device:

1. Click "Manage" in the "Network Devices" section to expand the configuration section.
2. The "INS" section lets you enter the IP address of the connected OXTS INS. Click the toggle button to "Enabled" and select the INS type from the dropdown list.
3. Enter the INS IP address into the text boxes.

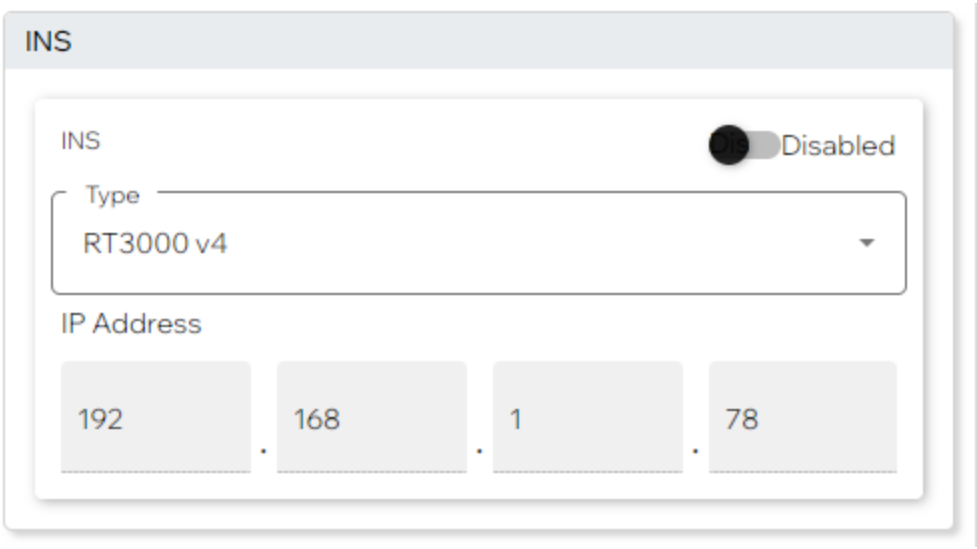


Figure 12: Adding an INS device

4. The "LiDAR" section lets you enter the IP addresses of connected LiDAR. The "LiDAR Destination" dropdown lets you choose whether to unicast the LiDAR data stream to the WF Hub (WayFinder Processor), or broadcast the stream on the network so other devices can also access it (Broadcast).
5. Click "Add LiDAR" to create a LiDAR device entry.
6. Click the toggle button to "Enabled" and optionally give the device a label name to help distinguish devices if using multiple LiDAR.
7. Select the LiDAR model from the dropdown list. The dropdown shows the list of supported LiDAR models for use in LiDAR Boost. “Fully supported” indicates the model has been tested and validated by OXTS. “Partially supported” indicates the LiDAR decoders are implemented in LiDAR Boost but the model has not been fully validated with real data. If you would like us to validate a model currently listed as "Partially supported" or would like to request support for a model not currently listed, please contact us at support@oxts.com.

8. Enter the LiDAR IP address into the text boxes.

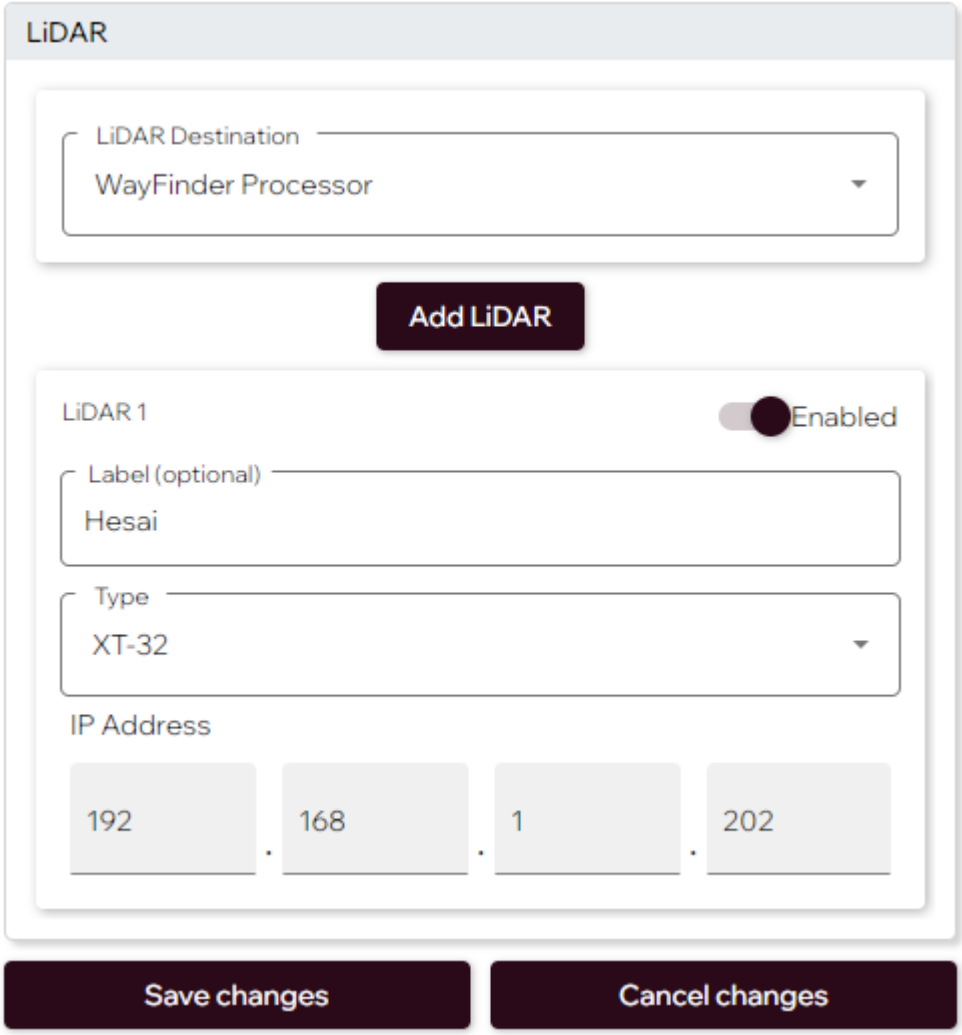


Figure 13: Adding a LiDAR device

9. If you are connecting multiple LiDAR, click the "Add LiDAR" button to create a new entry and repeat steps 6-8.
10. Ensure to click the “Save changes” button to save any modifications to the settings.

NOTE: All connected devices must be on the same subnet as the WF Hub. The WF Hub IP address and subnet mask may be changed in the Network Devices management section.

Password reset

In case of a lost or forgotten password, it's possible to reset the system password using the recovery key printed on the label.

1. Connect to the Hub and enter the IP address into a browser to open the system login screen.

2. Click "Reset password".
3. Enter the recovery key found on the bottom label of the WF Hub.

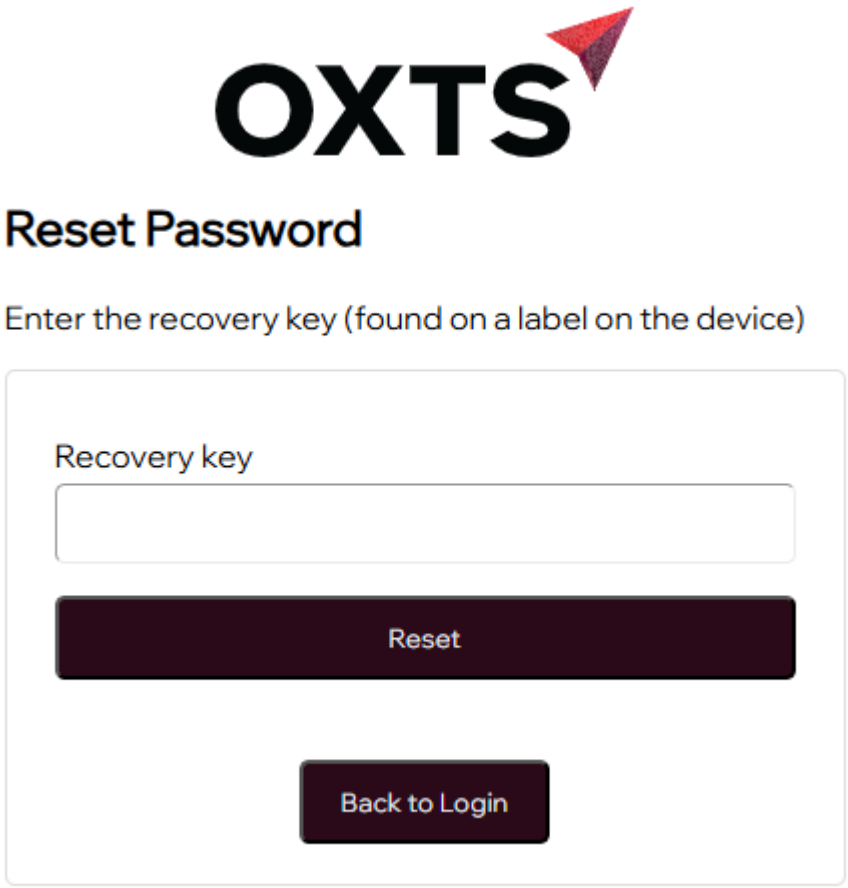


Figure 14: Resetting the system password

4. The system password will reset and it will prompt you to enter a new password like for the first-time boot.

NOTE: A 15-character length password is required after resetting it with the recovery key.

WARNING: Do not use the Back button in your browser while performing the password reset process.

WayFinder interface web apps

The WayFinder Hub hosts a number of web apps that can be accessed through a browser to monitor and control various aspects of the device.

	Name	Description
	Home	Manage network settings and connected devices, see an overview of system health, and access all other web apps.
	LiDAR Boost	Configuration and control settings for LiDAR Boost processing.
	Visualiser	Navigation and aiding data monitoring.
	Data logger	Configuration and control settings for logging data from connected devices.

Table 24: WayFinder web app overview

Home

The Home page is displayed when first connecting to the WayFinder web interface. It provides a brief overview of the connected network devices and is where the other web apps hosted on the WayFinder device can be launched.

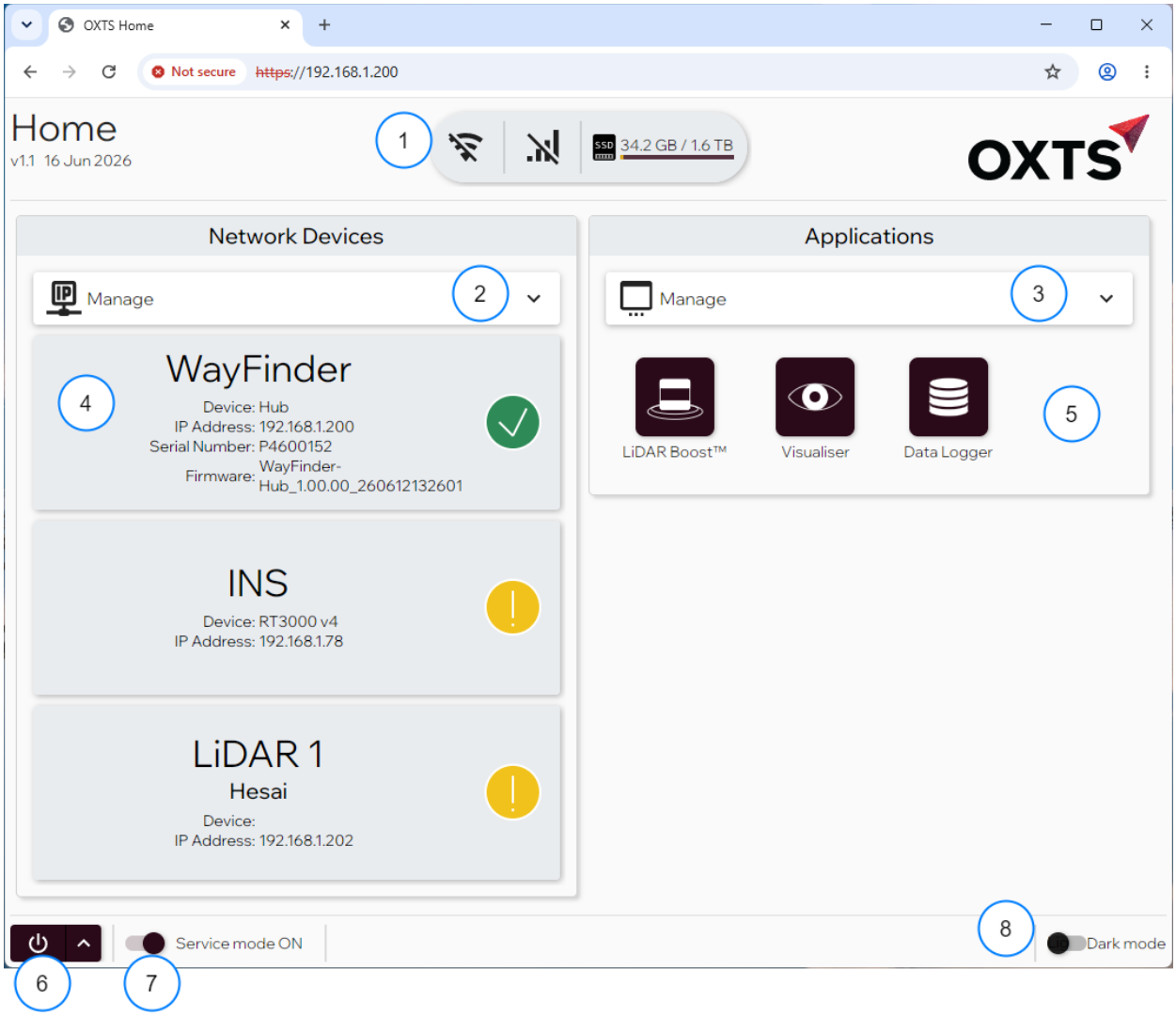


Figure 15: Web interface Home page

Label	Name	Description
1	System status	Displays the current status of the Wi-Fi hotspot and cell network for when the USB modules are connected. Also shows the status of the storage drive usage capacity.
2	Network device manager	Expanding section for managing connected devices including WayFinder device network settings, INS device, and LiDAR devices.
3	Application manager	Expanding section showing version details for docker applications installed on WayFinder device.
4	Device overview	Status overview of devices configured in network device manager section. Green icon indicates device is detected, yellow icon indicates device not detected.
5	Application launcher	Icon buttons for launching additional web apps installed on WayFinder device.
6	Power button	Issue a shutdown command to the WayFinder device or log out of the web interface.
7	Service mode toggle	Toggle “Service mode” on/off. Service mode enables an OXTS engineer to remote connect to the WayFinder device for support and troubleshooting.
8	Dark mode toggle	Toggle the appearance setting between light and dark modes.

Table 25: Web interface Home page descriptions

LiDAR Boost

The LiDAR Boost app provides configuration and control settings for the LiDAR Boost technology running in real-time on the WayFinder device to generate aiding data used in the INS sensor fusion.

Map matching

The map matching section can be configured when using a previously generated feature map for navigation aiding with LiDAR Boost Map Matching.

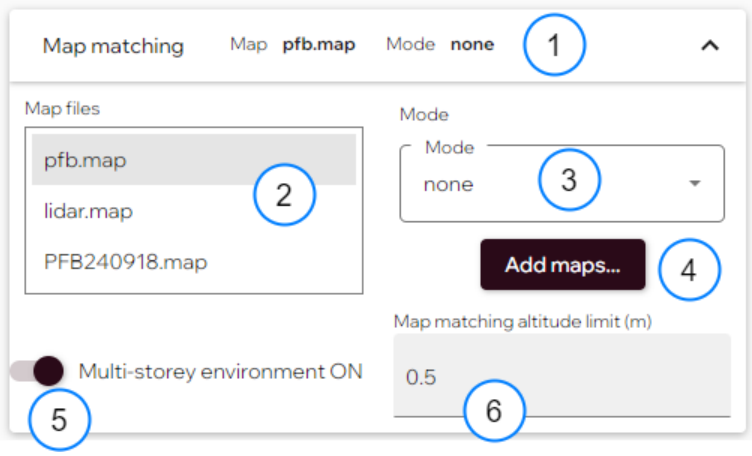


Figure 16: LiDAR Boost Map matching settings

Label	Name	Description
1	Map matching status overview	Displays the currently selected feature map and aiding mode.
2	Map file list	Shows a list of the available feature maps stored on the WayFinder device. Select a map from the list and click “Save changes” to update the currently selected map.
3	Aiding mode selection	Select the aiding mode from the dropdown list. “None” – Map matching will not be used for aiding. Odometry is still used when possible. “Navigation” – Map matching will be used for aiding when operating within the selected feature map.
4	Add map button	Upload generated feature map files to the WayFinder device. Ensure to select the map in the list and click “Save changes” to save the map file to the internal storage for future use.
5	Multi-storey toggle	Toggle for when operating in a multi-storey feature map. When toggled ON, the aiding will constrain the allowable altitude changes to avoid jumping between floor levels if the environment features are similar. Gradual changes in altitude are still allowed, so moving normally between floors driving up a ramp is fine.
6	Map matching altitude limit	When multi-storey toggle is ON, this value sets the maximum altitude change the INS is allowed to make in a single jump.

Table 26: LiDAR Boost Map matching settings description

LiDAR settings

The LiDAR settings section controls various settings for each of the LiDAR devices configured on the Home page network manager.

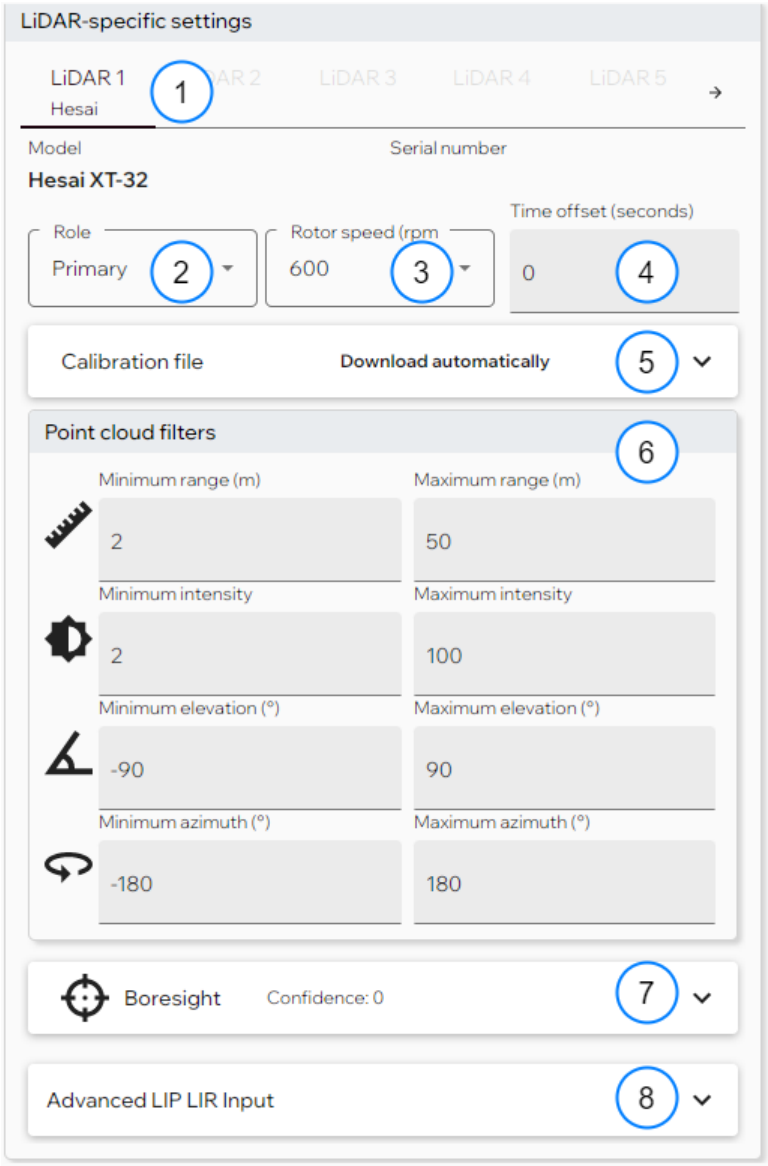


Figure 17: LiDAR Boost LiDAR device settings

Label	Name	Description
1	LiDAR selection	Select the LiDAR device for configuration.
2	Role selection	Select the role of the LiDAR in LiDAR Boost processing. “Primary” – all the LiDAR data is transformed into the Primary’s reference frame. If only a single LiDAR is being used, it must be the Primary. “Auxiliary” – if using multiple LiDAR for LiDAR Boost aiding, the Auxiliary LiDAR data is transformed into the reference frame of the Primary for processing. “None” – the LiDAR will not be used for processing in LiDAR Boost aiding.
3	Rotor speed	Select the rotor speed of the LiDAR. Increasing the rotor speed will increase the amount of data when logging. The default of 600 rpm is recommended for most applications.
4	Time offset	Add a time offset if required for the PTP settings. See section “Interfaces > PTP” for PTP setting recommendations.
5	LiDAR calibration file	For Hesai and Ouster models the LiDAR calibration file is automatically downloaded from the LiDAR. For other models, manually browse and select the appropriate calibration file for the selected LiDAR device.
6	Point cloud filters	Filters for the LiDAR point cloud data processing. Note that these filters are applied to the data processed for LiDAR Boost aiding, not to the raw logged data.
7	Boresight	Configure and run the automatic LiDAR Boost boresight process. See section “LiDAR boresight” for more details on the boresight process.
8	Advanced LIP LIR input	Manually enter the LiDAR position (LIP) and rotation (LIR) offsets from the INS if known.

Table 27: LiDAR Boost LiDAR device settings description

Control

Start and stop the LiDAR Boost aiding process. If a LiDAR is connected and configured as a Primary role, the process will start automatically when the INS initialises.

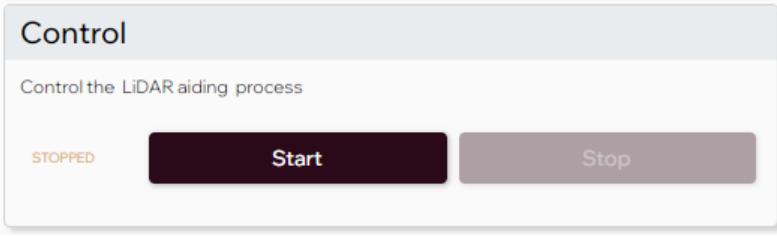


Figure 18: LiDAR Boost control settings

Process log

Status and debugging information for the LiDAR Boost processing. Click the “Fetch” button to update the log and retrieve the latest information.

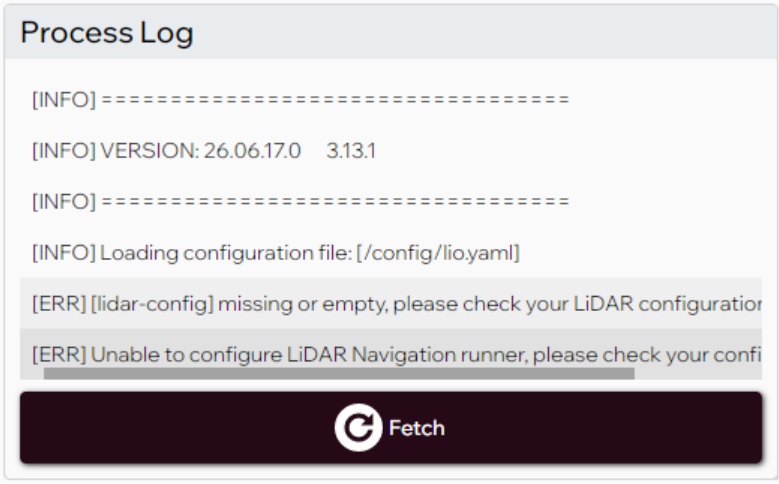


Figure 19: LiDAR Boost process log

Visualiser

The Visualiser app provides a lightweight, real-time way to monitor the overall status and performance of the INS.

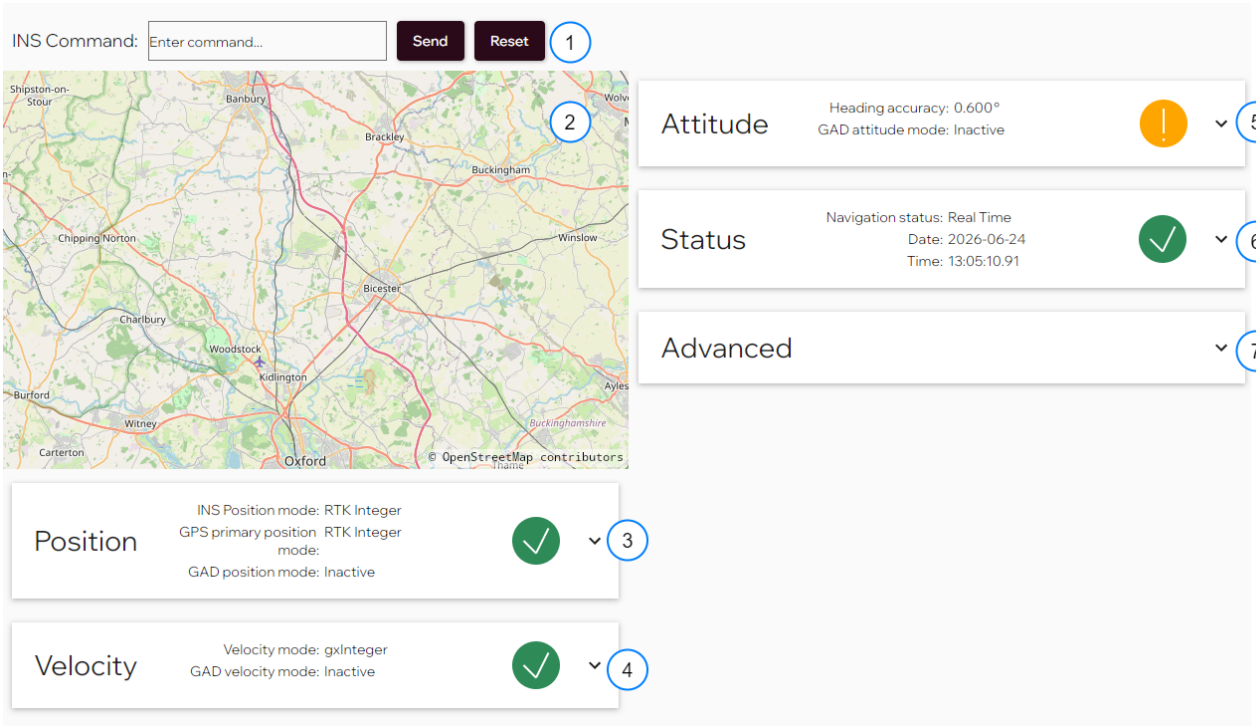


Figure 20: Visualiser web app

Label	Name	Description
1	INS command	Send commands to a live INS. The Reset button sends a command to soft-reset the INS.
2	Map display	OpenStreetMap plugin to display the current position output of the INS. Requires internet connectivity to display.
3	Position status	Displays an overview and status icon of the INS position. Click to expand and show additional detail. If LiDAR Boost Map Matching is enabled, “GAD position mode” will show as Active while using the feature map for aiding.
4	Velocity status	Displays an overview and status icon of the INS velocity. Click to expand and show additional detail. If LiDAR Boost Odometry is running, “GAD velocity mode” will show as Active while using the LiDAR for aiding.
5	Attitude status	Displays an overview and status icon of the INS attitude. Click to expand and show additional detail.
6	System status	Displays an overview and status icon of the INS system. Click to expand and show additional detail.
7	Advanced status	Click to expand and show additional information such as satellites tracked and warm-up status.

Table 28: Visualiser web app descriptions

The warm-up status shown in the Advanced section indicates the readiness of the INS at a glance. If a warm-up has been achieved, then the INS is in good operational condition with the in-run metrics converged. If the warm-up has not yet been achieved, the status will display a set of sub-flags to indicate what has and has not yet been achieved, e.g. [A-P-]. A description of the sub-flags is below.

Flag indicator	Description
A	Accelerometer biases has converged.
N	GNSS antenna lever arms have converged.
P	RTK Integer lock has been maintained for 60s.
Y	Gyro biases have converged.

Table 29: Warm-up status flag descriptions

Data logger

The Data logger app allows you to configure and control logging data streams from connected devices to the WayFinder onboard storage.

For logging LiDAR data, the PCAP stream is captured by the WF Hub and written directly to the storage.

For INS data, the RD stream is logged on the INS storage in real-time. When the data logger is stopped, that active RD file is downloaded from the INS to the WF Hub storage.

When using the data logger, session folders are created in the /data/ folder of the onboard storage. Session folders are named with reverse date format of the timestamp for when the

logging was started. As well as the data logged from the configured devices, the session folder will also contain additional files such as the LIP and LIR, LiDAR calibration file, and process logs.

Configuration

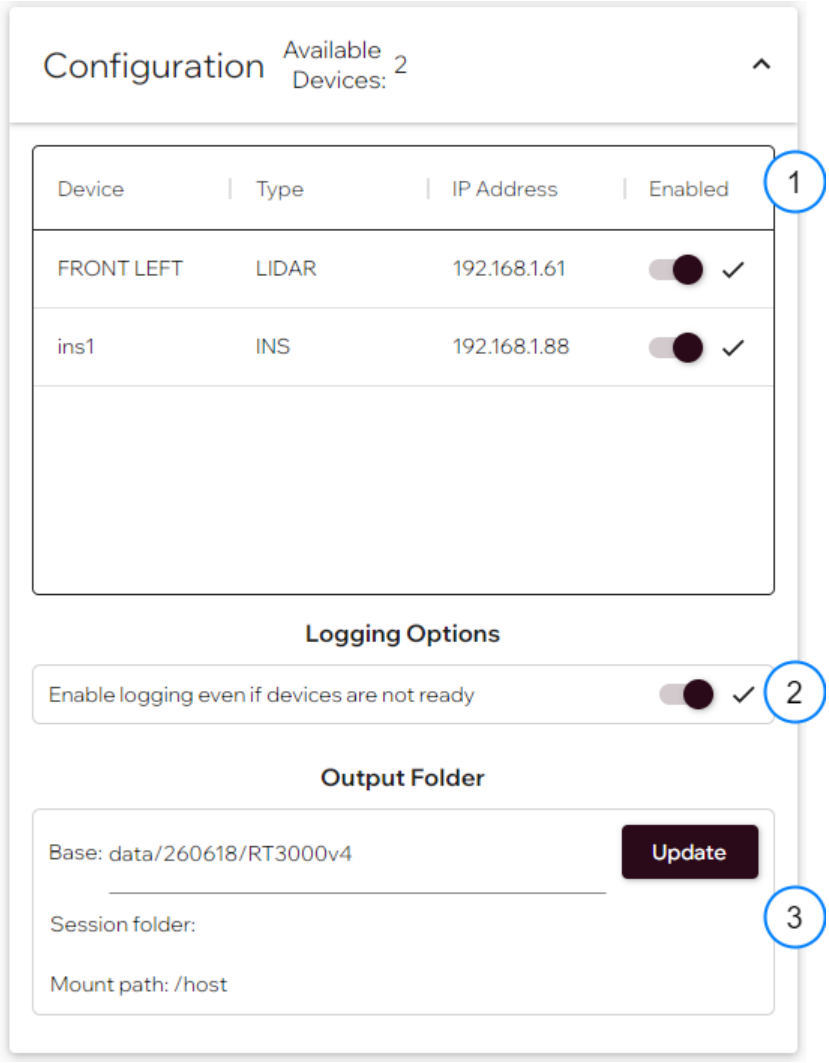


Figure 21: Data logger configuration settings

Label	Name	Description
1	Device list	List of connected devices that are available for logging data. Click the toggle button to enable logging of the data.
2	Logging options	Toggle the override option to ignore the device ready status and allow logging to start when not ready.
3	Output folder	Configure the output folder where the data is logged to. By default the session folders are created in the /data/ folder with a reverse-date format name timestamped with the data logger start time.

Table 30: Data logger configuration setting descriptions

Control

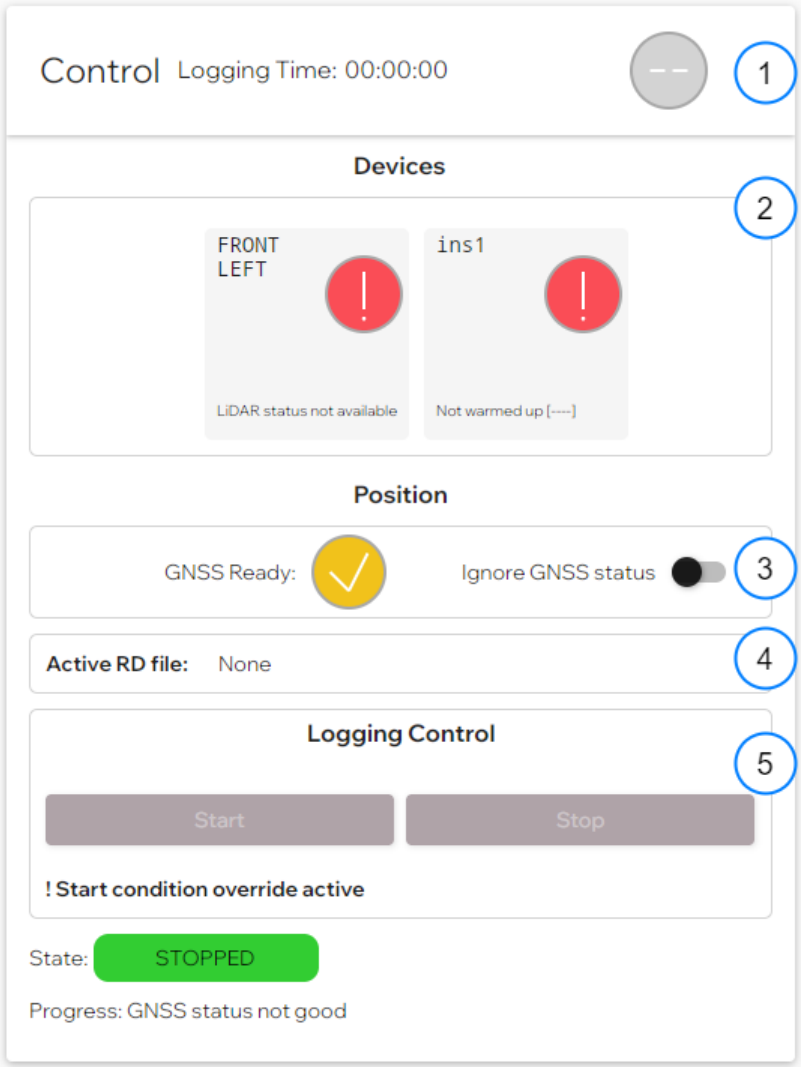


Figure 22: Data logger control settings

Label	Name	Description
1	Logging status	Shows a status icon and the time the data logger has been active.
2	Device status	Shows the status of connected devices available for data logging.
3	Position status	Shows the position status of the INS. By default data logging cannot be started until the INS has a GNSS lock and is initialised. This can be overridden by toggling the “Ignore GNSS status” button on.
4	Active RD file	Shows the file name of the active RD file being created on the INS.
5	Logging control	Start and stop the data logging for the configured devices.

Table 31: Data logger control setting descriptions

Storage

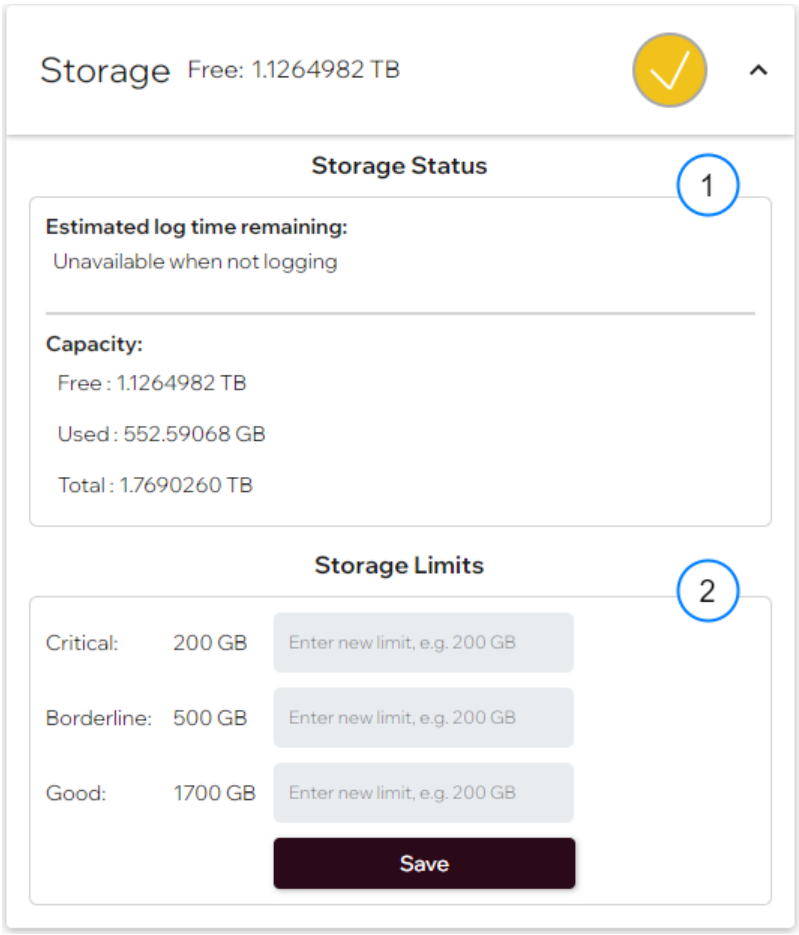


Figure 23: Data logger storage settings

Label	Name	Description
1	Storage status	Shows current status of storage drive capacity. When data logging is active, an estimated log time is calculated based on the current data bandwidth being logged and the remaining storage.
2	Storage limits	Configure limits for when warning flags are shown to alert users of low storage.

Table 32: Data logger storage setting descriptions

NOTE: Deleting files to free up storage capacity must be done through FTPS with an FTP client such as FileZilla.

Previous sessions

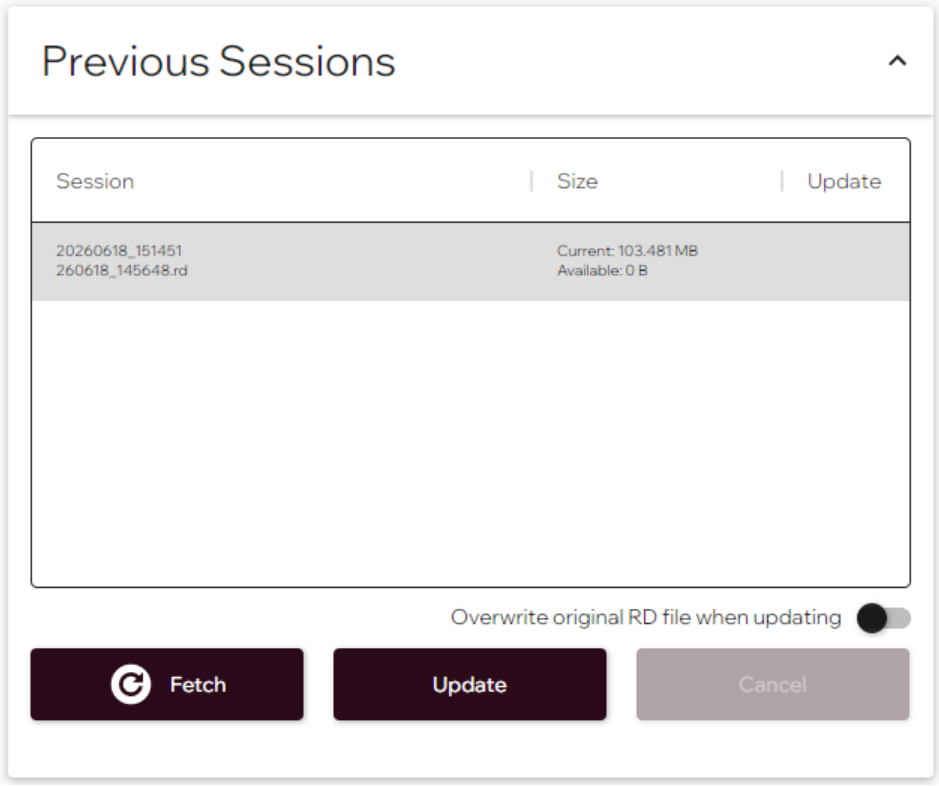


Figure 24: Data logger previous sessions

If multiple session folders exist in the data storage, the Previous Sessions section will display a list of those sessions. Click the “Fetch” button to update the list.

If multiple sessions have been created that share an RD file, i.e. the INS had not been powered off or reset between logging sessions, then you can choose to update the saved RD file in a session folder with the final state of the RD file once it is no longer active. This updates the RD file to include the additional data from the INS after the initial logging session was stopped. Select the desired session you wish to update and click the update button. By default, this will create a copy of the new larger RD file in the session folder. Select the toggle button if you wish to overwrite the original RD file instead.

Data collection

INS configuration

Refer to the individual INS documentation for full guidance on setup and configuration. This section covers the relevant sections in NAVconfig required for enabling LiDAR Boost.

Hardware > IMU orientation

Generally the INS can be mounted in any location on the vehicle in any orientation. However for ease of setup it is recommended to try to roughly align the IMU axes with the vehicle axes so there are no large offsets to the rotations.

NOTE: In particular for the LiDAR Boost boresight process, one of the IMU axes should be aligned with the vehicle's vertical axis.

Hardware > LiDAR

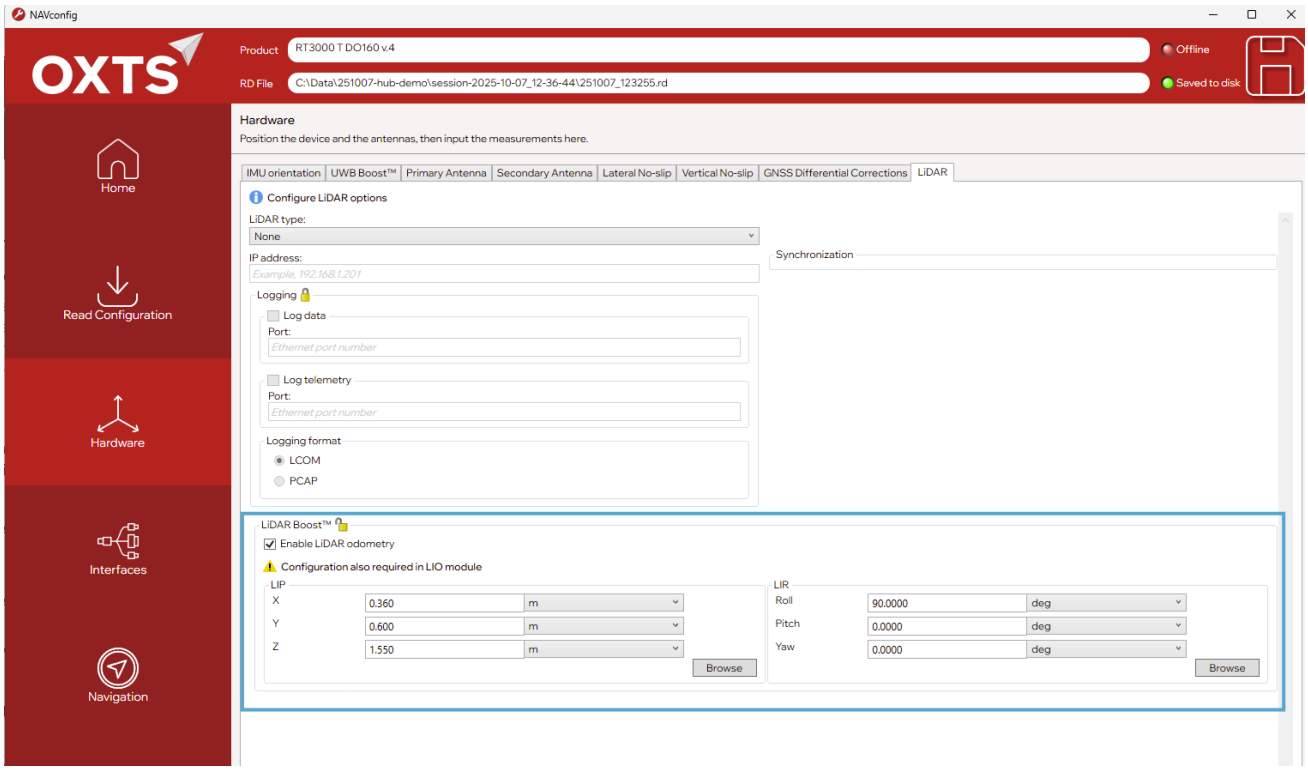


Figure 25: NAVconfg LiDAR settings

1. Ensure the checkbox is ticked for "Enable LiDAR odometry" in the LiDAR Boost section.

2. For a fresh installation, the LIP (INS to LiDAR position offset) and LIR (INS to LiDAR rotation offset) values can be left blank as they will be determined later through the boresight process.
3. If a boresight process has been completed and the optimised LIP and LIR values calculated, enter them here. If using multiple LiDAR with LiDAR Boost, only the Primary LiDAR's values should be entered here.

Hardware > GNSS Differential Corrections

The 4G USB modem provided can be used with the WF Hub to provide internet to the INS for receiving differential corrections via NTRIP.

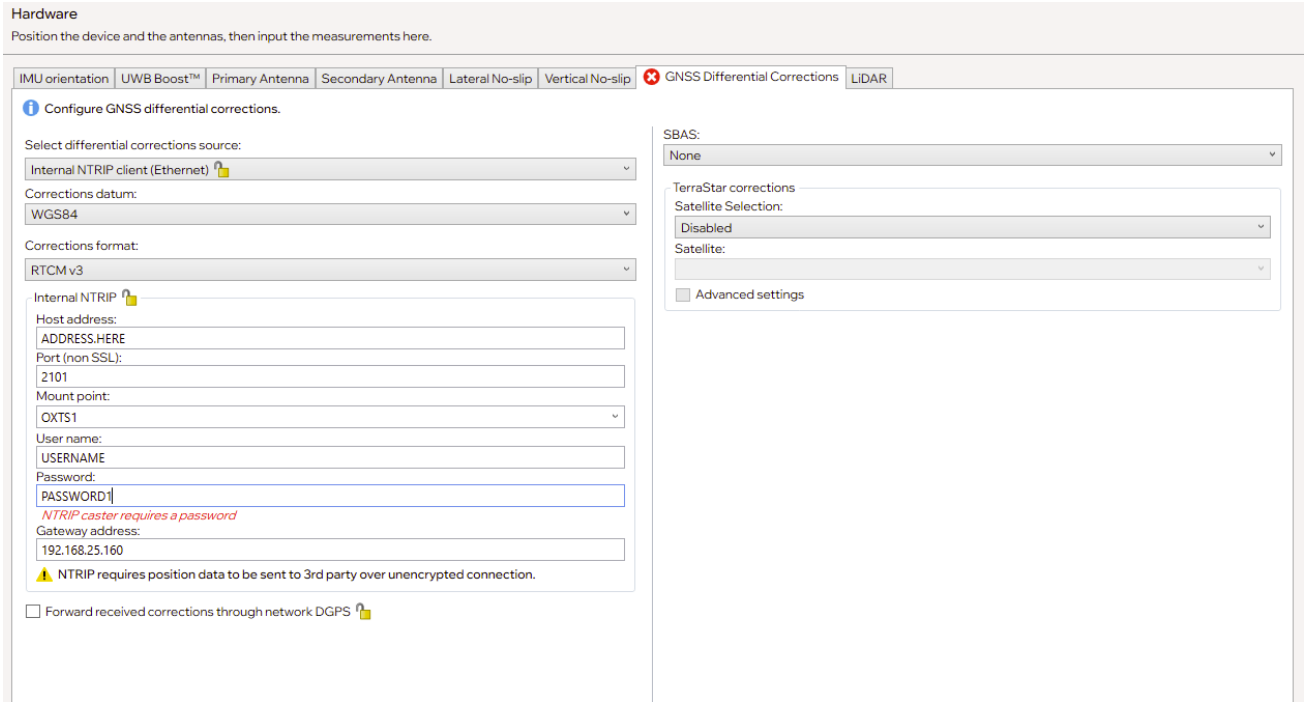


Figure 26: NAVconfg GNSS differential correction settings

1. Select "Internal NTRIP client (Ethernet)" from the differential corrections source dropdown menu.
2. Ensure RTCM v3 is selected as the corrections format.
3. Enter the NTRIP caster service details including host address, mount point, and user credentials.
4. Enter the Hub IP address as the Gateway address

NOTE: For cybersecurity reasons, the internet connection provided by the 4G USB modem to the WF Hub is limited to connecting to an NTRIP service to deliver corrections. It cannot be used for general browsing or other internet connections through the WF Hub.

Interfaces > PTP

PTP is Precision Timing Protocol (IEEE 1588), a networking protocol used to synchronize clocks throughout a computer network and/or between devices with sub-microsecond precision. The INS provides a grandmaster clock using GPS time for a highly precise time source. The WF Hub acts as a network switch to distribute the PTP synchronisation from the INS to other connected devices.

Different LiDAR manufacturers may require different PTP settings, refer to the manufacturer's documentation to check.

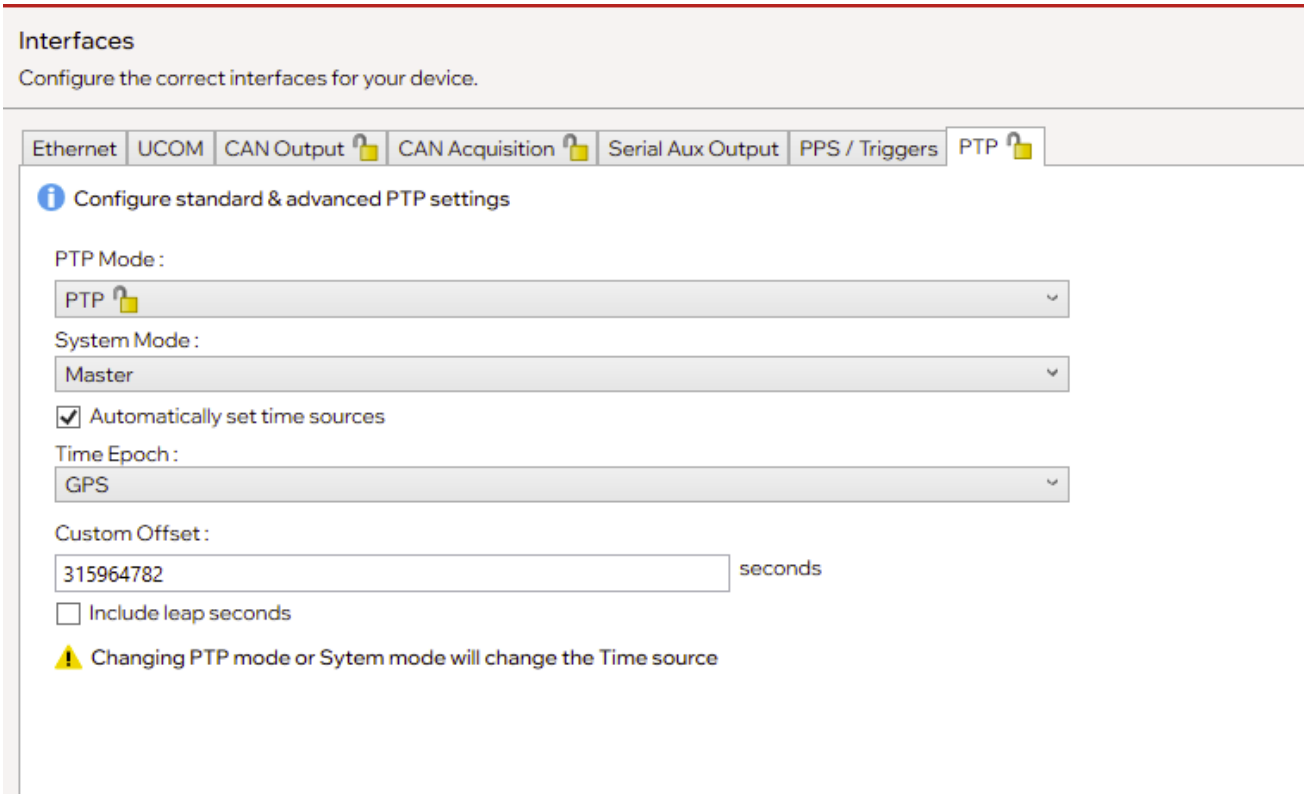


Figure 27: NAVconfig PTP settings

For Ouster and Hesai LiDAR, the time epoch is down to user preference. Depending on the epoch selected, the following offsets will be required either in the Custom Offset field in NAVconfig, or the Time Offset field of the LiDAR Boost web app interface.

PTP Epoch	Custom Offset (NAVconfig)	Time offset (LiDAR Boost web app)
GPS	315964782	0
UTC	-	-18
PTP	-	-37

Table 33: PTP offset settings

Preparation

1. Install and configure the WF Hub, INS, and LiDAR accordingly.

2. When using the INS or LiDAR PoE cables, those devices will be powered by the WF Hub and there is no need to supply them power separately. Only the WF Hub needs to be connected to a power source through the 3-pin terminal connector. The power source must be capable of supplying 8-48V DC and enough power to support connected devices. The WF Hub will draw a maximum of 160W including the full 100W capacity of the PoE+ ports.
3. Power the system and wait for boot. The WF Hub OS LED will be solid red and the INS Status LED will be solid or flashing red.
4. (Optional) From the WayFinder Home page, click the Visualiser button to open the Visualiser app page. This shows some key metrics of the INS at a glance to verify the operational status.
5. Initialise the INS:
    a. Static initialisation - Remain stationary with good satellite visibility while the system determines heading from the dual antenna configuration.
    b. Dynamic initialisation - Drive forward in a straight line with good satellite visibility, accelerating through the configured initialisation speed (default 5 m/s (18 km/h or 11 mph)).
6. Warm up the INS by performing 1-3 minutes of driving manoeuvres with representative dynamics of what will be experienced throughout the data collection.

LiDAR boresight

A fresh installation will require a boresight alignment process to calculate the offsets between the INS and LiDAR sensors, ensuring the coordinate frames of both devices are aligned. The LiDAR Boost app on WF Hub has an automatic boresight capability to achieve this.

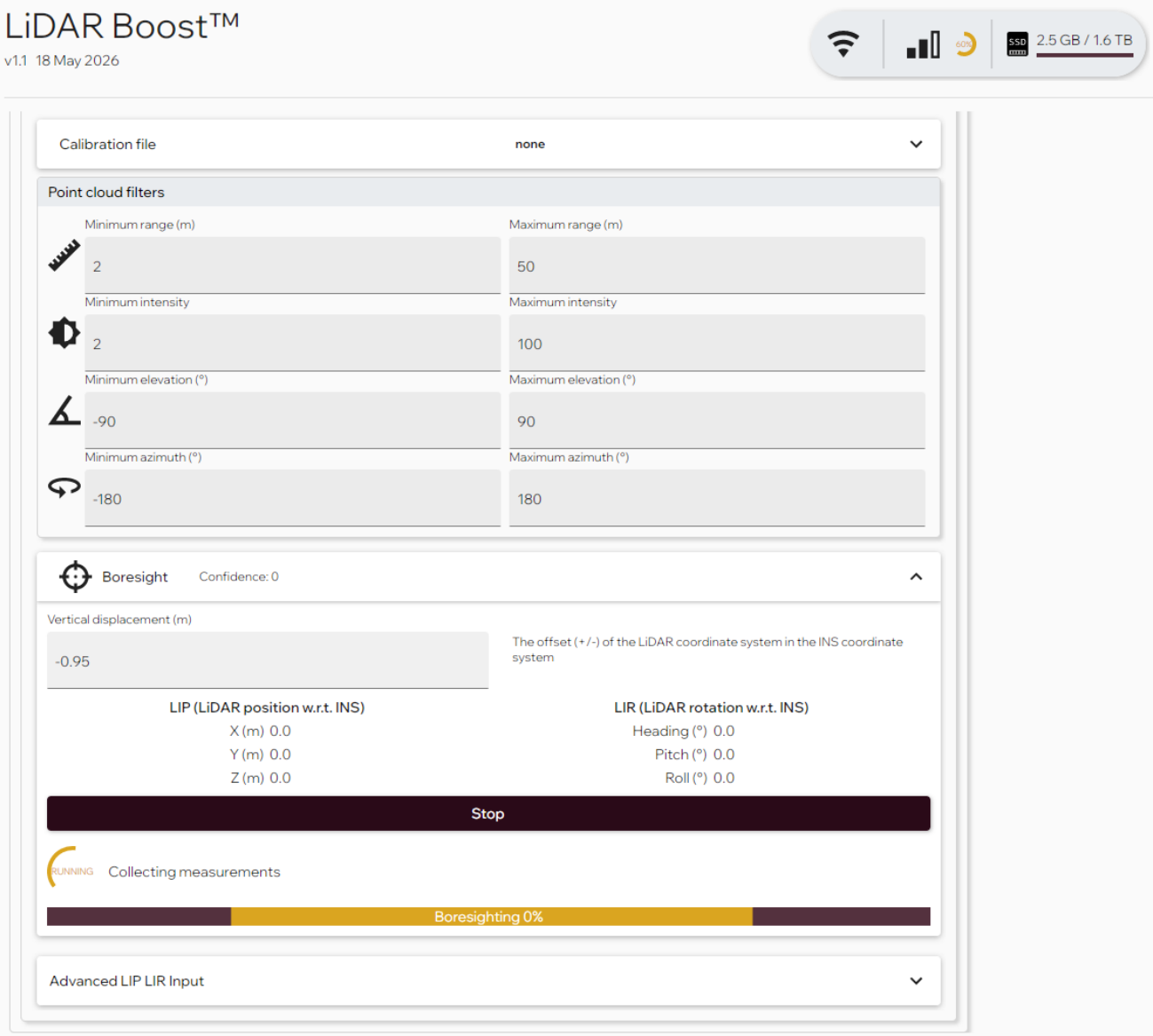


Figure 28: LiDAR Boost web app boresight

1. From the WayFinder Home page, click the LiDAR Boost button to open the LiDAR Boost app page.
2. Scroll to "Boresight" and click to expand the configuration section.
3. If using multiple LiDAR, each one will require its own boresight process. Ensure the correct LiDAR tab is selected for the LiDAR you wish to boresight.

NOTE: For LiDAR Boost aiding, all the LiDAR data is transformed and processed in the Primary LiDAR frame.

4. Enter the vertical displacement from the INS to the LiDAR. This should be measured to within 10 cm precision. If the LiDAR is above the INS, the value is positive. If the LiDAR is below the INS, the value is negative.

5. Ensure the vehicle is in an environment with good GNSS availability, can perform varied driving manoeuvres, and has sufficient structural features in the LiDAR field of view.

NOTE: Semi-urban areas with low-rise buildings tend to provide good features for LiDAR without decreasing sky visibility for GNSS. Rural areas and wide-open spaces typically have fewer features leading to a poorer boresight. Try to avoid areas with large numbers of independently moving objects (e.g. other vehicles, pedestrians).

6. Ensure the INS is initialised, warmed up, and receiving RTK corrections.
7. Click the "Start boresight" button to begin the process.
8. Drive the vehicle for ~10 minutes or until the status shows as "Converged", performing a variety of typical road manoeuvres. The status bar will show the progress of the boresight optimisation.
9. Once the optimisation is complete, click "Save changes" to apply the optimised LIP/LIR values.
10. For the Primary LiDAR, these values also need to be applied to the INS configuration. In NAVconfig, click "Modify Configuration", select the INS IP address from the Device dropdown, and click continue. Navigate to Hardware > LiDAR and scroll down to the LiDAR Boost section. Enter the LIP and LIR values from the boresight process. Then go to the Write Configuration page and commit to the INS.

WARNING: Ensure the INS and LiDAR do not move relative to each other after boresighting, otherwise the values will be invalid and the boresight process will need to be repeated.

Data logging

From the WayFinder Home page, click the Data Logger button to open the Data Logger app page.

The Control section shows the connected devices available for logging. Individual devices can be selected or deselected from logging in the Configuration section.

Clicking "Start" in the Logging Control section will create a session folder in the WF Hub user storage area, named with the current date and time. Depending on which devices have been selected, the following behaviour occurs:

INS data logging: the INS automatically logs its own data (RD file) to its onboard storage once powered on. When the Logging Control is stopped, the active RD file is pulled from the INS onto the Hub storage into the current session folder.

LiDAR data logging: the raw LiDAR packets (PCAP file) will be captured and logged continuously in the current session folder until the Logging Control is stopped.

Retrieving data

Once logging is stopped, data can be downloaded from the WF Hub storage by accessing the session folder via FTPS (FTP Secure). FileZilla is recommended for accessing the WF Hub storage.

1. Enter the following details into the FileZilla quickconnect toolbar:

Host	WF Hub IP address (e.g. 192.168.1.200)
Username	user
Password	Password that was set during first time setup

Table 34: FTP credentials

2. Click “Quickconnect” to access the WF Hub root folder. The data/ folder is where the list of session folders are stored.
3. Copy the desired session folders to a local storage folder.

NOTE: When initiating a file transfer via FTP, PTP lock will be momentarily lost. This includes downloading the RD file from the INS onto the Hub storage when the Logging Control is stopped in the Data Logger app. Ensure critical synchronisation activities are completed before transferring data.

Shutting down

To safely shut down the WF Hub before removing power, click the “Shut down” button on the WayFinder home page. A forced shutdown can be completed by pressing and holding the power button located on the Hub front panel, although this is not recommended as it could result in data loss or corruption.

WARNING: Disconnecting power before the shutdown process is complete may result in data loss or filesystem corruption.

Updating the software

The system is shipped with WayFinder OS pre-installed, built on top of NVIDIA's JetPack OS. Occasionally NVIDIA may release critical security updates for JetPack and OXTS may release WayFinder OS updates with added functionality, enhancements or fixes. Web app docker updates are also delivered as part of a WayFinder OS package.

The WayFinder Hub software can be updated or re-flashed with the following methods.

Upload via FTPS

1. Connect the user PC with the OS update file to the WF Hub via Ethernet.
2. Open an FTP client such as FileZilla and connect to the WF Hub (see "Retrieving data" section for details on connecting via FTP).
3. Transfer the update file (e.g. wfhub_update_OS_1.00.00_260612132601_signed.tar) to the top-level user area on the WF Hub.
4. Shut down the device via the web interface Home page.
5. Power the device back on. The OS update file will be automatically detected and the update process will begin. The OS LED will blink for the duration of the update.
6. The update is complete when the OS LED shines solid red (currently this takes approximately 10 minutes).
7. The OS update can be validated by checking the Network Devices information on the web interface Home page and noting that the WayFinder firmware ID matches the ID of the update file. Individual web app docker version IDs can be checked in the Applications manager section of the WayFinder Home page.

Boot from USB

1. Transfer the update file (e.g. wfhub_update_OS_1.00.00_260612132601_signed.tar) to the root folder of a USB storage device.
    a. It is recommended (though not essential) that the USB storage device be blank.
    b. It may be formatted to most normal formats, e.g. NTFS, FAT32, EXT3.
2. Plug the USB storage device into an unpowered WF Hub.
3. Power on the device. The OS update file will be automatically detected and the update process will begin. The OS LED will blink for the duration of the update.
4. The update is complete when the OS LED shines solid red (currently this takes approximately 10 minutes but will vary based on the speed of the USB storage device).

5. The OS update can be validated by checking the Network Devices information on the web interface Home page and noting that the WayFinder firmware ID matches the ID of the update file.

NOTE: Updating the OS will reset the system password to the default. It will require changing on login.

Appendix A – LiDAR suction cup mount guide

Introduction

For users who do not have their own LiDAR setup already, OXTS provides a LiDAR Kit accessory option that includes a Hesai XT32M1X LiDAR, LiDAR to Hub PoE cable, and a suction cup mounting solution. This section provides information and instructions for installing the LiDAR and mounting solution on the roof of a vehicle.

The suction cup roof mount includes the following components:

- Suction cup
- LiDAR adaptor plate
- All required bolts and washers
- Retaining safety strap

While the LiDAR kit accessory option comes with a Hesai XT32M1X, the LiDAR adaptor plate Is also compatible with an Ouster OS1.

You will need:

- Calibrated, right-angled torque wrench and the following driver bits:
- T30 torx
- 3mm hex (for Hesai LiDAR)
- 2.5mm hex (for Ouster LiDAR)

Essential safety information

- Read these instructions carefully before you install, operate, or transport the system.
- Store and install only in a suitable dry and dust-free environment by a trained member of staff in accordance with these instructions.
- Only use on vehicles with a hard flat roof surface made of any metal, plastic, glass or composite materials with a minimum surface area of 35 cm x 55 cm, excluding soft top vehicles.
- Perform a suitable risk assessment and inspection before use.
- Use the included safety retaining strap during use.
- Check suction cup adhesion regularly during operation.
- Do not exceed the maximum payload capacity of 7 kg.
- Do not exceed the recommended top speed of 50mph (80km/h).
- Use product in reasonable weather conditions and wind speeds.
- Do not exceed the shelf life of the suction cups. The recommended shelf life is 1 year from the inspection date. The inspection date is shown on the label of the suction cup.

Figure 29: LiDAR roof mount suction cup inspection date

Fixing the adaptor plate to the suction cup

1. Place the suction cup on a stable flat surface.
2. Place the narrow section of the plate on the cup, aligning it with the cutouts in the suction cup mounting surface. Once placed the plate should be unable to rotate.

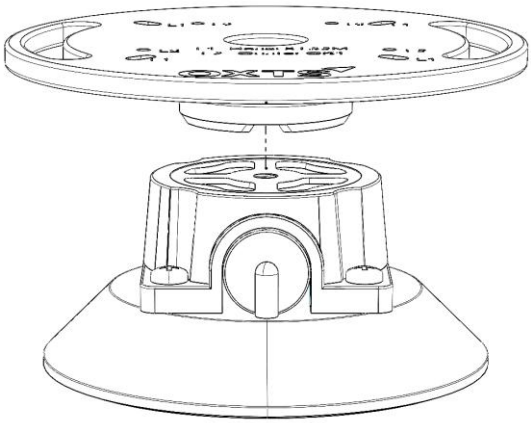


Figure 30: Placing LiDAR adaptor plate on suction cup

3. Place the provided NORDlock washer over the provided 1/4-20 UNC 3/4 inch screw and insert into the suction cups threaded insert.

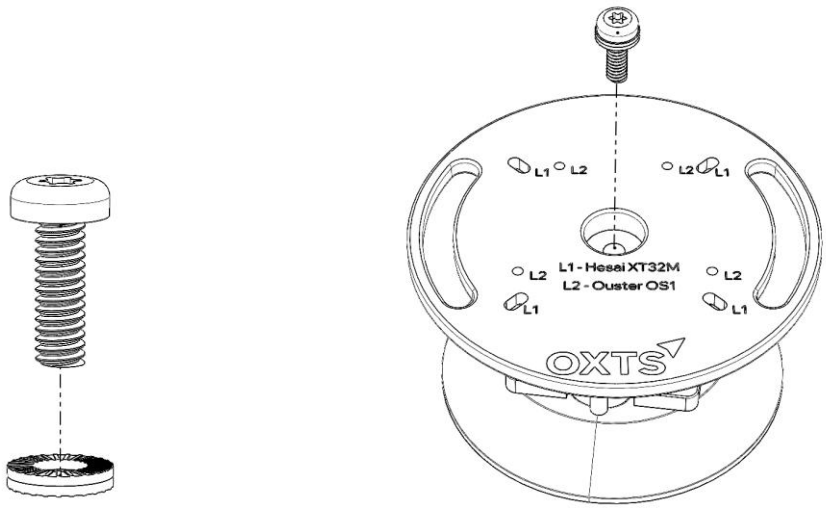


Figure 31: Attaching LiDAR adaptor plate to suction cup with screw

4. Tighten to 2.5 Nm using the T30 bit and calibrated torque wrench.

Fixing the LiDAR to the adaptor plate

1. Place the LiDAR upside down on a stable flat surface in order to access the mounting points on the bottom.
2. Align the adaptor plate with the appropriate mounting holes. The plate has two sets of mounting holes, one set for a Hesai XT32M1X (labelled L1), and one set for an Ouster OS1 (labelled L2).
3. For Hesai: prepare four M4x12mm Socket Cap Head SEMS screws.
4. Before fastening a screw, apply 1 or 2 dots of threadlocker in the thread fit area. LOCTITE® 263 Threadlocker is recommended. To ensure curing it in place, wait for at least 12 hours before operating the LiDAR.
5. Tighten the M4 cap head screw with 1.5 Nm using a calibrated torque wrench and 3 mm Hex bit.
6. For Ouster: prepare four M3x10mm Socket Cap Head SEMS screws.
7. Before fastening a screw, apply 1 or 2 dots of threadlocker in the thread fit area. LOCTITE® 263 Threadlocker is recommended. To ensure curing it in place, wait for at least 12 hours before operating the LiDAR.

8. Tighten the M3 cap head screw with 0.5-0.6 Nm using a calibrated torque wrench and 2.5 mm Hex bit.

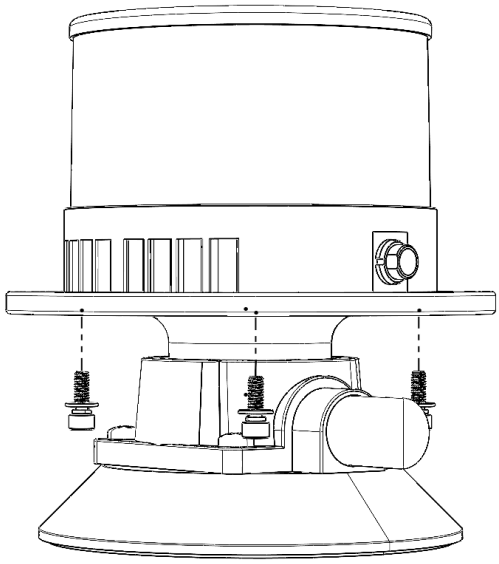


Figure 32: Attaching a LiDAR to adaptor plate

Mounting on the vehicle roof

1. Check the vehicle has a smooth, flat surface at the intended mounting location.
2. Remove any dust, particles, and moisture from the roof and wipe the intended mounting location with a damp microfibre cloth. If the surface is greasy use an appropriate cleaning substance.
3. Ensure the temperature is within the recommended operating range of the suction cups.
4. Inspect the system for any damage, particularly on the suction cups. If any of the parts appear to be damaged or compromised, do NOT continue with the installation.
5. Check the suction cups have not exceeded their shelf life. The recommended shelf life is 1 year from the inspection date. The inspection date is shown on the label of the suction cup.
6. Position the mount assembly at the desired location on the vehicle. Ensure it is positioned away from the windshield and any obstructions.
7. Engage the suction cup by pressing it down while simultaneously pumping the plunger to generate suction. Pump the plunger until the red line is no longer visible.

8. Tie the restraining strap through the cutout of the mounting plate and a secure point on the vehicle such as the internal grab handles. Pull the strap to remove any slack.

Figure 33: Retaining strap attached to LiDAR suction cup roof mount

WARNING: Be careful not to over-tighten the strap as pulling on the suction cups with too much force may cause them to distort and release.

9. Apply a gentle force to the mount to check for movement or rotation. If any movement is detected, release and re-mount the system.
10. After connecting the LiDAR system cables, ensure the cables are properly secured and routed into the vehicle to avoid snagging and wind loading.

Operation

During use

1. Always perform a pre-drive verification check to confirm the system is mounted securely and the suction cups are properly engaged (red line hidden on pump plunger).
2. Periodically check the suction cup integrity throughout operation.
3. Avoid excessive speeds, sudden accelerations, or harsh terrains.

After use

1. Remove the mount when not in use. The suction cups could bond with the surface if left for extended periods in a hot environment, resulting in damage when removed.

2. Release the suction cups by lifting a release tab until the cup disengages.
3. Carefully lift the system and remove from the roof.
4. Clean the suction cups and roof surface.
5. Inspect the mounting components for any wear or damage.
6. Store the mount system in a clean, dry location out of direct sunlight. Use the supplied pad covers to protect the suction cup faces from dirt and damage.

Appendix B – Compatible LiDAR models for LiDAR Boost

The table below lists LiDAR models that are fully or partially supported in LiDAR Boost. The WF Hub is capable of processing data from models with up to 128-channels real-time. Up to four LiDAR can be processed simultaneously for LiDAR Boost.

Full support indicates the LiDAR model has been tested and validated with real data.

Beta support indicates the decoders are supported in LiDAR Boost but they have not been validated with real data.

If you would like us to validate a model currently listed as "Beta" or would like to request support for a model not currently listed, please contact us at support@oxts.com.

Manufacturer	Model	Support
Hesai	XT32M1X	Full
	PANDAR64	Beta
	PANDAR40P	Beta
	PANDAR40	Beta
	PANDAR40M	Beta
	PANDAR128	Beta
	QT64	Beta
	XT16	Beta
Velodyne	VLP16 Puck	Beta
	Puck LITE	Beta
	VLP32C	Beta
	VLP32MR	Beta
	VLS128 'Alpha Prime'	Beta
	HDL32	Beta
	HDL64	Beta
Ouster	OS0-32	Beta
	OS0-64	Beta
	OS0-128	Beta
	OS1-16	Beta
	OS1-32	Beta
	OS1-64	Full
	OS1-128	Full
	OS2-32	Beta
	OS2-64	Beta
	OS2-128	Beta

Table 35: List of supported LiDAR models in LiDAR Boost

Appendix C – Drawing list

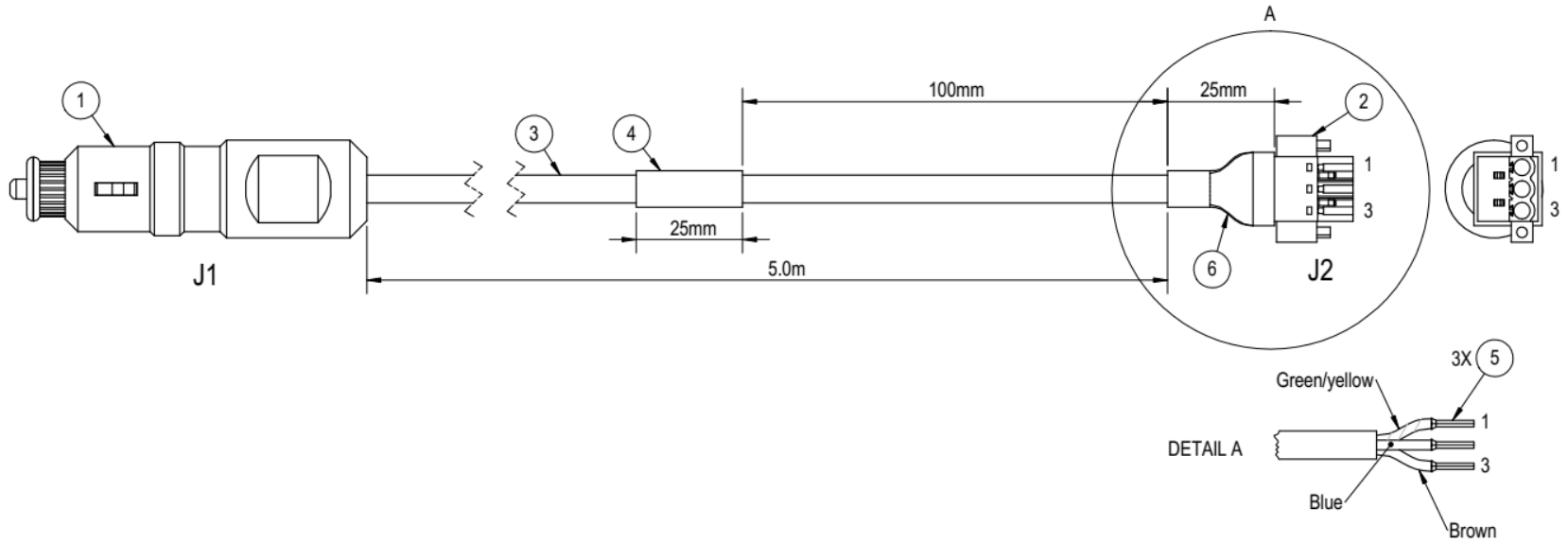
Table 36 lists the available drawings that describe components of the WayFinder system. Many of these drawings are attached to the back of this manual.

Drawing number	Drawing Name
14C0274	WayFinder Hub cigarette power cable
14C0275	INS user cable PoE adapter cable
14C0277	Hesai XT32 PoE adapter cable
14C0278	Ouster OS1 PoE adapter cable
14C0279	WayFinder Hub bare power cable
14M0318	Hub LiDAR mount adapter plate

Table 36: List of available drawings

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	67712000	PRO CAR - 8A fused-automotive connector plug	1
2	1012650000	WEIDMULLER - 3-pin connector	1
3	55100703	FS CABLE - 3-core 0.75mm² H05RR-F black rubber cable (blue, brown, green/yellow)	1
4	-	Yellow cable identifier label with black text, over sleeved with clear heat shrink - See Note (1)	1
5	0542500000	WEIDMULLER - H0,75/10 wire-end ferrule 10mm	3
6	HS121	MULTICOMP PRO - 3:1, 19.1 mm, adhesive lined heat shrink tubing	1

NOTES
1. LABEL CONTENTS: CABLE ID (DRAWING NO. & REV.), WORK ORDER ID, AND COMPANY WEBSITE (WWW.OXTS.COM).



ELECTRICAL CONNECTIONS			
J1	J2	WIRE COLOURS	FUNC.
Center contact	1	Green/Yellow	Ignition Control (IGN) [12V/24V]
	3	Brown	+V Supply / 12V / 24V
Outer barrel	2	Blue	-V Supply / GND / 0V

Cable and Wire Tolerances

≤0.3m	+25mm	-0mm
0.3m to 1.5m	+50mm	-0mm
1.5m to 3.0m	+100mm	-0mm
3.0m to 7.5m	+150mm	-0mm
>7.5m	+5%	-0%

REVISION HISTORY
A: First revision.

DRAWN BY: William Pavey — DATE:
CHECKED BY: Leon Chambers — DATE:
APPROVED BY: Tom Bailey — DATE: 2026-01-08

THIRD ANGLE PROJECTION
A3 SHEET 1 OF
DIMENSIONS: mm DO NOT SCALE DRAWING
DRAWING No.: 14C0274
DRAWING REVISION: A

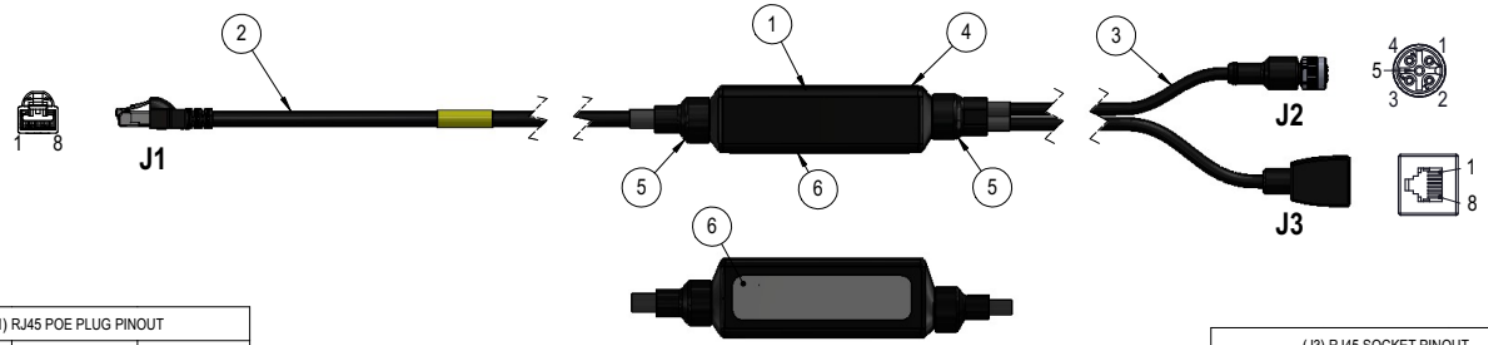
OXTS
Oxford Technical Solutions Ltd.
Part Farm Barns, Middleton Stoney, Oxfordshire, OX25 4NJ.

TITLE
Wayfinder Hub vehicle power cable

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	UF-SPG12V2A	10/100/1000M 12V 2.5A PoE Splitter	1
2	14C0275-02A	INS user cable PoE adapter (RJ45 Ethernet subassembly)	1
3	14C0275-01A	INS user cable PoE adapter (Molex subassembly)	1
4	RMW-35/12-1200/ADH-0	35mm dia. Black adhesive lined heat shrink tubing	130mm
5	HS121	19.1mm dia. Black adhesive lined heat shrink tubing	2x 25mm
6	14L0123A	INS user cable PoE adapter label	1
7	ACT75X2.4B	Cable Tie, Nylon (Polyamide), Black, 75 mm	1

NOTES
1. SEE "14C0275A ASSEMBLY INSTRUCTIONS.PDF"

(J2) 5-WAY M12 A-CODED PINOUT	
PIN	FUNC.
1	+V Supply / 12V
2	NC
3	-V Supply / GND
4	NC
5	NC



(J1) RJ45 POE PLUG PINOUT		
PIN	TWISTED PAIRS	FUNC.
1	A	DA+ (PoE)
2		DA- (PoE)
3	B	DB+ (PoE)
6		DB- (PoE)
4	C	DC+ (PoE)
5		DC- (PoE)
7	D	DD+ (PoE)
8		DD- (PoE)

(J3) RJ45 SOCKET PINOUT		
PIN	TWISTED PAIRS	FUNC.
1	A	DA+
2		DA-
3	B	DB+
6		DB-
4	C	DC+
5		DC-
7	D	DD+
8		DD-

Cable and Wire Tolerances

≤0.3m	+25mm	-0mm
0.3m to 1.5m	+50mm	-0mm
1.5m to 3.0m	+100mm	-0mm
3.0m to 7.5m	+150mm	-0mm
>7.5m	+5%	-0%

REVISION HISTORY
A: First revision.

DRAWN BY: William Pavey
CHECKED BY:
APPROVED BY: Tom Bailey
DATE: 23/01/2026

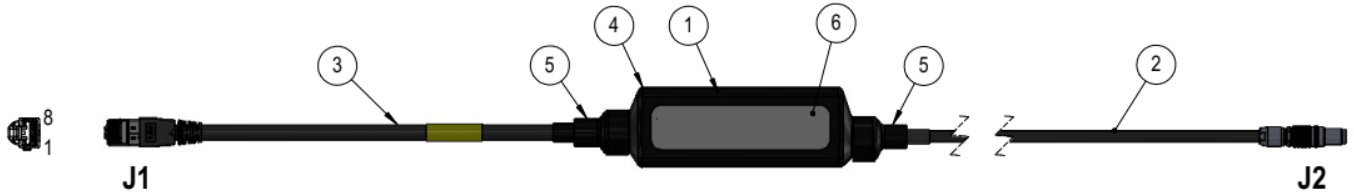
THIRD ANGLE PROJECTION
A3 SHEET 1 OF
DIMENSIONS: mm DO NOT SCALE DRAWING
DRAWING No.: 14C0275
DRAWING REVISION: A

OXTS
Oxford Technical Solutions Ltd
Park Farm Barns, Middleton Stoney
Oxfordshire, OX25 4NL

TITLE: INS user cable PoE adapter

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	UF-SPG12V2A	10/100/1000M 12V 2.5A PoE Splitter	1
2	14C0277-01A	Hesai XT32 PoE adapter (Molex subassembly)	1
3	14C0277-02A	Hesai XT32 PoE adapter (RJ45 Ethernet subassembly)	1
4	RMW-35/12-1200/ADH-0	35mm dia. Black adhesive lined heat shrink tubing	130mm
5	HS121	19.1mm dia. Black adhesive lined heat shrink tubing	2x 25mm
6	14L0124A	Hesai XT32 PoE adapter label	1
7	ACT75X2.4B	Cable Tie, Nylon (Polyamide), Black, 75mm	1

NOTES
1. SEE "14C0277A ASSEMBLY INSTRUCTIONS.PDF"



(J1) RJ45 POE PLUG PINOUT		
PIN	TWISTED PAIRS	FUNC.
1	A	DA+ (PoE)
2		DA- (PoE)
3	B	DB+ (PoE)
6		DB- (PoE)
4	C	DC+ (PoE)
5		DC- (PoE)
7	D	DD+ (PoE)
8		DD- (PoE)

(J2) 9-WAY HESAI XT32 LEMO		
PIN	TWISTED PAIRS	FUNC.
1	-	-
2	-	-
3	-	-V Supply / GND
4	-	+V Supply / +12V
5	A	TX +
6		TX -
7	B	RX +
8		RX -
9	-	-

Cable and Wire Tolerances

≤0.3m	+25mm	-0mm
0.3m to 1.5m	+50mm	-0mm
1.5m to 3.0m	+100mm	-0mm
3.0m to 7.5m	+150mm	-0mm
>7.5m	+5%	-0%

REVISION HISTORY
A: First revision.

DRAWN BY: William Pavey — DATE:
CHECKED BY: — DATE:
APPROVED BY: Tom Bailey — DATE: 23/01/2026

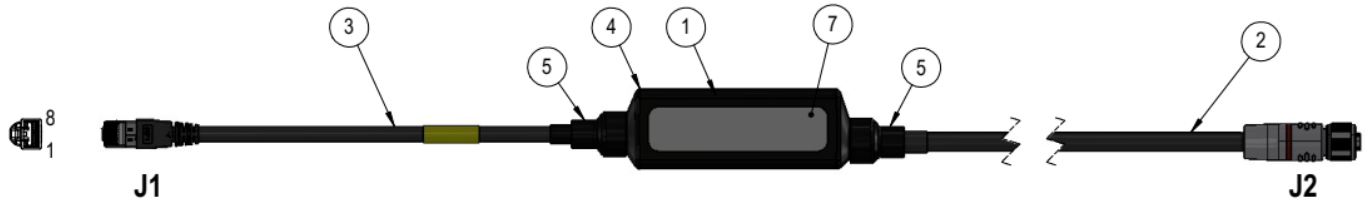
THIRD ANGLE PROJECTION
A3 SHEET 1 OF
DIMENSIONS: mm DO NOT SCALE DRAWING
DRAWING No.: 14C0277
DRAWING REVISION: A

OXTS
Oxford Technical Solutions Ltd
Unit 7 Cote Boons, Middleton Stoney
Oxfordshire, OX25 4AL

TITLE
Hesai XT32 PoE Adapter

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	UF-SPG12V2A	10/100/1000M 12V 2.5A PoE Splitter	1
2	14C0278-01A	Ouster OS1 PoE adapter (Molex subassembly)	1
3	14C0278-02A	Ouster OS1 PoE adapter (RJ45 Ethernet subassembly)	1
4	RMW-35/12-1200/ADH-0	35mm dia. Black adhesive lined heat shrink tubing	130mm
5	HS121	19.1mm dia. Black adhesive lined heat shrink tubing	2x 25mm
6	ACT75X2.4B	Cable Tie, Nylon (Polyamide), Black, 75mm	1
7	14L0125A	Ouster OS1 PoE adapter label	1

NOTES
1. SEE "14C0278A ASSEMBLY INSTRUCTIONS.PDF"



(J1) RJ45 POE PLUG PINOUT		
PIN	TWISTED PAIRS	FUNC.
1	A	DA+ (PoE)
2		DA- (PoE)
3	B	DB+ (PoE)
6		DB- (PoE)
4	C	DC+ (PoE)
5		DC- (PoE)
7	D	DD+ (PoE)
8		DD- (PoE)

(J2) 12-WAY OUSTER OS1 CONN.		
PIN	TWISTED PAIRS	FUNC.
1	-	+V Supply / +12V
7	-	-V Supply / GND
2	-	-
3	-	-
4	A	DA-
5		DA+
6	B	DB-
8		DB+
9	C	DC+
10		DC-
11	D	DD-
12		DD+

Cable and Wire Tolerances

≤0.3m	+25mm	-0mm
0.3m to 1.5m	+50mm	-0mm
1.5m to 3.0m	+100mm	-0mm
3.0m to 7.5m	+150mm	-0mm
>7.5m	+5%	-0%

REVISION HISTORY
A: First revision.

DRAWN BY: William Pavey — DATE:
CHECKED BY — DATE:
APPROVED BY: Tom Bailey — DATE: 23/01/2026

THIRD ANGLE PROJECTION
A3 SHEET 1 OF
DIMENSIONS: mm DO NOT SCALE DRAWING
DRAWING No.: 14C0278
DRAWING REVISION: A

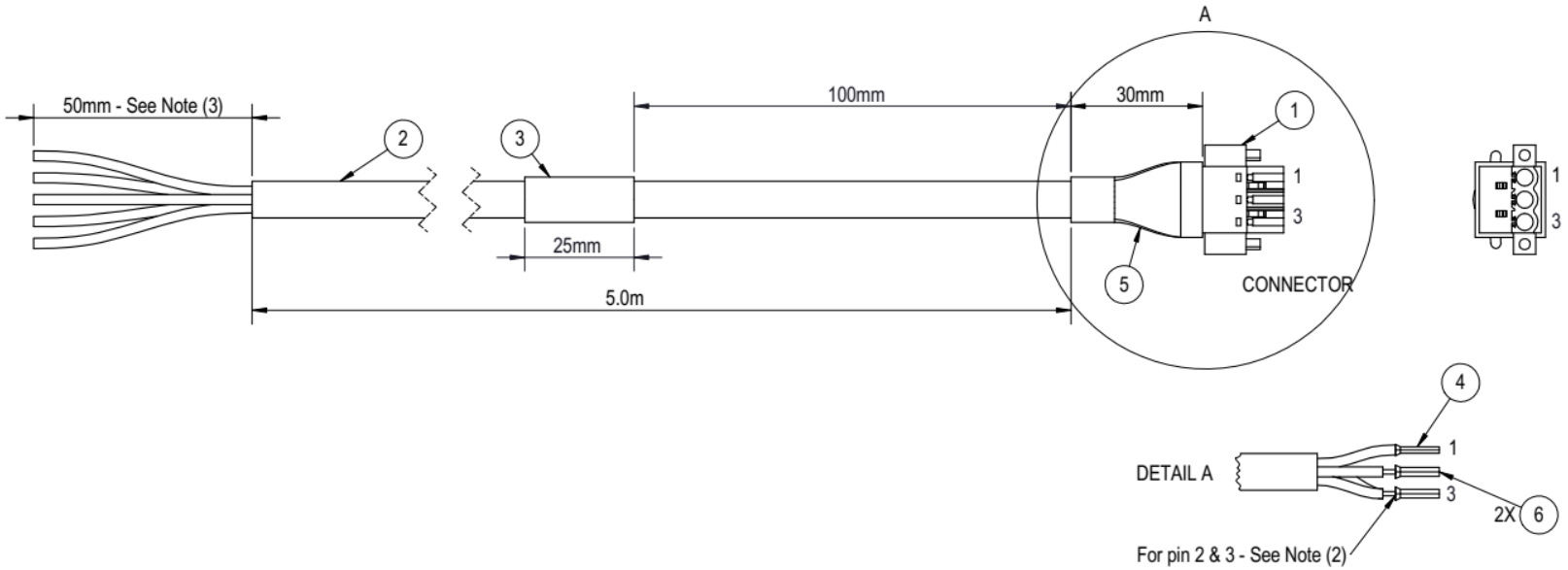
OXTS
Oxford Technical Solutions Ltd
Part Farm Barns, Middleton Stoney
Oxfordshire, OX25 4HL

TITLE
Ouster OS1 PoE Adapter

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1012650000	WEIDMULLER - 3-pin connector	1
2	3185Y-0.75MMBLK	5-core 0.75mm² black rubber cable (blue, brown, black, grey green/yellow)	1
3	-	Yellow cable identifier label with black text, over sleeved with clear heat shrink - See Note (1)	1
4	0542500000	WEIDMULLER - H0,75/10 wire-end ferrule 10mm	1
5	HS121	MULTICOMP PRO - 3:1, 19.1 mm, adhesive lined heat shrink tubing	1
6	0186500000	WEIDMULLER - H1,5/10 wire-end ferrule 10mm	2

NOTES

1. LABEL CONTENTS: CABLE ID (DRAWING NO. & REV.), WORK ORDER ID, AND COMPANY WEBSITE (WWW.OXTS.COM).
2. CRIMPS TO ACCOMMODATE TWO CONDUCTORS INSERTED INTO THE SAME BARREL.
3. PROVIDE AN ADDITIONAL 10MM CONDUCTOR LENGTH AT EACH FREE END - RESERVED FOR CABLE VALIDATION.



ELECTRICAL CONNECTIONS		
CONN. PIN	WIRE COLOURS	FUNC.
1	Green/Yellow	Ignition Control (IGN) [12V / 24V]
2	Blue	-V Supply / GND / 0V
	Black	-V Supply / GND / 0V
3	Brown	+V Supply / 12V / 24V
	Grey	+V Supply / 12V / 24V

Cable and Wire Tolerances

≤0.3m	+25mm	-0mm
0.3m to 1.5m	+50mm	-0mm
1.5m to 3.0m	+100mm	-0mm
3.0m to 7.5m	+150mm	-0mm
>7.5m	+5%	-0%

REVISION HISTORY

A (260108): First edition
A (260302): Drawing re-released - replaced item no. 2 part number due to supplier sourcing issue (prev. 55100705)

DRAWN BY: WP
CHECKED BY:
APPROVED BY: TB
DATE: 2026-03-02

THIRD ANGLE PROJECTION
A3 SHEET 1 OF
DIMENSIONS: mm DO NOT SCALE DRAWING
DRAWING No.: 14C0279
DRAWING REVISION: A

OXTS
Oxford Technical Solutions Ltd
Part Farm Barns, Middleton Stoney
Oxfordshire, OX25 4HL

TITLE
Wayfinder Hub pigtail power cable

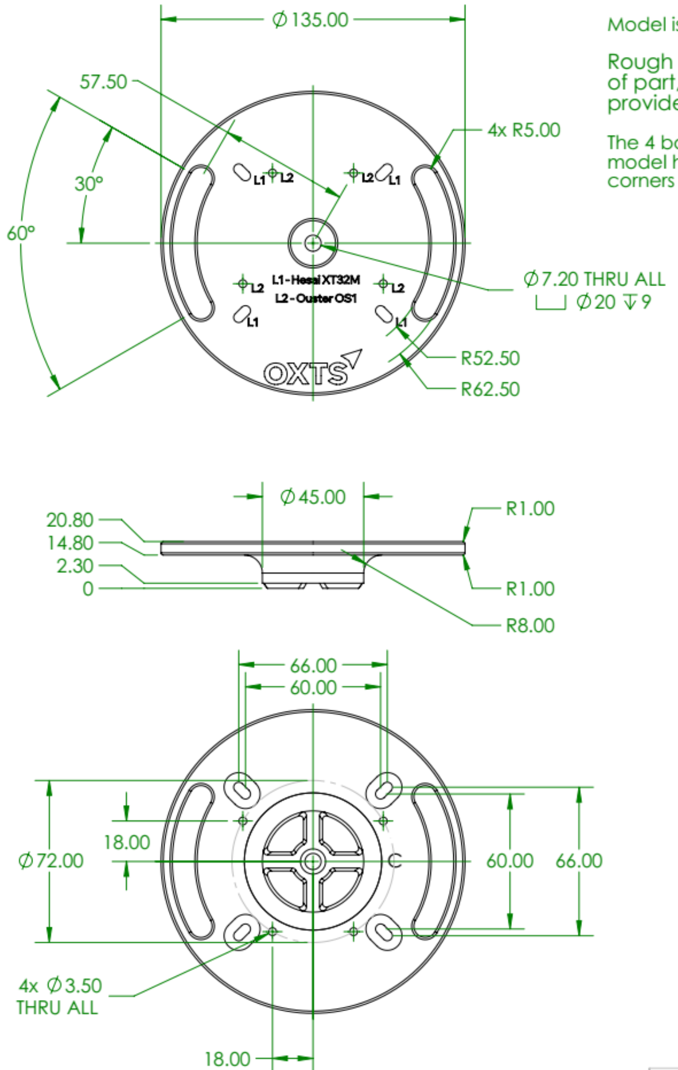
NOTES

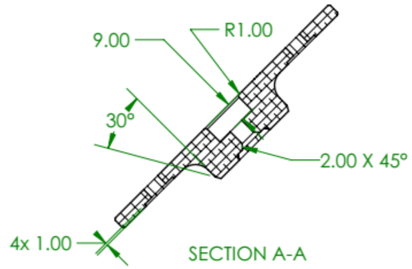
Model is Symmetrical from left to right

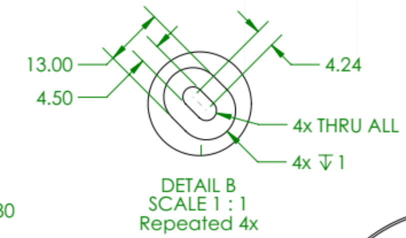
Rough silk screen shown in top view of part, full silk screen drawing to be provided alongside as illustrator file

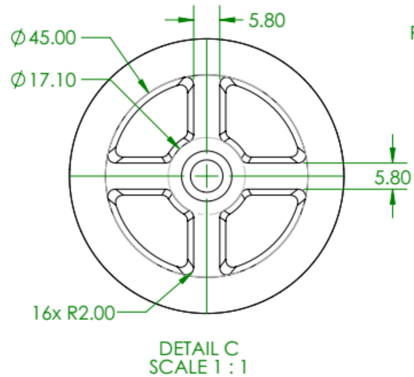
The 4 bosses on the underside of the model have a 30° draft and the corners have a 2mm fillet.

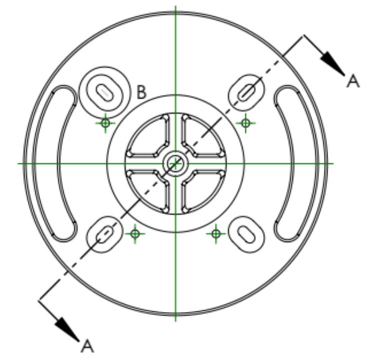
REVISIONS			
ZONE	REV.	DESCRIPTION	DATE
	A	First Revision	250915
	B	Reduced thickness to 8mm	251127
	B	Clarified powder coat and silkscreen colouring	251208
	C	Added a boss beneath the plate. Reduced plate thickness to 5mm. Changed central threaded hole to a counterbore	260330
	C	Added 'keys' to the boss. Increased plate thickness to 6mm and added cutouts for Hesai screws	260427











ALL CHAMFERS/ROUNDS TO HAVE TOL OF ±0.5 UNLESS STATED OTHERWISE						
BASIC SIZES ACC. TO ISO 2768 m						
LINEAR DIMENSIONS						
UP TO 6	OVER 6 TO 30	OVER 30 TO 120	OVER 120 TO 400	OVER 400 TO 1000	OVER 1000 TO 2000	OVER 2000 TO 4000
±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2.0
ANGULAR DIMENSIONS						
L	UP TO 10	OVER 10 TO 50	OVER 50 TO 120	OVER 120 TO 400	OVER 400	
/	±1°	±0.5°	±0.3°	±0.2°	±0.1°	

SURFACES TO ISO 1302	
Ra	CLASS
0.4	N5
0.8	N6
1.6	N7
3.2	N8
6.3	N9

DRAWN BY: J Ayling 260427

CHECKED BY: L Chambers 260427

APPROVED BY: T Bailey 260428

MASS: 260 g

MATERIAL: 6082-T651 Aluminium

FINISH: Powder Coated and Silkscreened

POWDER COAT: Interpon SG303G - RAL 3003 Fine Texture

SILK SCREEN: White

FINISH: N/A

THIRD ANGLE PROJECTION

A3 SHEET 1 OF 1

SCALE:1:2

DIMENSIONS: mm
DO NOT SCALE DRAWING

DRAWING No : 14M0318

DRAWING REVISION: C

OXTS

Oxford Technical Solutions Ltd
Park Farm Barns, Middleton Stoney
Oxfordshire, OX25 4AL

TITLE: WayFinder Hub LiDAR Mount

PROJECT: RD804

Revision history

Revision	Comments
260708	First release

Table 37: Revision history

Blank for user notes

Connect with us today

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OXTS