



June 2023

Mobileye Shield+ Connect

Technical Installation Manual v2.8

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18. Technical specification

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1. Warnings

General



Note

By Installing the Mobileye® shield+ System, you will be acknowledging and agreeing to operate Mobileye® Shield+ in accordance with the Safety Instructions and Warnings set forth below. If you do not agree to these terms, please return the Mobileye® Shield+ to your dealer.

Mobileye Shield+ is a driver assistance system which is intended to alert drivers to certain potentially dangerous situations. It does not replace any functions drivers would ordinarily perform in driving a motor vehicle, nor does it decrease the need for drivers to stay vigilant and alert in all driving conditions, to conform to all safe driving standards and practices, and to obey all traffic laws, rules, and regulations.

Mobileye Shield+ is not an automated driving system and it does not act as a substitute for any aspect of driver vehicle control or safe driving practices. Drivers are strongly cautioned not to rely on the Mobileye Shield+ as a substitution, to even the slightest degree, for the exercise of due caution in assuring that they are driving safely and avoiding accidents.

While Mobileye Shield+ represents a state-of-the-art innovation in machine vision software and other technologies, it cannot and does not guarantee 100% accuracy in the detection of vehicles or driving lanes, nor in providing warnings of all potential road hazards. Mobileye Shield+ system's recognition and response capabilities accordingly, drivers should not rely on the Mobileye Shield+ to assure their driving safety, but rather should continue to rely on safe driving practices.

Drivers should exercise caution in using the Mobileye Shield+ Display unit. Always maintain full concentration on the road including while looking at the Mobileye Shield+ display unit.

The Mobileye Shield+ is intended for paved roads, with clear lane markings.

The Mobileye Shield+ detects only fully visible pedestrians and cyclists.

The Mobileye Shield+ does not guarantee 100% accuracy in the detection of pedestrians and cyclists, nor in providing warnings of all potential road hazards. In addition, road, weather, and other conditions can adversely affect the Mobileye Shield+ system's recognition and response capabilities.

Any conditions that form partial or full blockage of the camera's view will result in reduced or non-functionality of Mobileye Shield+ performance. Always ensure clear camera view.



Note

The information and illustration images in this document are an example only and do not limit the installation to a specific vehicle type.



Warning

- ✓ Do not connect any system component when vehicle power is On.
- ✓ All system components must be connected before turning the system power On.
- ✓ Before making the power connections, extract the Fuse from the Fuse holder and add it back only after all system components and cables are connected and before turning the vehicle power On.
- ✓ DO NOT open the SIM card lid while system is On. Replacing the SIM card is prohibited.

Installation & Safety Instructions

Mobileye Shield+ installation must be carried out by an Authorized Mobileye Dealer or Installer.

The Mobileye Shield+ should only be operated with 12VDC~24VDC power.

Do not cover or obstruct the Camera Unit or Mobileye Shield+ Display and Control Unit.

Only proper tools are to be used.

Only L.E.D voltage tester or Digital Multi Meter should be used.

The use of light bulb voltage tester is prohibited.

Pay attention to unusual color cables for example: yellow cable isolation belongs to air bags; two twisted wires usually belong to different sensors (digital).

Before disconnecting the battery or the radio connectors make sure to have the radio code.

Do not disconnect any plug or connector in the vehicle when the ignition switch is turned on.

Ensure cables are not damaged due to pressures or cut during cable threading that can cause a power shortage

Installation tools

In addition to the standard installer`s tools, we recommend having the below tools list to assist with the installation process.

- | | | |
|-------------------------------------|-------------------------|---------------------|
| ▪ self-drilling screws | ▪ cordless drill driver | ▪ soldering iron |
| ▪ rivets + gun | ▪ mixed bit tips | ▪ shrink tube - mix |
| ▪ silicone for sealing | ▪ drill bit set | ▪ Heat gun |
| ▪ Corrugated Tubing (for isolation) | ▪ step drill bit | |
| ▪ plastic ties | ▪ fish tape | |
| ▪ Vinyl electrical tape | ▪ step ladder | |
| ▪ 3M spare double-sided tape | ▪ flashlight | |

2. Acronyms & Terminology

TERM	DESCRIPTION
ME	Mobileye
CAN	Controller Area Network
VRU	Vulnerable road user
CIPV	Closest-in Path Vehicle
LDW	Lane Departure Warning
FCW	Forward Collision Warning
HMW	Headway Monitor Warning
PCW	Pedestrian collision warning
PED	Pedestrian
DZ	Danger Zone (for Pedestrian's detection)
TSR	Traffic Sign Recognition
JB	Junction Box

3. System Requirements

Software & Hardware	
Operation system	Windows 10/11 64bit (home/pro)
Processor	Core I5-8350U CPU
Memory	8 GB RAM (or more)
Hard drive	128 GB SSD (min free space of at least 10 GB)
LAN	Ethernet card 1Gb Intel chipset
USB port	USB 3 connection (external LAN to USB adapter may be required)
Screen resolution	Minimum 1360 x 768

4. Software Download

Software download & installation

Note

Please make sure you have Administrator Privileges before installing the Mobileye IC application, if not, please contact your IT department for further assistance.

The Mobileye IC (Installation Center) application is available in our website at the following link <https://www.mobileye.com/support/>

Double click the **InstallationCenter.exe** and click "Next" on all pop-up messages until installation is complete.

Note

To keep the most up to date version of the IC application, login with your credential to enable automatic update. If an update is available, follow the on-screen notification.

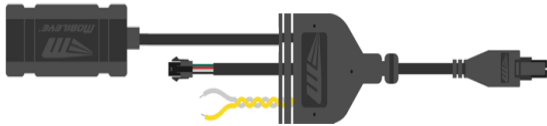
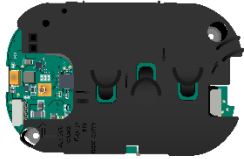
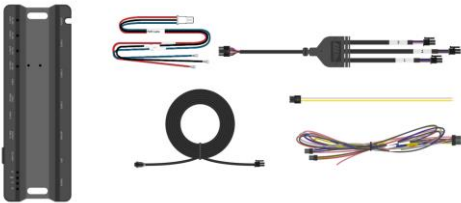
5. Component's overview

Component's list

Package List	Component	Mobileye P/N
Master camera kit PAC00S4MASTERSM2	Master Camera unit	ME8000000000VSM2
	Master camera display - Eyewatch	ASY000I30
	Master camera display cable	CAB000087
	Master camera cable	CAB000400
	GNSS	CAB000402
	CAN Reader	CANREADER1
Rear camera PAC0000000000S4L/R	Rear right/left camera unit (SerDec)	ASY0000000000S4L/R
	Coax cable with quick disconnect plug (6.6meter)	CAB000621
	Coax cable for rear camera (0.4meter)	CAB000622
	Metal bracket	MEC000605
	Black rubber cover	MEC000611
	ISO 7045 M3X14 Screw (x4)	SCR000098
	Shrink tube	SHR000008
Side SeeQ	Mobileye Shield+ Connect SeeQ (bridge unit)	PAC00000S4SIDESQ
PAC000000SHIELD4	Junction box	ASY000I20
	Power Cable	CAB000086
	CAN-B Cable	CAB000083
	Display Splitter Cables	CAB000305
	Extension Cable for side display unit	CAB000187
	AUX/IHC cables connector	CAB000133
PAC000LED	LED display unit (Right side)	ASY000I21
	Cable of LED display unit	ASY000274

Cables	Bridge unit cable to JB Extension cable (3 meter)	
	Or Master unit cable CAB000400rev3.3 to JB extension cable	CAB000164rev1.0
	Bridge unit to Junction-Box harness cable (8 meter)	CAB000600
	Bridge/master cable to JB Extension cable (9 meter)	CAB000587
	Bridge unit to Junction-Box harness cable (0.5meter)	CAB000615
PACSH0002	Additional junction box (4 cameras and up)	ASY000120
	Connection cable between JB_1 to JB_2	CAB000165
	Power Cable	CAB000086
(Optional)	LED side display main unit	ASY000486
PAC000000LED S4FE	Extension cable	CAB000750

Component's overview

Item description	Item image
ASY0000000000805 (master camera)	ASY000130 (master camera's display unit)
	
Mobileye CAN-Reader	ASY0000000000S4SQ (bridge unit)
	
ASY0000000000S4L/R (rear right/left-side camera)	PAC000000SHIELD4
	
PAC000LED	CAB000400
	
CAB000164(3m)/CAB000587(9m)	CAB000600
	
Installer kit (EyeNET, Laptop, TAC)	
	

6. Technology

Mobileye Shield+ is an intelligent blind spot detection system for buses and heavy good vehicles (HGV) that utilizes multi-vision smart sensors and provides an informational assistance system to the drivers and is activated with enough time for the driver to avoid dangerous situations. The artificial vision is trained to identify pedestrians, cyclists, and motorcyclists (Vulnerable Road Users- VRUs) while ignoring inanimate objects.

Furthermore, the artificial vision sensors of the Mobileye Turn Assist are connected to a gyro sensor to ensure that the proper parameter combinations are detected (lateral time-to-collision) based on the real time vehicle and VRU trajectories.

How the system works

The System detects VRUs at the following driving speeds of the vehicle:

VRU type	Driving speed of the vehicle at which the VRU is detected
Pedestrian	0 km/h to 70 km/h
Cyclist	0 km/h to 70 km/h (to avoid false alarm when entering a bus stop)
motorcyclist	0 km/h to 70 km/h

The Mobileye Shield+ Connect™ system delivers two levels of sensitivity's based on the severity of the risk of collision & the physical parameters of both the pedestrian and host vehicle.

Danger Zone Warning

Yellow visual warning - blind spot illumination

Indicating when a VRU is present in one of the vehicle blind spots (danger zones), alerting the driver to act with caution.



Collision warning

Red flashing visual and audio - indicating that a VRU and the vehicle are on an imminent collision course, triggered when the lateral time to collision (LTTC) between the VRU and the vehicle shortens to a critical time, alerting the driver to take immediate action to prevent the collision.

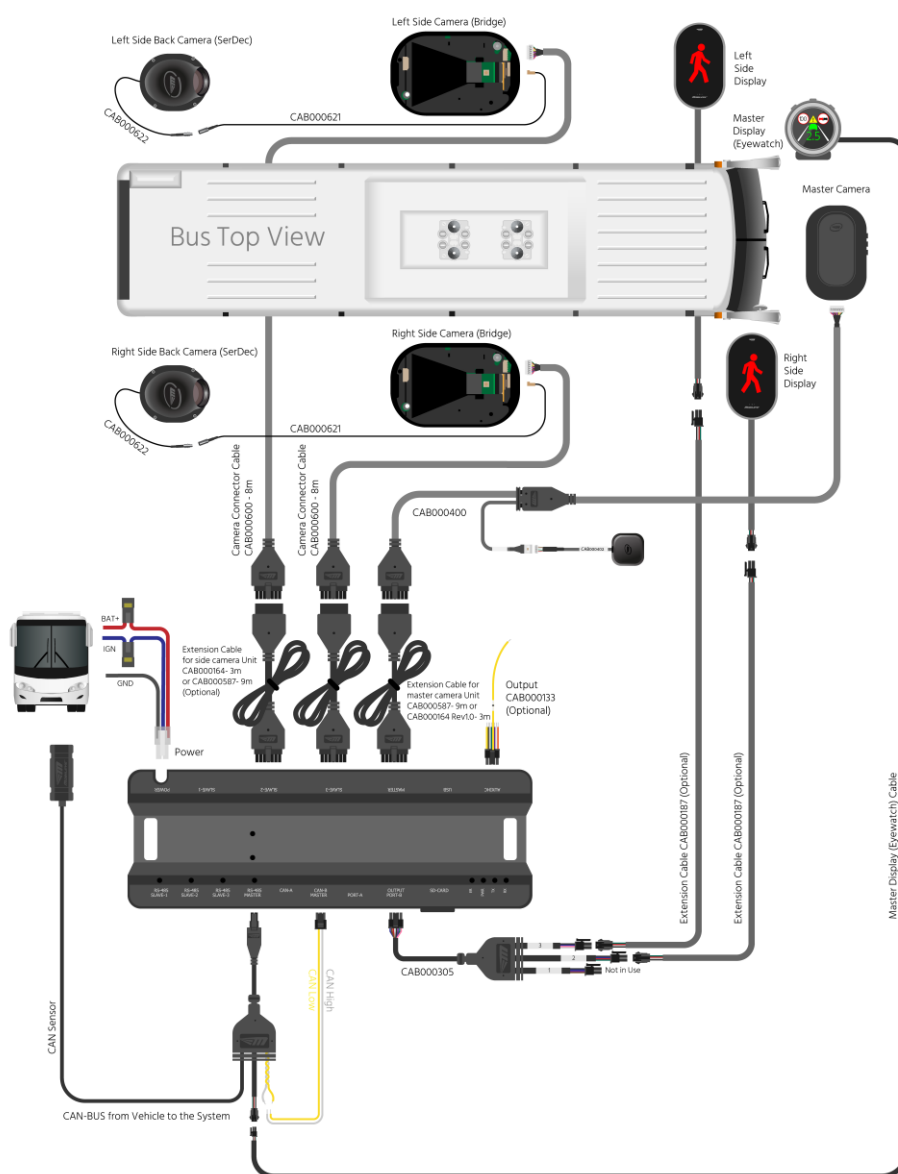


7. Connection Scheme

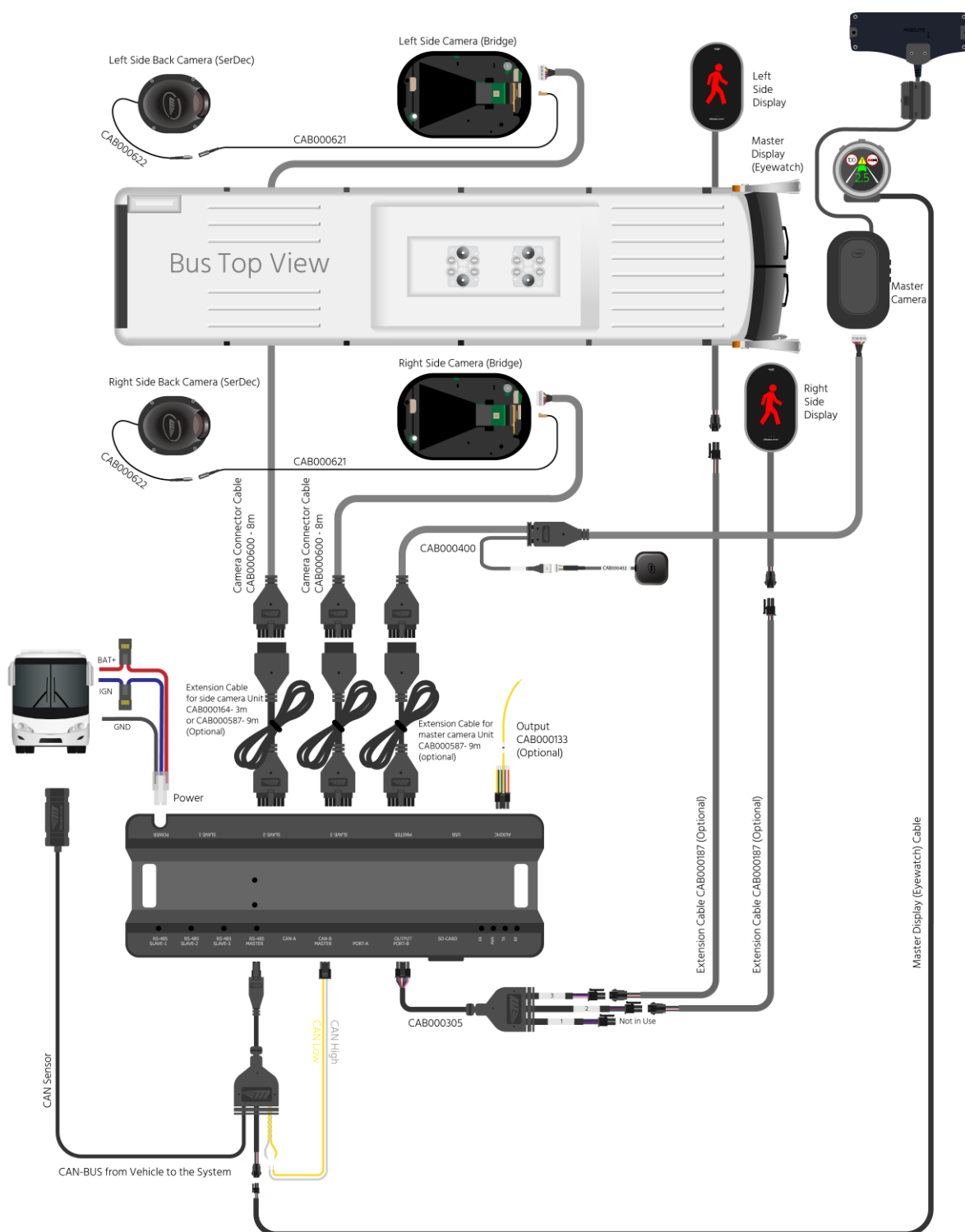
The below scheme uses the quick disconnecter cable (CAB000622&CAB000621).

Note that in some systems you might receive the coax cable as a single cable (without the quick disconnection feature). System configuration will remain the same.

CAN-bus installation scheme

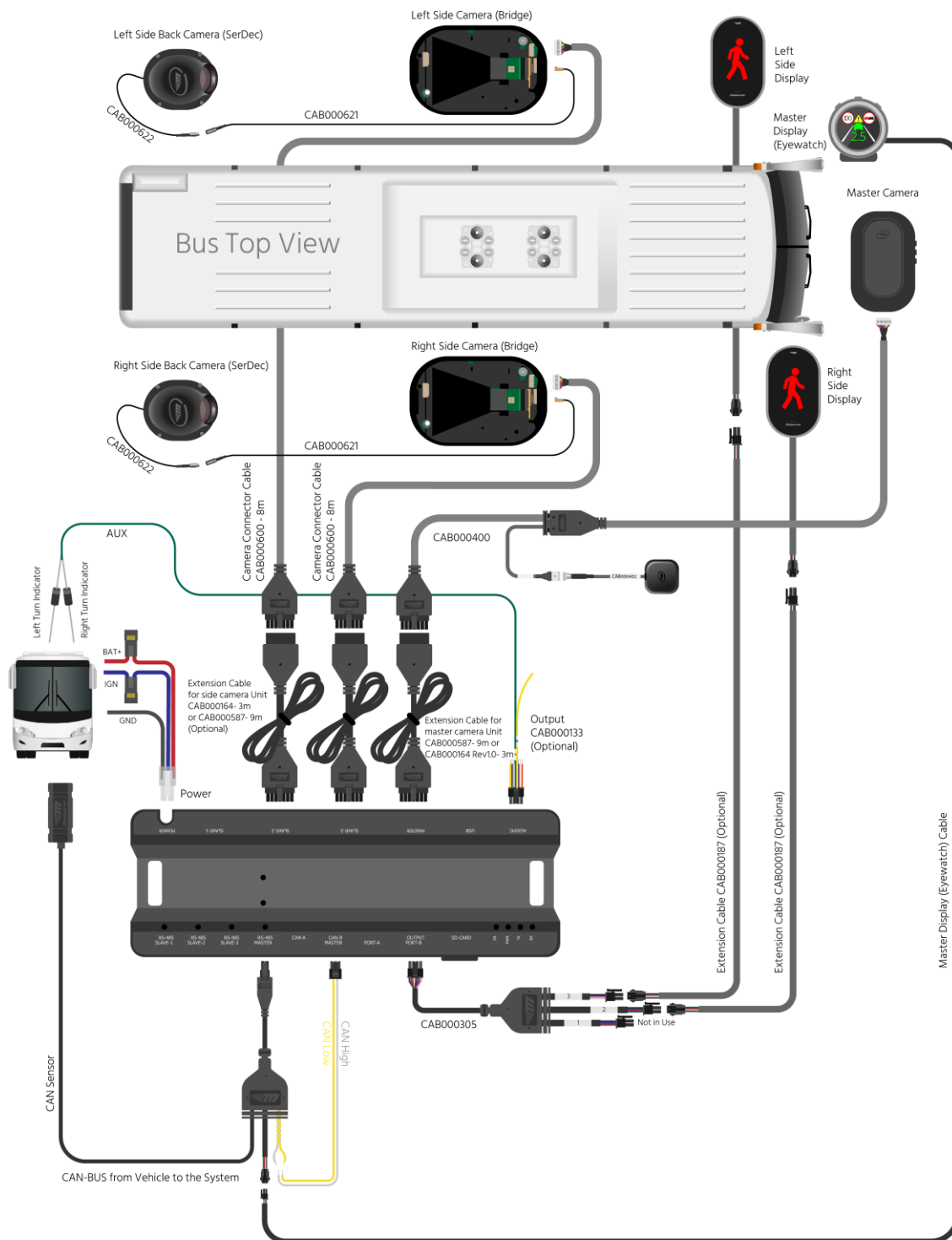


Connection scheme with Mobileye 8 unit including 3G modem.



Connection scheme with Mobileye 8 unit including 4G modem.

Mixed installation (CAN-bus & AUX) Scheme



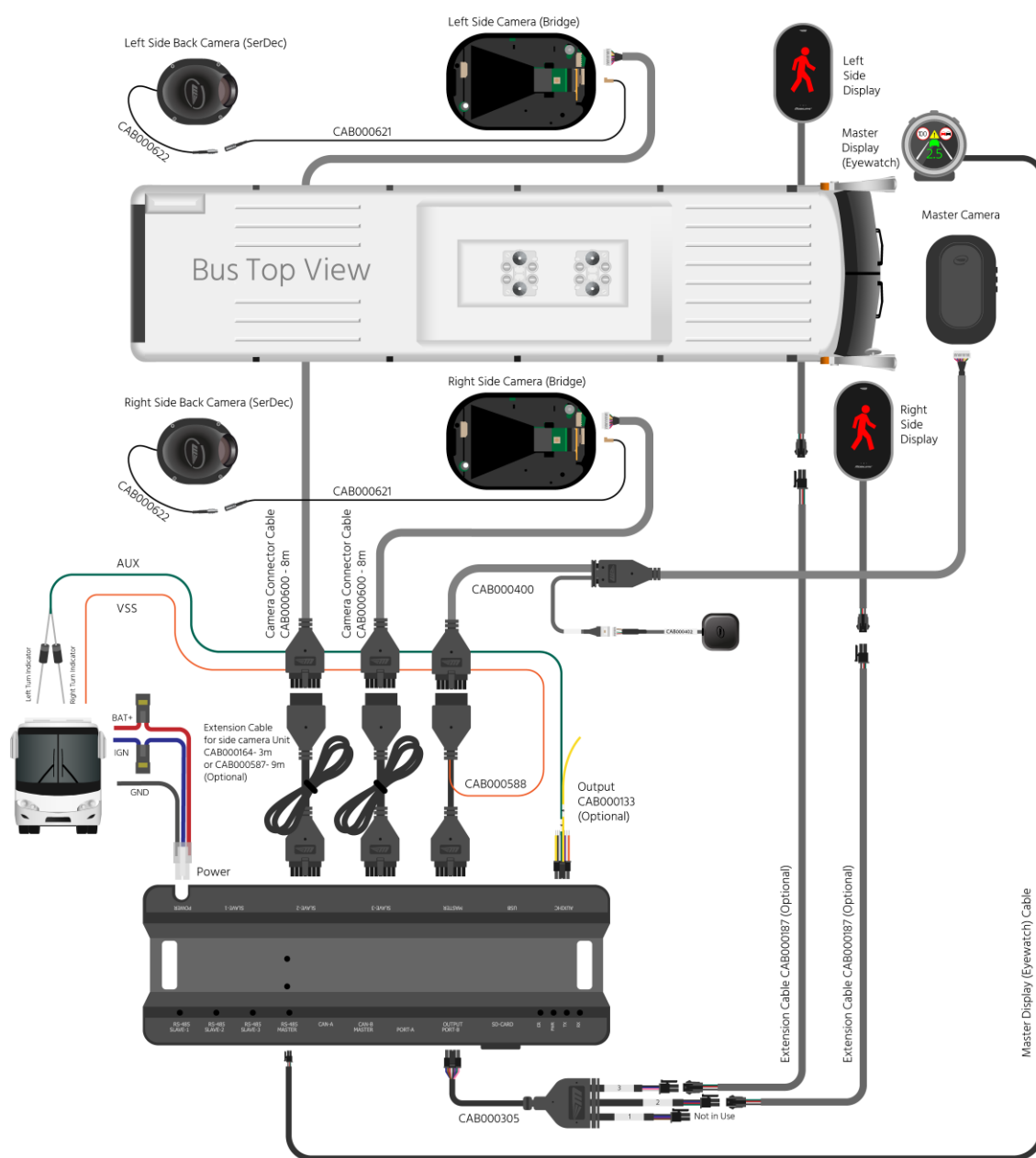
Connection scheme with Mobileye 8 unit including 3G modem.



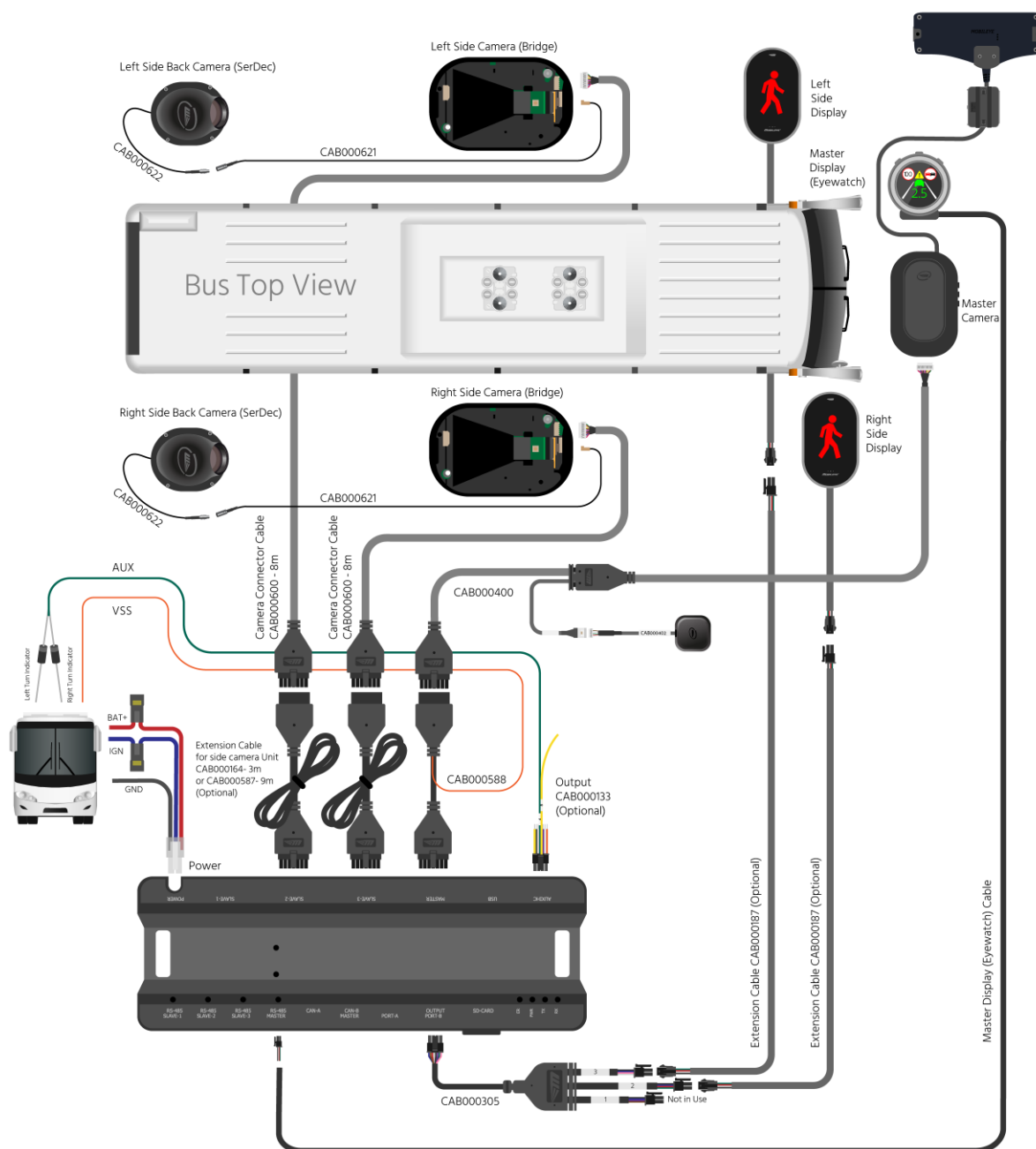
Analog installation scheme

When CAN-Bus is not available and would need to connect the analogue speed signal & turn indicators, we will use CAB000588 Shield+ Connect master extender VSS cable to connect between CAN000400 (rev3.3) Mobileye 8 main cable and the Junction box.

See connection scheme below:



Connection scheme with Mobileye 8 unit including 3G modem.



Connection scheme with Mobileye 8 unit including 4G modem.

8. Guidelines

8.1 Analog installation scheme

- ✓ Make sure the vehicle is parked on a flat surface (no slope).

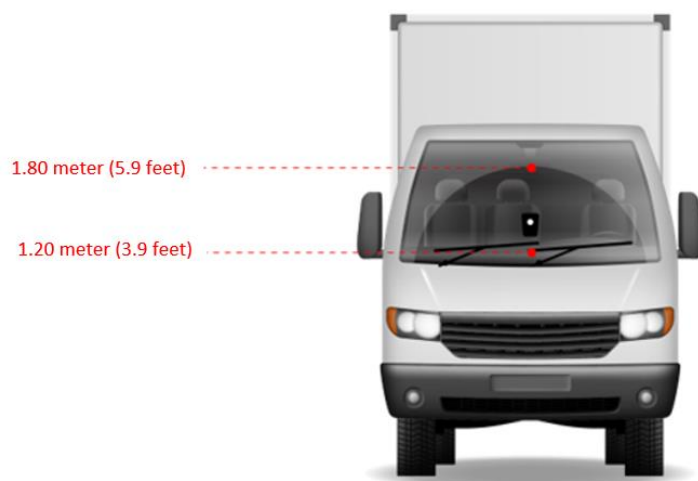


- ✓ Make sure the vehicle is set to driving mode - meaning no air suspension (air spring) mode.
- ✓ Check vehicle speed signal availability (either by CAN-bus or by Analog) to determine which type of installation will be for the Master camera (CAN, Analog, Mix).
- ✓ Plan a head, look around and learn the vehicle to find the optimal location for mounting the rear side cameras.

Analog installation scheme

Mounting the camera correctly on the front vehicle windshield is critical and will affect the system performance if not done according to the below guidelines:

- ✓ Camera height
 - Minimum installation height is 1.20meters (3.9 feet)
 - Maximum installation height is 1.80meters (5.9feet)



✓ Camera location

- Mounting the camera in the area covered by the wipers and 5cm above the wipers off position.
- Mounting the camera in the center of the windshield or with $\pm 10\text{cm}$ off center deviation



✓ Camera roll-up

- Allowed tolerance up to 2°

GPS attachment on Flat Windshield

GPS module attachment should be in any of the vehicle windshield corners is an area **not covered** by the wipers and/or without any other metal obstruction.

The GPS module should be facing up/forward (not sideways) and has a clear path to the sky.

Please bellow illustration for example

Green- GPS attachment allowed.

Red- GPS attachment not allowed.



EyeWatch display unit installation

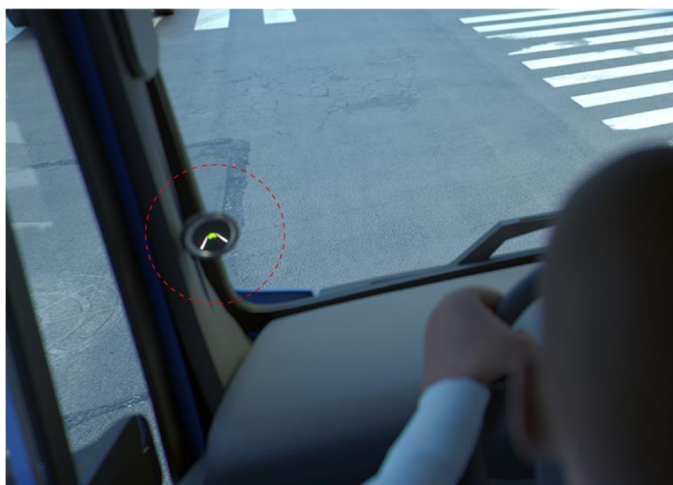
Note

The EyeWatch unit should be placed in a location that does not interfere with the driver's field of vision.

The EyeWatch should not be placed in front of the air-bags operational space as it may otherwise prevent the airbag from fully opening or cause injury during air-bag activation.

The Eyewatch display unit should be placed on the front windshield, close to the left side A pillar (or B pillar, depending on the driving side), parallel (or up to 10cm above)

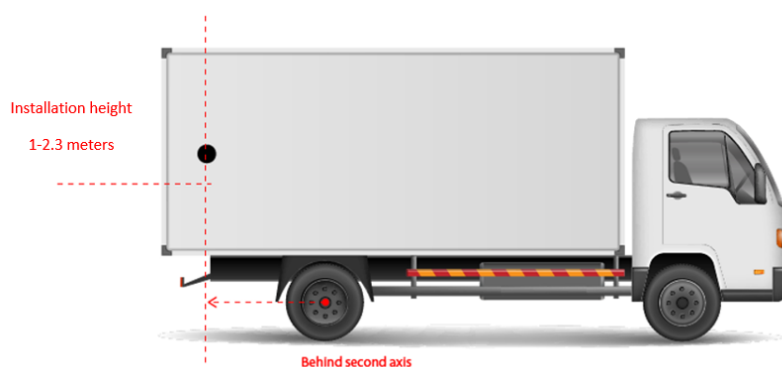
to top of the dashboard, facing the driver.



Rear-side camera installation

Mount the rear right-side camera at the back of the vehicle on an existing flat surface (non-flat surface cannot be used for installation as the calibration process cannot compensate the distortion and it will decrease system effectiveness) facing forward at height between 1-2.3m.

Allowed tolerance from back end of vehicle – up to 1 meter.



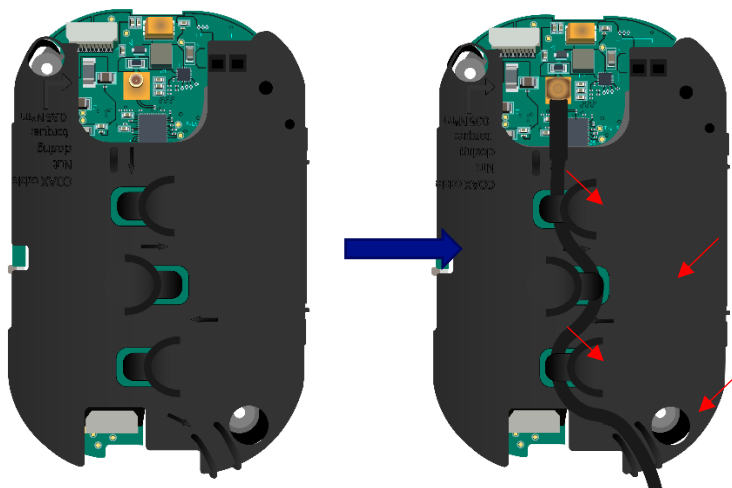
To install the camera on a non-flat surface and to compensate the distortion to comply with the above guidelines, a self-made bracket should be fabricated and will be attached either by screws or welding to the vehicle.

See example in the image bellow:



Side-SeeQ (bridge) unit installation

When connecting the coax cable to the bridge unit, route the wire trough the designated channel to prevent the cable to be pulled out.



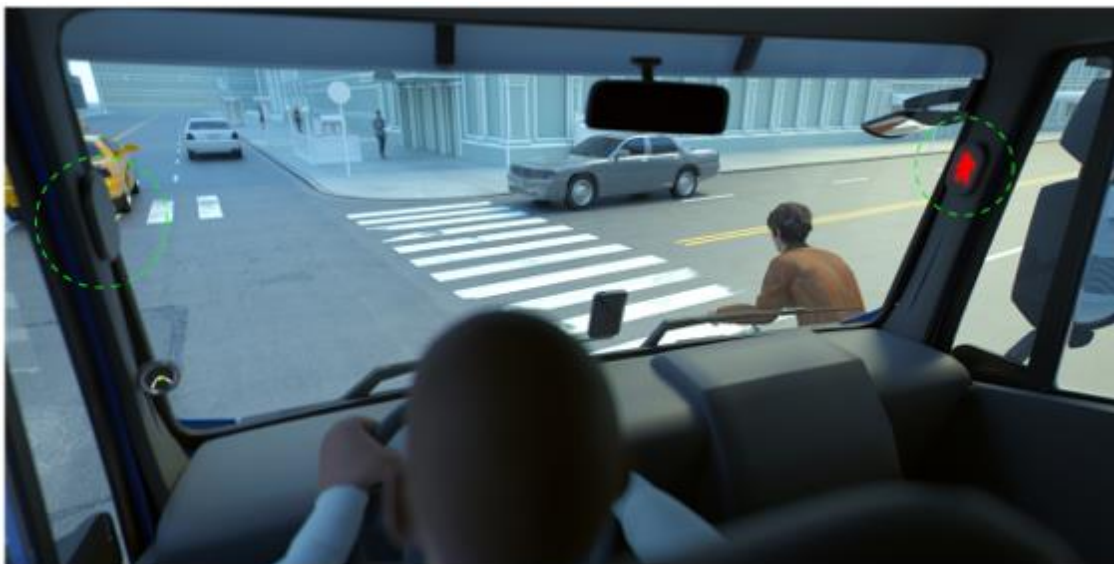
Once done, assemble the unit to the frame and use the provided screws x2 to permanently attach the unit to the frame.



Side display installation

Mount the side display up to 20cm above the center of A/B pillar.

Note that the display unit must be installed at least 30° carried out of the vehicle's propelled visual axis.



9. Installation & Calibration procedure

Side Master camera installation & calibration

- Remove the relevant panels to mount all shield+ Connect system components and route the cables.
- Run all the cables in the front cabin towards the Junction Box location – Master harness, Eyewatch and display cable/extension and CAN Sensor.
- Connect Power cable (BAT+, IGN and GND) to Junction Box.
- Connect vehicle's Signals to CAN-B cable (via CAN Sensor)
- Connect master camera to Junction Box.
- Mount the Eyewatch in the designated place according to the guidelines described in this document.
- Connect the Eyewatch to Junction Box.
- Connect the laptop to the front camera using the EyeNET.



- Turn ON the IGN to supply power to the system.



Note

System cable wiring inside the vehicle is at the installer's discretion.

Installation & calibration of the Master camera will be performed according to the standard [Mobileye 8 installation](https://www.mobileye.com/support) procedure available in the following link:

<https://www.mobileye.com/support>

EyeWatch installation

Select the optimal location for the EyeWatch and follow the guidelines in section 8.3.

Clean the selected location with the provided 3M VHB Surface cleaner, remove the protective cover of the 3M tape and attach the EyeWatch at the selected place

Route the EyeWatch cable behind the vehicle trimmings so that it reaches the EyeWatch connector of the junction box.

Rear camera installation

- Follow the [rear camera guidelines](#) to identify the location of the rear camera and **remove all relevant panels to easily route the necessary cables.**
- Secure and firmly attach the Junction Box to its final position inside the trimming and makes it accessible for future service and diagnostic purposes.
- Go outside and plan two drillings for the rear camera: one for the coax cable to be routed inside and one to place the metal bracket (screw or rivet) via the black rubber.

 Warning

Disassembling of the side camera in the installation site is forbidden.



- Drill the holes and remove and sharp edges (not to damage the camera cable while routing).
- It is recommended to use a rubber O-ring (same size as the drilled hole) to route the camera cable through it (to minimize damage to the cable).
- Place the camera on the metal bracket, make sure that the camera is located at the correct place and route the coax cable into the vehicle (without significant bending) towards the bridge unit.

Place the metal mounting bracket on the black rubber in the designated location and drill 2x 8mm holes:

1. 1x hole to place the metal bracket in a way that it will be possible to slightly adjust the camera angle (up/down) which will be explained in [section 9.4.4](#)
2. 1x hole to pass thru the coax cable into vehicle's trimmings

Once completing to drill, use a screw or a rivet (use only one, so it would be possible to adjust manually the bracket before fixing it) to firmly attach the metal bracket to the vehicle`s body.



Warning

- ✓ Ensure cables are not damaged due to pressures or cut during cable threading that can cause a power shortage

- Temporarily place the bridge unit inside the trimming and plug in the coax connector coming from the Side camera.
- Connect the Coax cable from rear camera to Bridge board.
- Connect the side camera`s harness to any of the Slave ports.
- Mount the side display in the designated place according to the guidelines described in this document, route the cable, and connect it to the junction box.



Note

Insert When routing the cables outside of the vehicle, use a corrugated tubing for isolation and use a waterproof box to hold the bridge unit/s.

Rear camera calibration

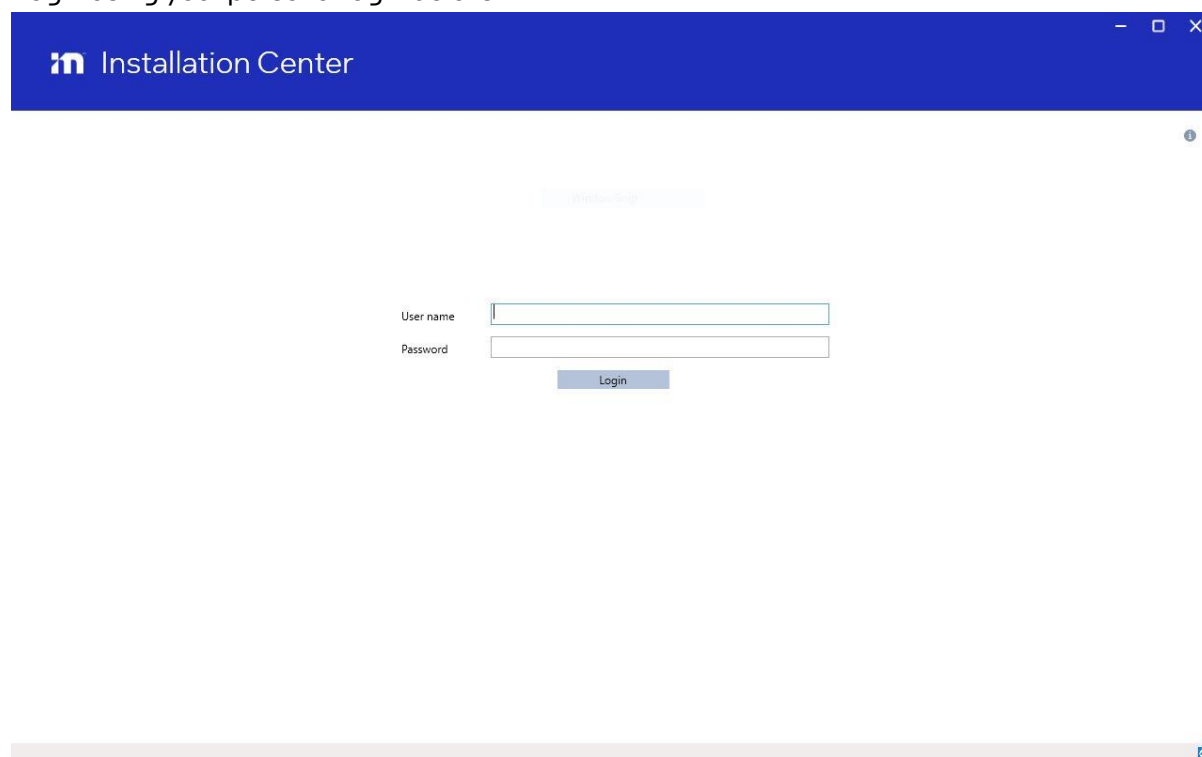
- ❖ Connect the bridge unit to the Junction Box.
- ❖ Connect the computer to the rear bridge unit using the EyeNET – see image below.



- ❖ Turn the power ON.
- ❖ Open Mobileye Installation Center and follow the instruction below @[section 9.4.1](#):

Connection phase

Login using your personal login details



Welcome to Mobileye

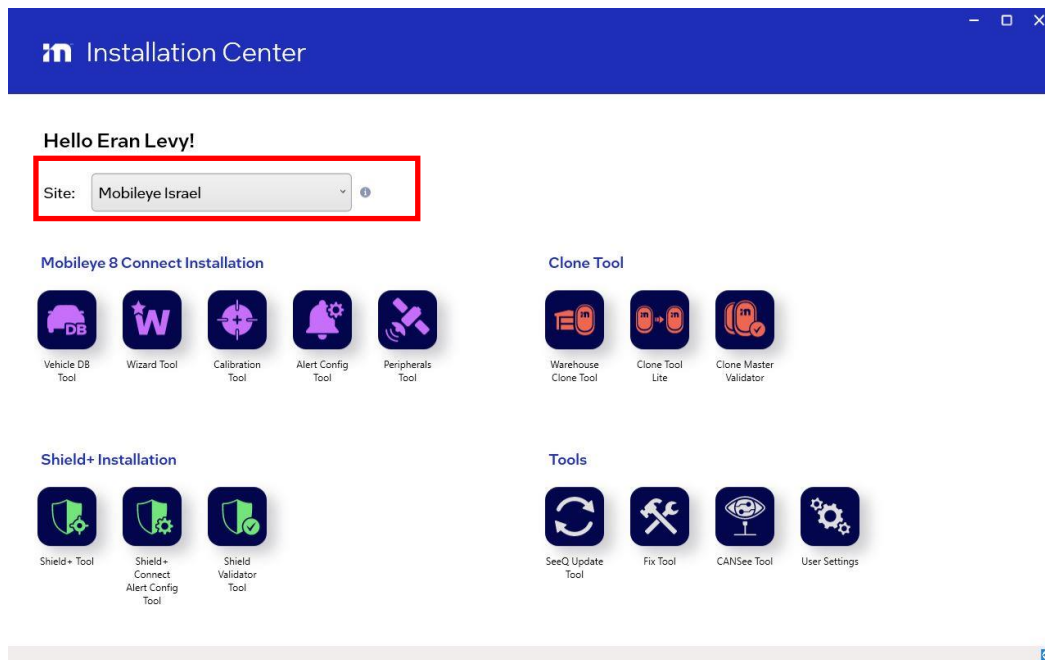
User name

Password

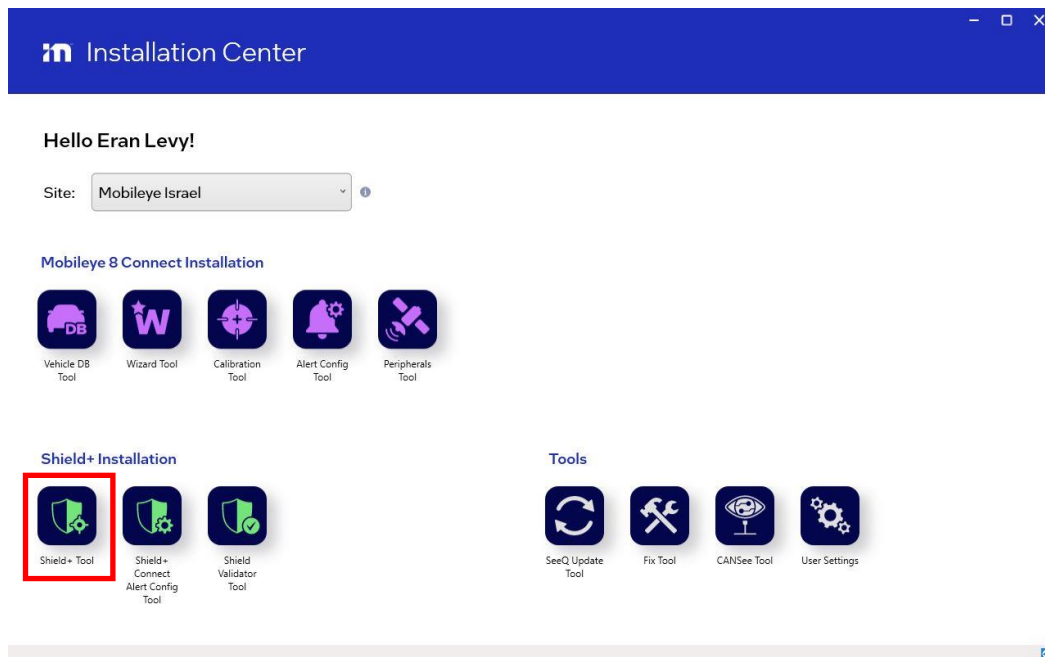
Login

[Forgot your login?](#)

Choose your working site from the drop down



Click the Shield+ Connect™ installation tool icon



Verify successful connection to the Mobileye system and click "NEXT" to continue

Connection status	Connected
Serial number	4819011070J02163
Firmware	AWS44.19.6_RC0_v5.3_R2.2_FFS_BUFF
Boot Manager	8.104.2
Board type	REV52_19
TLS Subject	6ca9d3b9-464b-49f2-9107-b3c24b6a6464
Gyro status	Test Skipped
GPS status	Test Skipped
Modem status	Test Skipped

Back

Retry

Next

User name: eranl@mobileye.com | Serial number: 4819011070J02163 | Selected vehicle: No vehicle selected | [Reconnect](#) | <https://aftermarket.mobileye.com>

Profile selection

Choose the correct profile according to the specific project / requirements from the dropdown menus:

Slave Configuration

Select the profile of the Unit:

Driving Side:

Project:

Profile:

Shield Unit Position:

Sensitivity:

Calibration Info

Roll:

Yaw:

Calibration

Please enter the unit measurements:

Camera height (Meters):

Distance to front (Meters):

Close TAC

Far TAC

Back

Finish

User name: eranl@mobileye.com | Serial number: 4819011070J02163 | Selected vehicle: No vehicle selected | [Reconnect](#) | <https://aftermarket.mobileye.com>

Slave Configuration

Select the profile of the Unit:

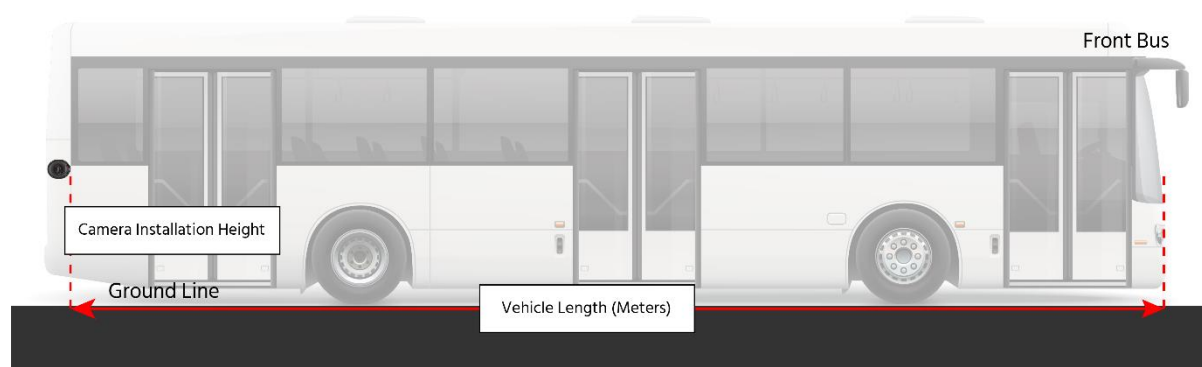
Driving Side	Right
Project	QA Generic Project
Profile	QA Generic Profile
Shield Unit Position	
Sensitivity	

Calibration Info

Roll:	Yaw:
Calculated height	Horizon:

- | |
|------------|
| Left |
| Right |
| Rear-Left |
| Rear-Right |

- Measure both the **camera height & vehicle length** (distance from the rear camera to the front of the vehicle)
- Enter the results in the relevant field



Shield V4.1.0.0

1. Connect to SeeQ
2. Profile Selection And Calibration

Slave Configuration

Select the profile of the Unit:

Driving Side
Right

Project
General

Profile
Generic Profile

Shield Unit Position
Right

Sensitivity
Mid

Calibration Info

Roll:
Yaw:

Calculated height:
Horizon:

Calibinfo Right Mid

Calibration

Please enter the unit measurements:

Camera height (Meters)
1.7

Distance to front (Meters)
12

Close TAC
Far TAC

Back
Finish

User name: elad.cohen@mobileye.com | Serial number: 1720022070800037 | Selected vehicle: No vehicle selected [Reconnect](#) <https://aftermarket.mobileye.com>

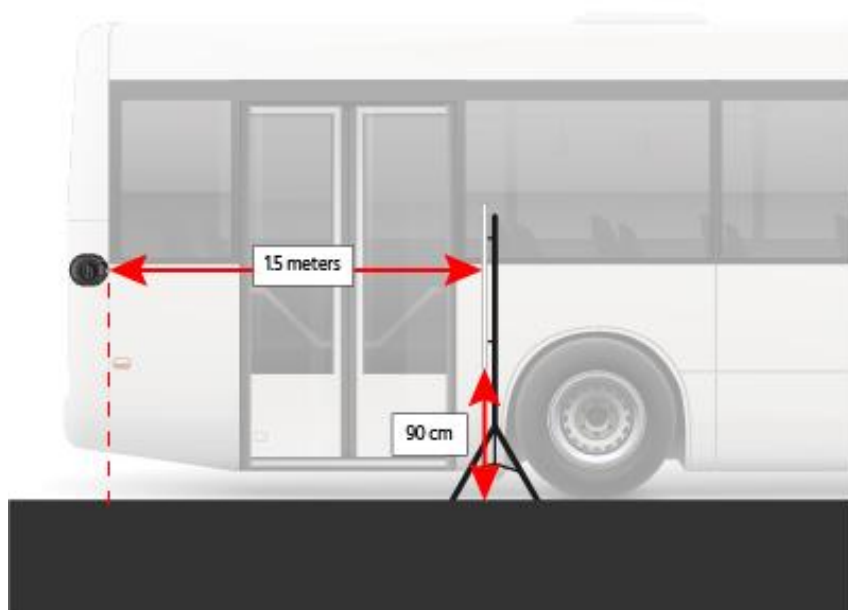
Note

Live image from the camera will appear only after choosing the profile and entering the measurements.

Rear camera's angle adjustment (Y axis):

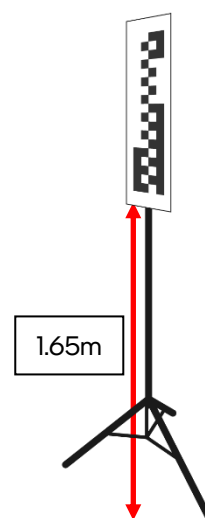
To adjust the correct camera angle, each camera (rear / far-rear) should be adjusted as instructed.

Following the live feed received from the rear camera, place the TAC board at **1.5 meters** away from the rear camera & at the center of the image shown in the wizard camera (use the yellow line as a reference)



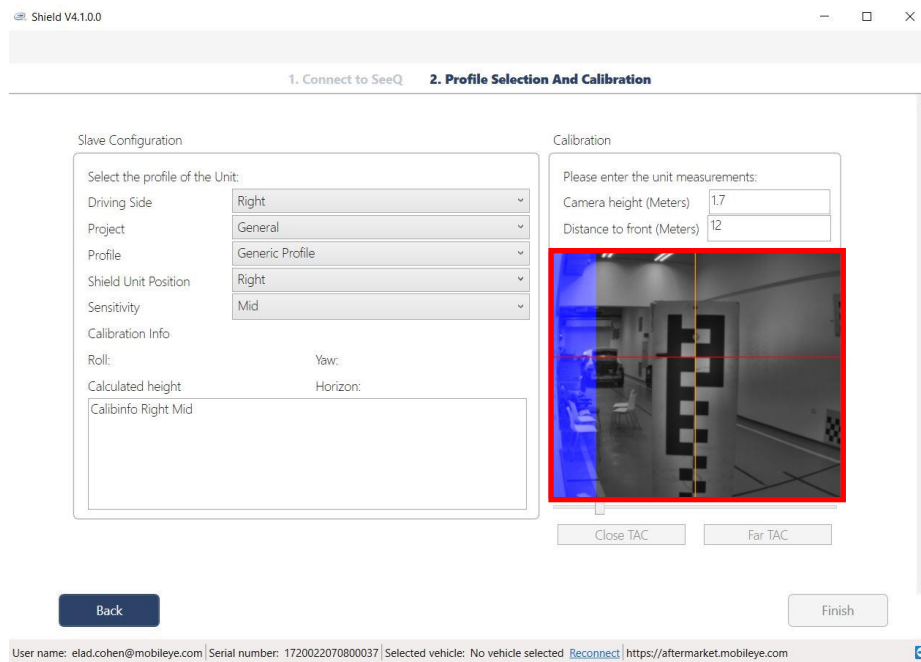
Note: when installing the side camera above 1.8meters, please open the TAC target and flip the target to high position as shown in the image →

Distance from the bottom of the target to the ground is 1.65meters.



Measure the installed camera height and mark the same height on the TAC board using a black isolation tape.

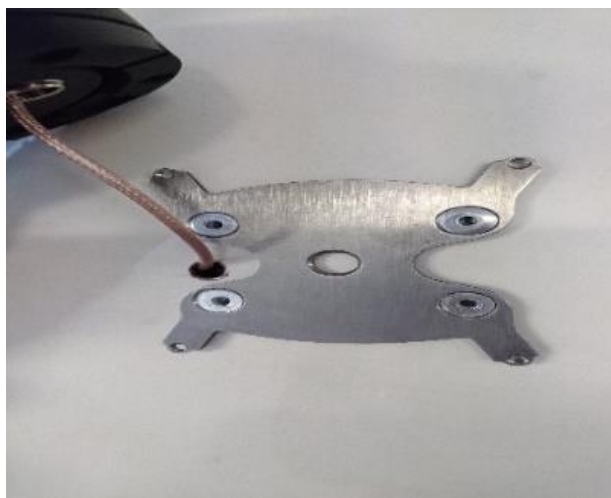
Adjust the camera (up / down) so that the red line showing on the live image will be parallel with the marked camera height (using the black isolation tape)



Once the angle has been verified and fixed, drill & screw (or use rivets) all remaining holes on the metal bracket.

Push 1-1/8" grommet (not supply by Mobileye) into center hole to keep the coax cable from damaging.

Feed the Mobileye Coax cable trough grommet into interior of the bus.



Note:

When working with rear camera which uses the quick disconnect cable, you must ensure using the shrink tube to secure and seal the quick disconnect connector.

See image below:



Use a Heat gun to shrink the tube thoroughly along the quick disconnect connector

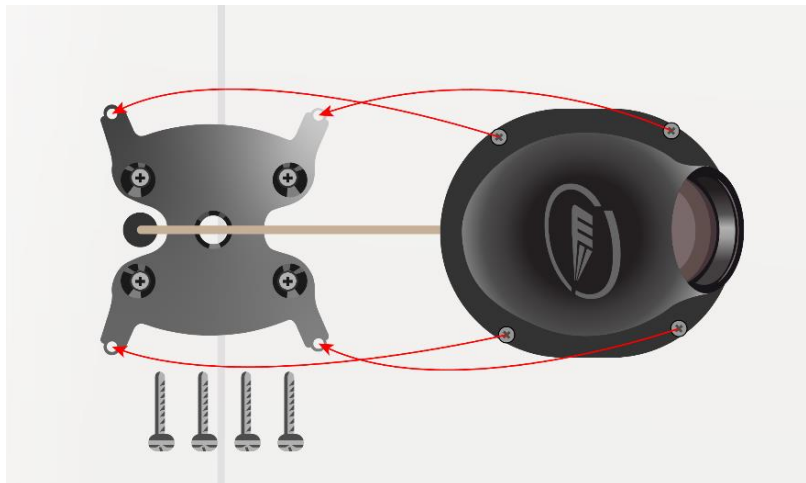


Once completed, feed the cable towards the vehicle body, and follow to the next step below.

Note

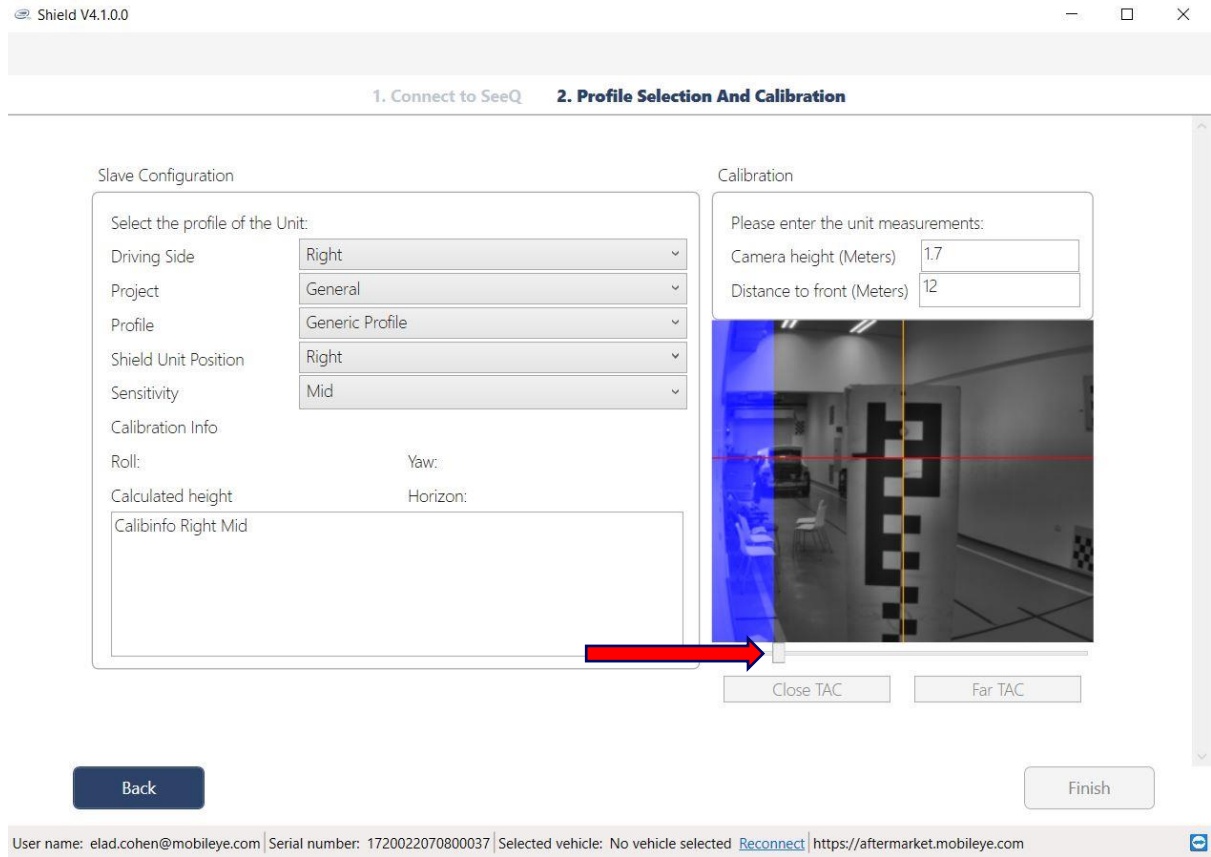
When replacing a camera, and removing the shrink tube is necessary, use a sharp knife and start cutting the shrink where the connector is located to avoid damaging the coax cable.

Align camera housing mount with (4) mounting holes and screw the camera to the metal mounting bracket.



Calibration of rear camera

Use the blue slider to mark where the vehicle body begins.



Shield V4.1.0.0

1. Connect to SeeQ 2. Profile Selection And Calibration

Slave Configuration

Select the profile of the Unit:

Driving Side: Right

Project: General

Profile: Generic Profile

Shield Unit Position: Right

Sensitivity: Mid

Calibration Info

Roll: Yaw:

Calculated height: Horizon:

Calibinfo Right Mid

Calibration

Please enter the unit measurements:

Camera height (Meters): 1.7

Distance to front (Meters): 12

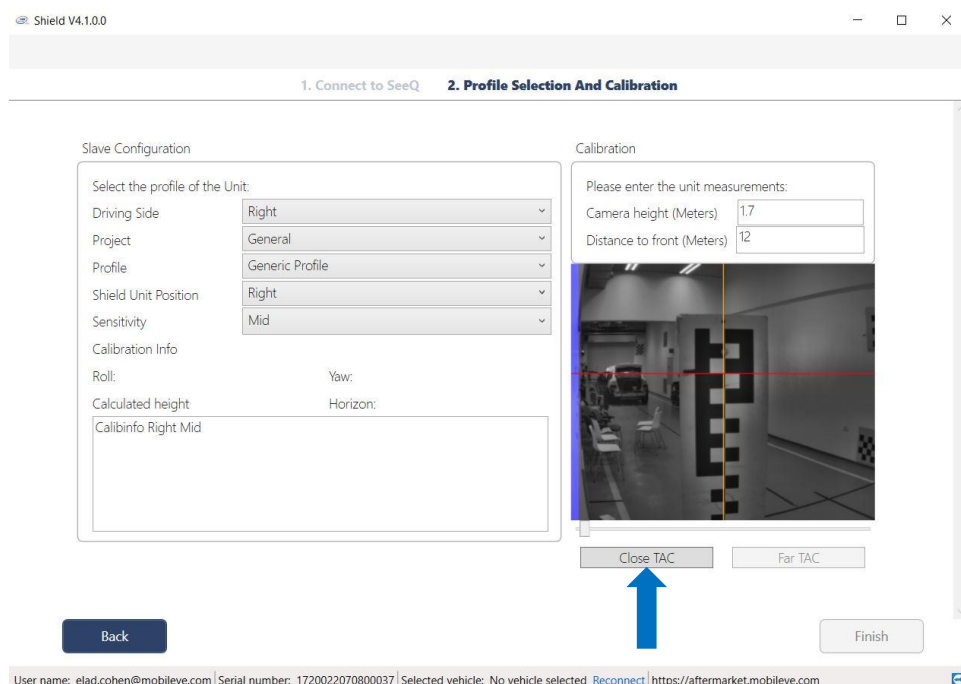
Close TAC Far TAC

Back Finish

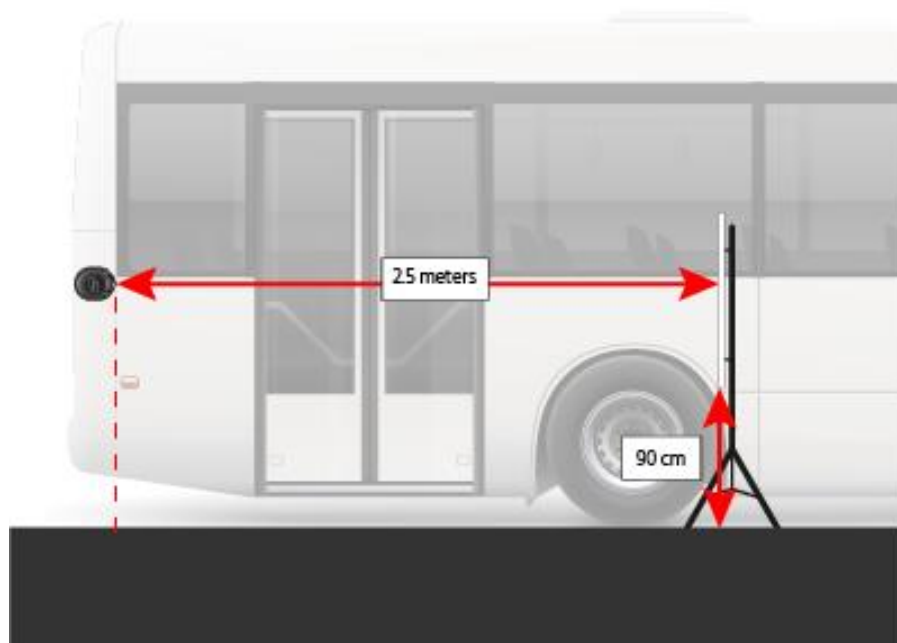
User name: elad.cohen@mobileye.com | Serial number: 1720022070800037 | Selected vehicle: No vehicle selected | [Reconnect](#) | <https://aftermarket.mobileye.com>

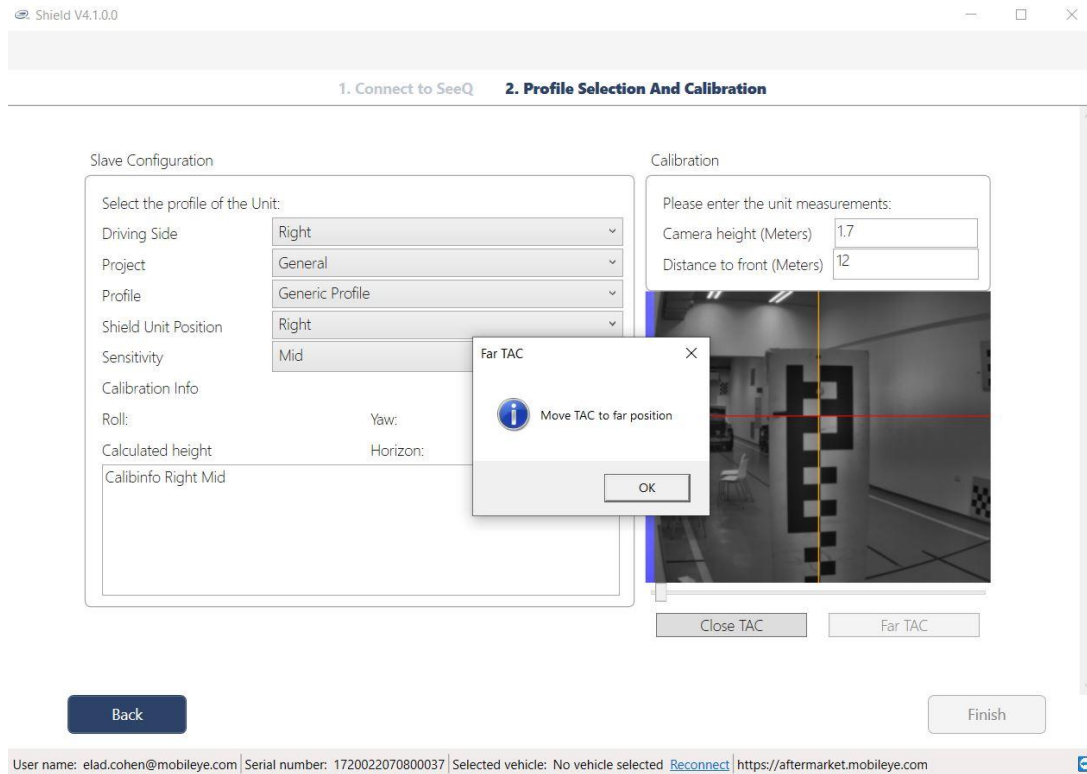
Only after adjusting the blue slider, the "Close TAC" button will be available.

Click the "Close TAC" button and wait for the calibration results to be displayed.

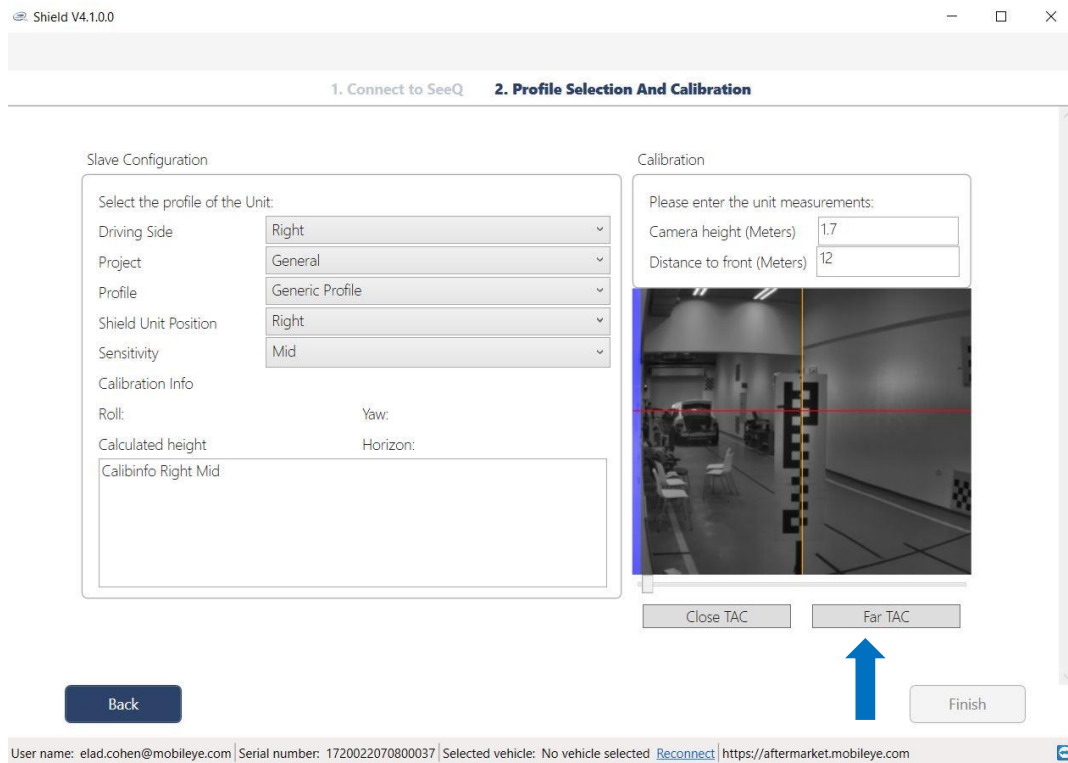


Upon completion of the "Close TAC" calculation, follow the pop-up message and move the TAC target an additional 1 meter away from the current location (total of 2.5 meters from the side camera).

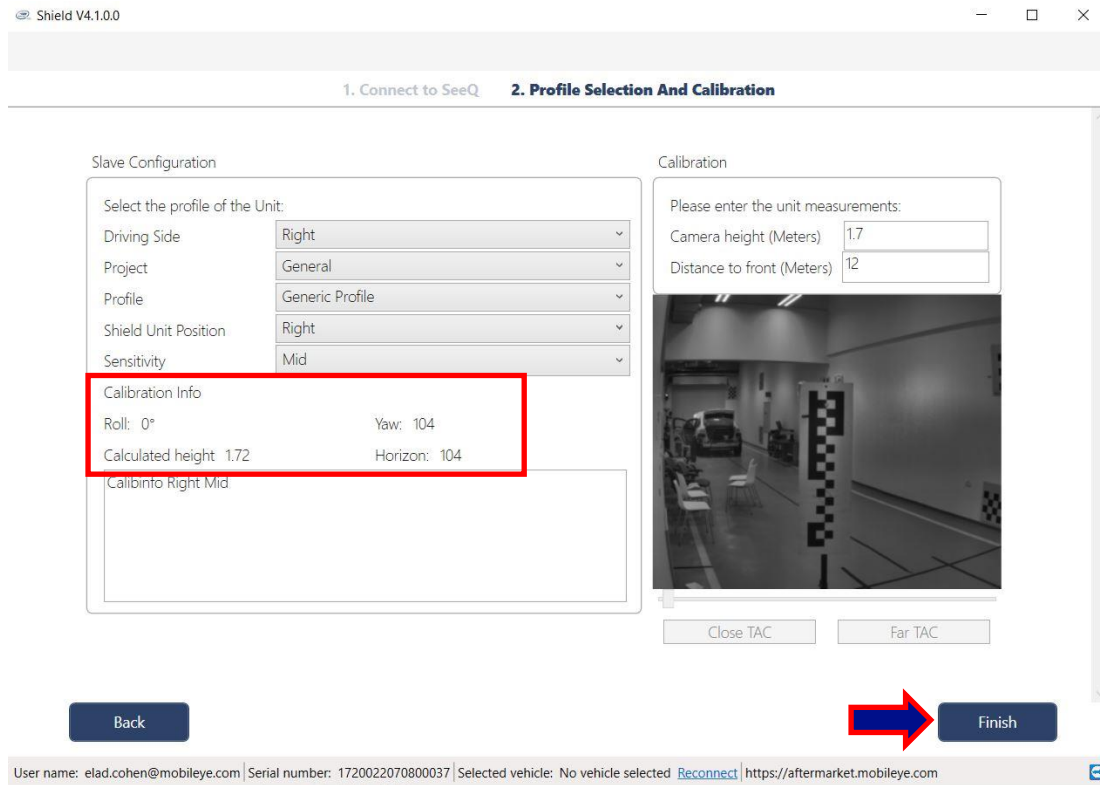




Click the "Far TAC" button.



Once TAC calibration has been completed, the calibration results to be displayed:



Shield V4.1.0.0

1. Connect to SeeQ 2. Profile Selection And Calibration

Slave Configuration

Select the profile of the Unit:

Driving Side: Right

Project: General

Profile: Generic Profile

Shield Unit Position: Right

Sensitivity: Mid

Calibration Info

Roll: 0° Yaw: 104

Calculated height: 1.72 Horizon: 104

Calinfo Right Mid

Calibration

Please enter the unit measurements:

Camera height (Meters): 1.7

Distance to front (Meters): 12

Close TAC Far TAC

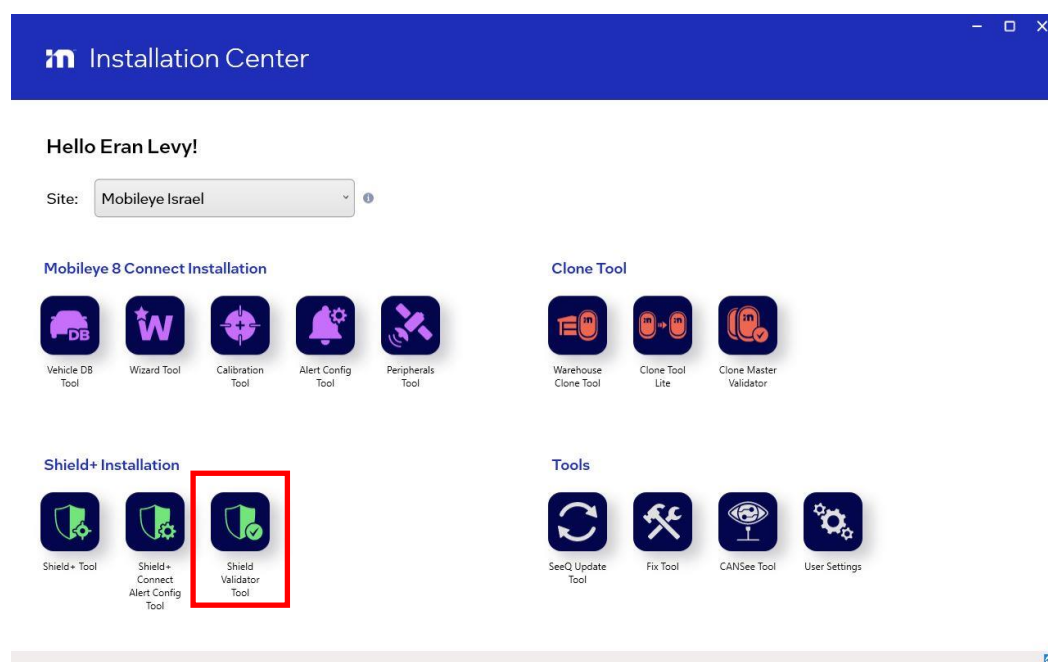
Back Finish

User name: elad.cohen@mobileye.com | Serial number: 1720022070800037 | Selected vehicle: No vehicle selected | [Reconnect](#) | <https://aftermarket.mobileye.com>

Click "Finish" to burn the calibration results and exit the application.

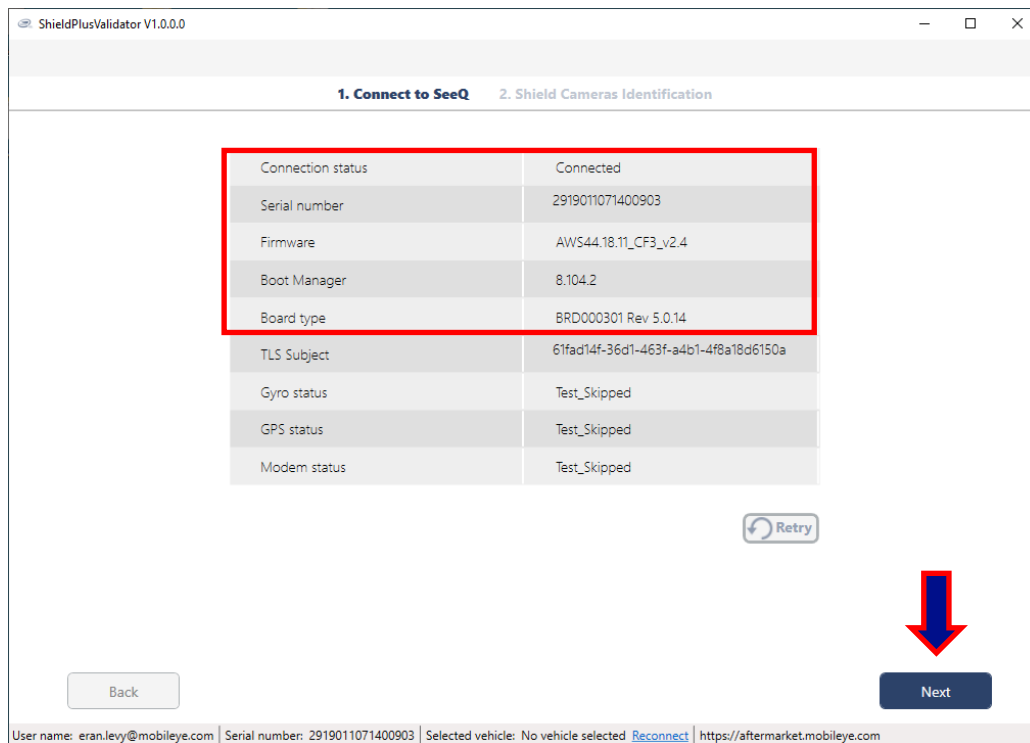
Validation

- The Shield validation step must be done while connecting to the front master camera when installation is complete, all cameras are connected to the junction box and power is turned ON.
- The validation application will automatically detect and display the connected cameras.
- This step is mandatory as it will configure the system which & how many cameras are connected.
- Open the Mobileye Installation Center, make sure power/IGN is ON and click the validation application icon.



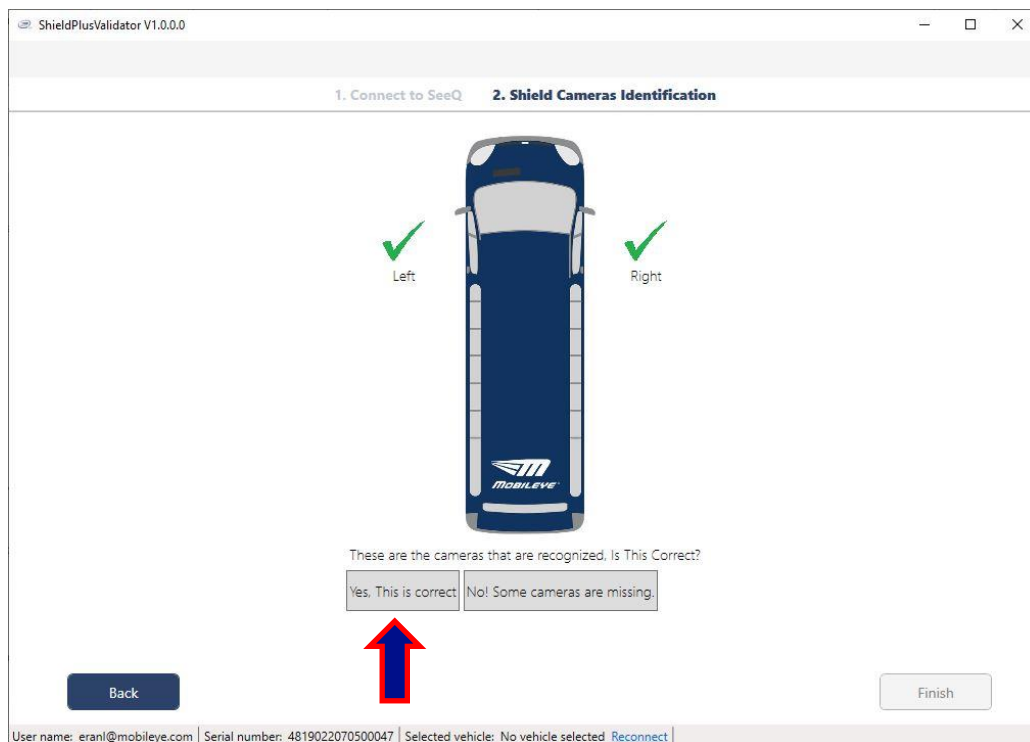
Verify good communication with the system by seeing the connection status, system serial number and firmware version.

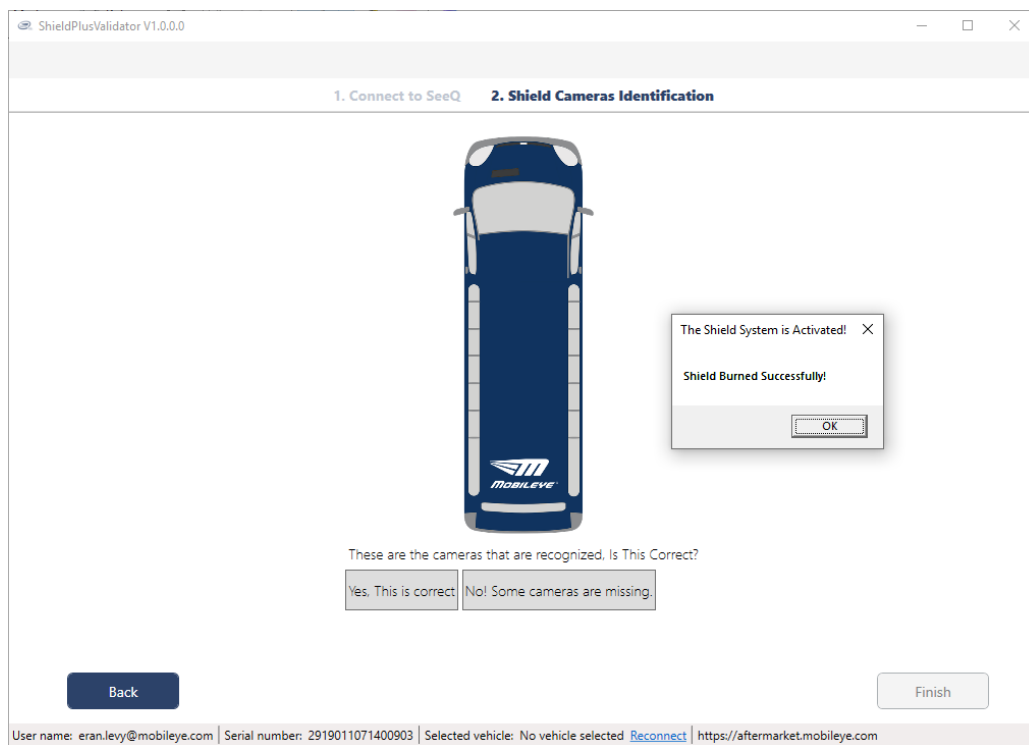
Click "Next" to continue.



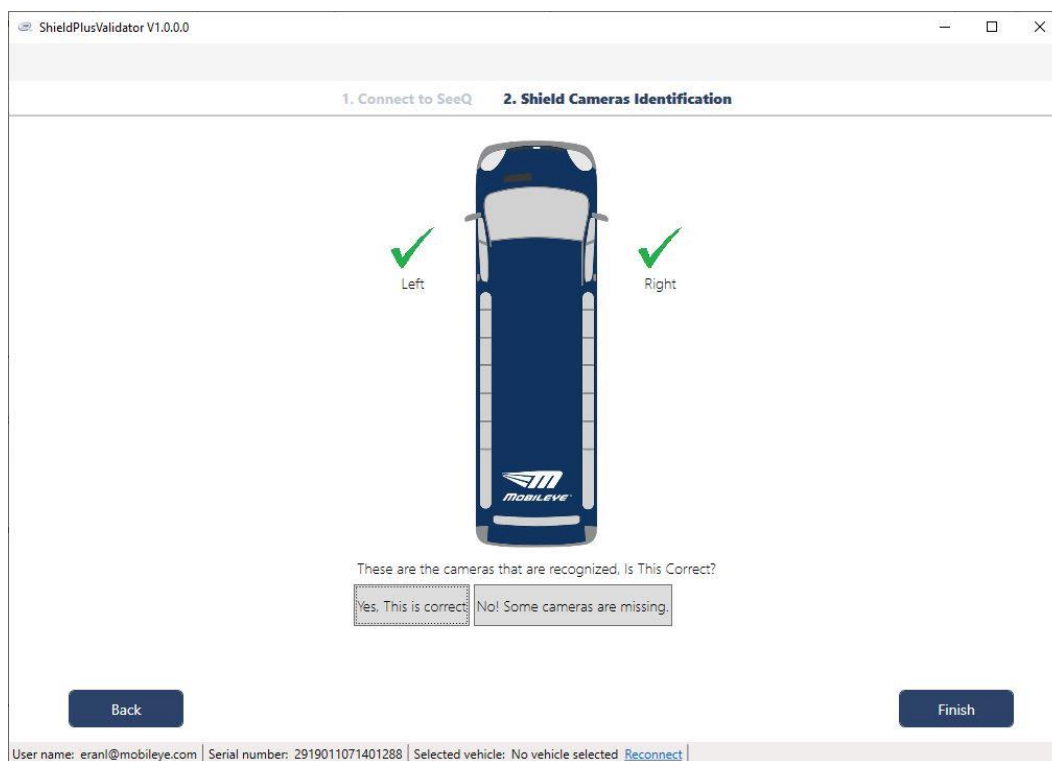
The Shield validator tool will display all detected rear cameras connected to the junction box.

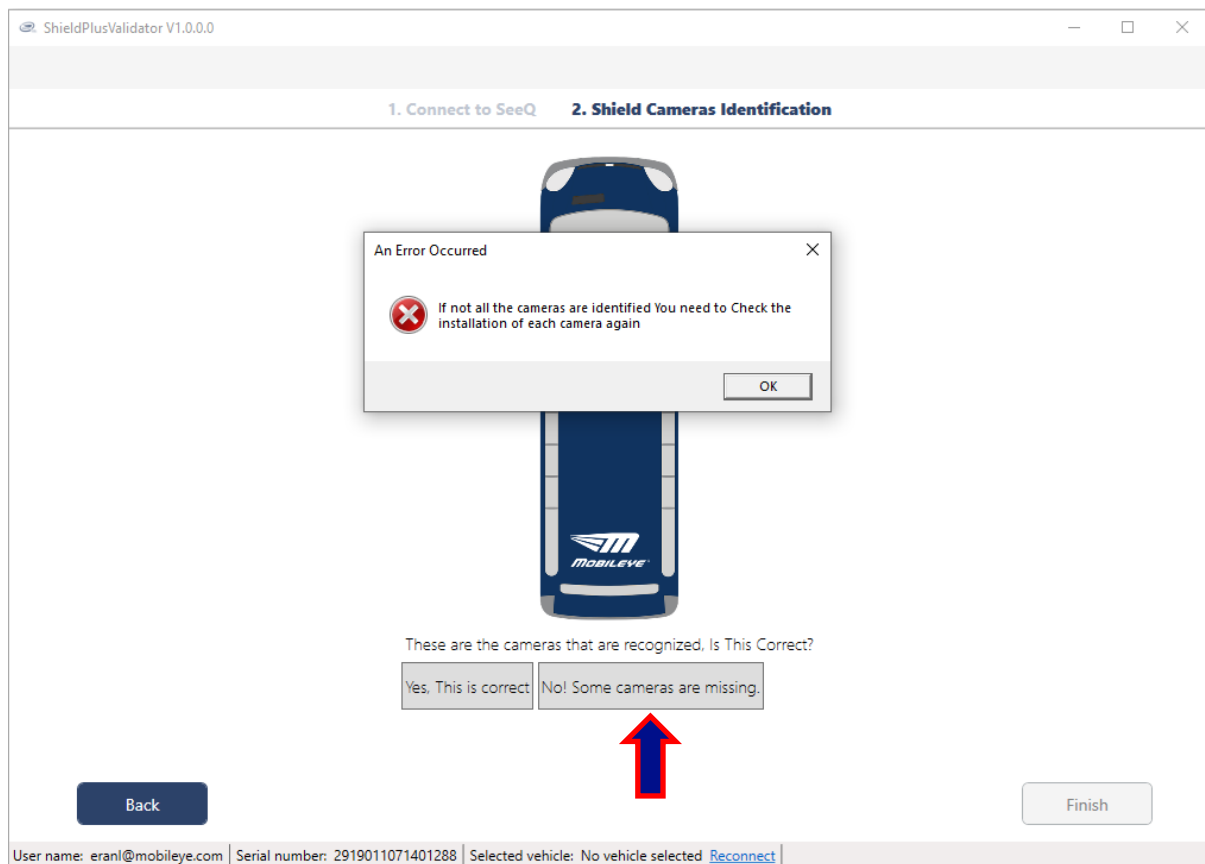
Verify the installed rear camera/s and click the "Yes. This is correct" button to apply changes and burn them to the front master camera.





Click "OK" and "Finish" to complete the validation and activation of the shield+ Connect system.





If, for some reason, not all cameras identified, please check the following:

- Physical connection of the coax cable between the rear camera to the bridge unit
- Check the coax cable and make sure it is not damaged.
- Physical connection between the bridge unit to the junction box
- Check the cable between the bridge to the junction box and make sure it is not damaged.

10. System functionality test

System Status

Mobileye Shield+ Connect™ system has a status indication via the Eyewatch display unit to indicate the driver if any error or visibility issue exist with the rear camera.

System Status	Icon on EW3	Possible Solution
No Errors – system is fully working		N/A
Error in System		Contact technical support
Low visibility on rear camera – a VRU will not be detected	Blinking 	Check rear camera's view – if needed, clean lens
Night mode – system will work normally but might not detect if lux level will be less than 15		Expected behavior – no action required

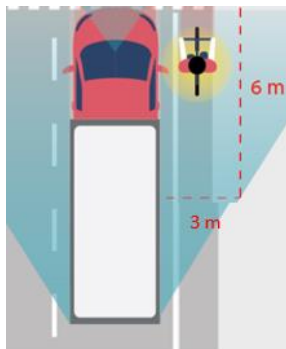
Front camera functionality

Testing the front camera will be performed as instructed in the standard Mobileye 8 installation manual.

Once the installation & calibration is complete, a basic functionality test is required to confirm detection of VRU.

Testing VRU detection is available at vehicle speed of 0km/h.

While driving straight, have a VRU located in the coverage area and confirm the rear side display will issue a visual alert.



11. Appendix A – Alert Config Tool

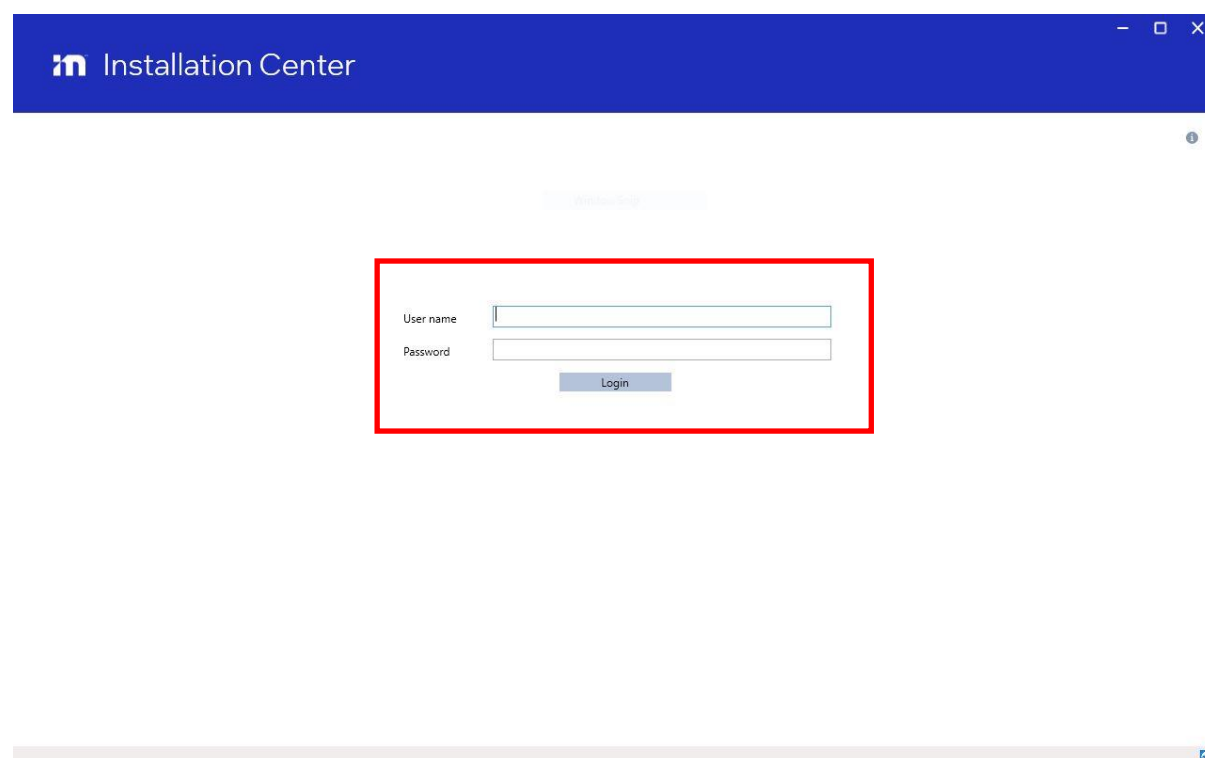
The alert config tool provides the installer the ability to change different configurations of the side camera alerts to maximize system performance according to customer requirements.

Note

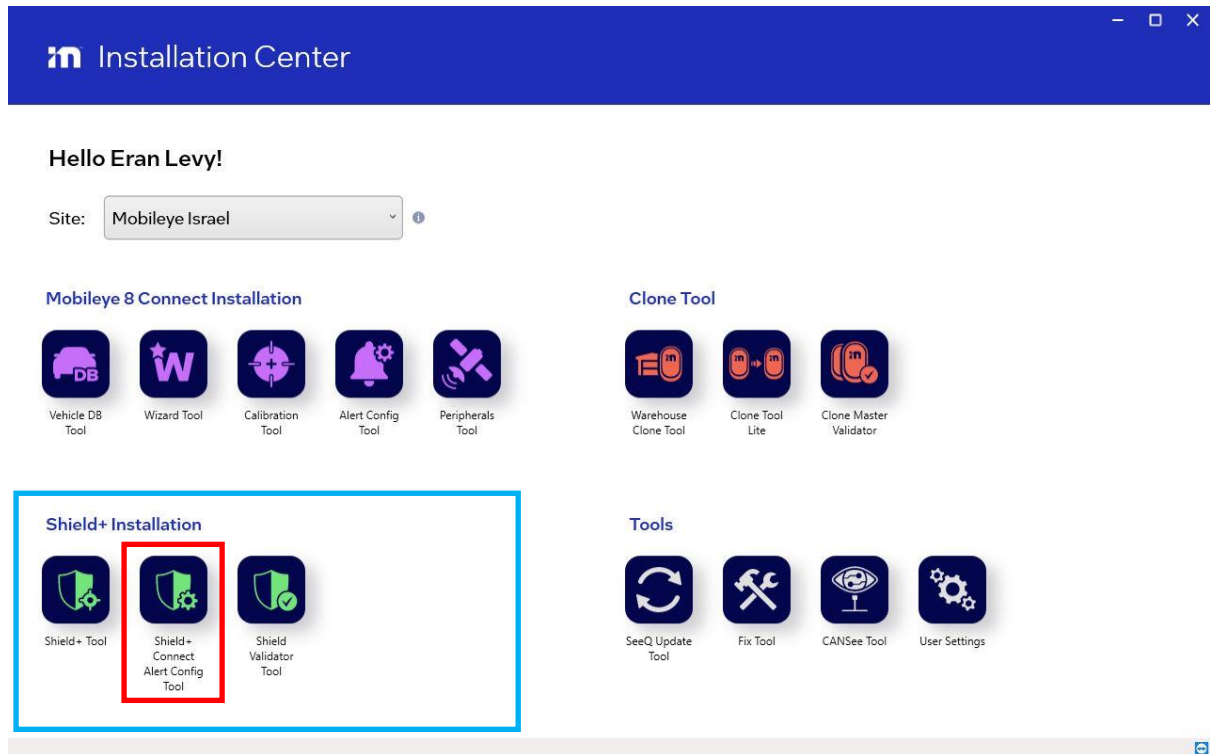
Insert The tool can be used only after the system has been calibrated using Installation Center v13.2 and up.

Making changes/adjustment using this tool is recommended only after performing a normal test drive to simulate real time scenarios as much as possible. **Safety comes first.**

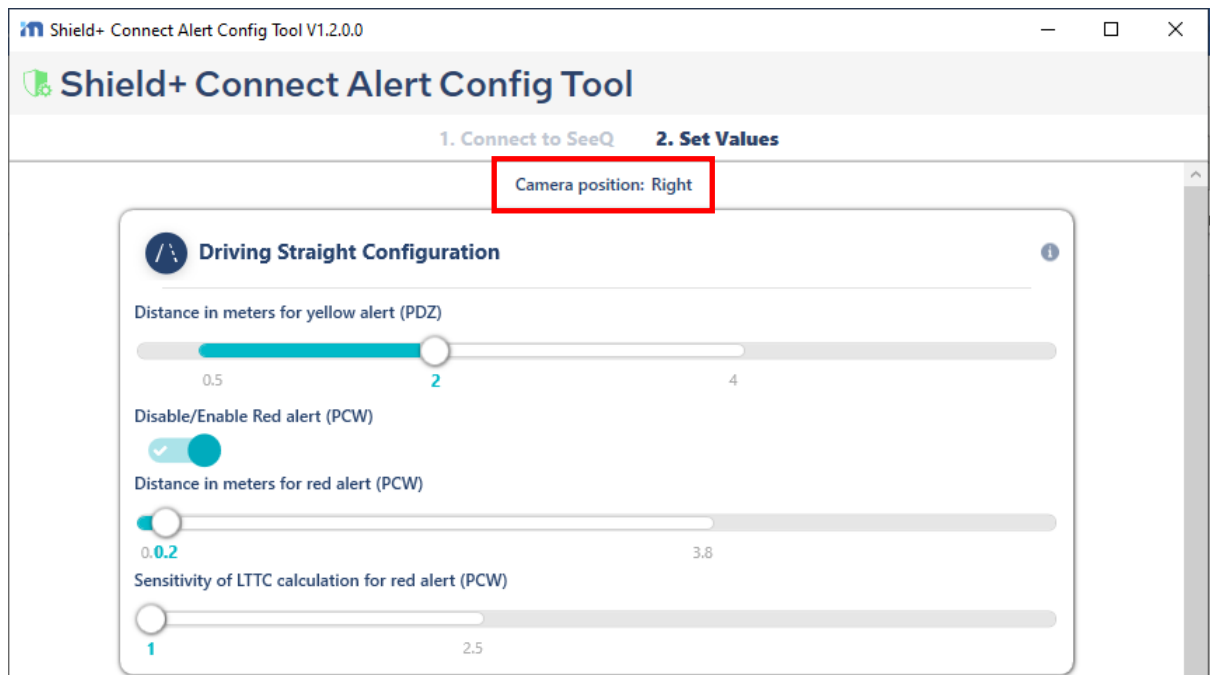
→To use the tool, login to the IC with your credential:



→Under the Shield+ Installation section, click the Shield+ Connect Alert Config Tool icon to open the app

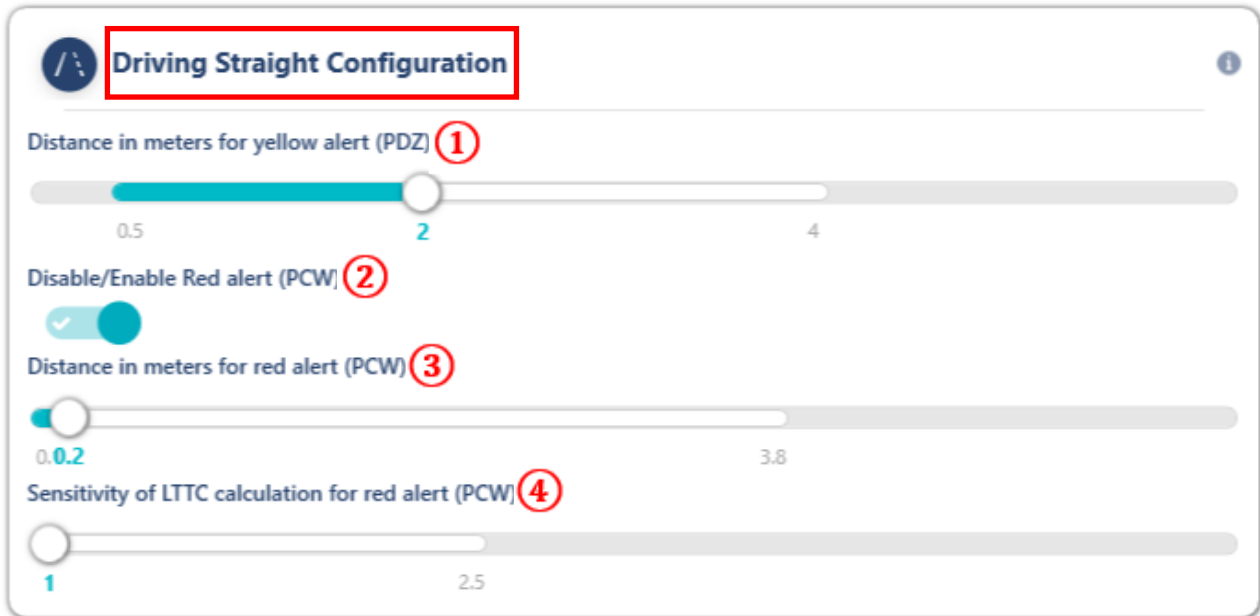


→Confirm you are connecting to the correct camera



→By default, the app will display the current configuration burned on the camera.

Configuration which are available to set:



Move the scrollbar to adjust the DZ alert distance.

①

PDZ distance can be adjusted between 0.5meter to 4meters.

Turn on to enable red alert (PCW).

②

Move the scrollbar to adjust the distance in meters for red alert (PCW)

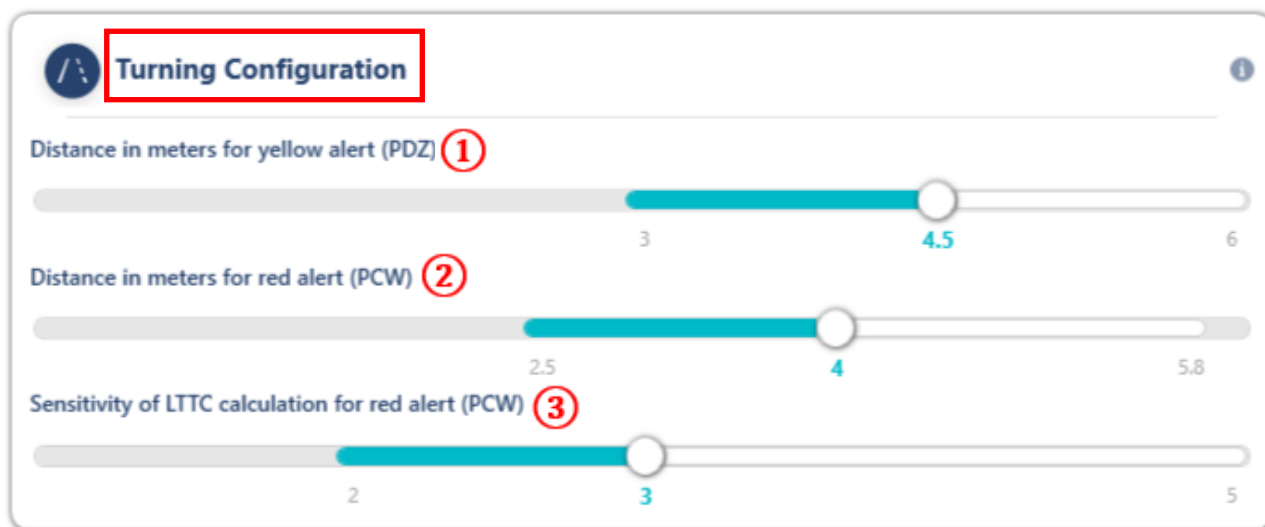
③

Can be adjusted between 0 (off) to 3.8meters.

Move the scrollbar to adjust the LTTC (lateral TTC) to receive red alert (PCW)

④

Can be adjusted between 1second to 2.5seconds.



- ① Move the scrollbar to adjust the DZ alert distance
PDZ distance can be adjusted between 3meters to 6meters
- ② Move the scrollbar to adjust the PCW alert distance
PCW distance can be adjusted between 2.5meters to 5.8meters
- ③ Move the scrollbar to adjust the LTTC (lateral TTC) to receive red alert (PCW)
Can be adjusted between 2seconds to 5seconds.



- ① Choose to receive yellow alert (PDZ) for either cyclist or cyclist & pedestrian.
- ② Move the scrollbar to adjust the distance in meters for yellow alert (PDZ)
Can be adjusted between 0.5meters to 4meters.
- ③ Turn on to enable red alert (PCW) at 0 kph/mph
- ④ Move the scrollbar to adjust the distance in meters for red alert (PCW)
Can be adjusted between 0.1meter to 3.8meters.
- ⑤ Move the scrollbar to adjust the LTTC (lateral TTC) to receive red alert (PCW)

12. Appendix C - Articulated vehicle

The Mobileye Shield + system works by considering the movement of the vehicle and the angle changes according to the driving path.

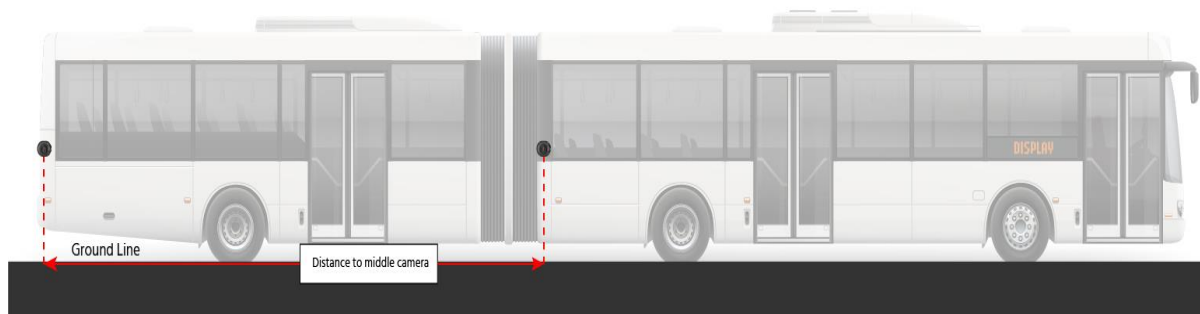
Installation process of each of the rear cameras in an articulated vehicle is the same as a standard shield+ installation with a few remarks as below.

Guidelines for articulated Shield Connect installation

- **Cables length and extensions** - In order not to exceed the CAN network length (which is approximately 100m), cable length adjustment should be routed in a proper way to minimize length.
- **Termination resistors** – it will probably be required to use one or two termination resistors (120Ω or 60Ω) and connect it between CAN high & CAN low wires of CAB000165.
- **Display units** - the sides display unit will cover each side regardless of how many cameras are connected, therefore, there is no need for an additional side display.
- **JB connection** – when installing a trailer that can be separated from the main cabin, we are using a retractable Suzi cable to connect between them.
- **External waterproof box** – when installing the JB or the bridge unit outside the vehicle (usually at the bottom of the vehicle, away from water), we will use an external waterproof box (not supply by Mobileye). The waterproof box should comply with IP69.
- Retractable Suzi cable – physical design according to standard ISO 7638-2 to allow CAN-bus communication. (Not supply by Mobileye).
- Extension cable for power to the 2nd junction box should be at least **14AWG**
- Extension cables of CAB000165 (to connect between the 1st JB to the 2nd JB) should be twisted wires of at least **14AWG**

Calibration of far-rear camera

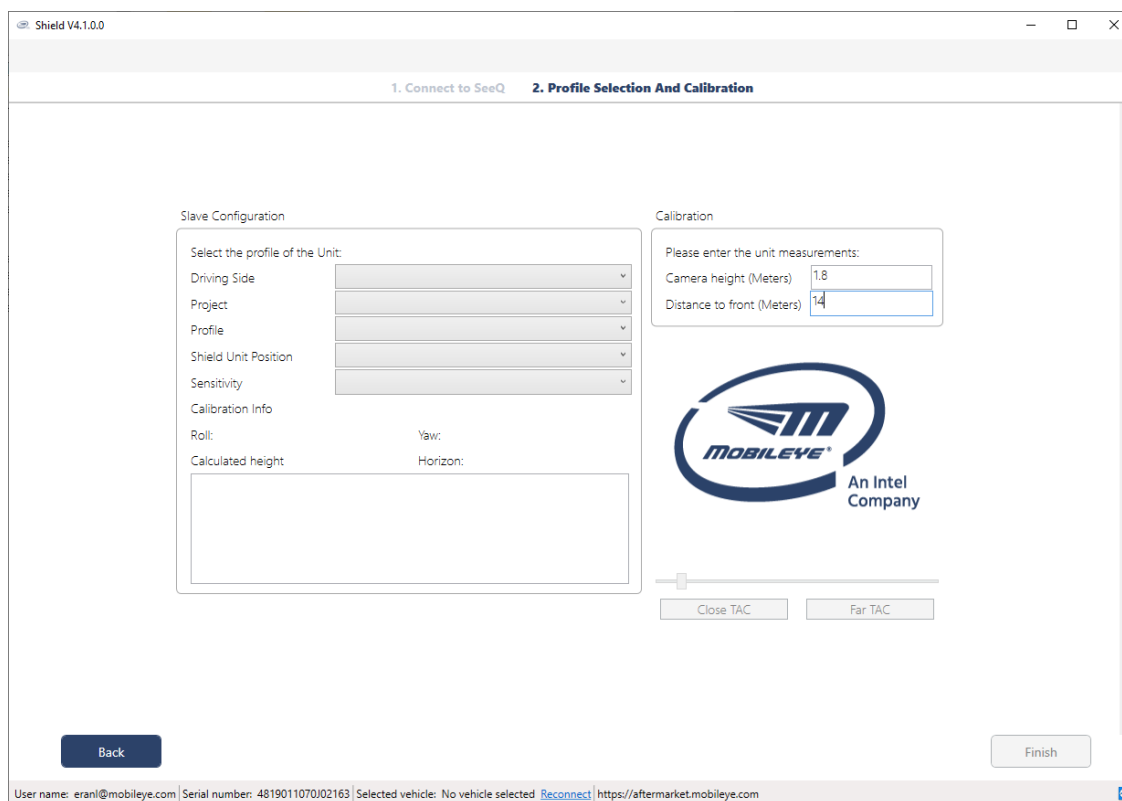
When measuring "distance to front", measure the distance to the middle camera. See image:



To the measured distance, please **add 4 meters to the total measurement**.

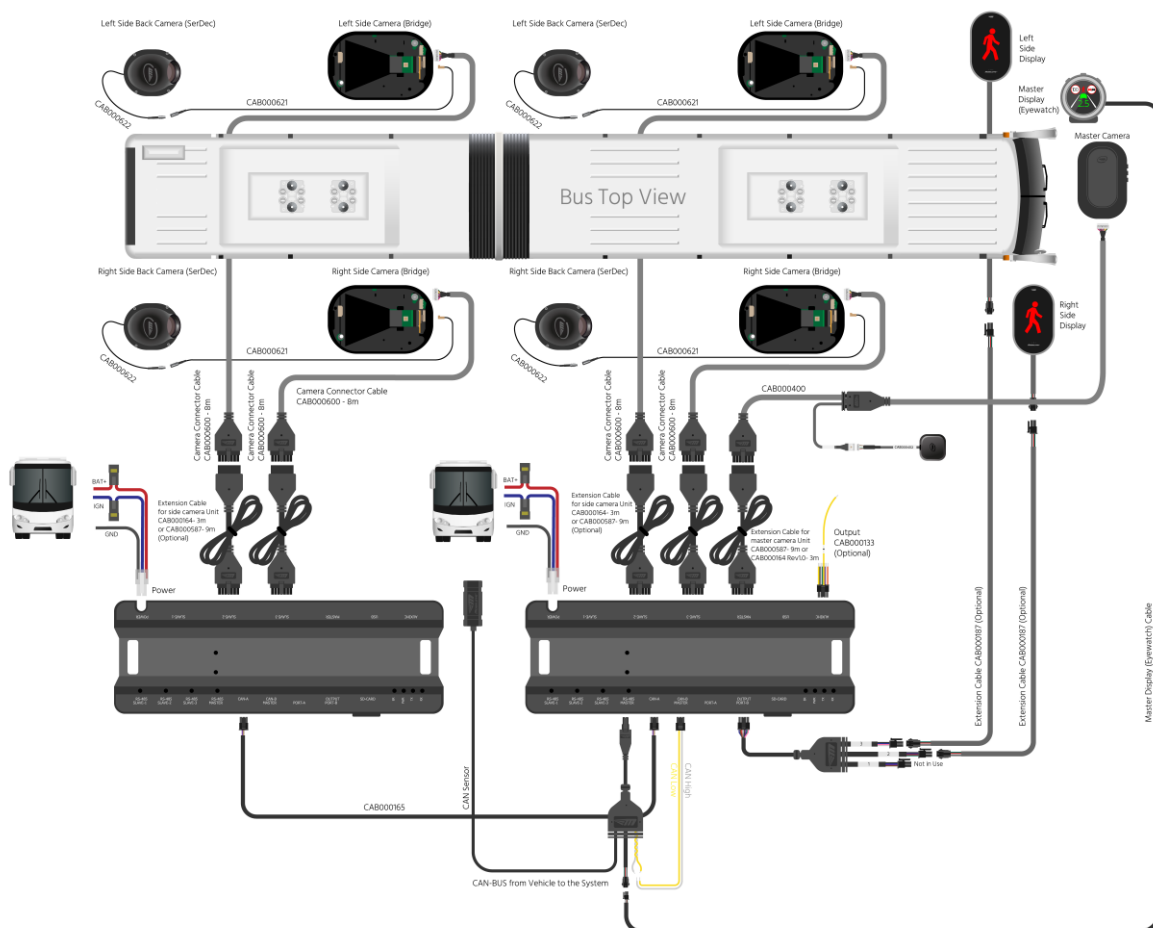
Example: distance from far-rear camera to middle camera is 10meters. You will enter 14 meters.

We are adding the 4 meters distance to cover the blind spot detection of the middle camera.

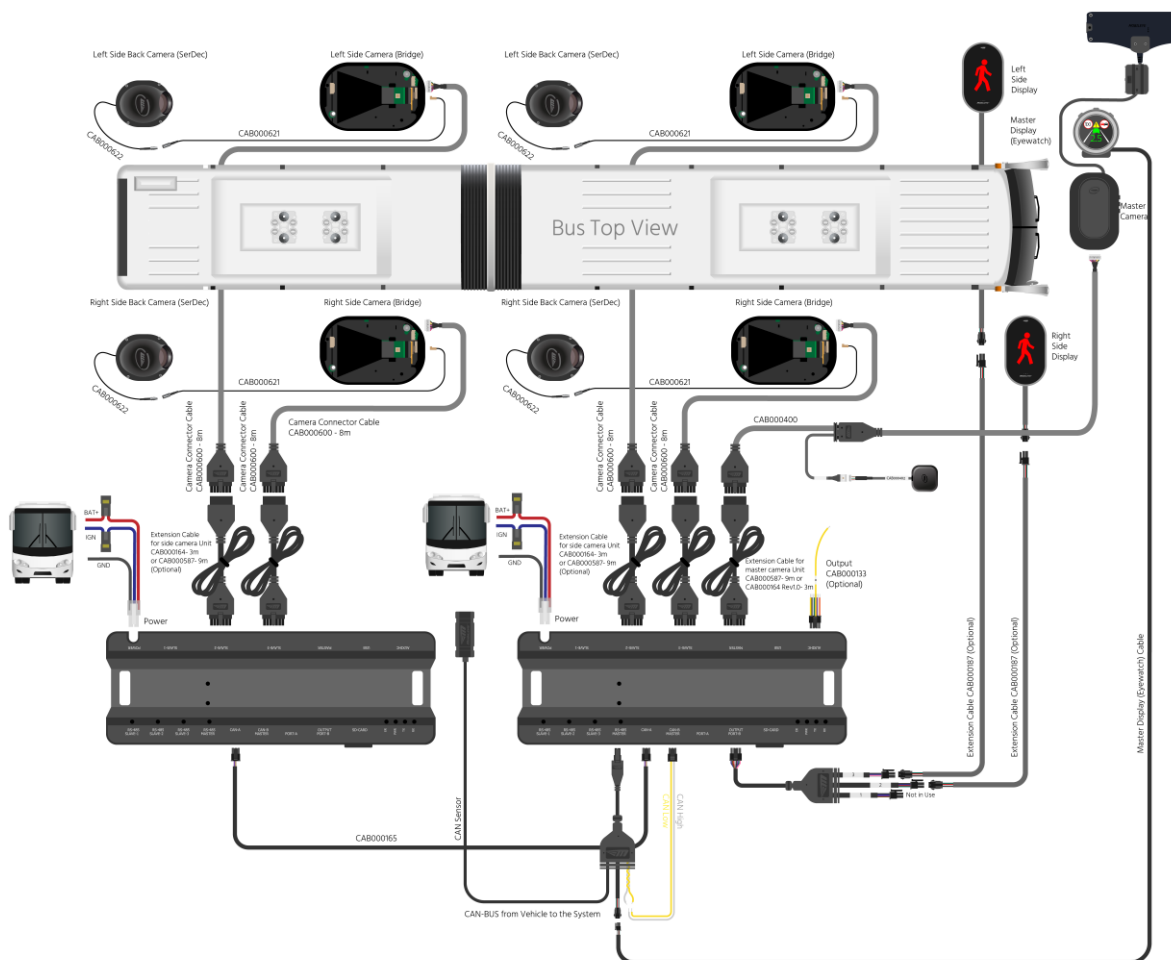


All other procedure is the same as described in [section 9.4.3](#) and further on.

Articulated bus – Connection scheme

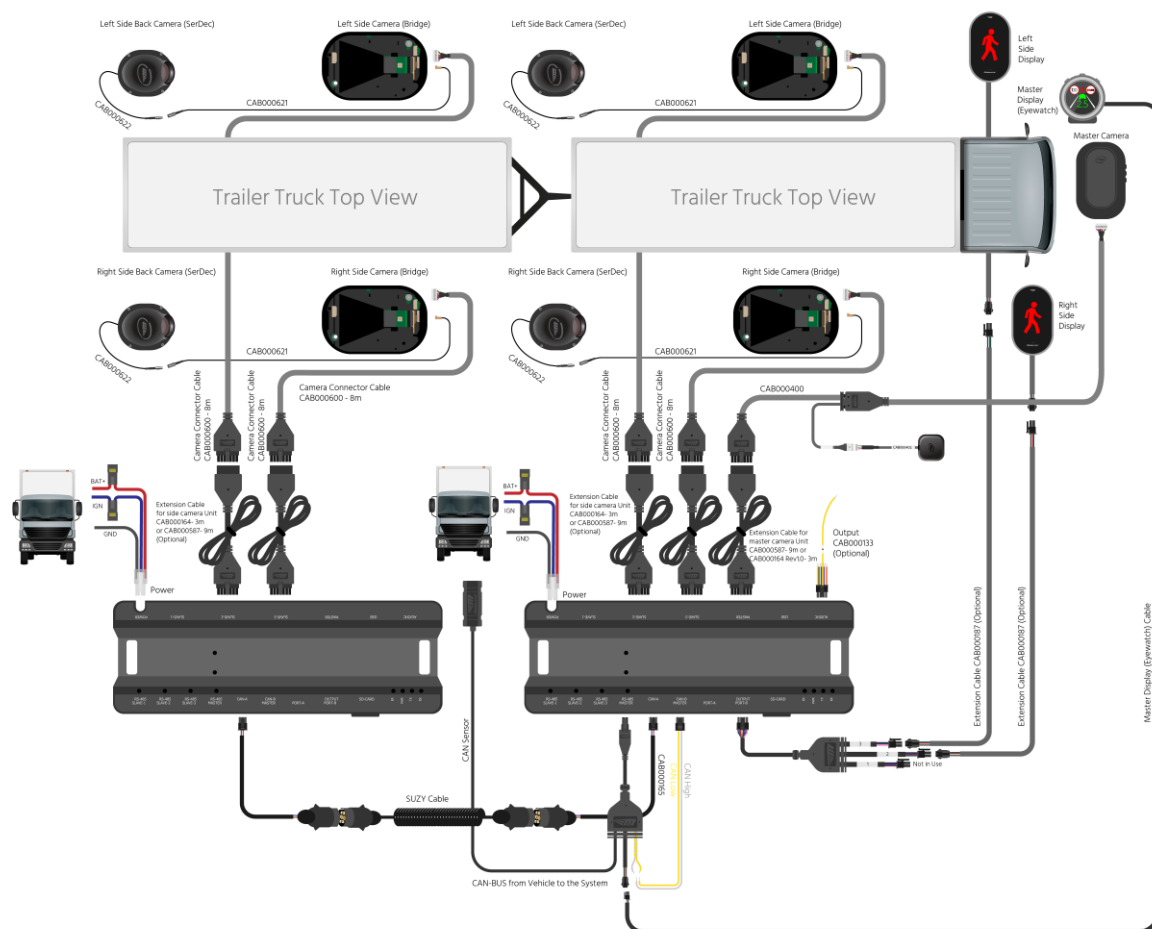


Connection scheme with Mobileye 8 unit including 3G modem.

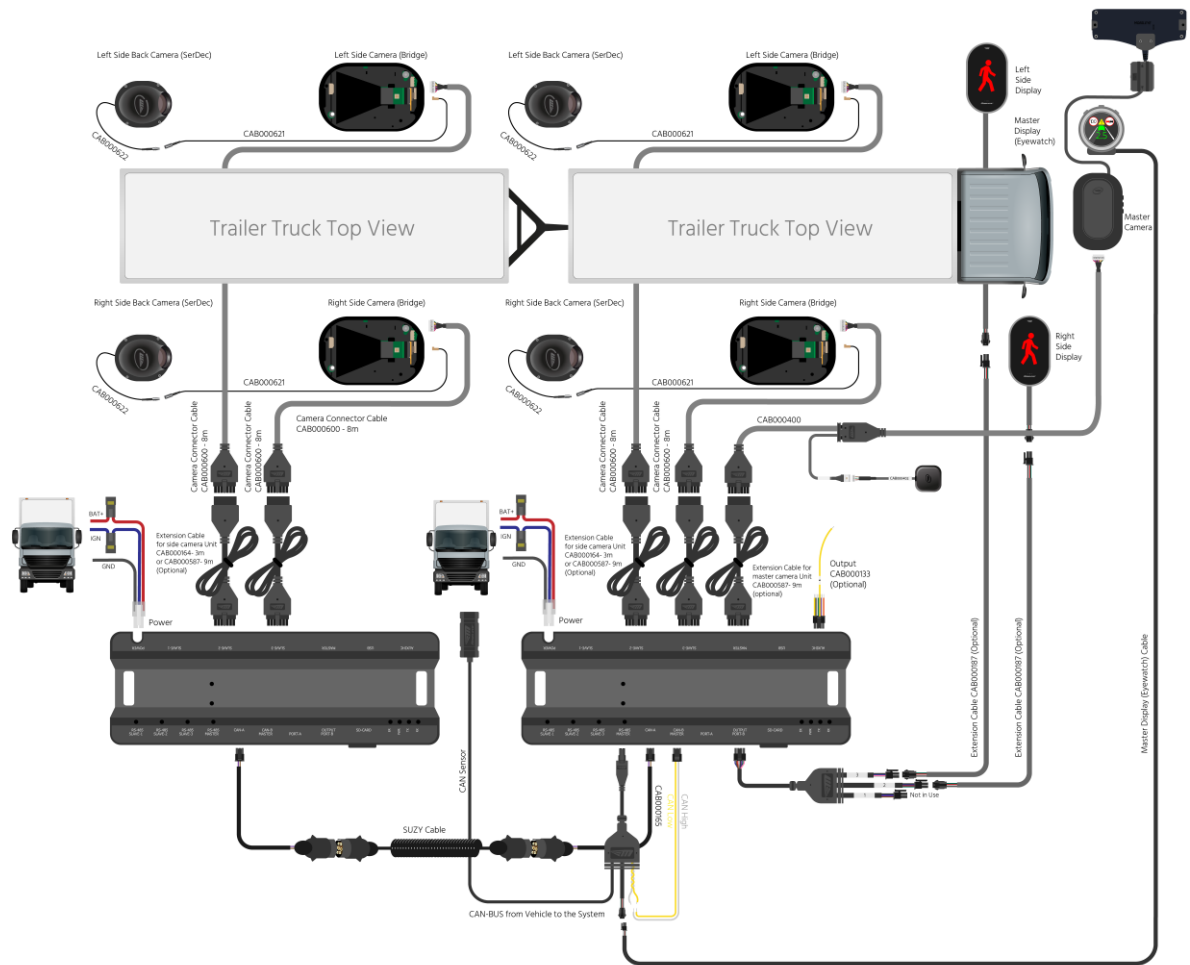


Connection scheme with Mobileye 8 unit including 4G modem.

Artic-Trailer – Connection scheme



Connection scheme with Mobileye 8 unit including 3G modem.



Connection scheme with Mobileye 8 unit including 4G modem.

13. Appendix D – side display

Side display extension cable (CAB000187)

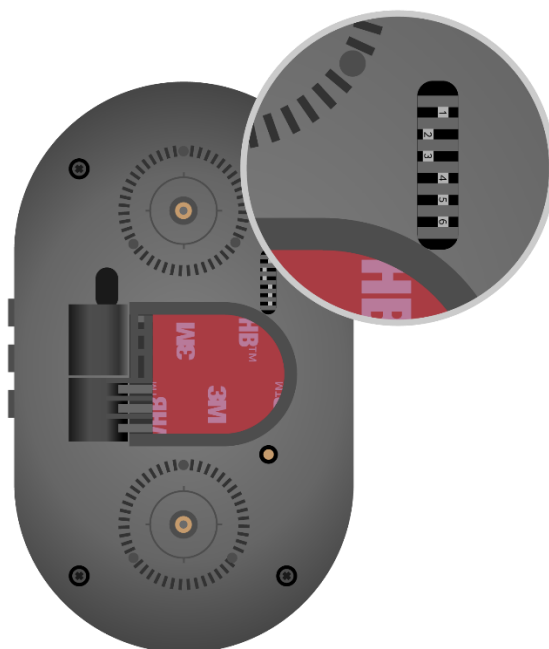
The 4 pins extension cable is an optional solution to extend the display unit if necessary.

It also can be used to extend the Mobileye CAN-Reader, E-Box or the EyeWatch.

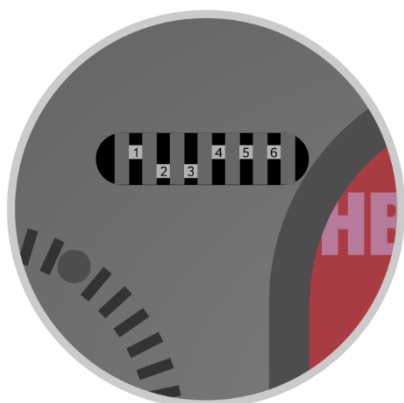


Side display unit's dip-switches configuration

At the back part of the display unit a 6 dip switches can be found which are used to configure the audio and visual alerts.



See below each dip switch combination and the relevant functionality:



Dip Switches status:

Up position = ON

Down position = OFF

Switches combination	Alert	Switches status	Functionality
1&2	DZ	1 = OFF & 2= ON	DZ visual icon + audio
		All other scenarios	Only visual
		3 = OFF & 4= OFF	Audio & visual icon are disabled
3&4	DZ & PCW	3 = ON & 4= OFF	DZ icon will blink at a 1HZ frequency. PED icon will blink at a 3HZ frequency
		3 = OFF & 4= ON	Visual icon (DZ or PCW) will blink continuously
		3 = OFF & 4= OFF	Audio & visual icon are disabled
5&6	DZ & PCW	5 = OFF	Volume in low mode and according to the potentiometer resistor
		5 = ON	Volume in high mode and according to the potentiometer resistor
		6 = ON	Enable manually adjustment of the volume level using the potentiometer resistor
		6 = OFF	Disable manual volume adjustment

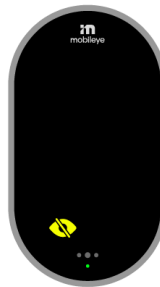
DZ = Danger zone alert – Yellow pedestrian icon

PCW = Pedestrian collision warning – Red pedestrian icon

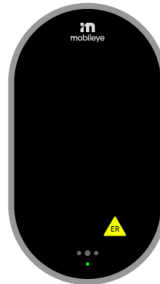
New Side display unit (PAC000000LEDS4FE)

The new side display was added with 2 new icons as below and an updated JB (PAC000SHIELDPLUS) to support these icons.

1. Low visibility



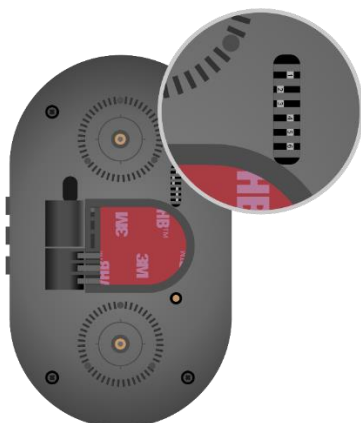
2. Error notification



To distinguish between the new JB version to the previous version which works only with the previous display units (which has only PED icons) see below and refer to the back cover of the JB.

JB version	JB part number	JB back sticker	Main box kit side sticker
New JB	PAC000SHIELDPLUS		
Previous JB	PAC000000SHIELD4		

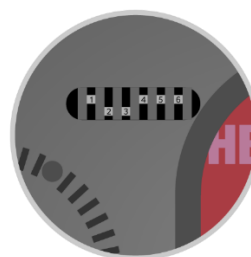
At the back part of the display unit a 6 dip switches can be found which are used to configure the audio and visual alerts.



Dip switches status:

Up position = ON

Down position = OFF



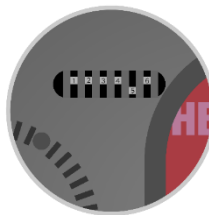
See below each dip switch combination and the relevant functionality:

Switches combination	Alert	Switches status	Functionality
1&2	DZ	1 = OFF & 2= ON	DZ visual icon + audio
		All other scenarios	Only visual
3&4	Vehicle in blind-spot alert	All other scenarios	Red vehicle icon with sound
		3 = ON & 4= ON	Red vehicle alert without sound
5&6	General volume	5 = OFF	Volume in low mode and according to the potentiometer resistor
		5 = ON	Volume in high mode and according to the potentiometer resistor
		6 = ON	Enable manually adjustment of the volume level using the potentiometer resistor
		6 = OFF	Disable manual volume adjustment

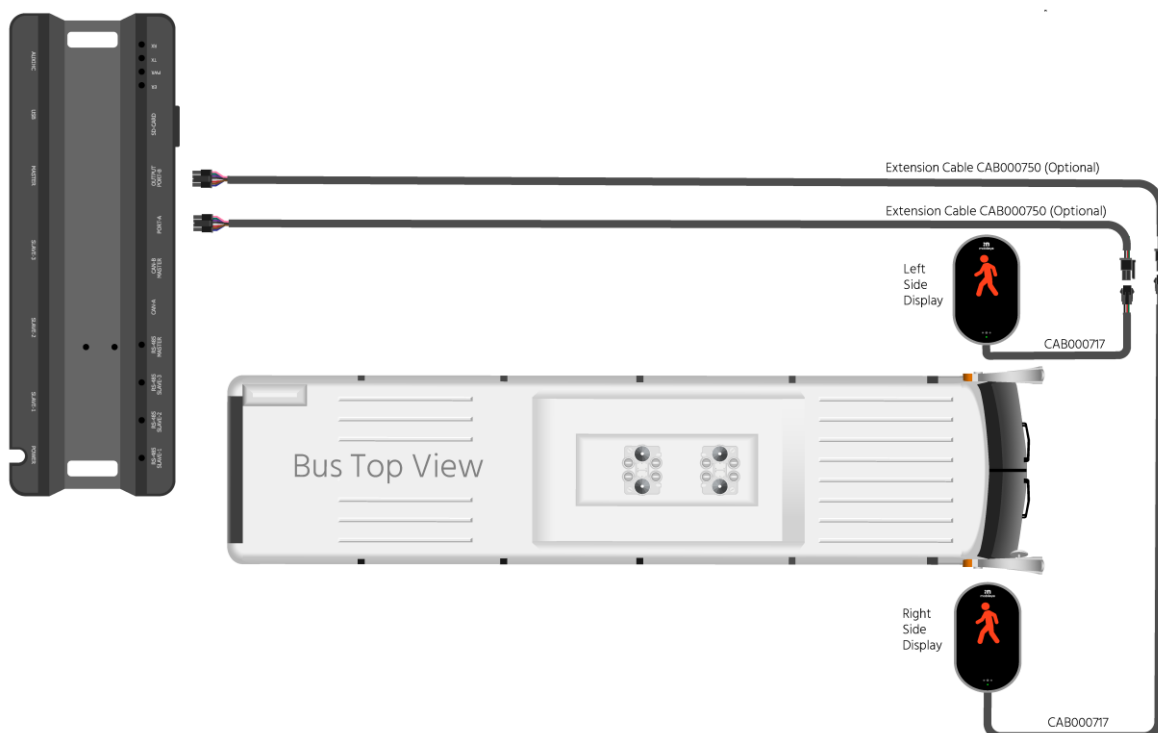
DZ = Danger zone alert – Yellow pedestrian icon

PCW = Pedestrian collision warning – Red pedestrian icon

By default, all dip switches are set to ON except #5



Connection scheme:



Note

The new display unit (PAC000000LED S4FE) uses CAB000750 as an extension cable if needed.

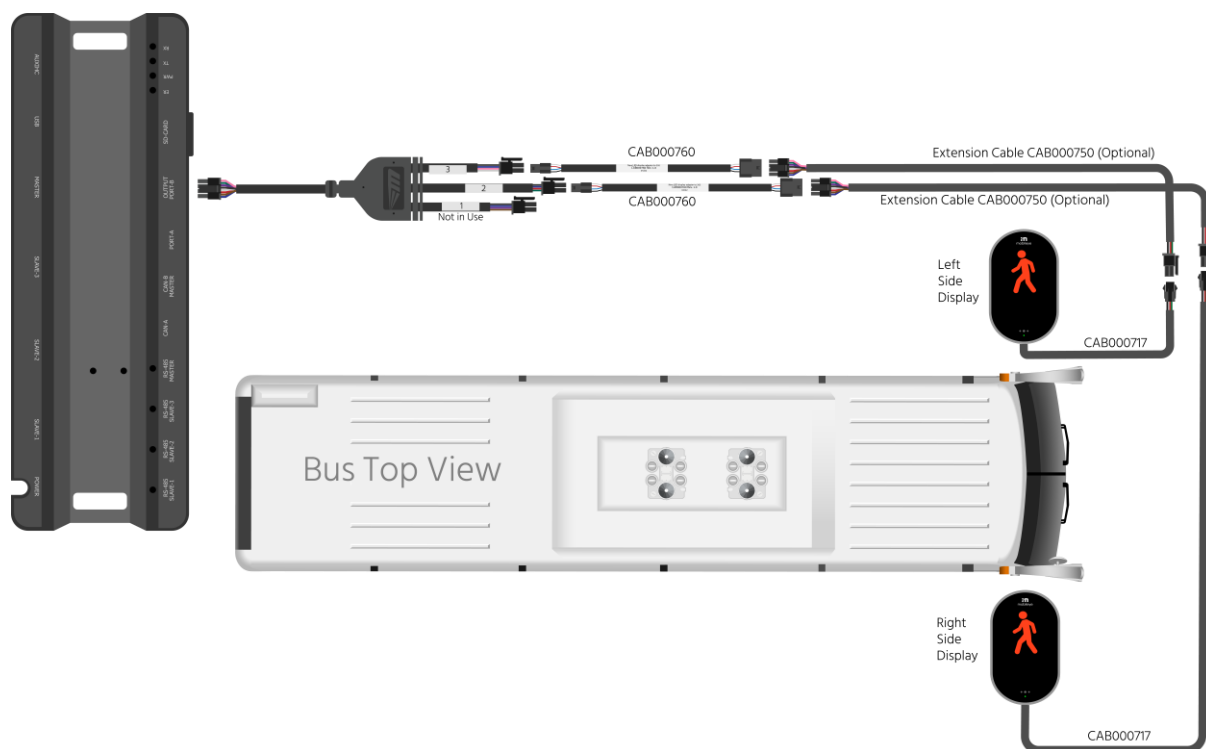
Note

Please note that the matching JB version is PAC000SHIELDPLUS

The new display unit (PAC000000LED S4FE) can be used also with previous version of the junction box.

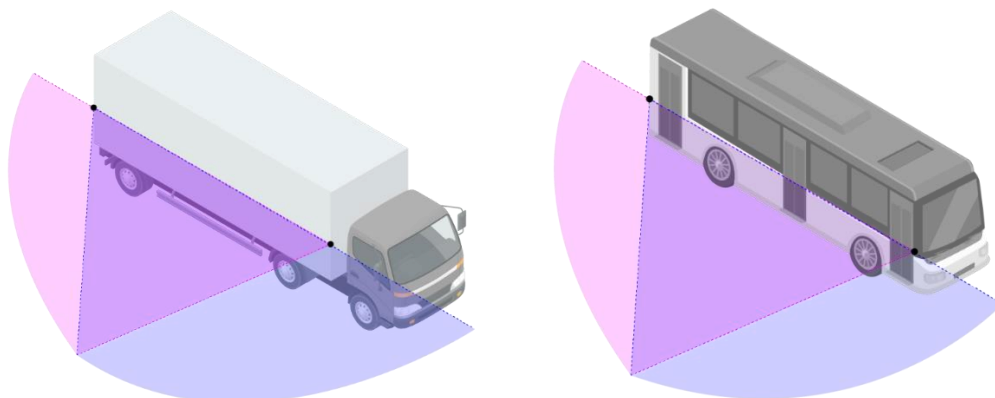
New LiD display adapters to 326
CAB000750 Rev. 1.0
04/22

Connection scheme (new display with old JB)



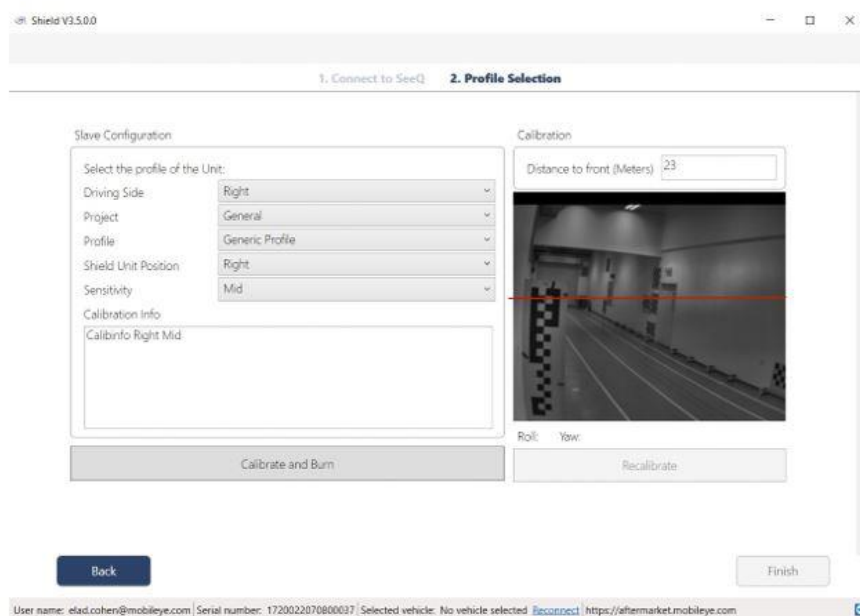
14. Appendix E – front side camera

A new solution has been utilized to get more detection area when making a turn by adding a side camera in the front of the vehicle looking backwards.



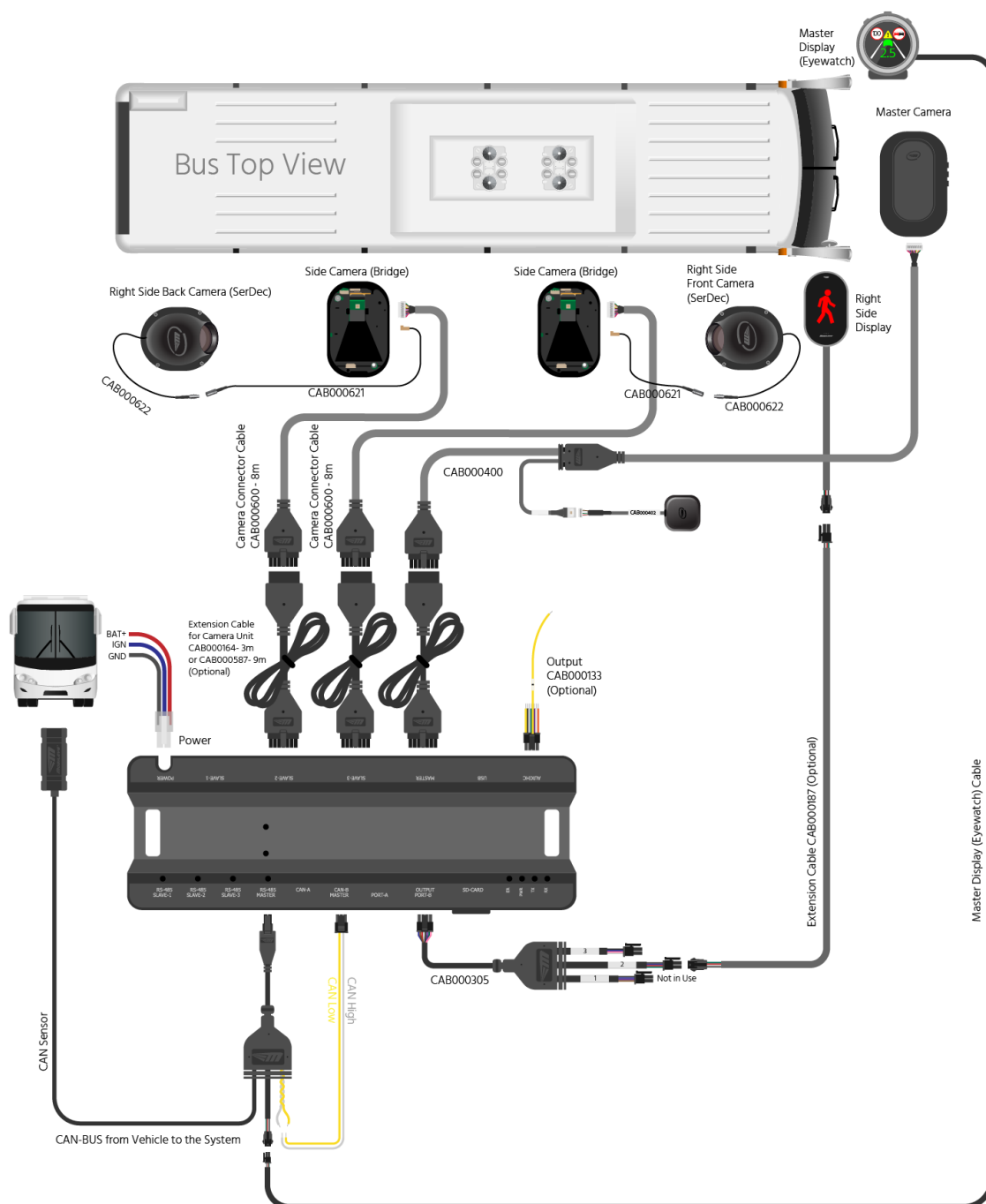
By adding a front-side camera looking backwards, we can detect any VRU that is located behind the rear camera but is in the vehicle path and provide an alert in danger is imminent.

For this configuration we will use a left-rear camera as the front-side camera BUT with a dedicated profile to be chosen from the profiles drop-down list:

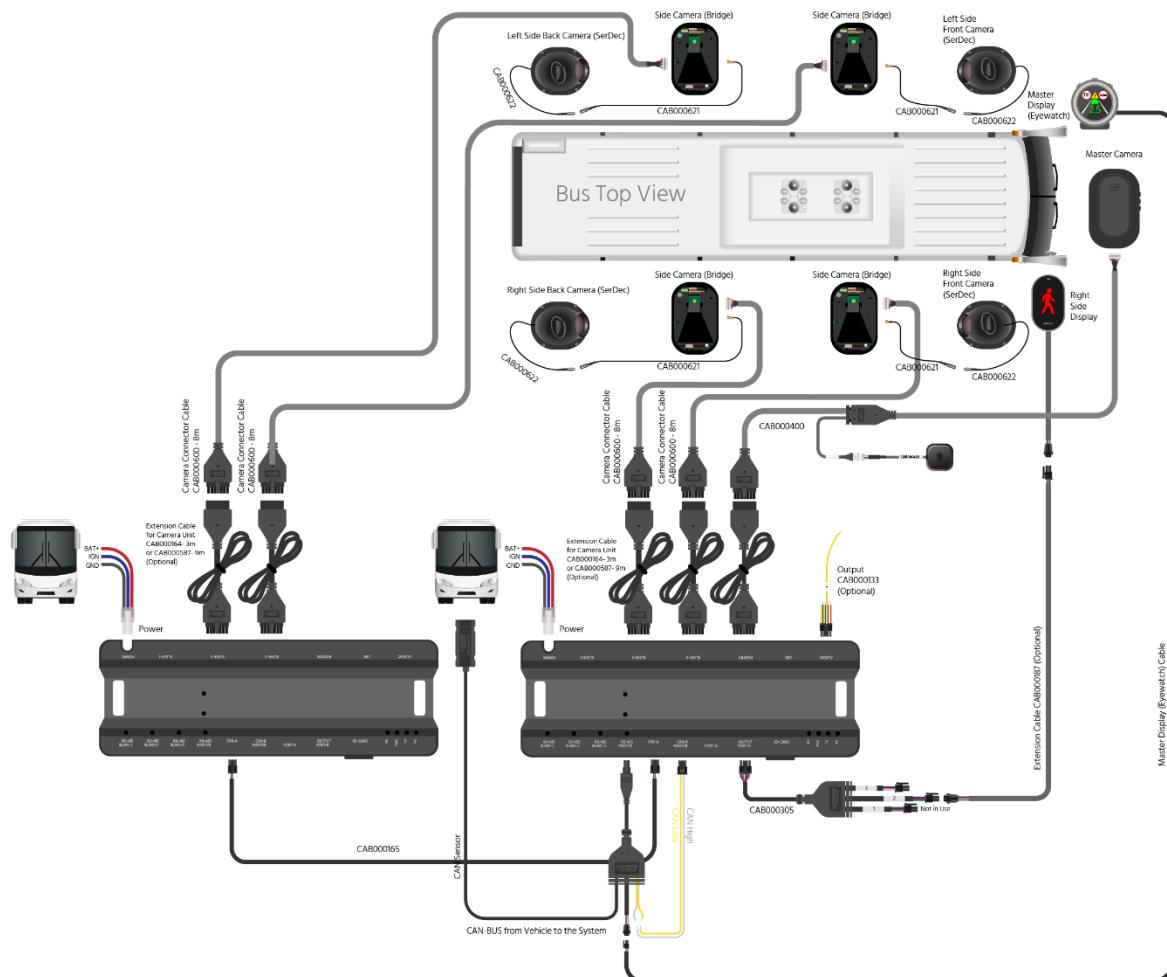


Note that in this configuration, the side display will provide a visual alert from either the rear-side or the front-side camera.

Front-side camera (right side) – connection scheme



Front-side camera (left & right) – connection scheme



Front-side camera – Calibration instructions.

When measuring "distance to front", measure the distance to the rear camera. See image:



To the measured distance, please add 2 meters to the total measurement.

Example: distance from front-side camera to rear-side camera is 10meters. You will enter 12 meters.

We are adding the 2 meters distance to cover the area behind the rear camera.

All other procedure is the same as described in [section 9.4.3](#) and further on

Note

Minimum distance between the front to rear-side camera should be at least 4m

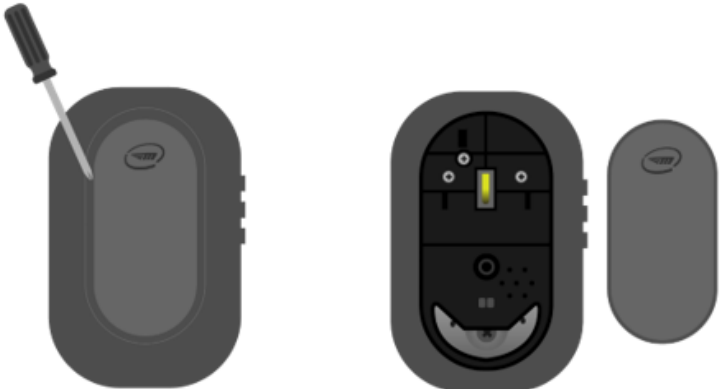
15. Appendix F – installing after windshield replacement or transferring the unit to another vehicle

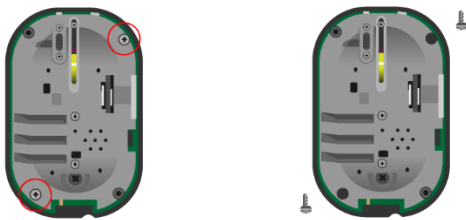
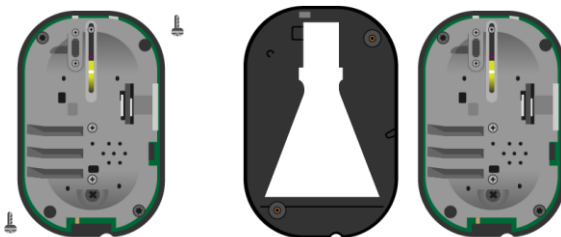
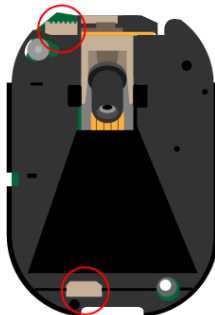
The following will describe and emphasis the process of installing a system due to windshield replacement or when transferring the unit to another system.

Step 1 – removing the system from the windshield.

To easily remove the system from the current (old/broken/cracked) windshield you will first need to disconnect the main cable from the system.

Please follow the below steps

① Using a small flat screwdriver, slide and push out the oval cover.	
② Using a small Philips screwdriver, unscrew the 3 screws and remove the main back cover.	

③ Using a small Philips screwdriver, unscrew the 2 screws and remove the main back cover.	
④ Remove the main chassis from the frame.	
⑤ Disconnect the main cable from the relevant connector (up or down)	

Step 2 – reinstalling the system

To install the camera, please follow the standard procedure and recalibrate the system.

Note

When re-installing the system, do not use the old frame with a new 3M tape to avoid detachment of the whole camera unit from the windshield in the future.

16. Appendix G – FW update - side unit

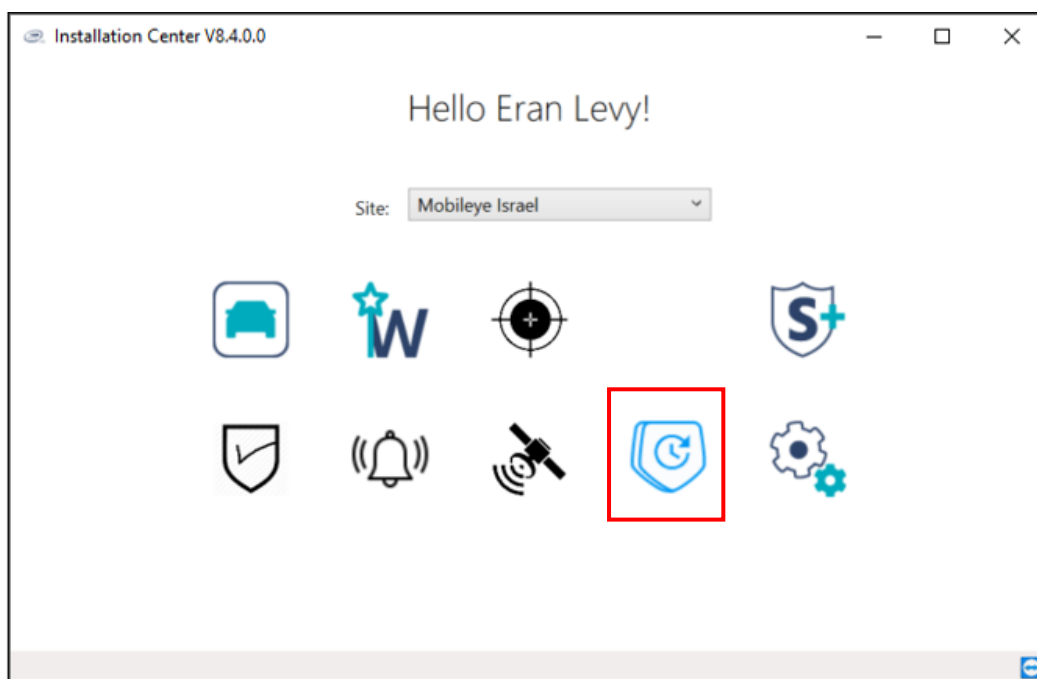
This tool will update the side unit to the latest firmware version AWS4 4.18.11v3.4.3

The latest firmware to enable in certain cases an FFS update.

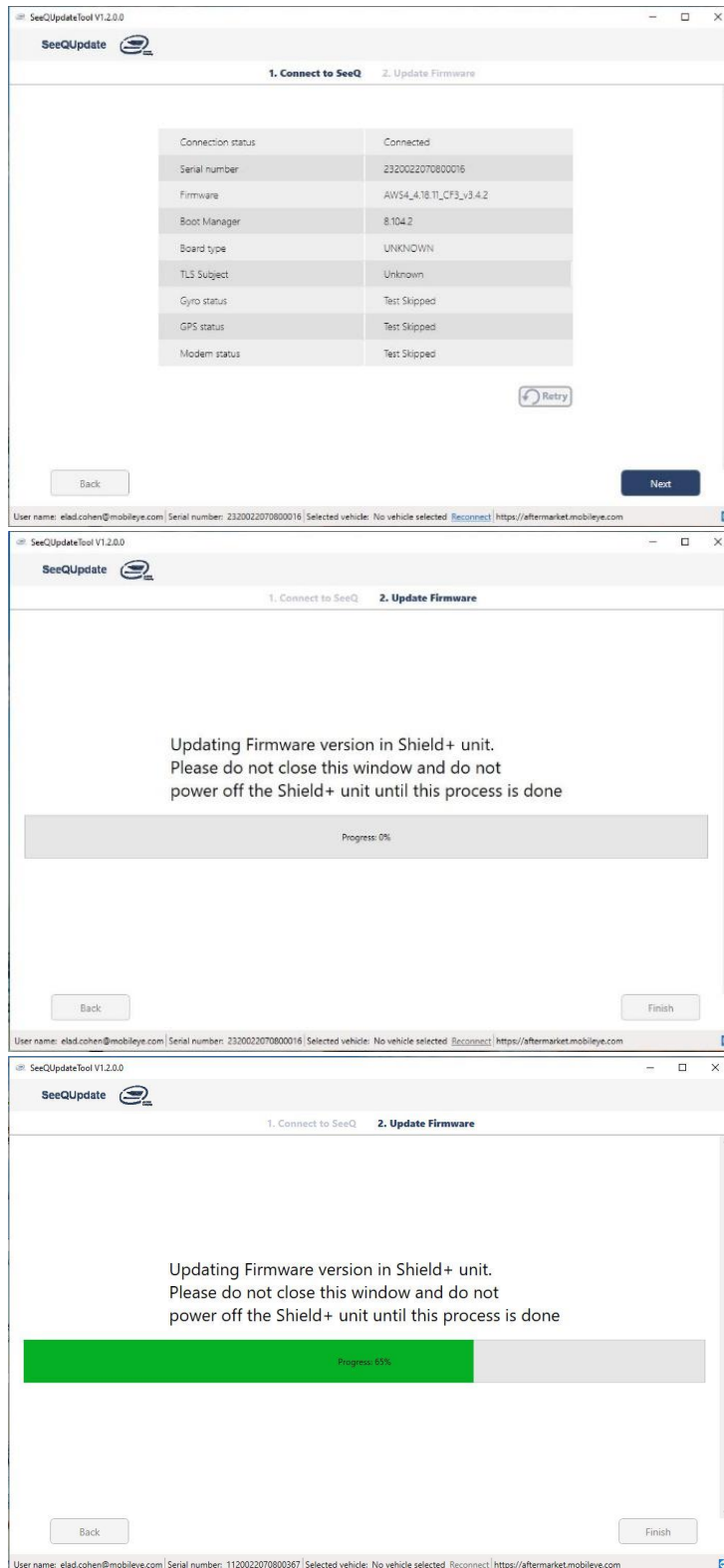
To update the Shield+ Connect side unit (bridge unit) to the latest firmware version, connect the computer to the unit via the EyeNET adapter.



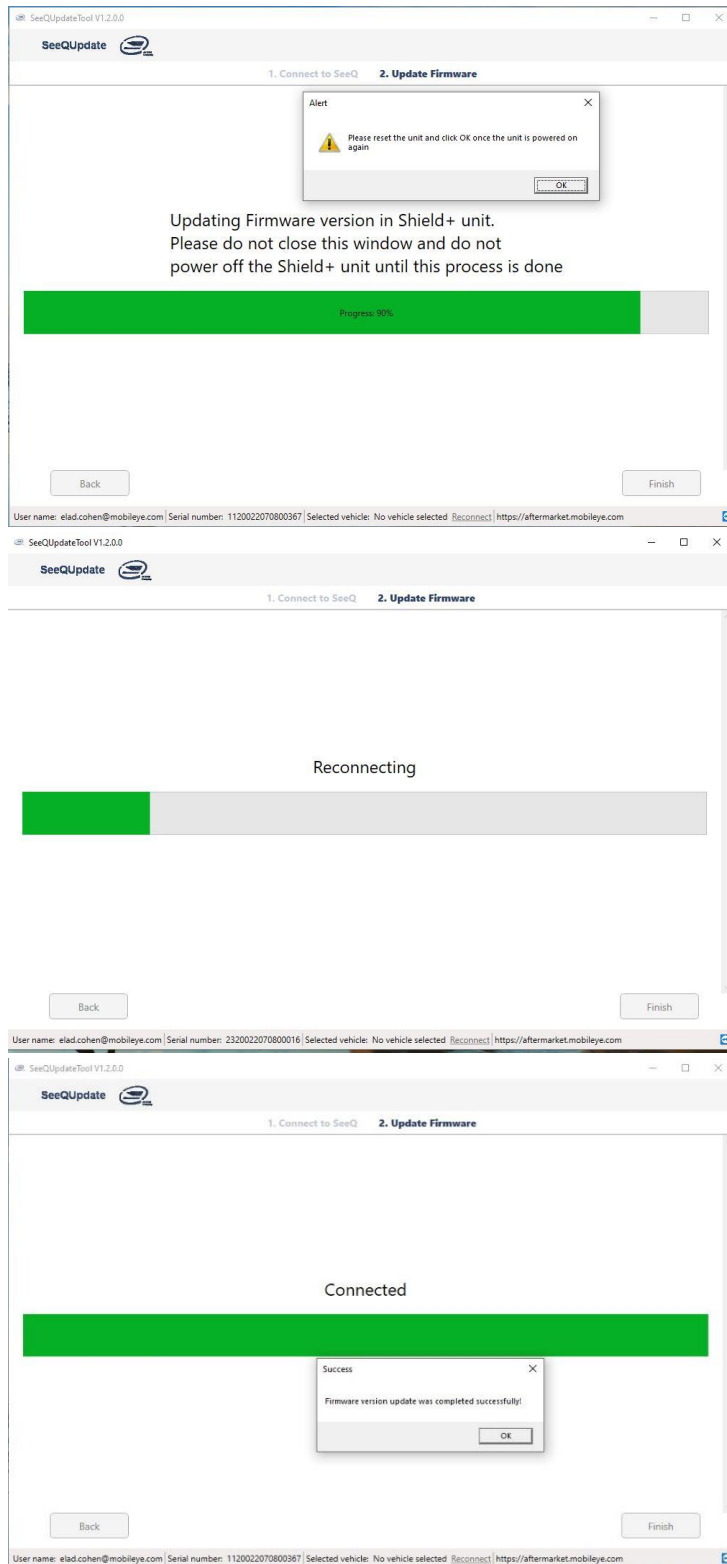
- Open the IC application and login.
- In the main application screen, choose the following icon



- Follow the on-screen messages for a successful FW update.



Power reset the system and click "OK" to continue.



- When completed, follow the standard calibration for side unit.

17. Appendix H – replacing side camera

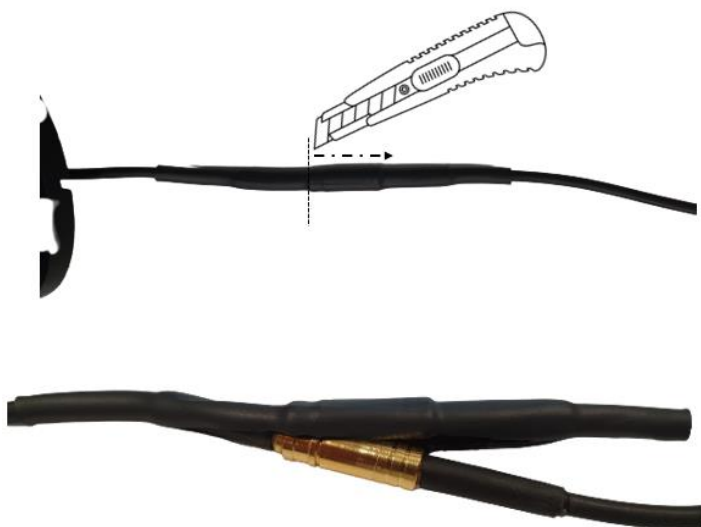
The Shield+ Connect side camera comes in 2 different variations:

1. With a single coax cable directly from the bridge to the SerDec unit
2. A coax cable with a quick disconnects connector.

When replacing the external side camera for any reason (RMA, etc.....), the installer must take an extreme caution to avoid damaging the coax cable.

When replacing a side camera with a quick disconnect connector, please see instructions below:

1. Remove the side camera from the mounting bracket and reveal the coax cable.
2. Using a sharp knife and extreme caution, cut the shrink tube, starting from the thick point (where the connector is) towards the coax cable.



3. Once the shrink has been removed, you can disconnect the side camera, replace, connect the new one and DO NOT forget to add a new shrink tube to seal back the connector.

18. Technical specification

Main unit			
PHYSICAL CHARACTERISTICS		PHYSICAL CHARACTERISTICS	
Length	120mm	Input voltage	10-36VDC
Width (without lens)	78mm	Input current (full operation)	24v > 320mA
Height	44mm	Input current (stand-by max)	24v > 0.6mA
Weight	200g	Max power consumption	27W (master + 2xRear)
Color	Black	SYSTEM IDLE CURRENT CONSUMPTION	
Case material	Plastic & Aluminum	Battery = 24VDC	IGN status = off
Cable length	3m	Shield+ FE configuration	
Cable diameter	5.8mm (±0.2)	Only JB	0.028A
ELECTRICAL CHARACTERISTICS		JB + Master camera	0.917A
Input voltage	10-36VDC	JB + Master + 1x Rear	1.182A
Input current max	24v > 350mA	JB + Master + 2x Rear	1.450A
Max power	9w	JB + Master + 3x Rear	1.755A
AMBIENT TEMPERATURE		JB + Master + 4x Rear	2.020A
(AS TESTED IN LAB WITH NO RADIATION EFFECT)			
Operation temperature	-20°C to +60°C		
Storage temperature	-30°C to +85°C		
VISION SENSOR			
Vision sensor	OV10642 RCCC CMOS 1.3MP		
Active array size	1280H * 1080V		
Optical format	1/2.56"		
Size	4.2µm x 4.2µm		
Dynamic range	48° (horizontal)		
Shutter type	Rolling shutter		
Responsivity	4.8V/lux sec (550nm)		
Angle of view	52° (horizontal)/42° (vertical)		
Focus range	5m to infinity		
Image transfer rate	36 fps		
AUDIO SYNTESIZER			
Spl minimum	86dB @ 10cm		
EYEQ4® VISION PROCESSOR MAIN FEATURES			
Hyper-thread 64bit RISC interAptiv MIPS CPU			
1GB Ethernet Port (Service port for EyeNET)			
128MB Flash x2 (for code memory redundant)			
2 x 1.6GHz, 32bit LPDDR4 SDRAM interfaces			
4 x MIPI CSI-2 Rx serial video and image preprocessing input			
1 x parallel video image preprocessing input port			
3 x CAN ports (>1Mbps)			
3 x UART ports (5Mbps)			
3 x I2C Interfaces			
MANUFACTURE STANDARD			
Mobileye 8 Connect manufactured in ISO/TS 16949 certified			



Caution

Beware when removing the system after operation as it may be hot.

For your safety, please use gloves.

EyeWatch Display Units		
PHYSICAL CHARACTERISTICS	EYEWATCH 3	EYEWATCH 8
Diameter	49mm	Width 84.5mm
Depth	78mm	25mm Leg closed: 34mm Leg open: 73mm
Height	44mm	57mm
Weight	46g	109g without cable 146g with cable
Color	Black	Black
Case material	Plastic	Plastic & Aluminum
Cable length	3m	2.5m
Cable diameter	5.8mm (±0.2)	3mm (±0.2)
ELECTRICAL CHARACTERISTICS		
Input voltage	5VDC	10-36VDC
Input current	50mA	120mA @ 12V
AMBIENT TEMPERATURE (AS TESTED IN LAB WITH NO RADIATION EFFECT)		
Operation temperature	-20°C to +60°C	-20°C to +60°C
Storage temperature	-30°C to +85°C	-30°C to +85°C
Operating humidity	Up to 95%	Up to 95%
DISPLAY CHARACTERISTICS		
Screen size	1.5"	3.2"
Contrast ratio	250	500
Surface luminance	LCD full color – 40mcd (min)	900 cd/ m ²
Viewing angle	100°	45°/45°/45°/20°
Resolution	128 x 128 pixels	240 x 320 RGB
ADDITIONAL FEATURES		
Display colors		262k
Light sensor for automatic view day/night	Yes	Yes

3G Cellular Module	
PHYSICAL CHARACTERISTICS	
Model	SARA-U201
GSM / GRPS protocol	3.75G HSPA
Coverage area:	Global
Bands:	2G: 850/1800/1900 MHz 3G: 800/850/900/1900/2100 MHz
Data rates:	Up to 7.2 Mbit/s DL Up to 5.76 Mbit/s UL
Internet protocol version	IPv4 / IPv6 dual stack
Transport layer security	Embedded TLS 1.2
Certification	GCF/PTCRB/R&TTE/CE/FCC/IC/Anatel/RCM/Giteki
Telecommunications standards	3GPP TS 27.010
Serial interface	UART (up to 921,600 bps)
Sim voltage	1.8V
Sim size	Nano SIM 10mm X 12.5mm X 1.2mm

GNSS	
RECIEVER TYPE	
Receive and track multiple GNSS systems	
Support satellite: GPS, GLONASS, BeiDou and QZSS signals	
FEATURES	
Frequency of time pulse signal (1pps)	0.25 Hz...10 MHz
Module type	External module with antenna included
RTC using a crystal	External 32.768 kHz signal to the RTC input Clock and data backup on sleep mode
Voltage operation	1.65-3.6V
Dimension	40mm x 40mm
Cable length	450mm

Side SeeQ Unit (Bridge)	
PHYSICAL CHARACTERISTICS	
Length	100mm
Width (without lens)	82mm
Height	55mm
Weight	135g
Color	Black
Case material	Plastic
Cable length	8m
Cable diameter	4.8mm (±0.2)
ELECTRICAL CHARACTERISTICS	
Input voltage	10-36VDC
Input current max	24v > 300mA
Max power	9W
AMBIENT TEMPERATURE (AS TESTED IN LAB WITH NO RADIATION EFFECT)	
Operation temperature	-40°C to +85°C
Storage temperature	-40°C to +105°C

SERDEC CAMERA (EXTERNAL MINION)	
PHYSICAL CHARACTERISTICS	
length	104.7mm
width	87.2mm
height	56.1mm (±0.3)
weight	158g
color	Black
case material	Plastic
cable length	0.4m (short cable); 6.6m (main)
cable diameter	3.1mm
VISION SENSOR	
Vision sensor	OV10642 RCCC CMOS 1.3MP
Active array size	1280H * 1080V
Optical format	1/2.56"
Size	4.2µm x 4.2µm
Dynamic range	48° (horizontal)
Shutter type	Rolling shutter
Responsivity	4.8V/lux sec (550nm)
Angle of view	52° (horizontal); 42° (vertical)
Focus range	5m to infinity
Image transfer rate	36 fps
ENVIRONMENTAL CHARACTERISTICS	
Operation	-40°C to +85°C
Storage temperature	-40°C to +105°C
Water resistance	Outdoor ambient, standard IP-67, IP-69

Side camera's Display unit	
PHYSICAL CHARACTERISTICS	
Length	145mm
Width	87mm
Depth (leg closed)	35mm
Depth (leg open)	72mm
Weight	205g
Color	Black
Case material	Plastic
Cable length	3m
ELECTRICAL CHARACTERISTICS	
input voltage	24VDC
Input current max	8mA on idle, 250mA
ENVIRONMENTAL CHARACTERISTICS	
Operation temperature	-20°C to +80°C
Storage temperature	-40°C to +100°C
DISPLAY CHARACTERISTICS	
Resolution	LEDs

JUNCTION BOX UNIT	
PHYSICAL CHARACTERISTICS	
Length	180mm
Width	70mm
Height	20mm
Weight	155g
Color	Black
Case material	Plastic
ELECTRICAL CHARACTERISTICS	
Input voltage	12-24VDC
Input current	12v > 29mA, 24v > 20mA
ENVIRONMENTAL CHARACTERISTICS	
Operation	-20°C to +80°C
Storage temperature	-40°C to +100°C
Operation humidity	95%