Mobileye 6

- Technical Installation Guide -

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1 Warnings

1.1 General

By Installing the Mobileye® 6® Driver Assistance System, you will be acknowledging and agreeing to operate Mobileye 6 in accordance with the Safety Instructions and Warnings set forth below. If you do not agree to these terms, please return Mobileye 6 to your dealer, in its original packing materials, within 30 days of purchase, for a full refund.

Mobileye 6 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 6 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 6 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 6 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 6 system's recognition and response capabilities accordingly, drivers should not rely on the Mobileye 6 to assure their driving safety, but rather should continue to rely on safe driving practices.

Drivers should exercise caution in using the Mobileye 6 Display unit. Always maintain full concentration on the road at all times including while looking at the Mobileye 6 display unit.

1.2 System Limitations

The Mobileye 6 is intended for paved roads, with clear lane markings.

The Mobileye 6 only detects fully visible rear ends of vehicles (Day and Night) and fully visible pedestrians and rear ends of Bicycles (Day only). Therefore the detection of crossing, oncoming, and passing vehicles is not supported.

The Mobileye 6 does not guarantee 100% accuracy in the detection of vehicles or driving lanes, nor in providing warnings of all potential road hazards. In addition,

road, weather and other conditions can adversely affect the Mobileye 6 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 6 performance. Always ensure clear camera view.

1.3 Installation and Safety Instructions

Mobileye 6 installation must be carried out by an Authorized Mobileye 6 Dealer or Installer.

The Mobileye 6 system should not be transferred between vehicles, other than by an Authorized Mobileye 6 Dealer or Installer.

The Mobileye 6 should only be operated with 12VDC~24VDC power.

Do not cover or obstruct the Camera Unit or Mobileye 6 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.

NOTE:

- Mobileye 6® installation is possible only on **CAN-bus** supported vehicles.
- Minimum CAN-bus signals required for Mobileye 6 installation:
  - Speed
- Mobileye 6 installation on non CAN-bus vehicles is possible only using the Mobileye E-box add-on

2 Mobileye 6 Description

WARNING: The Mobileye 6™ system should be installed ONLY by Mobileye® Technologies Ltd. authorized personnel!

2.1 Mobileye 6 Components overview

The Mobileye 6 is based on the following elements:

- The **Mobileye 6** Main Unit and Connector Cable (Camera)
- The **EyeWatch** Display & Control Unit
- The Mobileye **Enhancement-Box** (E-box) – (Optional add-on)
- The Mobileye **CAN-Sensor** (Optional add-on)

When receiving the Mobileye 6 please verify receiving & identify all the following components:

2.1.1 Mobileye 6 Main Unit & connecting cable (CAB000205)

The Mobileye 6 Main Unit contains the following components:
Camera unit, High-quality Audio Alert Buzzer, Mobileye Chip on Board system (SeeQ) and Connector Cable.

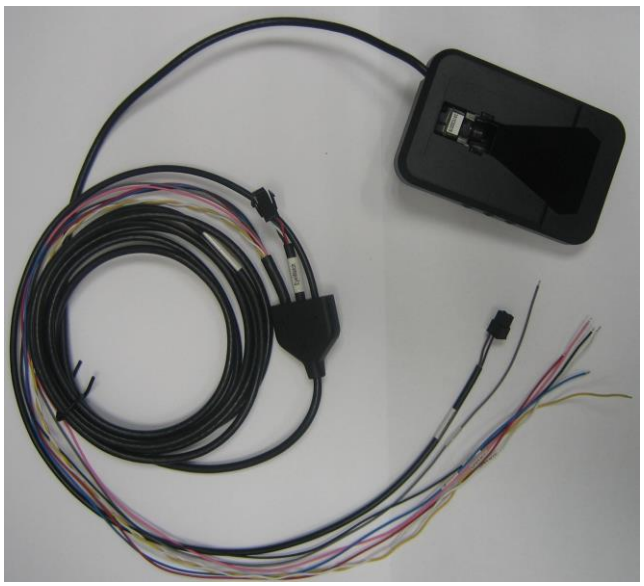


Figure 1: Mobileye 6 with connecting cable – Front view.

2.1.2 EyeWatch - Display & Control unit (CAB000087)

NOTE: The **EyeWatch** Display & Control Unit is sold as an optional add-on on certain Mobileye 6 models.

Figure 2: EyeWatch Display and Control Unit with connecting cable

2.1.3 External Fuse Holder

The Mobileye 6 is supplied with an External Fuse Holder and a 2A Fuse for protection against short circuiting the vehicle electrical system.

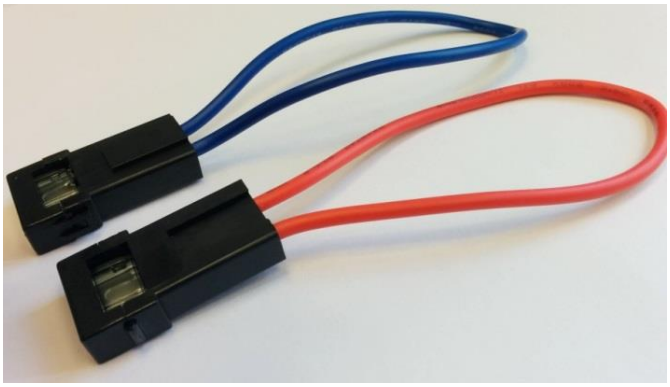


Figure 3: External Fuse Holder & 2A Fuse

2.1.4 3M VHB Surface Cleaner

The 3M VHB Surface Cleaner supplied with Mobileye 6 Cleans and degreases the Windshield surface to ensure optimum adhesion for 3M VHB Tape provided with the Mobileye 6 Main Unit.

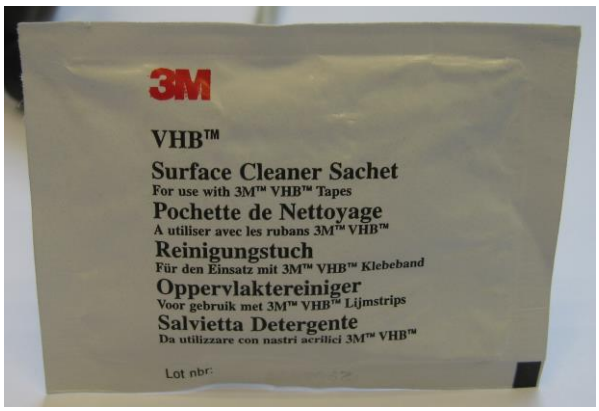


Figure 4: 3M VHB Surface Cleaner

2.1.5 Mobileye 6 Connection Scheme

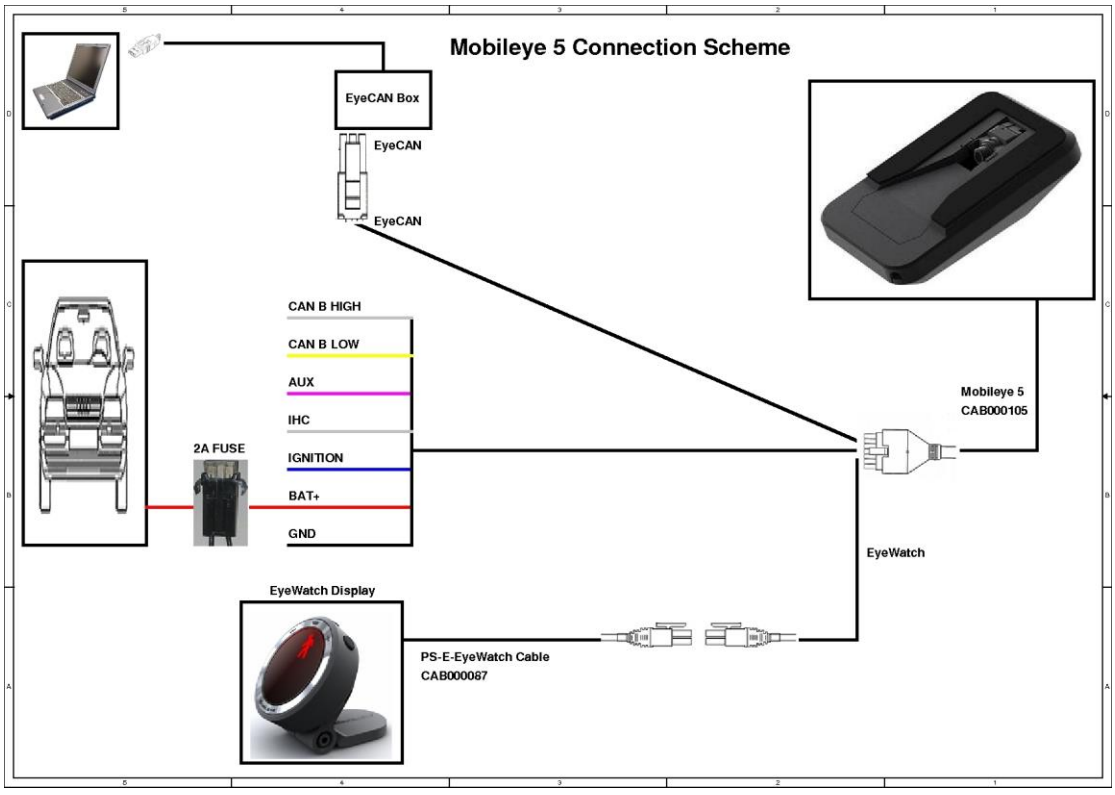


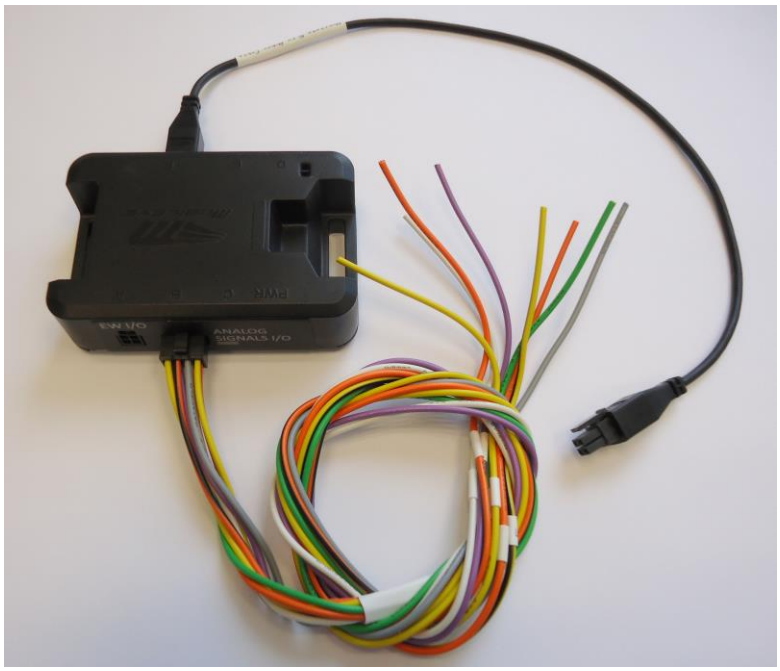
Figure 5: Mobileye 6 connection scheme with EyeCAN

2.1.6 Mobileye Enhancement Box (E-box) - (ME5ABOX001)

NOTE: The Mobileye **E-box** is sold separately as an optional add-on.

The Mobileye E-box (Enhancement box) is an Analog to CAN adapter that allows us to install the Mobileye 6 system in any vehicle, regardless of CAN-bus availability.

For more detailed information on the Mobileye E-box please see appendix E



2.2 Mobileye 6 Connections Description

The following paragraphs describe in detail the function of the cables and connections shown above.

2.2.1 Mobileye 6 Main unit connections

The Mobileye 6 main unit contains the camera, the Audio Buzzer and the main processor (EyeQ™). The Mobileye 6 main unit also contains volume control buttons.

The Mobileye 6 Main unit functions as a Universal Mounting Adapter for all vehicles' front windshield angles. It is attached to the vehicle's front windshield with the provided 3M double sided sticker.

The Mobileye 6 Connecting cable is split into a few various cables which are used to connect to the vehicle power source, to the vehicle CAN-bus, to the vehicle High-beams (for IHC), to 1 of the vehicles' Analog signals if required (or both analog Left and Right Turn indicator signals via Diode) and to the Mobileye EyeWatch display and Control unit and Mobileye EyeCAN.

A detailed description of each Mobileye 6 connecting cable connections can be found in the table below:

Wire Name & Function	Wire color	Connector	Connection To
EyeCAN - (6 pin connector)	Black	P2	EyeCAN unit (for system calibration)
EyeWatch - (4 pin connector)	Black	J1	EyeWatch Display & Control unit
BAT+ (12/24V)	Red	-	Vehicle constant power (Battery)
GND	Black	-	Vehicle GND (BAT-)
Ignition (12/24V)	Blue	-	Vehicle Ignition signal
CAN B H	White	-	Vehicle CAN-bus (CAN High wire)
CAN B L	Yellow	-	Vehicle CAN-bus (CAN Low wire)
IHC – **(Analog Output)**	Gray	-	Vehicle High-beams via external Relay or connection to any 3rd party device
AUX (Analog Input)	Pink	-	*1 analog Signal Input (or both Left and Right Turn indicators analog input via Diode)*

Table 1: Mobileye 6 connecting cable connections

2.2.2 External Fuse Holder & 2A Fuse – 2 pieces

The External Fuse Holder connection is as follows

1. Cut the fuse holder cable so that it creates 2 separate wires
2. Connect one end of the Fuse holder to the Vehicle Power source (12V/24V).
3. Connect one end of the 2nd fuse holder to the vehicle ignition source (12V/24V).
4. Connect the available end of the Fuse holder wire to the Mobileye Power Cable (Red wire) or the vehicle ignition source (Blue wire).

2.2.3 EyeWatch – Display & Control unit connection

The EyeWatch is connected to the Mobileye 6 EyeWatch Female connector (J1) using the EyeWatch connecting cable Male connector (J1).

Wire Name	Wire color	Connector	Connection To
EyeWatch Cable (CAB000087)	Black	J1 - male	Mobileye 6 cable - EyeWatch connector
EyeWatch - (CAB000205)	Black	J1- female	EyeWatch Display & Control unit

Table 2: EyeWatch connections

2.2.4 EyeCAN – Mobileye CAN to USB interface

The EyeCAN is NOT part of the Mobileye 6 system. It is a tool which enables the installer to configure and calibrate the Mobileye 6 system during the installation. The Mobileye 6 EyeCAN Male connector (P2) is used for connection with the Mobileye EyeCAN Box Female connector labeled “CAN” (J5).

Wire Name	Wire color	Connector	Connection To
CAN (EyeCAN box connector)	Black	J5 - female	Mobileye 6 cable - EyeCAN connector
EyeCAN - (CAB000205)	Black	P2- Male	EyeCAN box connector labeled “CAN”

Table 3: EyeCAN connections

2.2.5 E-box Connections

For information regarding E-box connection please see Appendix E.

3 Mobileye 6 Installation

3.1 Electrical Vehicle Signals Requirements

Table 4 details the Mobileye 6 requirements regarding which vehicle signals are needed, and what their electrical attributes should be.

Please make sure the vehicle to-be-installed complies with these requirements

Item	Description	Value
Signals Cables	Car inputs	BAT+, GND, Ignition, High Beam, CAN-Bus (High/Low)
Voltages	Input	12 - 36VDC
	Current Load (full operation)	12v > 360mA, 24v > 180mA**
	Stand-by Current Load (Ignition off)	12v > 10µA, 24v > 10µA
	Power consumption	Nominal 5.2W

* A 12V vehicle has battery voltage of 13.7V and 24V vehicle has battery voltage of 27V.

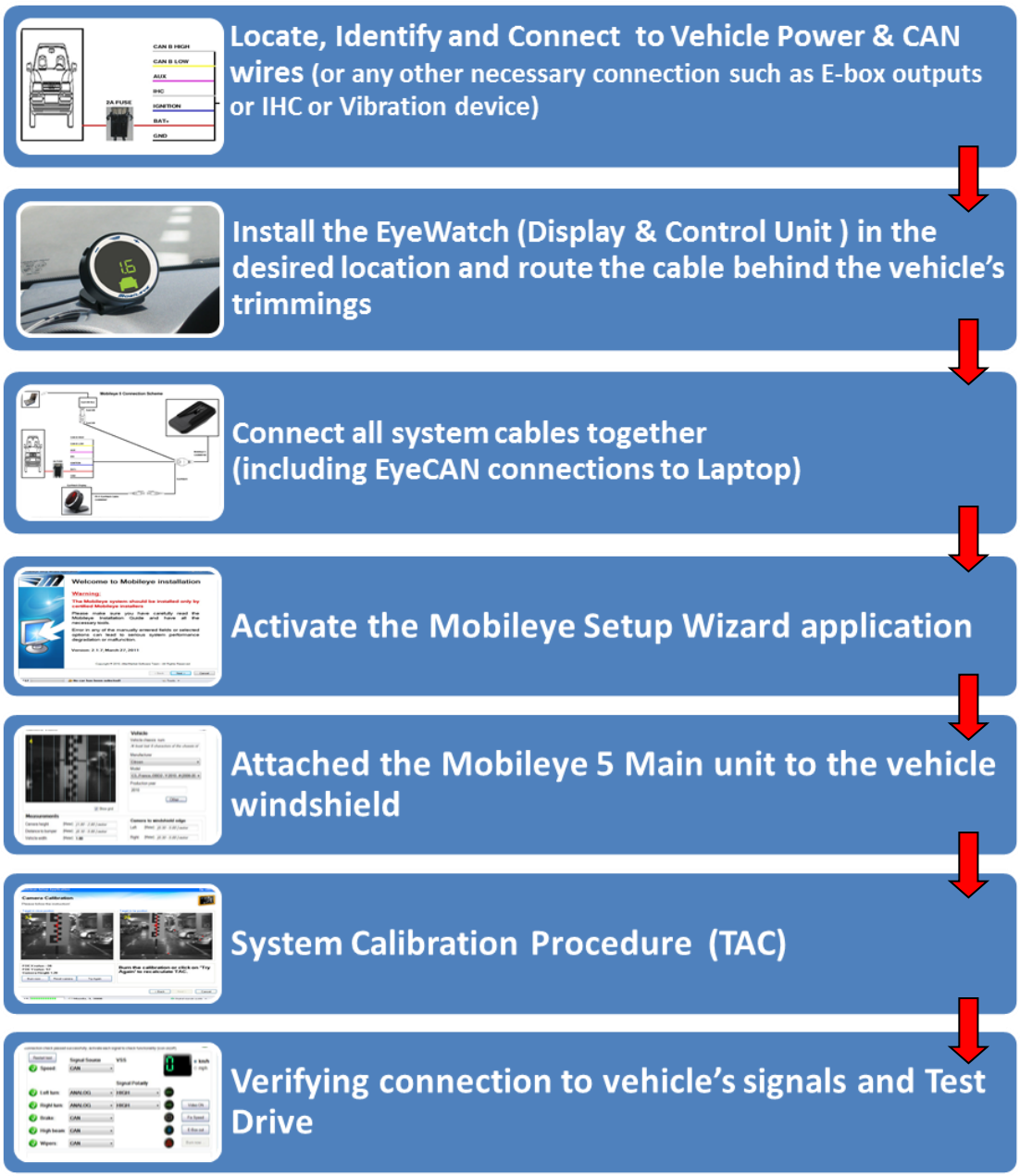
** The current consumption of the Mobileye 6 is depended on the vehicle system voltage (12 or 24V).

Additional Notes:

1. Mobileye 6 complies with automotive standard (ISO-7637-2) regarding voltage transients for all signals (input voltage and car signals).

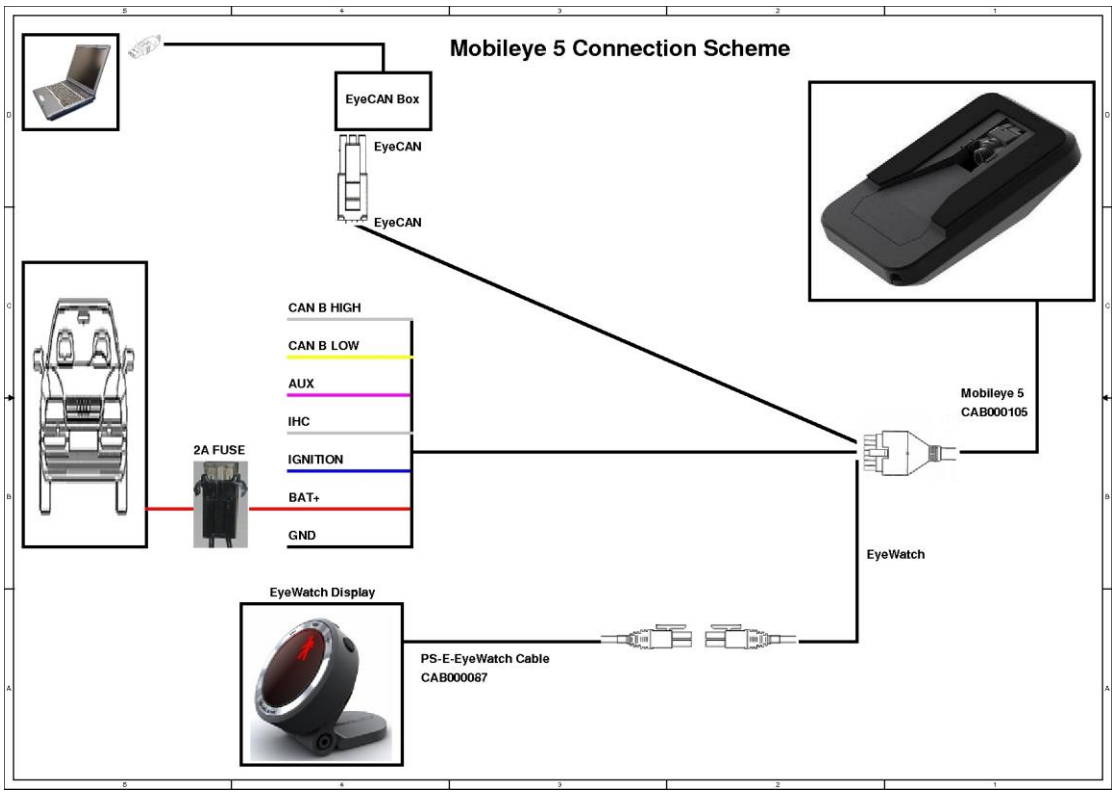
3.2 Mobileye 6 Installation Procedure

The following chart summarizes the main stages of the Mobileye 6 installation procedure:



3.2.1 Mobileye 6 Connection Scheme

Please ensure that you identify the Mobileye 6 cables according to diagram below. The paragraphs that follow will present the function of each cable, and then guide you through their actual connection procedures with the car signals.



3.2.2 Connecting to Vehicle Signals

<u>CAUTION</u>: Identifying the vehicle's electrical signals requires having the keys in the ignition in the ACC (Accessory) position or Ignition ON. Make sure the car headlights and/or any other power consuming devices are turned off during Mobileye 6 installation to prevent battery drainage.

1. Identify the wires in the vehicle that carry the required electrical signals (according to table below).
2. After identifying the required signals locations in the vehicle, pass the Mobileye 6 cable (CAB000205) behind the vehicle trimmings so that it reaches all vehicle signals (it is recommended to hang the Mobileye 6 Main

Unit on the rear view mirror or place it on the dashboard before passing the cable behind the vehicle trimmings).

3. Firmly connect the appropriate wire from the **Mobileye 6 (CAB000205)** to the identified vehicle signal.

   Each wire in the Mobileye 6 cable mentioned above has a unique color. Make sure to connect the correct vehicle signal to its appropriate wire according to Table 2-7.

Identified vehicle signal	Wire label	Wire color
Vehicle battery (Constant 12V~24V) **via 2A Fuse**	BAT+	Red
Ignition (12V~24V)	Ignition	Blue
Vehicle GND	GND	Black
CAN High	CAN High	White
CAN low	CAN low	Yellow
1 Analog signal – (Brake, Wipers or High Beams), or both analog Left and Right Turn indicator signals via Diode (Connection description for AUX wire can be found in Appendix B)	AUX	Pink

NOTE: Make sure the 2A fuse is kept easily accessible

NOTE: Wires' colors are not guaranteed. Always refer to the wires' labels

NOTE: Always check the Mobileye Internal Database for CAN-Bus availability before Installation is started

4. Keep the Mobileye 6 EyeCAN and EyeWatch connectors easily accessible.

3.2.3 Installing the EyeWatch (optional)

1. Select the optimal location for the EyeWatch. The unit should be placed on the dashboard at a location which is in the driver's field of view and convenient for him to see when driving, and to allow him access to the controls while seating comfortably in the driver's seat (the EyeWatch mounting angle is adjustable by the installer, a Philips screw driver is required).
2. Clean the selected location with the provided 3M VHB Surface cleaner.

3. Attach the EyeWatch to the selected area (remove the protective cover from the adhesive tape).
4. Remove transparent protecting cover from the display surface
5. Insert the EyeWatch cable (CAB000087) behind the vehicle the trimmings so that it reaches the EyeWatch connector of the Mobileye 6 cable (CAB000205).

WARNINGS!

- The EyeWatch and Main Unit should be placed in a location that does not obstruct the driver's field of view.

- The EyeWatch should not be placed in front of air-bags operational space. The unit may prevent the air-bag from fully opening and/or may cause injury during air-bag activation.

- Attaching the EyeWatch on the Vehicle's windshield is not recommended (EyeWatch may overheat).

3.2.4 Installing the Mobileye 6 Main Unit (Camera)

3.2.4.1 Selecting the optimal location for the Main Unit:

Select the optimal location for the Main Unit. Please comply with the following requirements as incorrect positioning may affect the overall performance of the system.

- The Main Unit should preferably be placed at the top of the windshield (preferably at a height over 1.2 meter), in an area well covered by the windshield wipers.
- The Main Unit should be placed at approximately the center of the vehicle widthwise. If this is not possible it should be within the central third of the vehicle width. It should be noted that some car models have convex windshield (sideways), which intensifies the problem of an off-center installation.
- The validation to the windshield edges allows an offset up to 15cm only. The preferable position of the Main Unit is in the middle of the windshield. If this is not possible we allow up to 15cm offset to one of the sides but no more so to not cause reduction in system performance.

- There should be no occlusions such as stickers or darkened windshield areas in front of the Main Unit.
- In tall commercial vehicles that do not have an engine hood occluding the field of view of the camera, the v Main Unit can be placed on the lower part of the windshield, while considering all of the above-mentioned requirements. In this case, you can modify the Main Unit cable to the "DOWN" position. “DOWN” means that after the Main Unit installation, the Main Unit cable exits the Main Unit downwards, instead of upwards (which is the case in the default “UP” position.

3.2.4.2 Attaching the Camera to the Windshield

1. Before starting the Main Unit installation, make sure that the car is not loaded with unusual heavy cargo that can tilt the orientation of the car body.
2. Make sure the vehicle is standing on a flat surface with no side or forward slope.

3. Clean the intended installation location on the windshield using the 3M VHB Surface Cleaner to remove oily or other remains.
4. Wipe the installation area on the windshield by thoroughly using a ***dry wipe*** (important since the 3M VHB Surface Cleaner that removes oily substances may leave marks on the windshield that will obstruct the camera’s field of view)

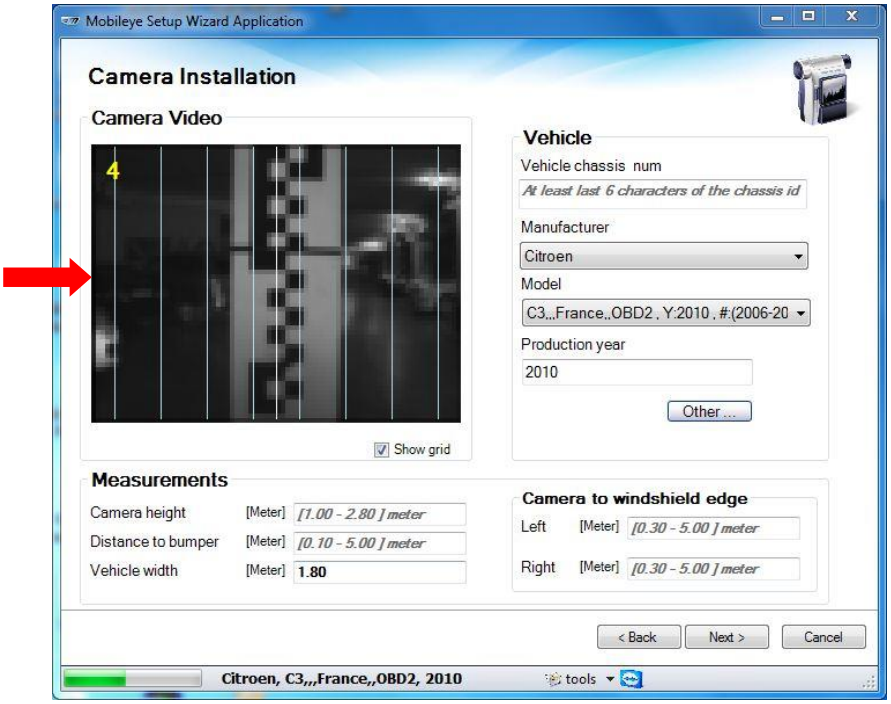
5. Connect the Mobileye 6 EyeCAN cable (6 pin male connector – CAB000205) to the EyeCAN Unit (6 pin Female connector labeled “CAN”).
6. Connect the EyeCAN unit USB connector to the Laptop Computer USB port.

Mobileye 6	EyeCAN	Laptop PC
Connector	Connector	Connector
6 pin male	6 pin Female	
	USB	USB

7. Power On the laptop computer.
8. Power on the Mobileye 6 system by turning on the vehicle ignition switch to ACC (Accessory) position.
9. Run the Mobileye Setup Wizard Application

NOTE: Chose the vehicle from the Internal Database in the Mobileye Setup Wizard application before continuing.

10. After connecting successfully and passing ***the System Information*** and ***Local Information*** windows, you should see the Camera image in the “***Camera Installation***” window of the Mobileye Setup Wizard.



11. Locate the "TAC Target" exactly in the middle of the vehicle's front bumper (for cars – close as possible to the front bumper and for trucks – 1 meter away from front bumper)
12. Using the image feed (camera installation slide) start gluing the Camera from the top down, maintaining the Blue and Yellow vertical lines in the scene ahead as the vertical lines in the image window. When completed, firmly attach the camera to the windshield.
    - The Yellow line indicates the center of the image.
    - To see the Red horizontal line you must first fill in the Camera height measurement.

NOTE: Before attaching the Main Unit verify there is enough room to dismantle the Main Unit back covers using a small Philips screw driver.

NOTE: For Truck and Bus installations first remove the Mail Unit back covers, Slide the Camera Down the railing to Level 6 and then follow steps 5 to 12.

The image below shows the Main Unit (Camera) attached to the front windshield, typically behind the rear view mirror. The Blue (or Green) L.E.D on the back of the Main Unit indicates that the Mobileye 6 is receiving power.

Figure 1-10 Vision Sensor Unit located on the windshield behind the rear view mirror

NOTE: At the end of this process, all the system components are connected and all Mobileye 6 components are attached to the vehicle and connected to the Laptop PC

4 System Calibration Procedure

CAUTION: When Performing System Calibration DO NOT:

- **Disconnect the EyeWatch connection**
- **Move the laptop carelessly**
- **Turn off the vehicle or in any other way turn off power to the Mobileye 6 system**

4.1 Removing the Mobileye 6 Back Covers

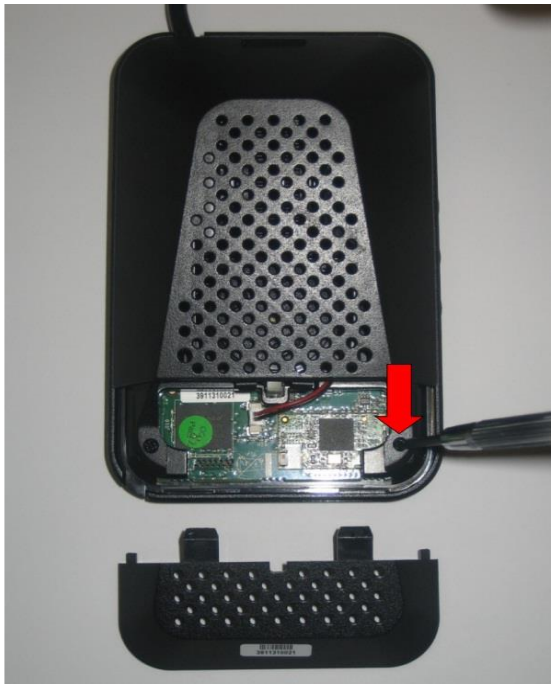
In order to calibrate the Mobileye 6, the camera angle must be set prior to the calibration process. To access the camera adjustment screw there is a need to remove the Mobileye 6 Main Unit Back Covers.

To remove the Main Unit Back Covers follow the below instructions:

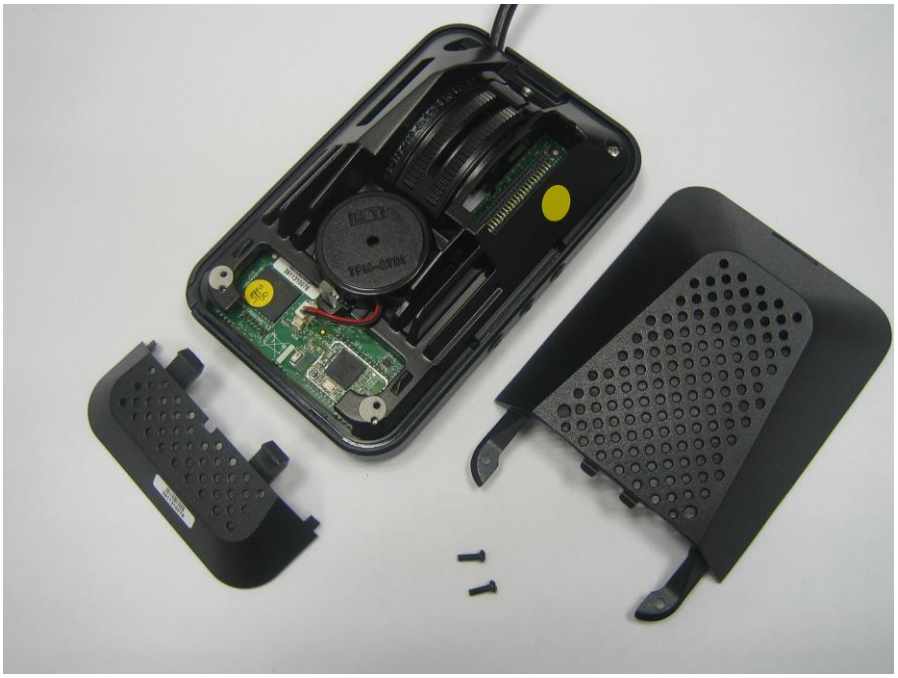
1. Insert a small screw driver at the slightly larger circles at the right and Left ends of the lower part of the Main Unit Back Cover and press the bracket to release.

2. Once the 2 Brackets on the Left and Right side have been released pull the Lower Back Cover downwards and remove completely.

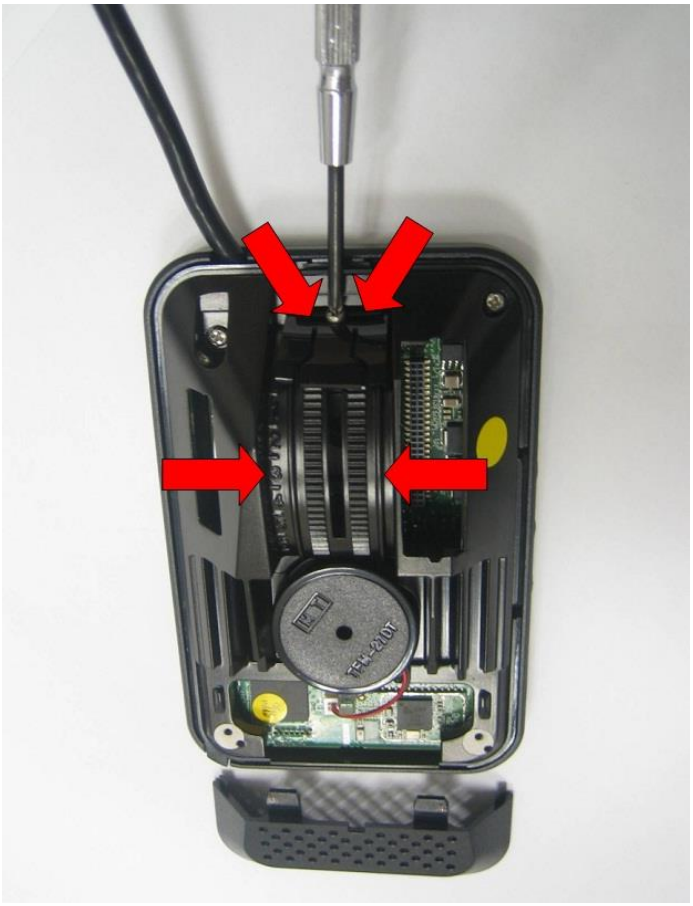
3. Un-screw the 2 small screws on the Left and Right sides to remove the Upper Back Cover.

4. Once the 2 screws have been removed, remove the Upper cover completely.



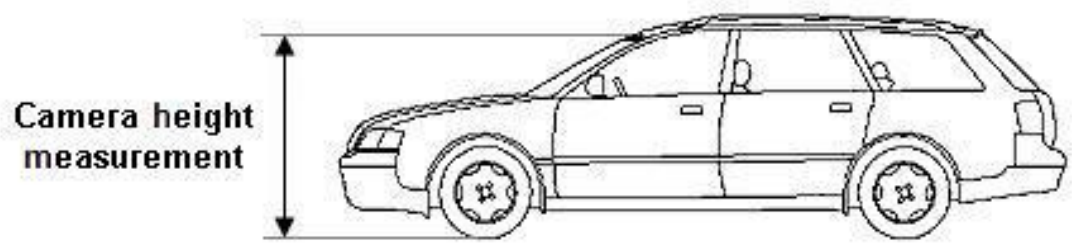
5. Now use the Camera adjustment screw to set the correct camera angle by releasing the screw a little and moving the Camera along the Camera Railing.



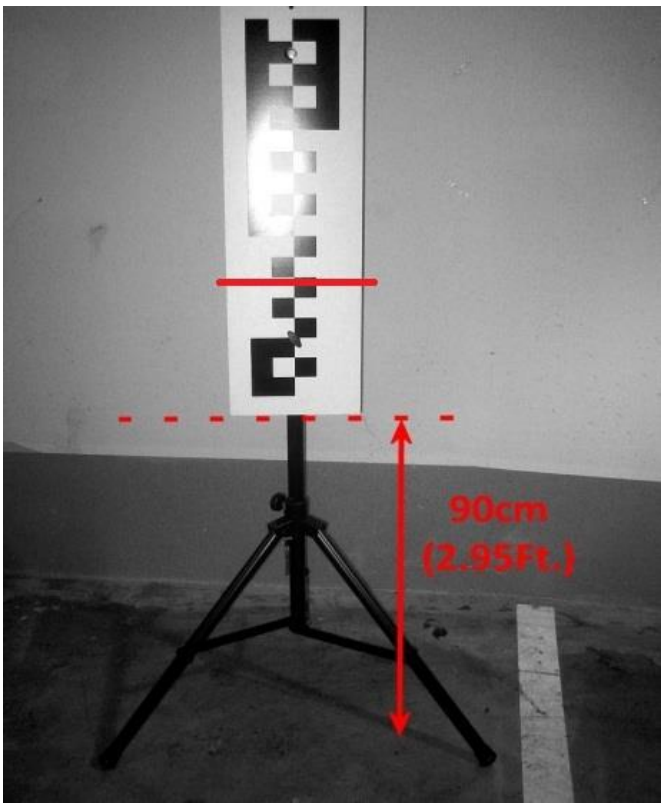
4.2 Adjusting the Camera Angle + Vehicle information and measurements

To adjust the correct camera angle follow the below procedure:

1. Measure the **Camera Height** from the Ground Up using a measuring tape

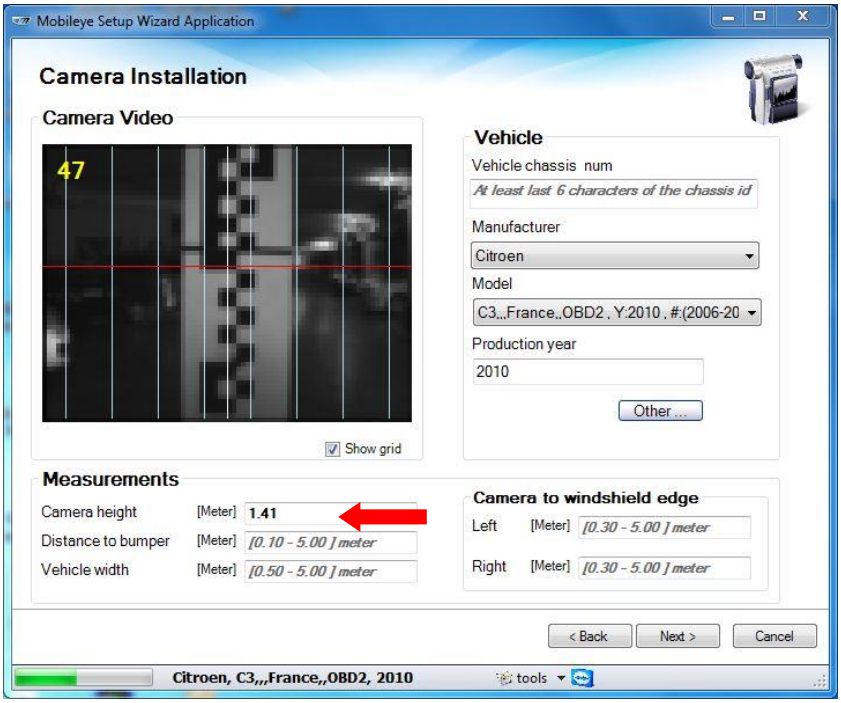


2. Using a piece of isolation tape (See Red Line in below image), mark the Camera Height you measured on the TAC Target.
   - When TAC is assembled and Open correctly the bottom part of the Checkered TAC Board should be 90 cm from the Ground.
   - Each Checkered Box in the TAC board = 5 cm



Red Line represents Camera Height marked by isolation tape at a Height of 1.25m

3. After marking the Camera Height on the TAC Target enter the already measured Camera Height in the Camera Installation slide ***Measurements*** section



a) When inserting camera height value in the field under ***Measurements*** section, a Red horizontal line will pop-up in the camera image feed.

b) Using the Red line and image feed; adjust the Camera Lens Angle by sliding it Up/Down the Camera Railing until the Red line is aligned with the marked line on the TAC target.

4. Once the Camera Angle is adjusted correctly, Lock (tightened) the Camera Adjustment Screw and continue with entering all other measurements and information in this slide, as instructed below:

NOTE: Do not re-connect the Main Unit Back Covers until the Calibration Process is completed.

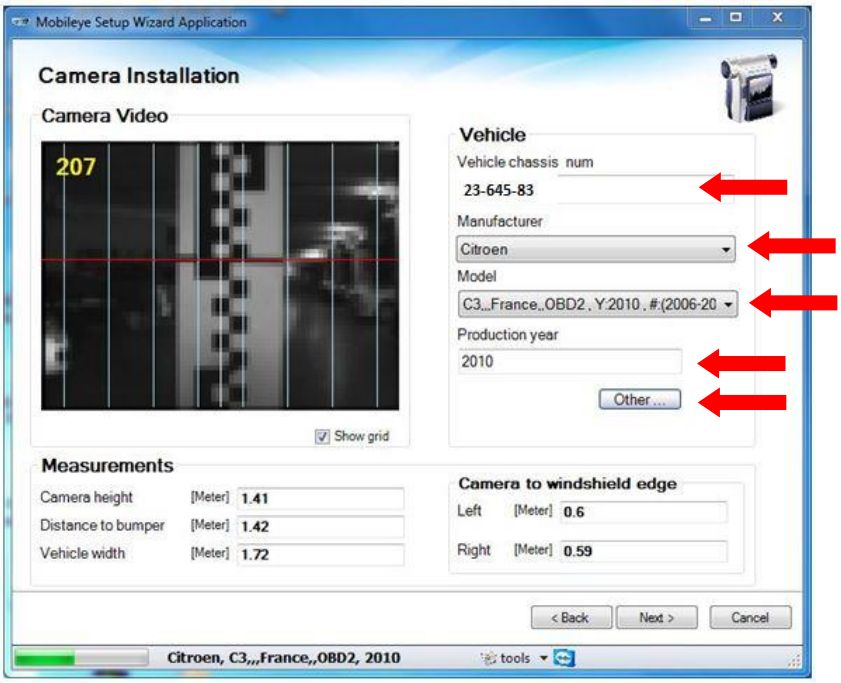
4.2.1 Car Information and Measurements

In the “Camera installation” Slide, please enter the following:

4.2.1.1 Vehicle

a) **Vehicle Chassis num**
Enter the last 6 digits of the vehicle VIN number.

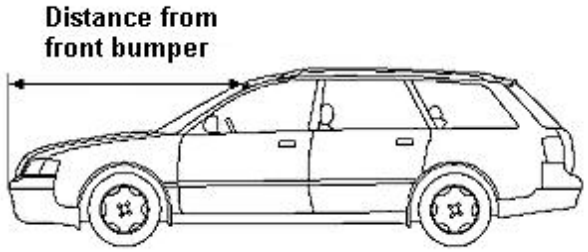
b) Insert the **Manufacture**, **Model**, and **Production year**.
Choose “**Other**” if the car is not in the automatic list and input the correct values.



4.2.1.2 Measurements

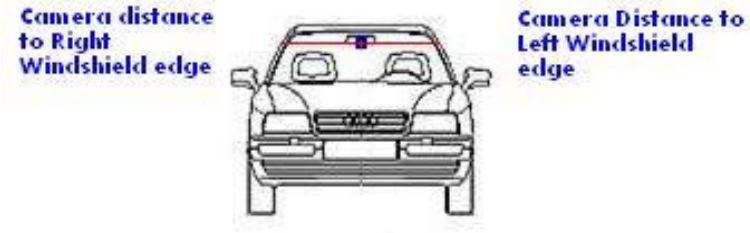
a. **Camera height**
Use the same measurement which inserted during lens angle adjustment.

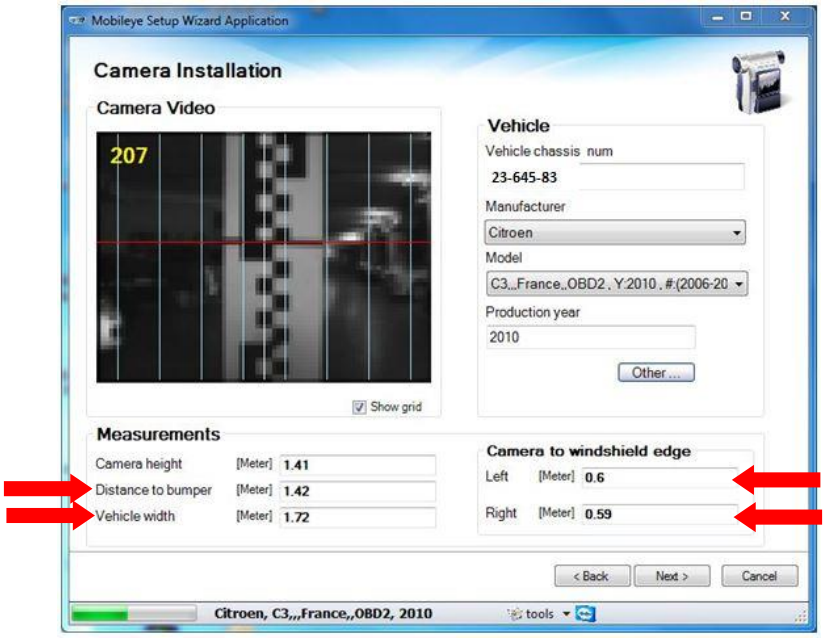
b. **Distance to bumper**:
This is the horizontal distance from the camera to the front bumper edge of the vehicle. For example, this value should be 0.1cm for flat nosed trucks.



c. **Vehicle width**
This is the distance between the outer edges of the Front wheels.

d. **Camera to Windshield edge**
Lateral distance from the camera to the right and left windshield edges:



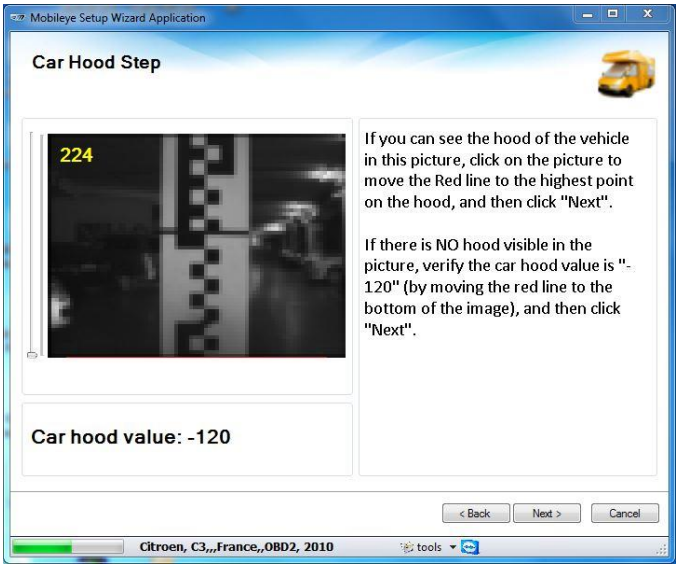


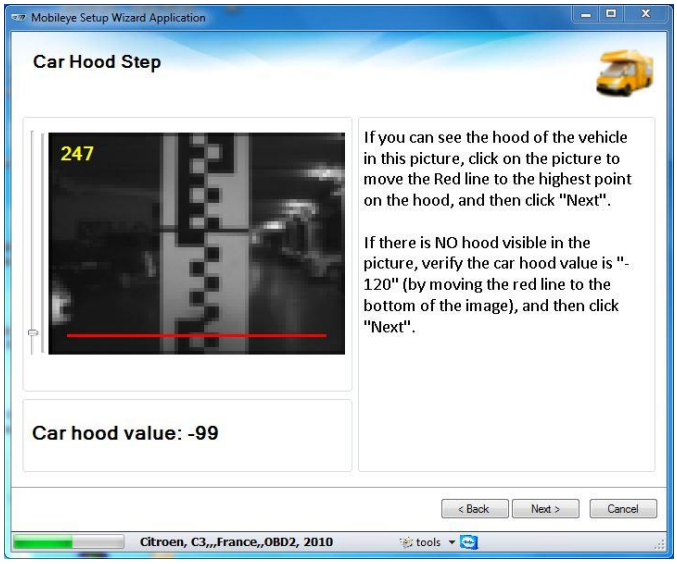
4.2.2 Car Hood Step

NOTE: Perform car hood calibration only if there is a permanent obstruction to the camera's field of view by the car hood

Adjust car hood to exclude the car hood areas from being processed by moving the mark (Red Line) using the drag bar on the left side of the image, by clicking on the correct location in the image using the Mouse device or by using the keyboard arrows, until the cross is in the right position (see figure below).

If NO Car Hood is present in the image, Car Hood value should remain at the default value (-120).





When done, click "**Next**"

4.2.3 Signals Source

- The Signal source slide informs you about the source of each signal.

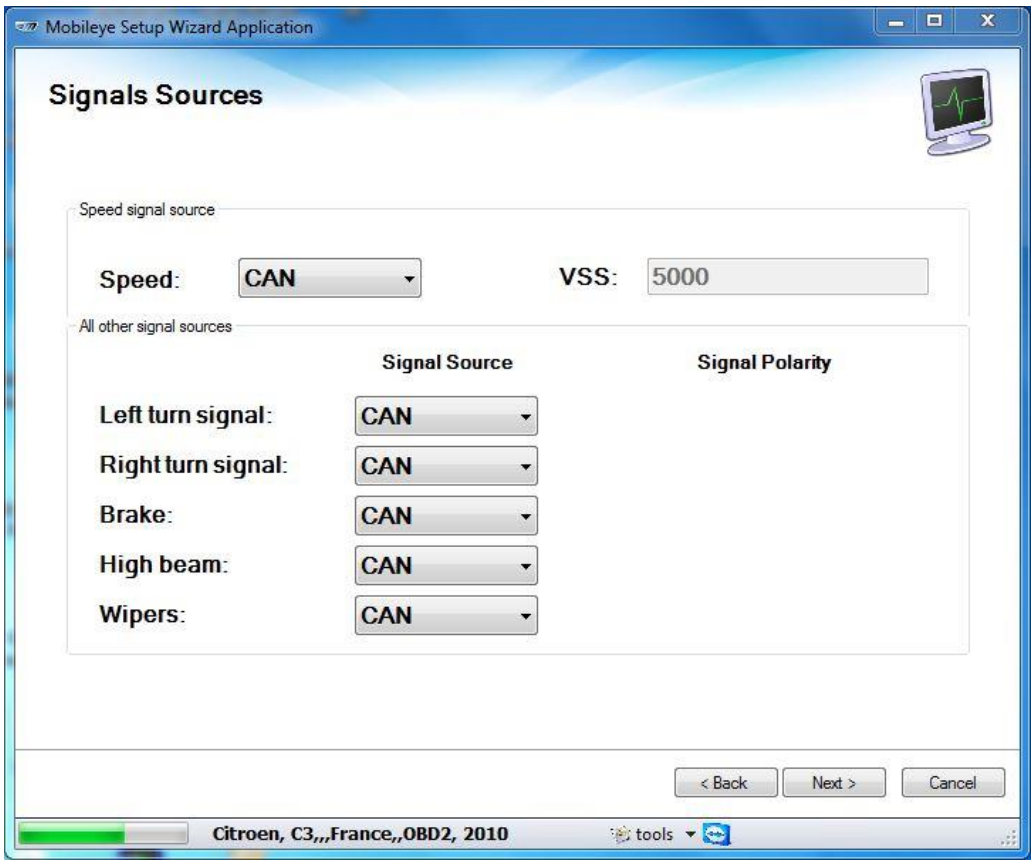
- CAN-Bus signals can be configured back to work with an Analog connection.

- A vehicle must be chosen from the CAN Database using the “Digital signals form”.

- Signals not available by CAN will either be disabled, AUX or Analog.

- When connecting the AUX wire to 1 Analog (or the L & R indicators together), the Signal source should be configured to “AUX”

- It is recommended not to make any changes if you followed the instructions in the Digital signals form” (CAN installation).

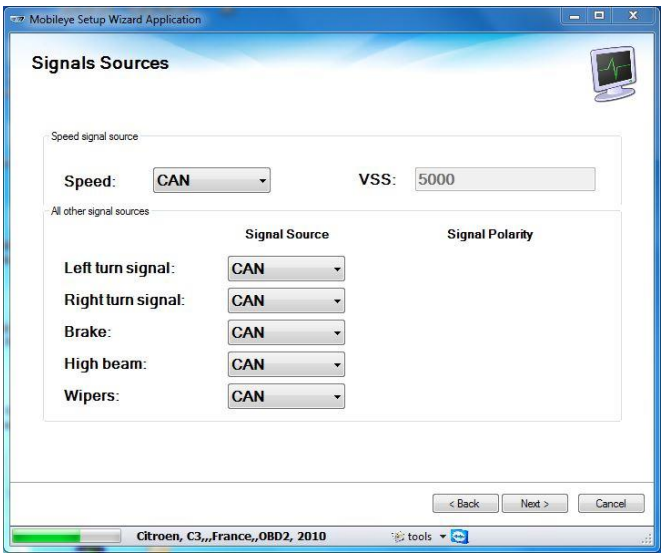


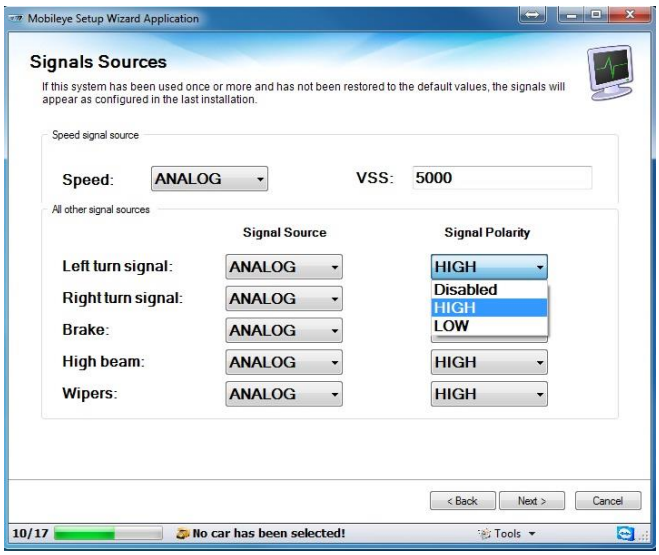
When done, click “**Next**”

4.2.4 Signals polarity

When performing a CAN installation this option is not active (see image below).

The Signal Polarity is available only for Analog signals (via E-box) or signals connected through the “AUX wire” (only for Brake, Wipers and High Beams signals). If L and R indicators are connected via the “AUX” wire they will always be in Polarity “High”.
For If L and R indicators with Polarity Low see section 6.1.2.

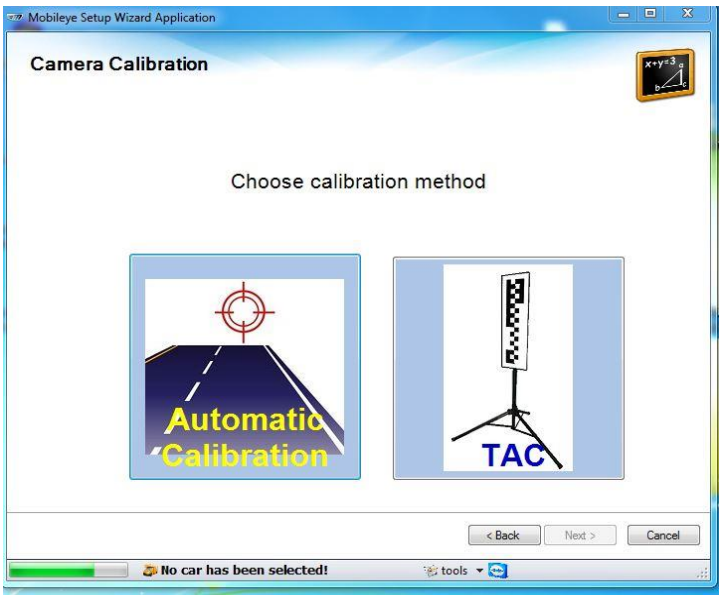




Click “Next” to continue

4.2.5 Calibration Method

You now will be asked to choose your Calibration method.



1- TAC

System will be calibrated manually at installation site without the need to move the vehicle.

If you choose **TAC** you will be directed to the next step which is Camera Calibration. Follow the online Wizard instructions as explained in the next pages.

2 – Automatic Calibration

System will automatically calibrate during your first drive (between 5 to 10 minutes)

If you choose **Automatic Calibration** you will be directed to the "Signal Test & Configuration" step or to the "Alerts configuration" step (if you have suitable user permissions – see section 4.3.9 or 4.3.10).

Note:

If you choose Automatic Calibration you must complete the Calibration Procedure with a Calibration Drive.
To Exit the Automatic Calibration mode you will need to restart the Mobileye Setup Wizard and follow the online instructions.

The full **Mobileye Automatic Calibration – User Manual** can be downloaded here.

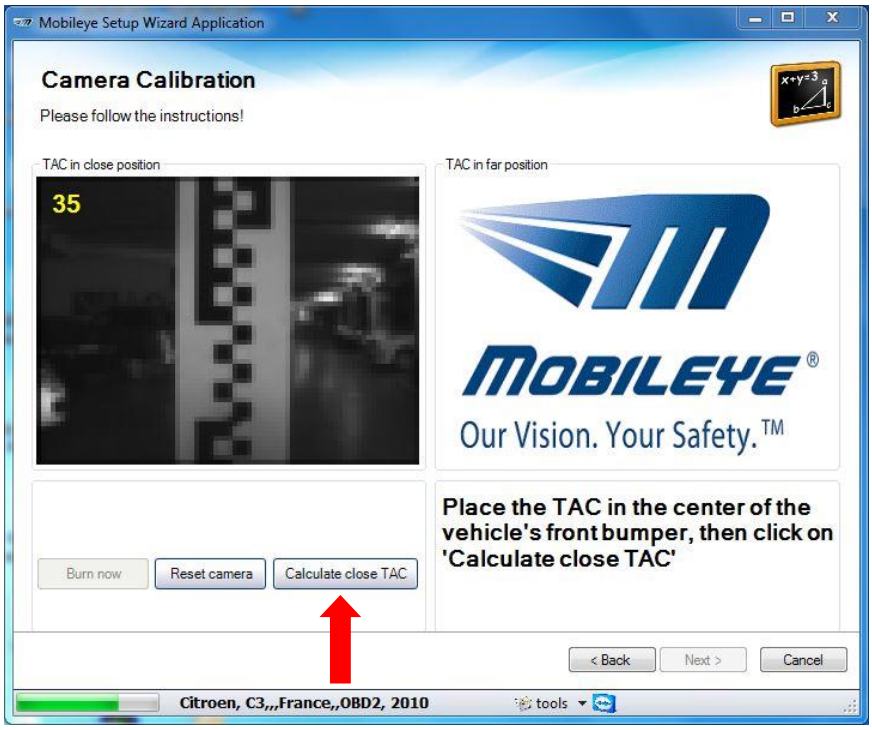
4.2.6 Camera Calibration (TAC)

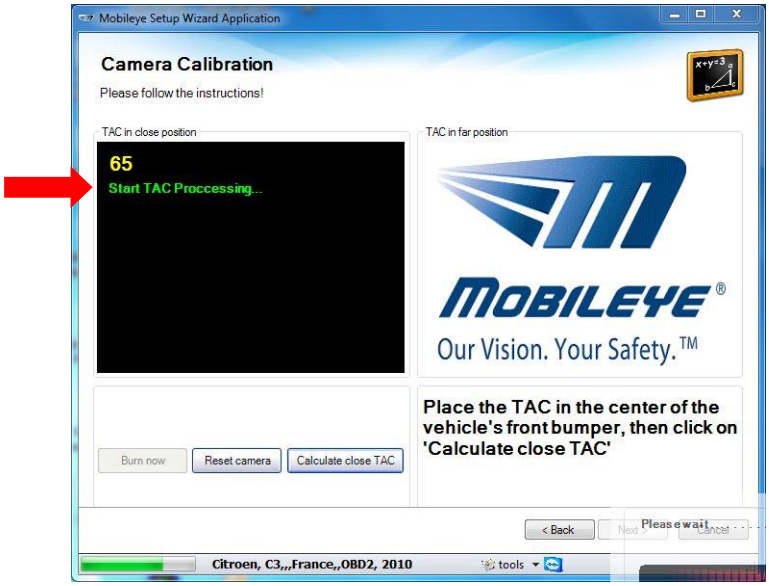
NOTE: Please perform this process while seated in the driver's seat

1. Locate the TAC Target exactly in the middle of the vehicle's front bumper, as close as possible to the bumper.

2. For Trucks and Buses with No Front Engine Hood (flat nose) locate the TAC Target exactly 1 meter from the middle of the vehicle's front bumper (verify exact middle position be using any flat 1 meter pole).

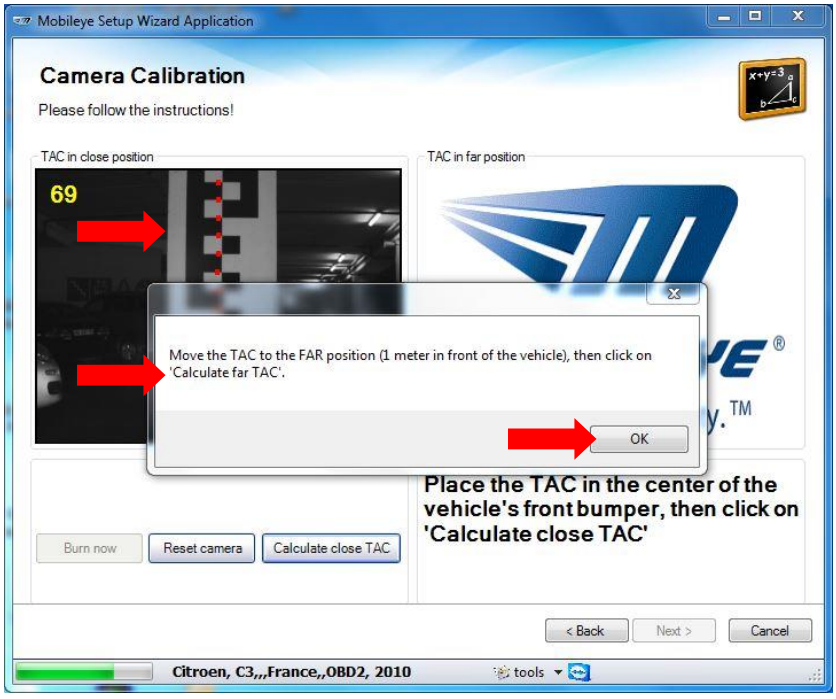
4.2.7 Click on "Calculate Close TAC".





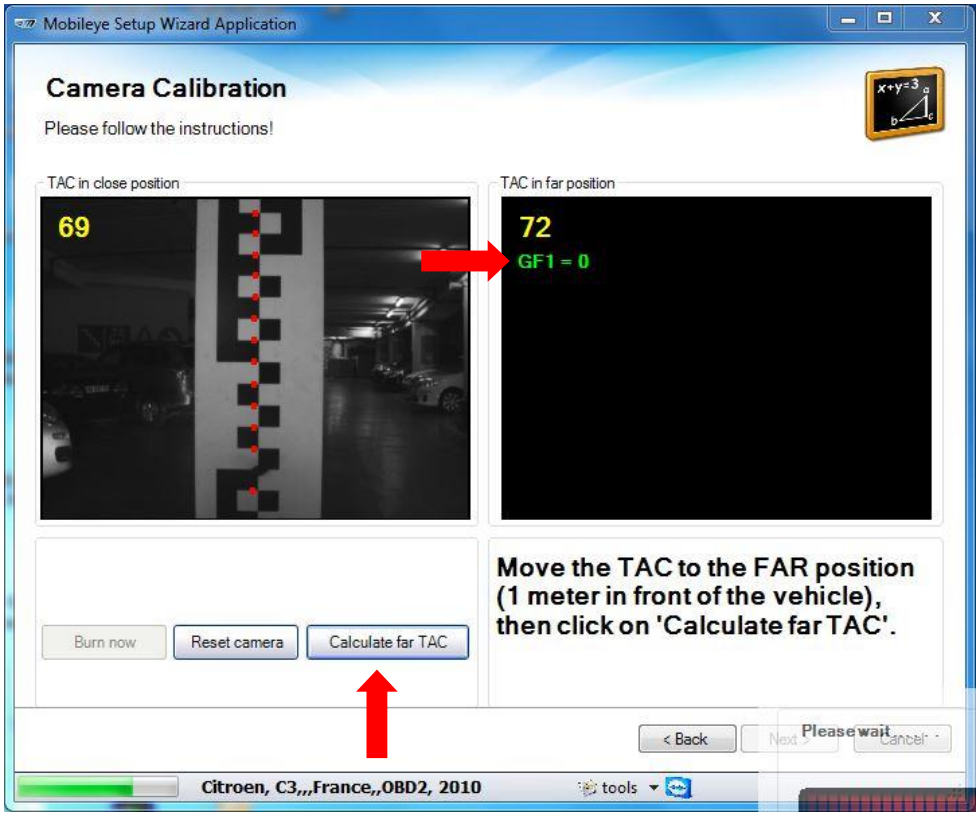
3. When the "Calculate Close TAC" is complete, an image of the close target with red dots will appear

4. A pop-up message will ask you to move the TAC to the Far position – Move the target to the Far position (1 meter backwards) and only then click on “OK” in the pop-up message to continue.



5. Now, after placing the TAC Target at the Far position, click on "**Calculate far TAC**".

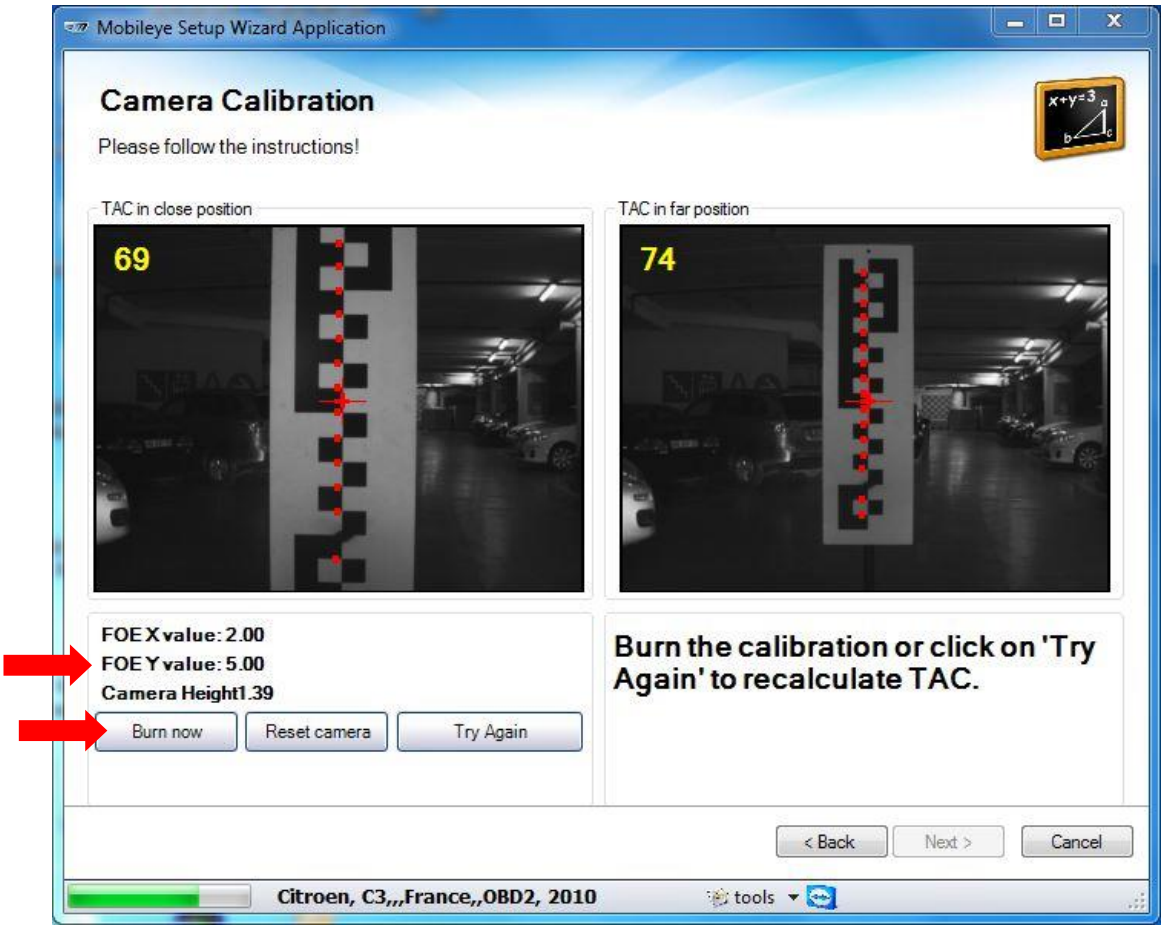
6. For Trucks and Buses with No Front Engine Hood (flat nose) locate the TAC Target another 1 meter further away from the previous Close position.



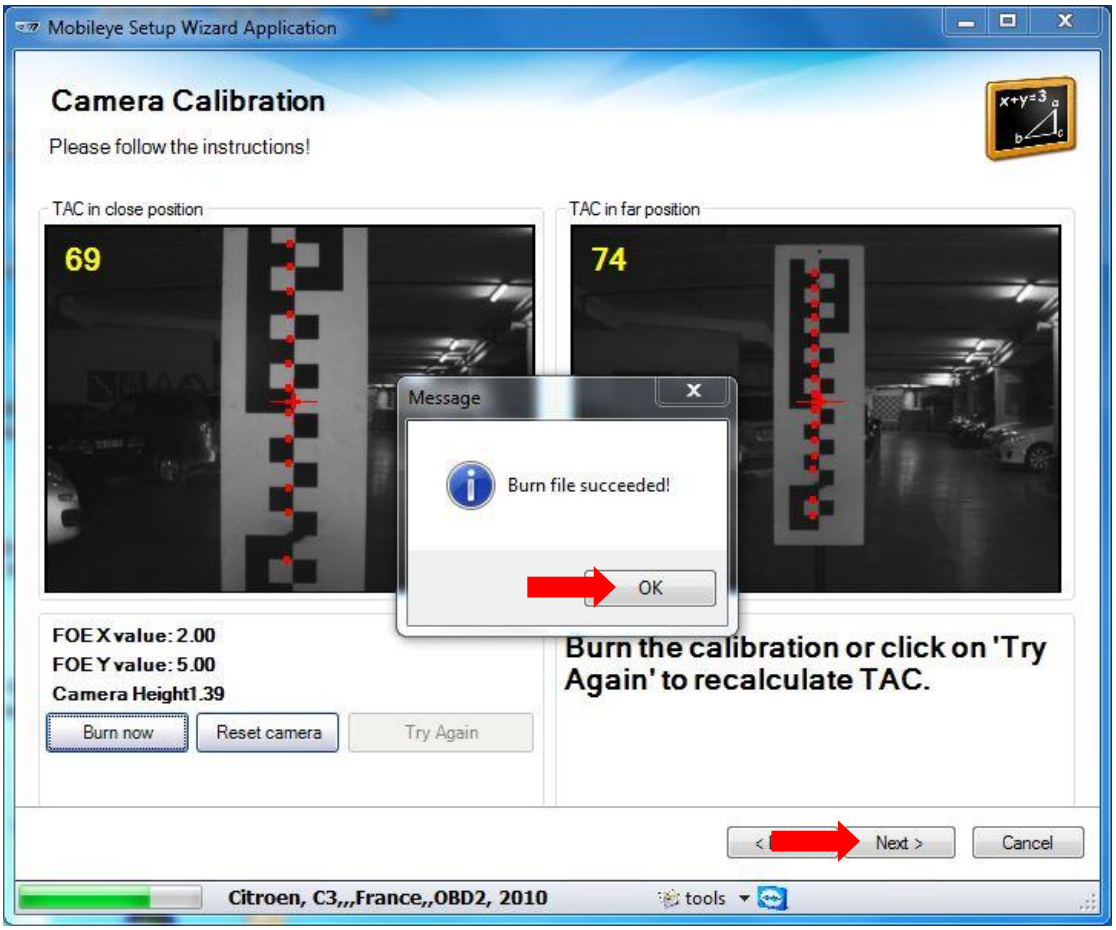
7. When the "Calculate far TAC" is complete, you can see the F.O.E (Focus of Expansion) and Camera Height results at the bottom left corner of the slide.

8. If the Calculation did not succeed, try again by clicking on the "Try Again" button. If you still do not succeed please verify the TAC positioning (as instructed above).

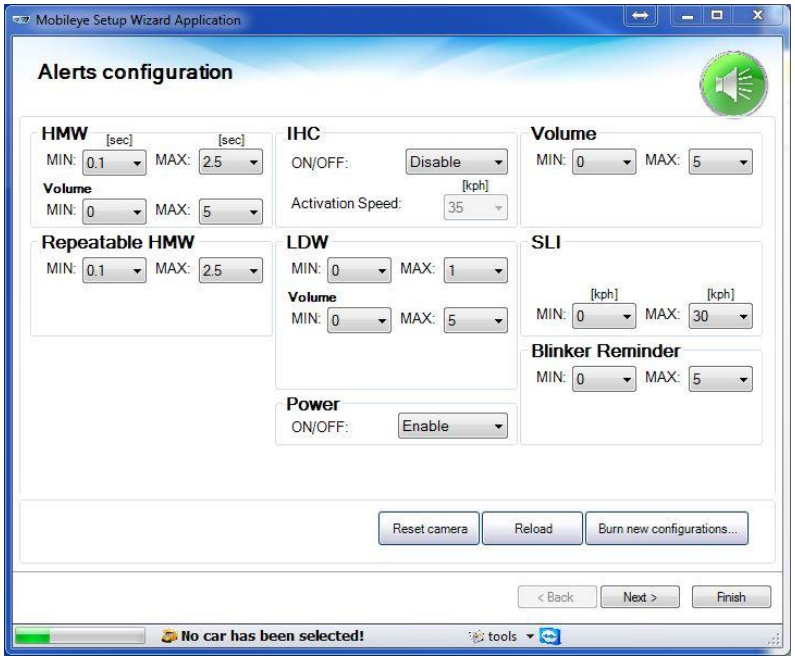
9. If the calculation has succeeded click on "Burn Now".



When burning is completed, click “OK” in the Pop-up notification and then ‘Next’ to continue.



4.2.8 Alerts configuration



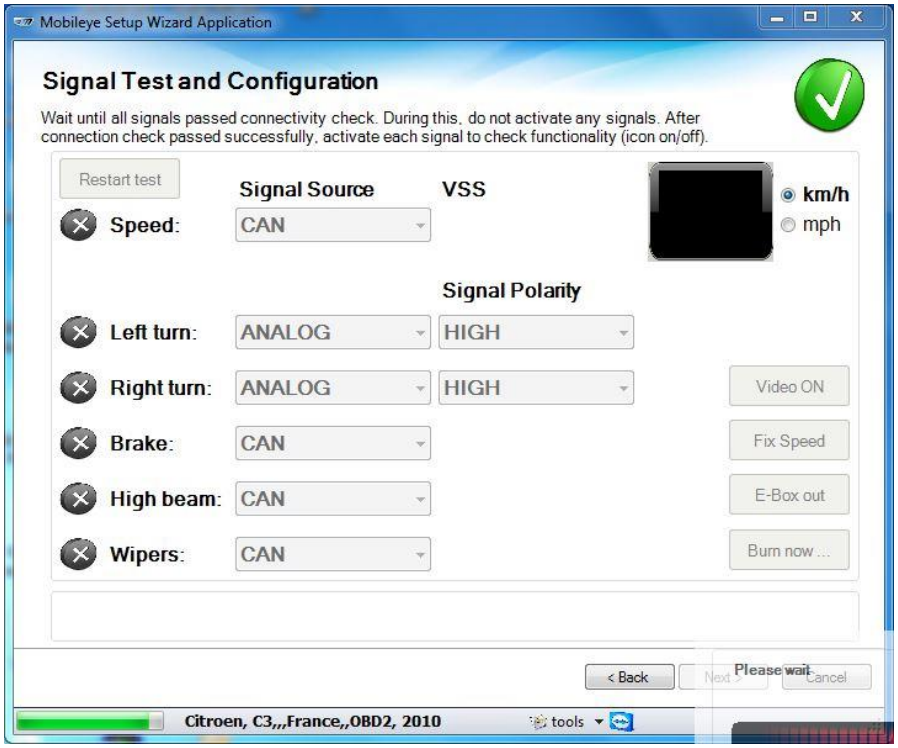
The full **Alerts configuration - User Guide** can be downloaded here.

4.2.9 Signal Test & Configuration

Step 1

Check physical connections of all signals to the Mobileye system - either by CAN or Analog).

The connection status icon will change accordingly.



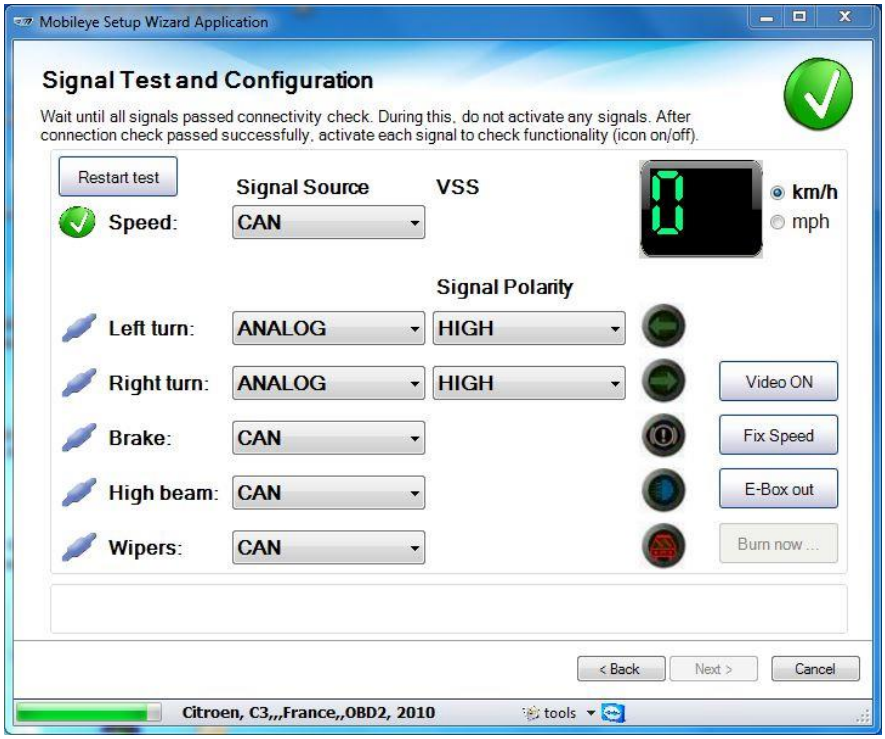

Signal is not detected by the Mobileye system


Signal is detected by the Mobileye system, but not activated


Signal is both detected and activated


Signal is disable

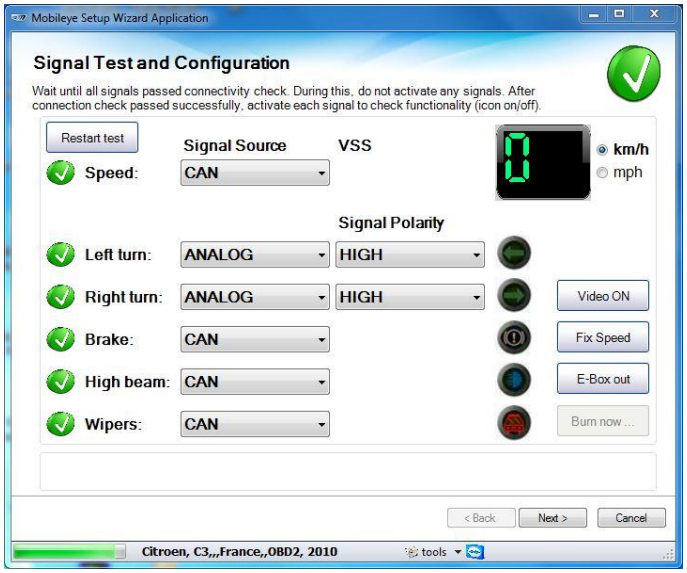
Once all signals are identified by the ME6 system, the connection status will change.



Step 2

Activate each signal to pass the signal test step.
When activate any signal an activation icon will turn on as an indicator.

Click "Restart test" button to retest if any of the signals did not pass the test.



Step 3 **- Verify Speed signal**

Drive and confirm speed indication in the Mobileye setup wizard matches to the actual speed of the car.

Note: Be aware that there is a 2 to 3 second delay between the vehicle`s speed to the speed indication in the Mobileye Setup Wizard application.

- Click "**Video ON**" if you want to see the camera image (low resolution) while performing the test drive.

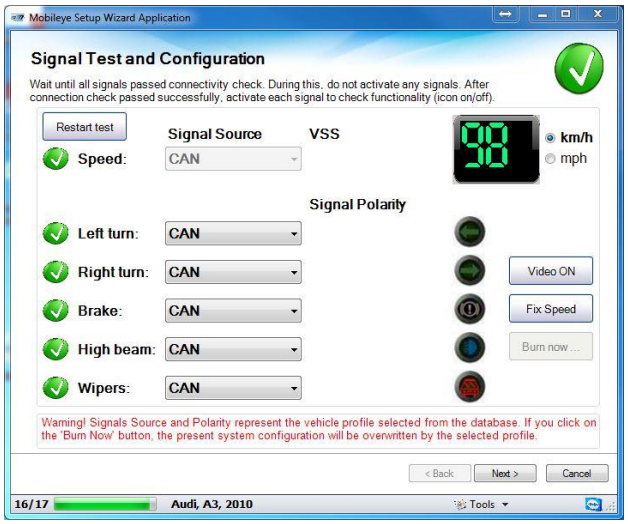
- When using the analog speed signal and the real vehicle speed does not match the speed shown in the Mobileye setup wizard, you will need to change the VSS rate and click "Burn now" for the changes to take effect. (This option is available only when using the E-box).

- **Fix Speed** - OBDII universal speed signal acquisition (speed by request from OBD2)

  we will use this option if the speed signal is not accurate or not working.

  Note: Works only when connected to OBDII CAN-Bus on a bus speed of 250kbs or 500kbs (and only when connected to Pins 6 & 14 in OBDII)
  Note: Will not affect other signals received from the OBDII CAN-Bus.
  Note: Other required signals not available on OBDII CAN-Bus will be automatically configured to "***Analog***" (once the Fix Speed option is chosen) even if available on a different CAN-bus (since only 1 CAN-bus configuration is available)

SAFETY WARNING!
Drive carefully and according to the law during the test drive!



4.3 Test Drive

What you need to check while performing the test drive:

After the Speed indication has been verified and found to match the vehicle speed, disconnect the system from the laptop according to these instructions:

- Click “Next >”.
- Click “Finish” to close the Mobileye Setup Wizard application.
- Disconnect the EyeCAN cable from the laptop.
- Turn off the car and back on to reset the system.

Verify features functionality:

- Drive behind a vehicle and verify vehicle detection (Green or Red car icon on EyeWatch is available).

- While driving on a safe road test the LDW functionality.

Attention – So as not to endanger the installer, Mobileye does not recommend testing FCW and PCW!

You completed installing and calibrating the Mobileye 6 system.

5 Appendix A

5.1 Parameter error significance and functionality implications

Camera height

The range measurement accuracy of the system is proportional to the camera height error. E.g., 1 cm error in camera height of 2.2 meters implies a ~0.45% error in range and headway measurement (insignificant).

Lateral distance to the front wheels

An error in this parameter will cause the warning to be moved by the same amount. For example, if the distance to right wheel is off by 1 cm then the warning will be issued with an error of 1 cm from the lane marking line (insignificant).

Distance to the front of the vehicle

The headway calculation subtracts this value from the camera-to-target distance. For example, an error of 10 cm in the distance of the vehicle bumper to the camera will result, for a target in the range of 30 meters, in a 0.33% error in range measurement. For European trucks this parameter can be assumed to be 0.

6 Appendix B

6.1 AUX wire connections

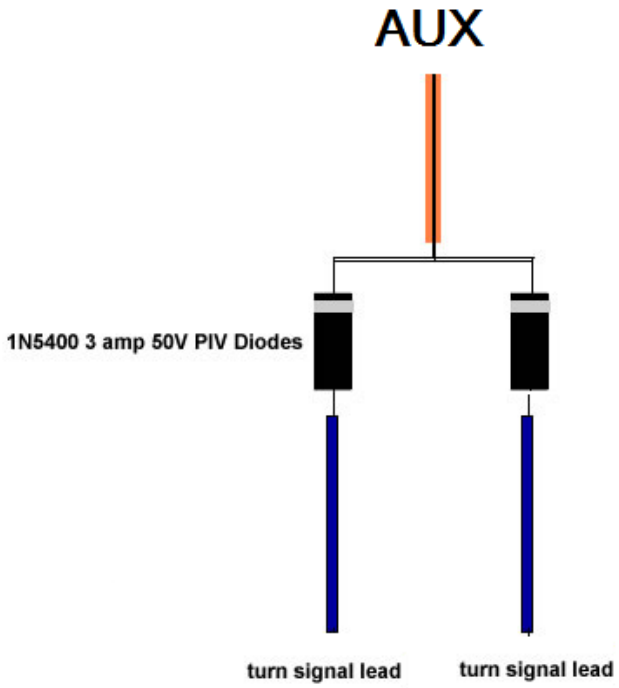
Mobileye 6 can be installed only in vehicles that have a Speed Signal Source by CAN-bus.

Vehicles without a Speed Signal Source by CAN-bus cannot be installed with the Mobileye 6 system (unless you are using the Mobileye Analog to CAN adaptor called "Mobileye E-box")!

6.1.1 AUX connection to Analog Turn Indicators (High Polarity)

In vehicles that have a Speed Signal Source by CAN-bus but are missing the Left & Right Turn indicators by CAN-bus, the AUX wire can be used to complete the installation with the minimum required vehicle signal connected for the Mobileye System operation.

In such cases the AUX wire needs to be connected to both analog Left and Right Turn indicator signals via 2 Diodes as shown in the connection scheme below:[1]



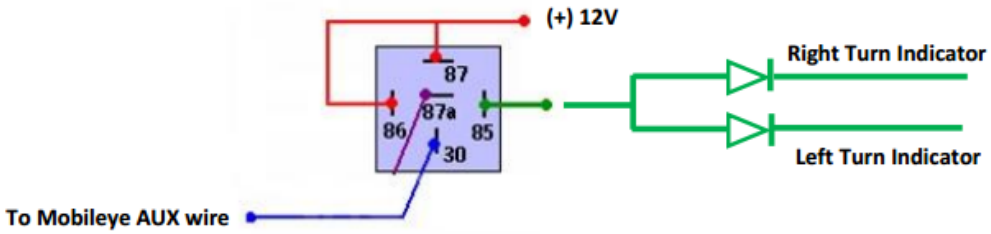
[1] The Polarity of the Turn indicator signals in this connection will always be "High"

6.1.2 AUX connection to Analog Turn Indicators (Low Polarity)

If the analog Left & Right Turn indicators are in Low Polarity, follow the AUX connection scheme below.

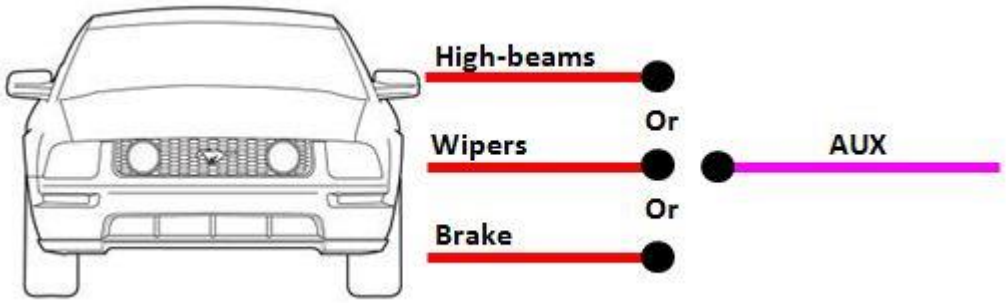
External Relay Connection Scheme for connection of Analog Turn Indicators in "Low Polarity" for Mobileye 5 Installation via "AUX" wire

85 – Left & Right Turn indicators with Diodes (note Diode direction)
86 – 12V input
30 - Output to the Mobileye 5 AUX wire (Pink)
87 - 12V input
87a – Not in use



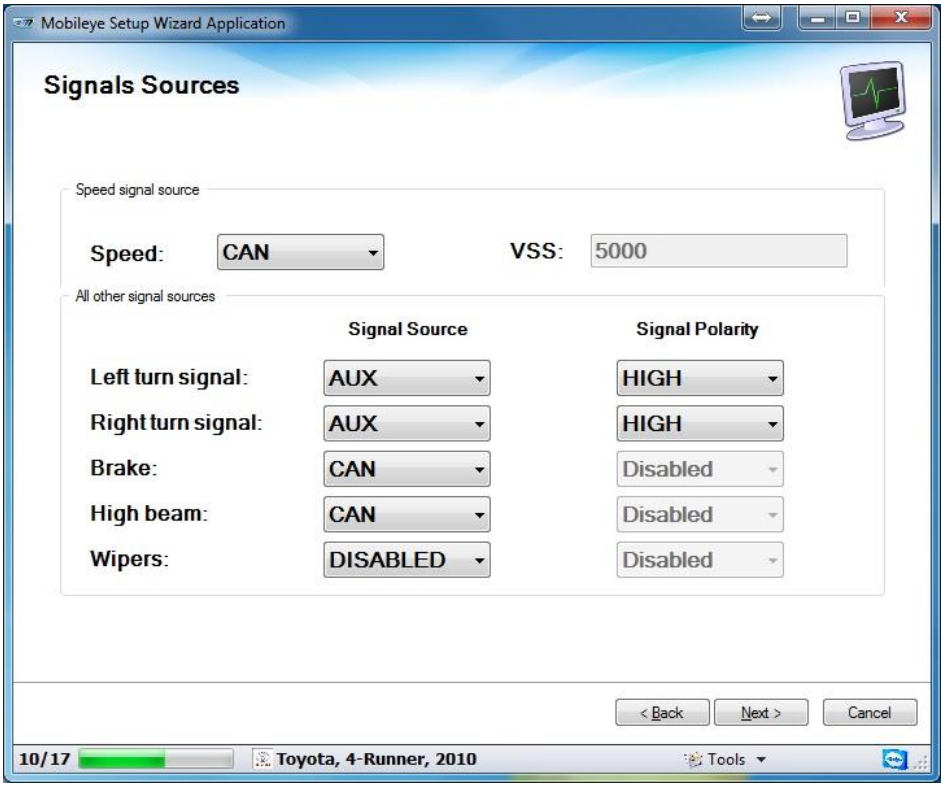
6.1.3 AUX connection to Analog signals

In all other cases in which only the ***Brake***, ***Wipers*** or ***High-beams*** signal is missing on the vehicle CAN-bus, the AUX wire can be used to complete the installation with a direct connection to the required analog signal.



6.1.4 AUX configuration

Signals connected to the AUX wire will need to be defined as such in the Mobileye Setup Wizard application, Signal Sources step (10/17) during the system configuration process (calibration).



*AUX wire connection is supported from Mobileye 6 Firmware version (2.10v1.5) or newer

7 Appendix C

7.1 Mobileye 6 - Up/Down configuration instructions

Mobileye 6 Driver Assistant System is based on a smart camera which is installed on the vehicle's front windshield. To suit all vehicle models (cars, trucks, buses) the smart camera has 2 configurations, Up and Down.

Camera Up

Camera Down

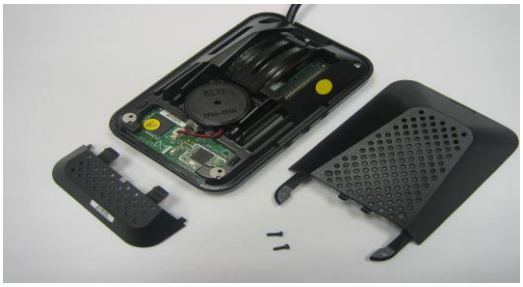
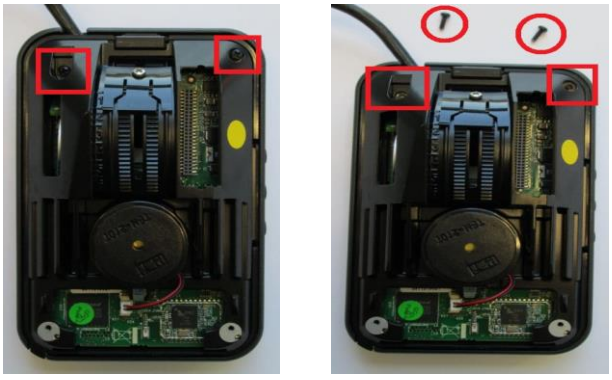
All Mobileye 6 systems are supplied in Up configuration. Each distributer/installer can change the Up/Down configuration at their discretion.

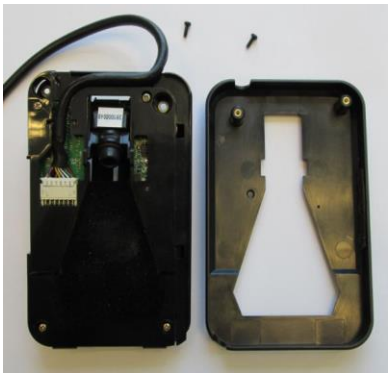
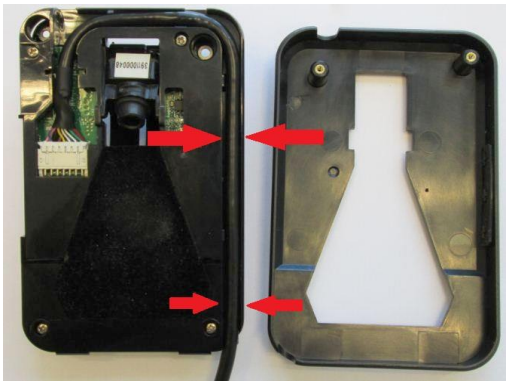
Changing the Mobileye 6 Up/Down configuration is a simple but delicate procedure. Instructions on how to change Up/Down configurations are listed below.

Required Tool:

* Philips Screwdriver (Tip Size = PH1)

Up/Down Configuration Instructions

Step	Instructions	Picture
1.	Remove the Main Unit Back Covers by inserting a small screw-driver at the slightly larger circles at the right and Left ends of the lower part of the Mobileye 6 Main Unit Back Cover and press the bracket to release.	
2.	Once the 2 Brackets on the Left and Right side have been released pull the Lower Back Cover downwards and remove completely. Then Un-screw the 2 small screws on the Left and Right sides to remove the Upper Back Cover.	
3.	Upper cover is removed completely	
4.	Remove the additional two screws shown in the Red boxes to remove the Main unit out of the mounting frame	

5.	**Press the small clip above the Camera Railing and remove the Main unit out of the mounting frame.**	 
6.	**To Configure the system to Camera Down mode simply route the cable along the side canal.** **Do not disconnect the camera cable connector**	
7.	**Return the Main unit in to the mounting frame and screw-in the 2 screws to complete the attachment.** **Make sure the side buttons are attached to the mounting frame side before returning the main unit.**	 
8.	**Return the Main Unit Back Covers (in reverse to steps 2 and 1 above) to complete the configuration.**	

8 Appendix D

8.1 Verifying the Camera Angle

In order to verify the correct Camera angle we will refer to the calibration results which are displayed after the TAC Calculation process is completed.

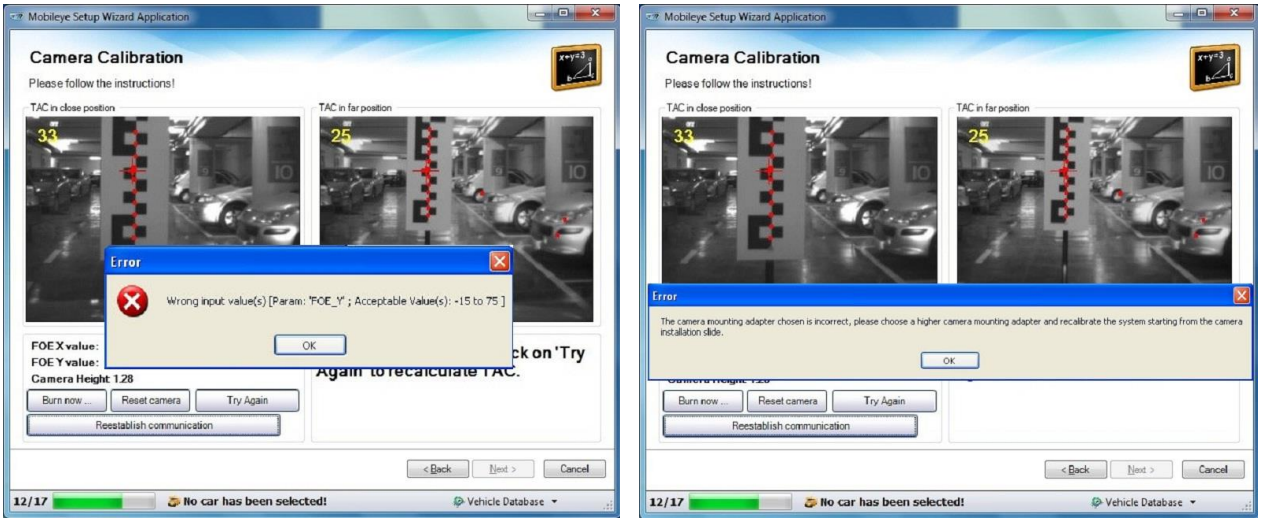
For example:

If after the Close/Far TAC calculation the F.O.E- **Y value** is 70, we will prefer to change the Camera angle so that the F.O.E- **Y value** will be in a more desirable range (between 0 to 50). In order to decrease this value, we should decrease the Camera angle degree

A table with the recommended **F.O.E- Y value** according to different camera highest (for best system performance) can be found below. Note this is only a recommendation and values can vary by a value of ±10

CAMERA HEIGHT	HORIZON
1.2	6
1.4	15
1.6	22
1.9	28
2.2	34
2.5	41
2.7	45

If the Camera Angle is out of rang and the F.O.E- **Y value** exceeds the acceptable norms an error message will appeared after the Far TAC Calculation (see figure below).



If such a case appears follow the below instructions:

a. The Mobileye Setup Wizard will automatically return you to the "Camera Installation" step.

b. Change the Camera angle (refer to sections 4.2 above) to increase/decrease the Camera angle by 1° or 2° degrees, according to the FOE Y results (or more if you were far from a 3° to 5° degree angle).

c. Continue with the standard Calibration Process (as instructed in the Mobileye Setup Wizard).

9 Appendix E

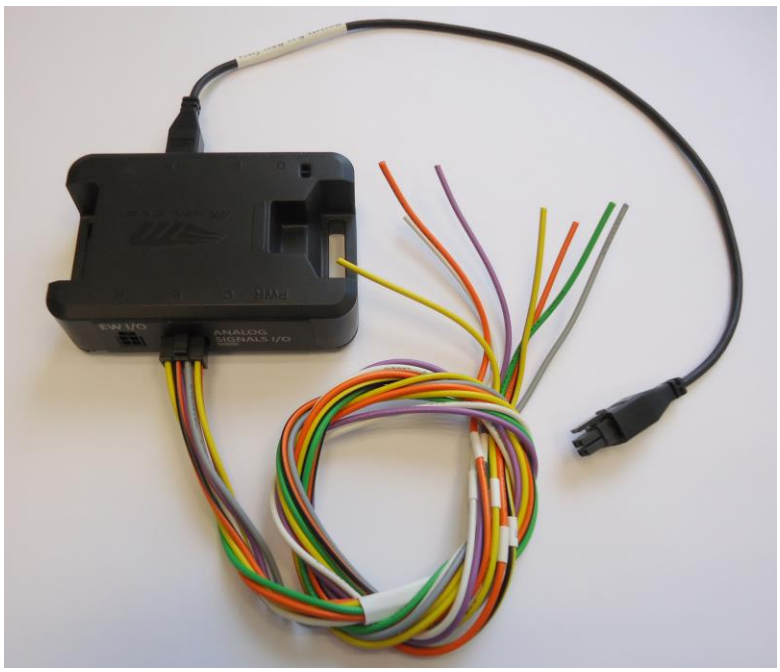
9.1 Mobileye E-box (ME5ABOX001)

The Mobileye E-box (Enhancement box) is a new adapter that allows us to install the Mobileye 6 system in any vehicle, regardless of CAN-bus availability.

The E-box supports up to 6 analog signals inputs and 2 analog outputs (for various devices/applications.)

The E-box can be used for a full Analog Mobileye 6 installation, for a Mixed CAN/Analog Mobileye 6 installation or just as a source for 2 additional analog outputs.

The E-box enables easier installation on vehicle with a limited variety of signals on the CAN-bus and/or with no CAN-bus and allows us to upgrade from an older Mobileye system using the existing wiring/connections.



9.2 E-box Components

The Mobileye E-box has 3 components:

1) E-box unit

2) A-box I/O Signals Cable (CAB000133)

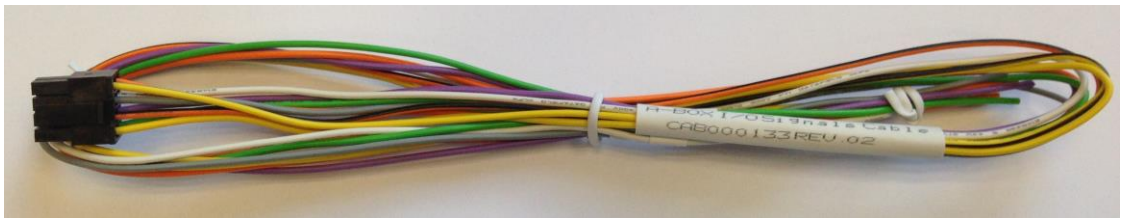
3) Mobileye 6 to A-box Cable (CAB000131)

E-box

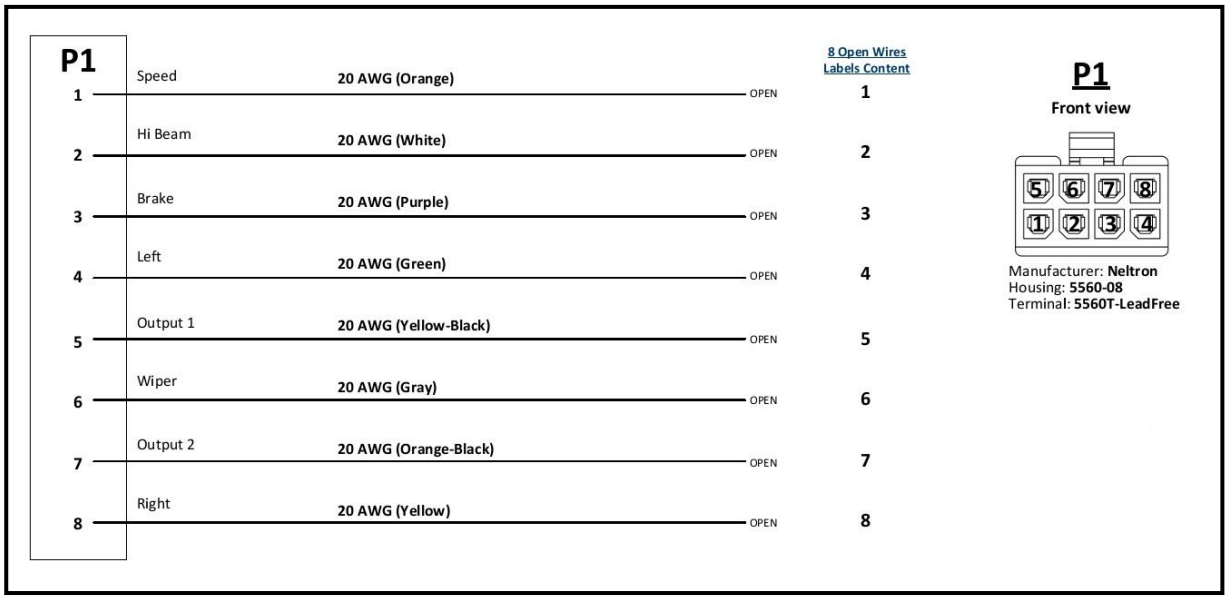
	Port name	Function	Connect to	Color
1	Analog signals I/O	Analog signals Input/output	A-box I/O Signals Cable (CAB000133)	Multiple
2	EW I/O (1)*	1) 5V Power supply to E-box (from Mobileye 6 unit). 2) Analog Signals input to Mobileye 6 from E-box (via Mobileye RS485 protocol)	Mobileye 6 to A-box Cable (CAB000131)	
3	EW I/O (2)*	See "EW I/O (1)"above	EyeWatch Cable (CAB000087)	

*** Note: The Ports "EW I/O (1)" and "EW I/O (2)" functionality is the same and both can be used as described above.**

A-box I/O Signals Cable (CAB000133)



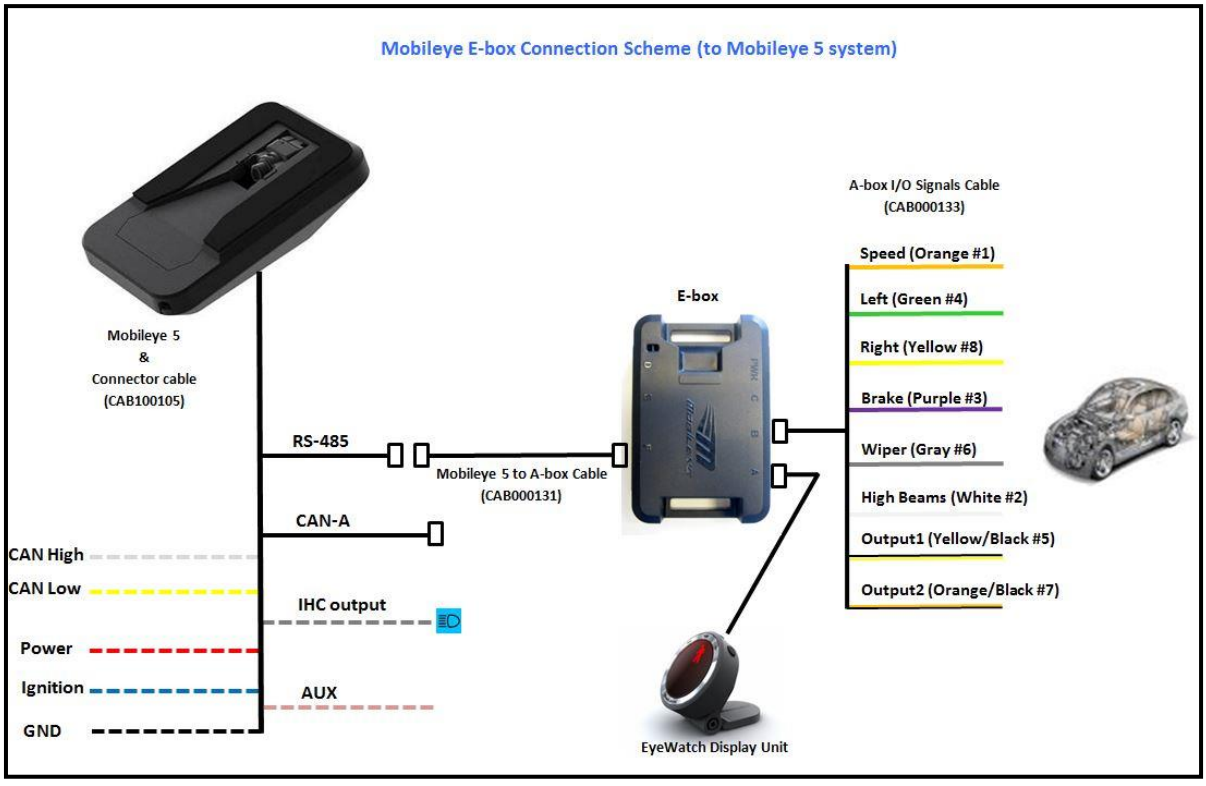
	Cable Label	Function	Connect to	Color
	A-box I/O Signals Cable (CAB000133)	Analog signals Input/output cable	A-box - Analog Signals I/O port	Multiple
1	"1"	Speed	Vehicle Speed Signal	Orange
2	"2"	High Beams	Vehicle High beams Signal	White
3	"3"	Brakes	Vehicle Brake Signal	Purple
4	"4"	Left	Vehicle Left Turn Signal	Green
5	"5"	Output 1		Yellow/Black
6	"6"	Wipers	Vehicle Wipers Signal	Gray
7	"7"	Output 2		Orange/Black
8	"8"	Right	Vehicle Right Turn Signal	Yellow



Mobileye 6 to A-box Cable (CAB000131)

	Cable Label	Function	Connect to	Color
1	Mobileye 6 to A-box Cable (CAB000131)	1) 5V Power supply to A-box (from Mobileye 6 unit). 2. Analog Signals input to Mobileye 6 from E-box (via Mobileye RS485 protocol)	Mobileye 6 cable, 4 pin connector labeled "EyeWatch"	
2			Any E-box port labeled "EW I/O"	

9.3 E-box Connection Scheme

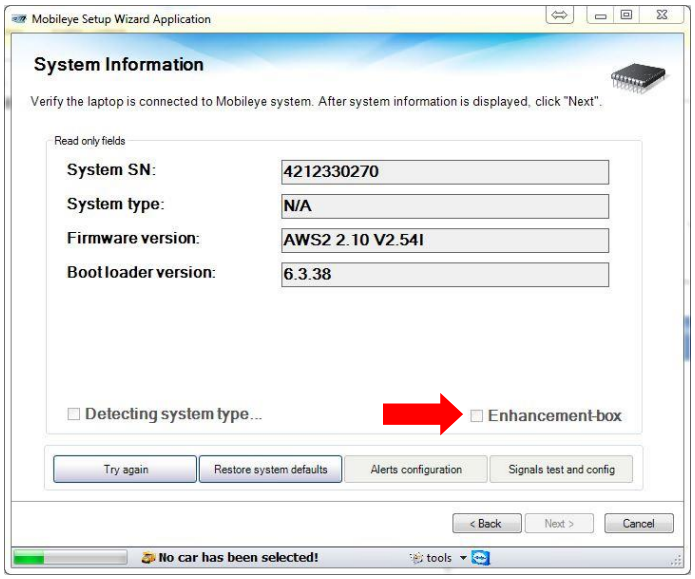


9.4 E-box Configuration

When installing a Mobileye 6 system using the Mobileye ***E-box*** make sure to:

Connect the Mobileye E-box to the Mobileye 6 system and confirm the E-box has been recognized (indicated by a V in the Enhancement–box check box).

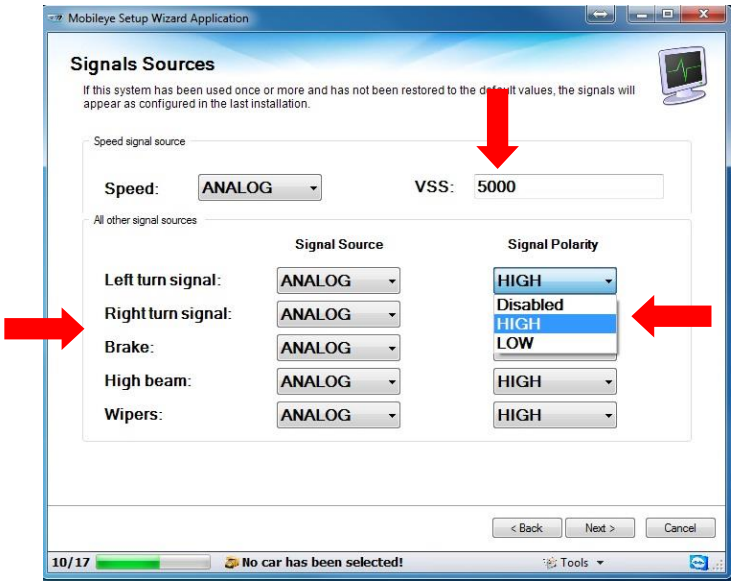
Press "***Next***" to continue with the installation.



Enter the Speed VSS rate if connected to the vehicle's Analog Speed Signal.

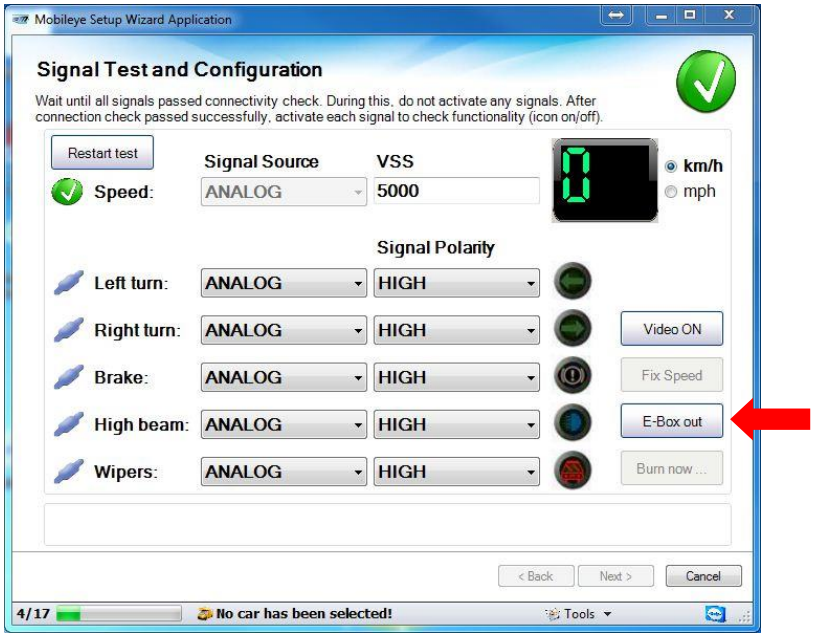
Choose the polarity of the Analog signals (choose between High, Low and Not connected)

Click "Next" to continue with the standard calibration procedure



When E-Box is connected the “E-Box out” button will appear.

Enhancement Box features 2 additional independent configurable analog Outputs.



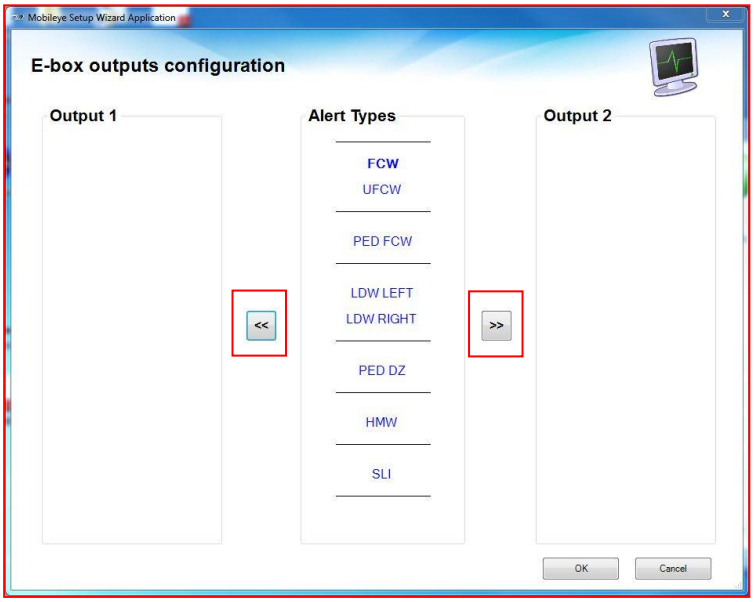
9.4.1 E-Box outputs configuration

Choose the alert type from the list and assign it to the relevant output by clicking Left or Right arrows.

Note:

- Up to 3 Alert Types can be assigned to each output.

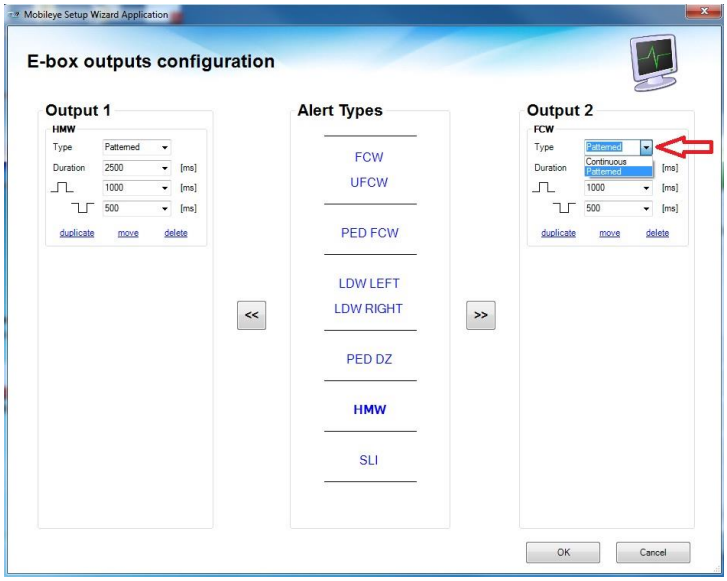
- SLI Alert Type cannot be assigned with other Alert Types



Choose ***Alert Output Type***:

Continuous **-** Output will be active for as long as the alert is active

Patterned **-** Output can be configured according to user demands.



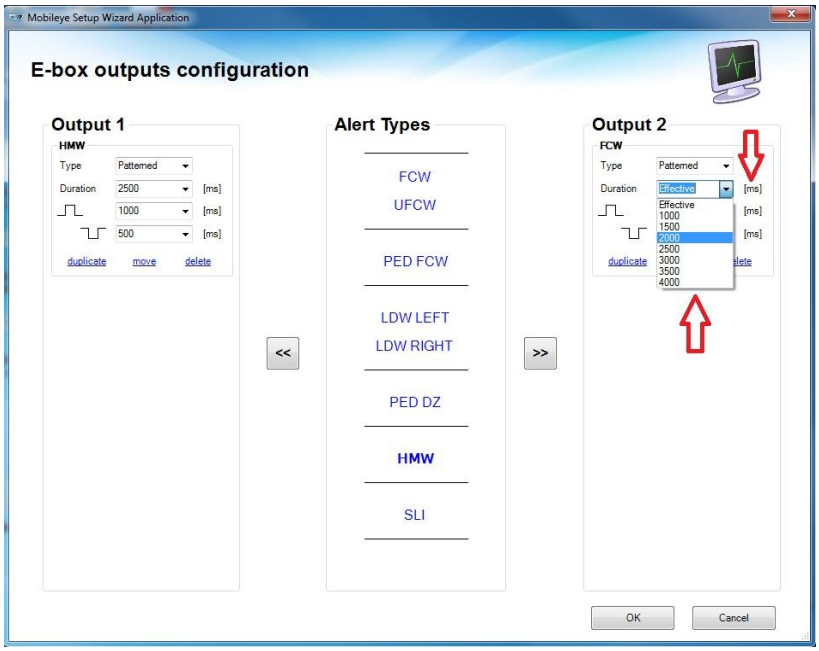
If you choose Alert Output Type: "***Patterned***" Choose the output ***Duration-***

Effective – Output will be active for as long as the Alert is active (On/Off)

Or

Choose to limit the Output Duration by choosing any of the time options in the list.

Using the options you can configure the output pattern duration (in milliseconds)

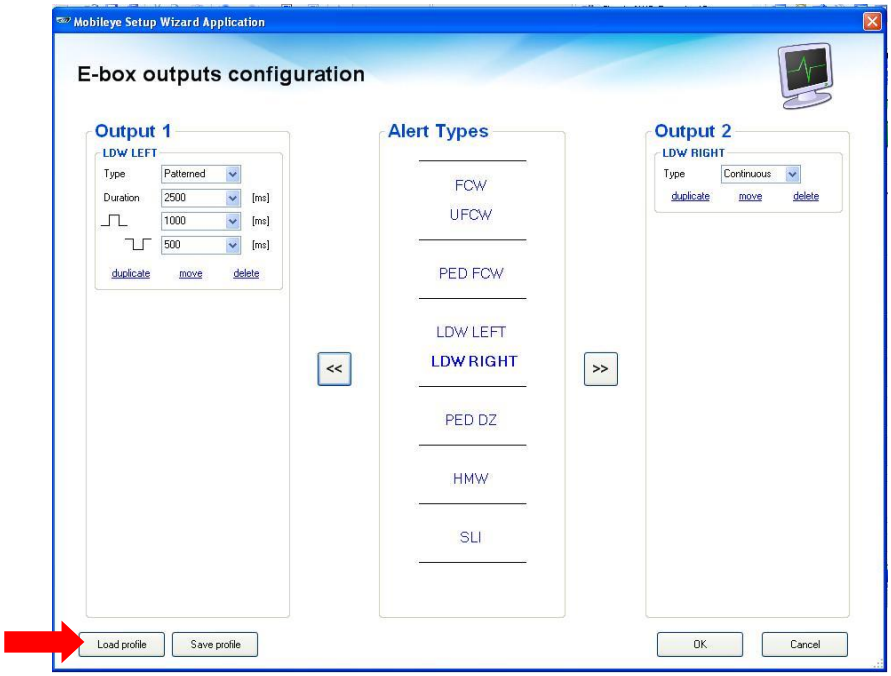


Use the "***duplicate***" button to copy the Alert Type to the second output option.

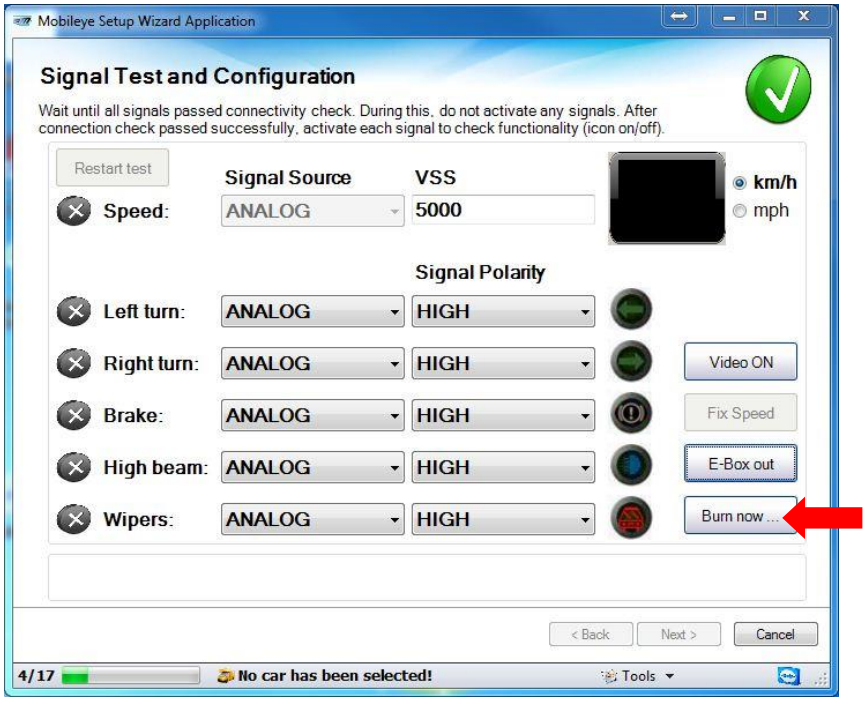
Use the "***move***" button to move the Alert Type to the second output option.

Use the "***Save profile***" button to save your E-box outputs settings for future use.

Use the "***Load profile***" to upload an E-box outputs settings profile you saved before.



After E-Box configuration is complete press "***Burn now***" to burn the new outputs settings

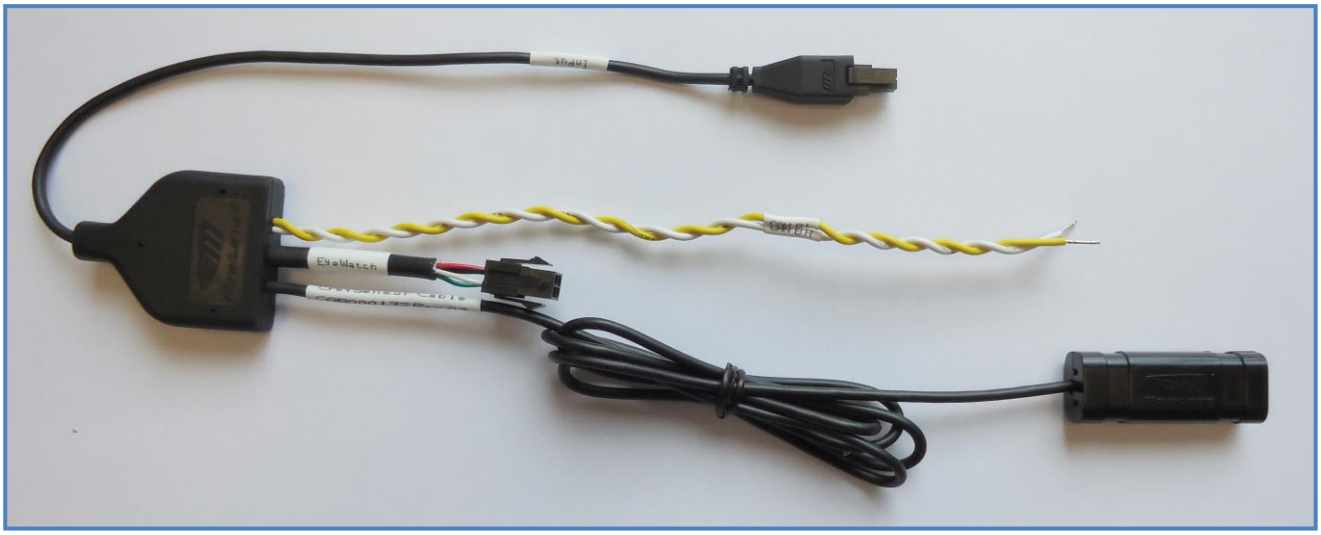


9.5 E-box Technical Specifications

E-box unit		
Physical Characteristics		
Length:	90mm	
Width (without lens):	58mm	
Height:	25mm	
Weight:	50g	
Color:	Black	
Case Material:	Plastic	
Electrical Characteristics		
Input Voltage:	4.5-5.5VDC	
Input current:	5V → 50mA	
Limited Power source	200mA max at normal and single fault conditions	
Environmental Characteristics		
Operating Temperature:	-20°c to +85°c	
Storage Temperature:	-40°c to +105°c	
Signals Input Support		
Signal Name	**Direction**	**Electric Spec**
Speed	Input	3.3-28V / 0-1KHz
Hi-Beam	Input	3.3-28V / Logic Level
Brake	Input	3.3-28V / Logic Level
Left Winker	Input	3.3-28V / Logic Level
Output (active Low)	Output	Open collector 3.3-28V (100mA max)
Wiper	Input	3.3-28V / Logic Level
Output (active Low)	Output	Open collector 3.3-28V (100mA max)
Right Winker	Input	3.3-28V / Logic Level
Hi-Beam	Input	3.3-28V / Logic Level
Signals Input – High Voltage (Pos)		3.3v – 28v
Signals Input – Low Voltage (Neg)		< 2.8v
Mobileye 6 to A-box Cable (CAB000131)		
Cable Length:		400mm
Cable Diameter:		4mm
A-box I/O Signals Cable (CAB000133)		
Cable Length:		650mm
Cable Diameter (each):		24 AWG

10 Appendix F

10.1 Mobileye CAN Sensor (CANSENSOR1)



The Mobileye CAN-Sensor is a new, non-intrusive solution for CAN-bus connection.

No more wrong connections, warranty violation or liability issues. The Mobileye CAN-Sensor will allow you to better handle a CAN-bus reading by simply placing the Mobileye CAN-Sensor on the vehicle CAN-bus wires without any wire cutting or pinching.

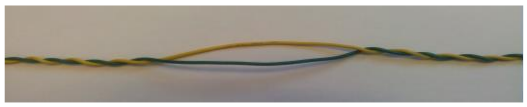
Benefits:

- Non-intrusive installation
  Simply install over the CAN-bus wires, no need to cut, strip, and crimp or connect physically
- Read the data thru the wires isolation
- Fits most vehicles
- Supports all CAN-bus speeds
- Reliable CAN-bus data reading
- Fast and simple installation

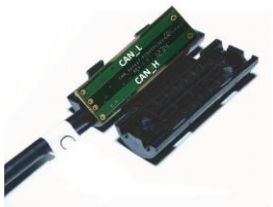
How to Install the CAN Sensor:

1. Identify the vehicle CAN-bus wires

2. Untwist the CAN-bus wires over a distance of about 5cm



3. Simply place the CAN Sensor over the CAN-bus wires as labeled on the CAN Sensor module

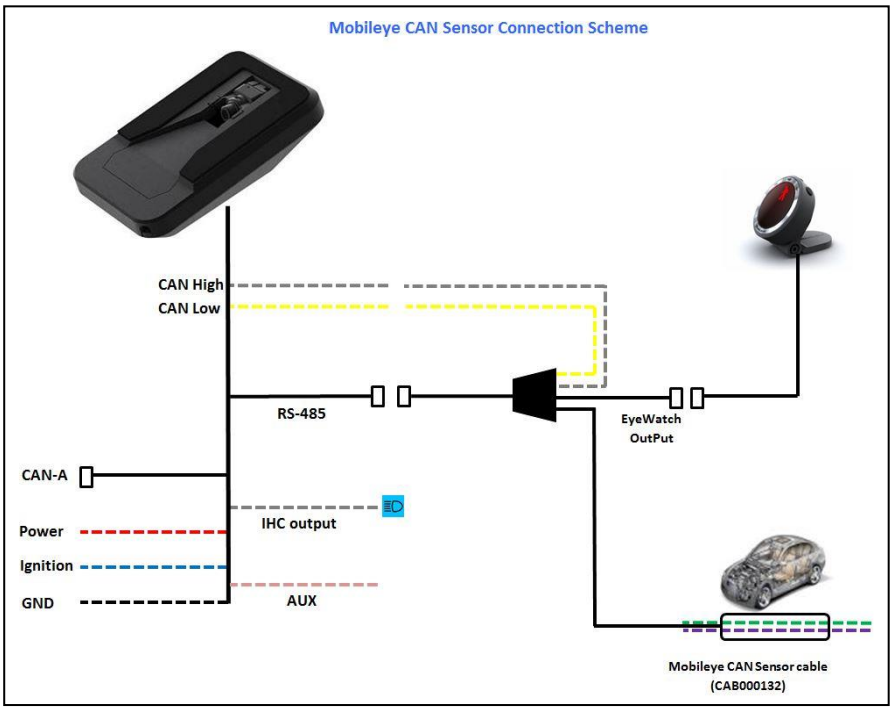


Note: In some cases (if Er-20 shows on Mobileye EyeWatch display), you will need to switch between CAN High and CAN Low wires

CAN-Sensor unit	
Physical Characteristics	
Length (entire cable):	1300mm
Width:	40mm
Height:	3mm
Weight:	55g
Color:	Black
Case Material:	Plastic
Electrical Characteristics	
Input Voltage:	4.5-5.5VDC
Input current:	5V → 30mA
Limited Power source	200mA max at normal and single fault conditions
CAN High, CAN Low:	Nominal input range: 0-5V
	Common mode input range: 7-12V
	Failsafe input range: 40v
Environmental Characteristics	
Operating Temperature:	-20°c to +85°c
Storage Temperature:	-40°c to +105°c

Conformity	
72/245/EEC	The automotive directive for electronic equipment which can build in road vehicles
ISO 7637	Road Vehicles Electrical Disturbances
ISO 11898	CAN for high-speed communication
ISO 9141	Road vehicles – Diagnostics systems. Requirements for interchange of digital information
RoHS	Yes
WEEE	Yes
EN60950-1:2006/A1:2010	Europe Safety
ETSI 301489-1/-17	Europe EMC
FCC Verification part 15 subpart B	USA EMC

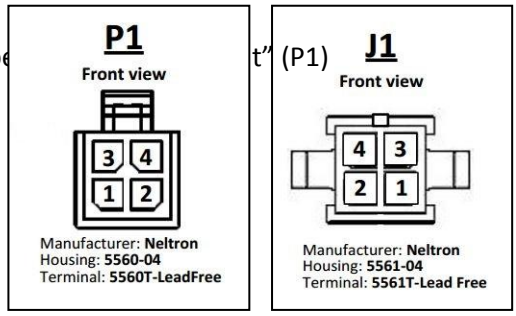
Connection Scheme:



Power Input:

The CAN-Sensor power input is placed in the 4 pin connector labe t" (P1) and/or in the 4 pin connector labeled "EyeWatch Output" (J1).

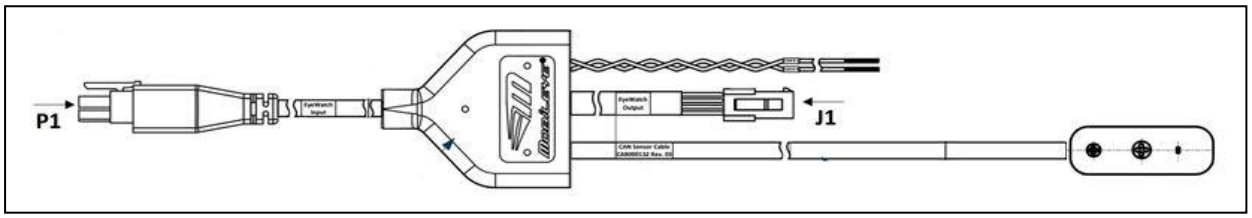
Pin 1 – +5Vdc (Red wire)
Pin 3 – GND (Black wire)



CAN-bus Output:

The CAN High and CAN Low output wires are the twisted pair of wires:

CAN High: White wire (labeled CAN B H)
CAN Low: Yellow wire (labeled CAN B L)



11 Appendix G

11.1 Technical Specification Sheet

Mobileye 6 Main unit	
Physical Characteristics	
Length:	122mm
Width (without lens):	79mm
Height:	43mm
Weight:	200g
Color:	Black
Case Material:	Aluminum/plastic
Cable Length:	3m
Cable Diameter:	4.8mm
Electrical Characteristics	
Input Voltage:	12-28VDC
Input current:	12v → 220mA, 24v → 120mA
Environmental Characteristics	
Operating Temperature:	-20°c to +85°c
Storage Temperature:	-40°c to +105°c
Vision Sensor	
Vision Sensor:	Aptina MT9V024 (1/3") RCC
Array Format:	Total: 752H x 480V - Active pixels: 640H x 480V
Optical Format:	1/3"
Pixel Size:	6.0µm x 6.0µm
Dynamic Range:	>55dB linear; >100dB in HDR mode
Shutter type:	Global shutter—TrueSNAP™
Responsivity:	4.8 V/lux sec (550nm)
Angle of view:	38° (horizontal)
Focus range:	5m to infinity
AGC:	Automatic Gain Control of the image sensor for high dynamic range
Audio Buzzer	
SPL Minimum	86dB @ 10cm
EyeQ2® Vision Processor	
332 MHz clock rate running seven parallel processes	
Two MIPS24KF 32bit CPUs	
Eight 64bit Vision Computing Engines (VCE)	
Eight channels DMA	
64bit width 512KB on-chip SRAM	
Bluetooth Module	
CSR BC5 Class II v2.1	
Profile Support: Serial Port Profile (SPP)	
Pairing Code: 1234	
Mobile Platform Supported: Android, IOS* *Only Mobileye 6 models with Blue L.E.D	

EyeWatch Display Unit	
Physical Characteristics	
Diameter:	49mm
Depth:	24mm
Depth (leg closed):	29mm
Depth (leg open):	66mm
Weight:	46g
Color:	Black
Case Material:	Plastic
Cable Length:	3m
Cable Diameter:	3.1mm
Electrical Characteristics	
Input Voltage:	5VDC
Input Current:	500mA
Environmental Characteristics	
Operating Temperature:	-20°c to +80°c
Storage Temperature:	-40°c to +100°c
Operating Humidity:	95%
Display Characteristics	
Viewing Angle:	100 Deg.
Display colors (backlighting):	LCD Full Color - 40 mcd (min)
Resolution:	128x128 pixels

Electrical Characteristics	
Input Voltage	12-28VDC
Input current (full operation)	12v → 360mA, 24v → 180mA
Input current (Stand-By Max)	12v → 10µA, 24v → 10µA
Max Power Consumption	5.2W

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