C2-270

Technical Installation Guide

Mobileye Technologies Limited

Rev. 3.1/PS3-MAM / May, 2012

Every effort has been made to ensure the accuracy of all information in this Technical Installation Guide. However, Mobileye Technologies Limited makes no expressed or implied warranty or representation based on the enclosed information.

Mobileye Technologies Limited reserves the rights to alter the equipment specifications and descriptions in this publication without prior notice. Any errors or omissions may be reported to Technical Support, Mobileye Technologies Limited.

Email: support@mobileye.com

www.mobileye.com

Table Of Contents

WARNINGS

1.1. GENERAL

By Installing the Mobileye® C2-270® Driver Assistance System, you will be acknowledging and agreeing to operate Mobileye C2-270 in accordance with the Safety Instructions and Warnings set forth below. If you do not agree to these terms, please return Mobileye C2-270 to your dealer, in its original packing materials, within 30 days of purchase, for a full refund.

Mobileye C2-270 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 C2-270 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 C2-270 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 C2-270 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. In addition, road, weather and other conditions can adversely affect the Mobileye C2-270 system's recognition and response capabilities. Accordingly, drivers should not rely on the Mobileye C2-270 to assure their driving safety, but rather should continue to rely on safe driving practices.

Drivers should exercise caution in using the Mobileye C2-270 Display Unit. Always maintain full concentration on the road at all times including while looking at the Mobileye C2-270 display.

1.2. SYSTEM LIMITATIONS

The Mobileye C2-270 is intended for paved roads, with clear lane markings.

The Mobileye C2-270 only detects fully visible rear ends of vehicles (Day and Night) and fully visible pedestrians and rear ends of Motorcycles (Day only). Therefore the detection of crossing, oncoming, and passing vehicles is not supported.

The Mobileye C2-270 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 C2-270 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 C2-270. Always ensure clear camera view.

1.3. INSTALLATION AND SAFETY INSTRUCTIONS

Mobileye C2-270 installation must be carried out by an Authorized Mobileye C2-270 Dealer or Installer.

The Mobileye C2-270 system should not be transferred between vehicles, other than by an Authorized Mobileye C2-270 Dealer or Installer.

The Mobileye C2-270 should only be operated with 12VDC~24VDC power.

Do not cover or obstruct the Camera Unit or Mobileye C2-270 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.

CHAPTER 2

C2-270 DESCRIPTION

WARNING!

The C2-270™ system should be installed ONLY by Mobileye® Technologies Ltd. authorized personnel!

2.1. C2-270 COMPONENTS OVERVIEW

The Mobileye **C2-270** is based on the following elements:

- The **Vision Sensor Unit** (**Camera**) and Multiple Angle Mount (MAM)
- The **EyeWatch** Display & Control Unit
- The System Connections Hub and Power supply Unit (**PS3**)

When receiving the C2-270 please verify receiving & identify all the following components:

2.1.1. Vision Sensor Unit with connecting cable (Camera – without MAM)

(CAB000080)

Figure 1-1: Vision Sensor Unit with connecting cable – Back view (without MAM).

2.1.2. PS3 – (System Connections Hub and Power Supply Unit)

Figure 1-2: (PS3)

2.1.3. Display and Control unit with connecting cable (EyeWatch)

(CAB000087)

Figure 1-3 EyeWatch - Display & Control unit with connecting cable

2.1.4. Power Cable - PWR (CAB000086) and External Fuse Holder

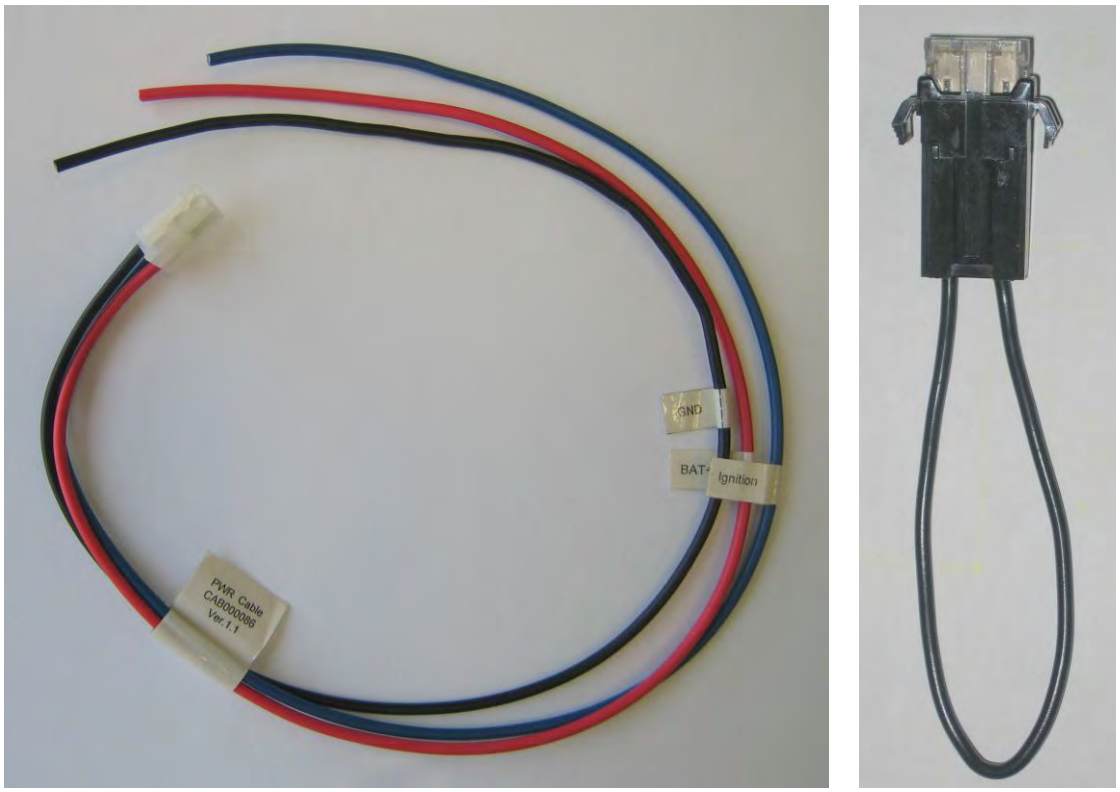


Figure 1-4: PWR cable

2.1.5. Signals Cable (CAB000084)

Figure 1-5: Analog Signals cable

2.1.6. **CAN-B Cable** (CAB000083)

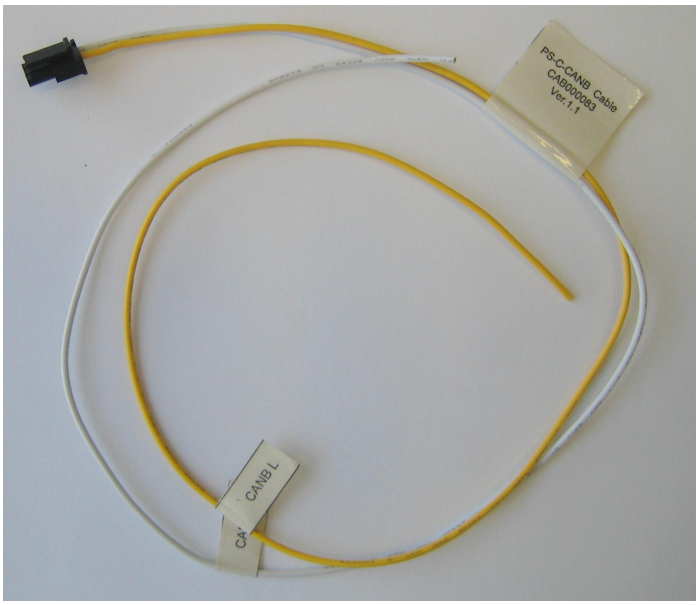


Figure 1-6: CAN-B cable

2.1.7 **EyeCAN** (ICAN000001)

NOTE: The EyeCAN cable kit is not part of the C2-270 kit. It is purchased separately and used as one of the installation tools for Calibration purposes and CAN sniffing.

Figure 1-7: EyeCAN cable kit

2.1.8 M.A.M – Multiple Angle Mount (Camera windshield adapter)

Figures 1-8: Fully assembled MAM with Camera unit

2.1.10. C2-270 connectivity scheme

The following scheme demonstrates all the different components of the C2-270, and the way they connect to each other.

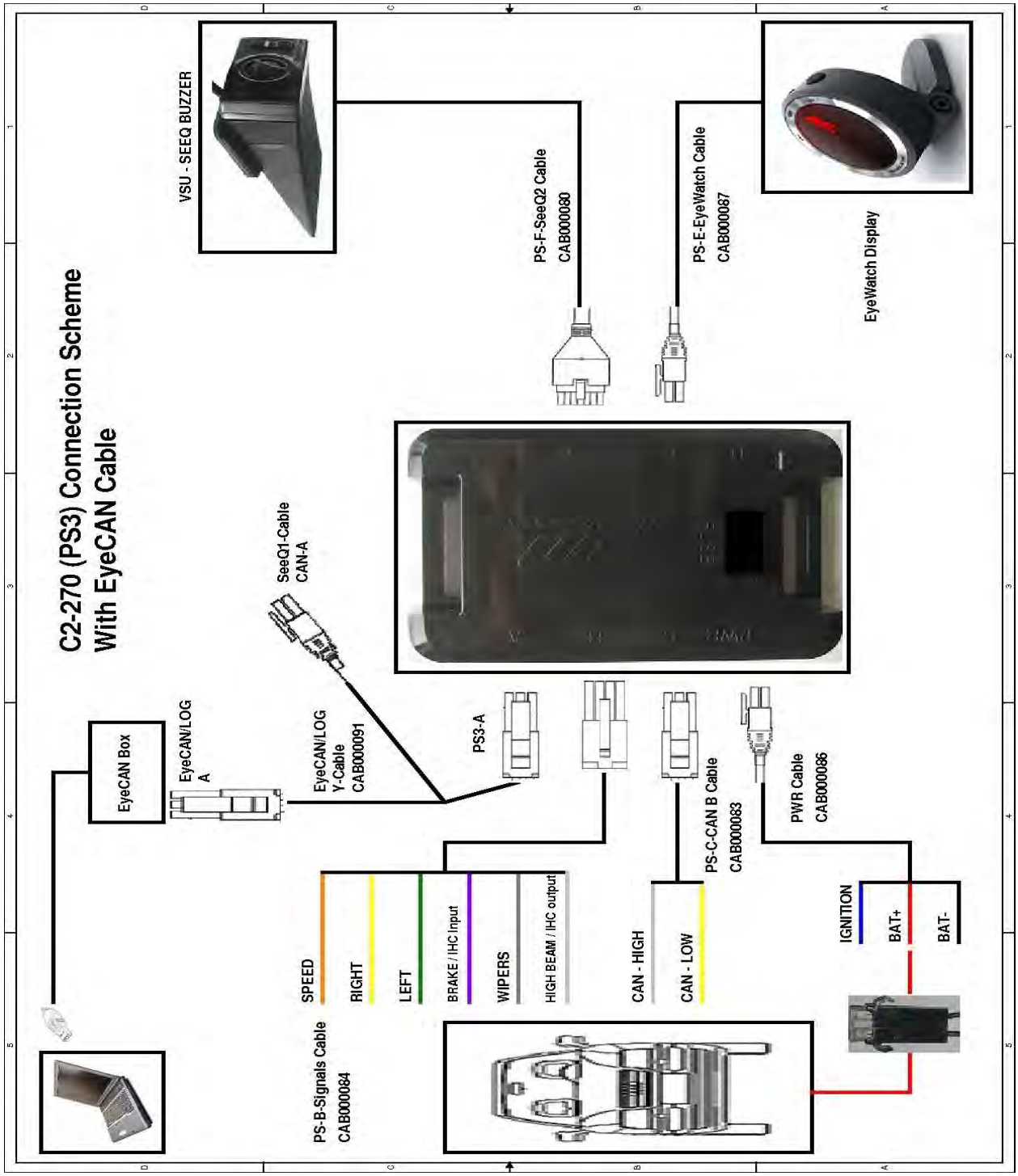


Figure 1-9: C2-270 connectivity scheme

The following paragraphs describe in detail the function of the cables

and connections shown above.

2.1.11. PS3 - System Connections Hub and Power Supply Unit

The System Connections Hub (PS3) is used to connect all system components together. The PS3 also function as the systems power supply.

The PS3 connections are detailed in table 1-2 below:

Table 1-1: PS3 Connections Table

PS3 Connector Label	System Component (cable label)
PWR	**PWR Cable** (CAB000086)
A	**PS3-A** from EyeCAN Cable (CAB000091)
B	**PS-B-Signals Cable** (CAB000084)
C	**PS-C-Cable** (CAB000083)
D/E	**EyeWatch Cable-E** (CAB00087)
F	**PS-F** from Camera Cable (CAB00080)

Table 1-1: PS3 connections table

2.1.12. Vision Sensor Unit (Camera) Cable (CAB000080)

The vision sensor unit contains the camera and the main processor (EyeQ™) of the C2-270™. It is attached to the vehicle's front windshield by the windshield mount (MAM) provided with the system.

In the C2-270, the Camera also includes a small built-in speaker and volume control buttons.

The Camera cable is to be connected to the PS3 unit. The cable's 14 Pin connector (F) is to be connected to the PS3 unit 14 pin (F) connector.

Table 1-2: Vision Sensor Unit (VSU) Cable

Wire Name & Function	Wire color	Connector	PS3 connector
PS-F-SeeQ2 Cable (CAB00080)	Black	J1	**F**

Table 1-2: Vision Sensor Unit (VSU/SeeQ2/Camera) Connector Cable

2.1.13. Display and Control Unit – (EyeWatch)

(CAB000087)

The Display and Control Unit is connected to the PS3 unit. The EyeWatch cable 4 pin connector (E/D) is to be connected to the PS3 unit 4 pin (E/D) connector.

Table 1-3: EyeWatch Cable

Wire Name & Function	Wire color	Connector	PS3 connector
PS-E-EyeWatch Cable (CAB00087)	Black	J1	**E/D**

Table 1-3: EyeWatch cable

2.1.14. PWR cable – (CAB0000886)

The Mobileye C2-270 requires the following signals as input:

- **Vehicle battery (Constant 12V~24V)**
- **Vehicle battery after Ignition (Ignition 12V~24V)**
- **Vehicle GND**

The wires that connect to these signals are detailed in Table 1-3:

Table 1-4: C2-270 Power connections

Vehicle signal (input)	Wire label	Wire color
Vehicle battery (Constant 12V/24V) via External FUSE	BAT+	Red
Ignition (12V~24V)	Ignition	Blue
Vehicle GND	BAT-	Black

The PWR Cable is connected to the PS3 unit. The PWR Cable white 4 pin connector (PWR) is to be connected to the PS3 unit 4 pin (PWR) connector.

Table 1-5: PWR Cable

Wire Name & Function	Wire color	Connector	PS3 connector
PS-B-Signals Cable (CAB00084)	Black	J1	**B**

Table 1-5: PWR Cable

2.1.15. Signals cable – analog (CAB000084)

If an Analog installation is conducted, the Mobileye C2-270 requires the following vehicle signals as input:

- **Speed** signal (VSS)
- **Right turn** signal
- **Left turn** signal
- **Brake** light signal
- **Wipers** signal
- **High Beams** signal

The wires that connect to these signals are detailed in Table 1-3:

Table 1-6: C2-270 Analog Vehicle Signals connections

Vehicle signal (input)	Wire label	Wire color
Speed signal	**1**	Orange
High Beams / IHC Output	**2**	White
Brake light signal/ IHC Input	**3**	Purple
Left turn signal	**4**	Green
Wipers	**6**	Gray
Right turn signal	**8**	Yellow

The Signals cable is connected to the PS3 unit. The Signals cable, 8 pin connector (B) is to be connected to the PS3 unit 8 pin (B) connector.

Table 1-7: Analog Signals Cable

Wire Name & Function	Wire color	Connector	PS3 connector
PS-B-Signals Cable (CAB00084)	Black	J1	**B**

Table 1-7: Analog Signal Cable

2.1.16. CAN-B Cable (CAB000083)

The CAN-B Connector Cable connects to the vehicles CAN interface in order to retrieve the digital Speed Signal (and if available through CAN, other required vehicle signals).

The cable's 2 wires (CAN High, CAN Low,) connect on one side to the vehicles CAN High and CAN Low wires and on the other side to the PS3 unit.

The CAN-B cable 3 pin connector (C) is to be connected to the PS3 unit 3 pin (C) connector.

Table 1-8: CAN-B cable

Wire Name	Wire Color	Function
CAN High	White	Connects to the vehicle's CAN High wire
CAN Low	Yellow	Connects to the vehicle's CAN Low wire

For more details please see appendix F

Table 1-9: CAN-B Cable

Wire Name & Function	Wire color	Connector	PS3 connector
PS-C-CANB Cable (CAB00083)	Black	J1	**C**

Table 1-9: CAN-B Cable

2.1.17. EyeCAN cable kit (ICAN000001)

The EyeCAN Cable connects between the PS3 unit and a laptop computer for calibration purposes and Software upgrades. It is connected to the PS3 unit at the end of the installation process and it is removed once the calibration process has been completed and a test drive has been successfully executed.

The EyeCAN cable is connected to the PS3 unit. The EyeCAN cable (CAB000091) 6 pin connector (PS3-A) is to be connected to the PS3 unit 6 pin (A) connector.

The EyeCAN USB connector cable is to be connected to the Laptop USB Port.

Table 1-10: CAN-A Cable

Wire Name & Function	Wire color	Connector	PS3 connector
PS3-A- (CAB000091)	Black	J1	**A**

Table 1-10: CAN-A Cable

Note: The EyeCAN cable is not part of the C2-270 KIT. It is purchased separately and used as one of the installation tools for Calibration purposes.

2.1.20. MAM – Multiple Angle Mount

The MAM is an adjustable Camera Mount for all vehicles types. It enables the installer to quickly adjust the camera's angle according to the vehicle's windshield angle without the need to use different Camera Mounting Adapters.

WARNING:
The MAM is delivered when it is already fully **assembled** (including camera unit).
Do not disassemble any of the MAM system components

If you are using a fully assembled MAM system (camera already attached to MAM) follow the instructions in the next pages:

If the MAM doesn't include the camera unit see ***Appendix E*** for MAM Assembly Instructions.

CHAPTER 3

C2-270 INSTALLATION

3.1. ELECTRICAL VEHICLE SIGNALS REQUIREMENTS

Table 1-12 details the C2-270 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.

Table 1-12: System requirements from vehicle signals

Item	Description	Value
Signals Cables	Car inputs	Speed, Left, Right, Brake, Wipers High Beam Ignition, Bat- and Bat+
Voltages	Input	12 - 28VDC
	Current Load (full operation)	12v > 360mA, 24v > 180mA**
	Stand-by Current Load (Ignition off)	12v > 10µA, 24v > 10µA
	Power consumption	Nominal 5.2W
Signals Values	"On" and "Off" voltage levels	28V > High ("1") > 3.3V 0V ≤ Low ("0") < 0.8V

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

** The current consumption of the C2-270 is depended on the vehicle system voltage (12 or 24V).

Additional Notes:

1. For required help in signal amplification or attenuation, please see Appendix.
2. Mobileye C2 complies with automotive standard (ISO-7637-2) regarding voltage transients for all signals (input voltage and car signals).
3. Mobileye C2 supports abnormal car signal voltages but will require a different system version. To receive assistance in such cases please contact technical support.

3.1.1. Analog Speed Signal Frequency (VSS)

The C2-270 unit polls the speed signal every 1/4 milliseconds, which means that the maximum polling frequency is 4 KHz. If there is no signal change for 500 milliseconds, the C2-270 assumes the vehicle speed is zero.

The C2-270 uses the Analog Speed Signal from the vehicle (or CAN bus speed message). To locate the correct Analog Vehicle Speed Signal (VSS) there is a need to connect to the suspected VSS wire in the vehicle with a L.E.D voltage tester and drive with the vehicle a short distance. If the L.E.D in the voltage tester starts flashing clearly then the VSS is verified.

NOTE:

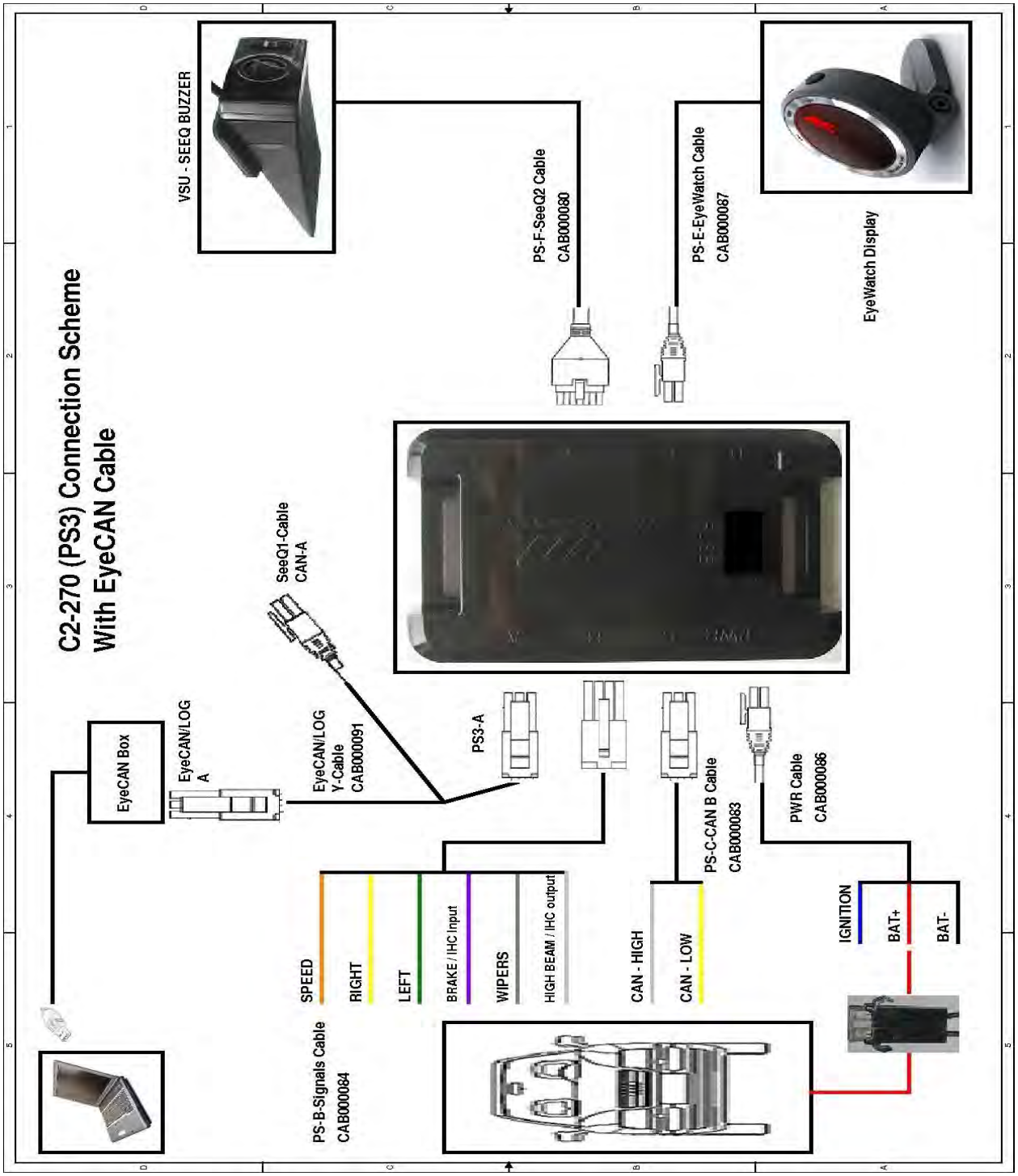
If Custom Aftre Market Tiers or Wheel and Gear Ratio changes (in trucks) are present in the vehicle, the Vehicle Speed Signal might not match to the real speed of the vehicle (unless the Speed Sensor itself was also altered to the Custom fitting.

3.2. C2-270 INSTALLATION PROCEDURE

The following chart summarizes the main stages of the C2-270 installation procedure:

3.2.1. C2-270 cable connection scheme review

Please ensure that you identify the C2-270 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

CAUTION: 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 C2-270 installation to prevent battery drainage.

1 Identify the wires in the vehicle that carry the required electrical signals (according to table below).

2 Firmly connect the appropriate wire from the **PWR Cable (CAB000086)** and the **Signals Cable (CAB000084)** and/or the **CAN-B cable (CAB000083)** to the identified wire in the vehicle.

Each wire in cables mentioned above and has a unique color. Make sure to connect the correct vehicle signals to their appropriate wire according to Table 2-7.

Table 1-13: C2-270 vehicle signal connection cables and connectors

Identified vehicle signal	Wire label	Wire color
Vehicle battery (Constant 12V~24V) via Fuse	BAT+	Red
Ignition (12V~24V)	Ignition	Blue
Vehicle GND	BAT-	Black
CAN Installation		
CAN High	CAN High	White
CAN low	CAN low	Yellow
Analog Installation		
Speed signal (VSS)	1	Orange
Right turn signal	8	Yellow
Left turn signal	4	Green
Brake light signal	3	Purple
Windshield wipers	6	Gray
High beam signal	2	White

3 After identifying and connecting to the required vehicle signals pass the cables mentioned above behind the vehicle trimmings so that:

(a) The PWR cable reached the PS3 unit PWR connector.

(b) The CAN-B cable reaches the PS3 unit C connector (if CAN installation is conducted).

(c) The Signals cable reaches the PS3 unit B connector (if Analog installation is conducted).

4 For Intelligent High-beams Control connection see ***Appendix H***

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

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

WARNING!

Do Not Connect the C2-270 Constant Power (BAT +) to the vehicles' Ignition source.

WARNING!

- **DO NOT CONNECT the CAN-B connector cable to the PS3 unit until Calibration stage has been completed (calibration BURN is successful)**
- **Always check the Mobileye Internal Data Base for CAN-Bus availability before Installation is started (see Appendix F)**

3.2.6. Installing the Display & Control unit (EyeWatch)

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, an Allen screw driver is required).
2. Clean the selected location with the alcohol wipe.
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 PS3 unit (E/D) connector.

WARNINGS!

- The EyeWatch and VSU 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)

3.2.7. Installing the Camera (Vision Sensor Unit /SeeQ2-Buzzer)

CAUTION: at this stage the Camera should NOT YET be attached to the vehicle's windshield. Attaching the Camera to the windshield will be done after feeding the C2-270 with power. The Camera should be left on the dashboard at this stage.

Before starting Camera installation, make sure that the car is not loaded with unusual heavy cargo that can tilt the orientation of the car body.

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

a. Selecting the optimal location for the Camera unit:

- The Camera 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 Camera 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 25cm only. The preferable position of the Camera is in the middle of the windshield. If this is not possible we allow up to 25 cm 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 Camera.

- In tall commercial vehicles that do not have an engine hood occluding the field of view of the camera, the Camera unit can be placed on the lower part of the windshield, while considering all of the above-mentioned requirements. In this case, you need a Camera with a "DOWN" cable. “DOWN” cable means that after Camera installation, the camera cable exits the MAM downwards, instead of upwards (which is the case in the “UP” camera cable, used when installing the Camera on the upper part of the windshield).

b. Make sure the vehicle is standing on a flat surface with no side or forward slope.

c. Clean the intended Camera installation location on the windshield using an alcohol wipe to remove oily or other remains

d. Wipe the installation area on the windshield by thoroughly using a ***dry wipe*** (important since the alcohol wipe that removes oily substances may leave marks on the windshield that will obstruct the Vision Sensor Unit field of view)

e. Mark a horizontal line of the position of the intended base of the Camera unit using tape or a marker. The marking should be accurately horizontal.

3.2.8. Connecting the Camera (VSU/SeeQ2) Cable to PS3

1. Connect the Camera (VSU/SeeQ2) Cable (CAB000080) to the PS3 unit **F** connector.

3.2.9. Installing the Camera (continued)

h. Connect the EyeCAN cable (CAB000091) 6 pin Molex connector to the PS3 unit **A** connector on 1 side and the other 6 pin Molex connector to the EyeCAN box “CAN” port, and the EyeCAN USB cable to the Laptop USB port.

i. Turn on the notebook PC.

Table 1-14: C2-270 PS3 > EyeCAN > > Laptop > connections

PS3	EyeCAN cable (CAB000091)	EyeCAN box	Notebook PC
Connector	Connector	Connector	Connector
A	PS3-A	USB	USB
	Eye CAN / LOG A	CAN	

WARNING!

DO NOT CONNECT the Short CAN-B connector cable to the PS3 unit until Calibration stage has been completed (calibration BURN is successful)

j. Power on the system by turning on the vehicle ignition switch to ACC (Accessory) position.

NOTE:

If the Installation was done using the Vehicle CAN-Bus, chose the vehicle from the Signals Connection guide in the Mobileye Setup Wizard application before continuing (see Appendix F for more details).

k. Run the Mobileye Setup Wizard application on the notebook PC. After connecting successfully, you should see the vision sensor image in the “Camera Installation” window of the Mobileye Setup Wizard.

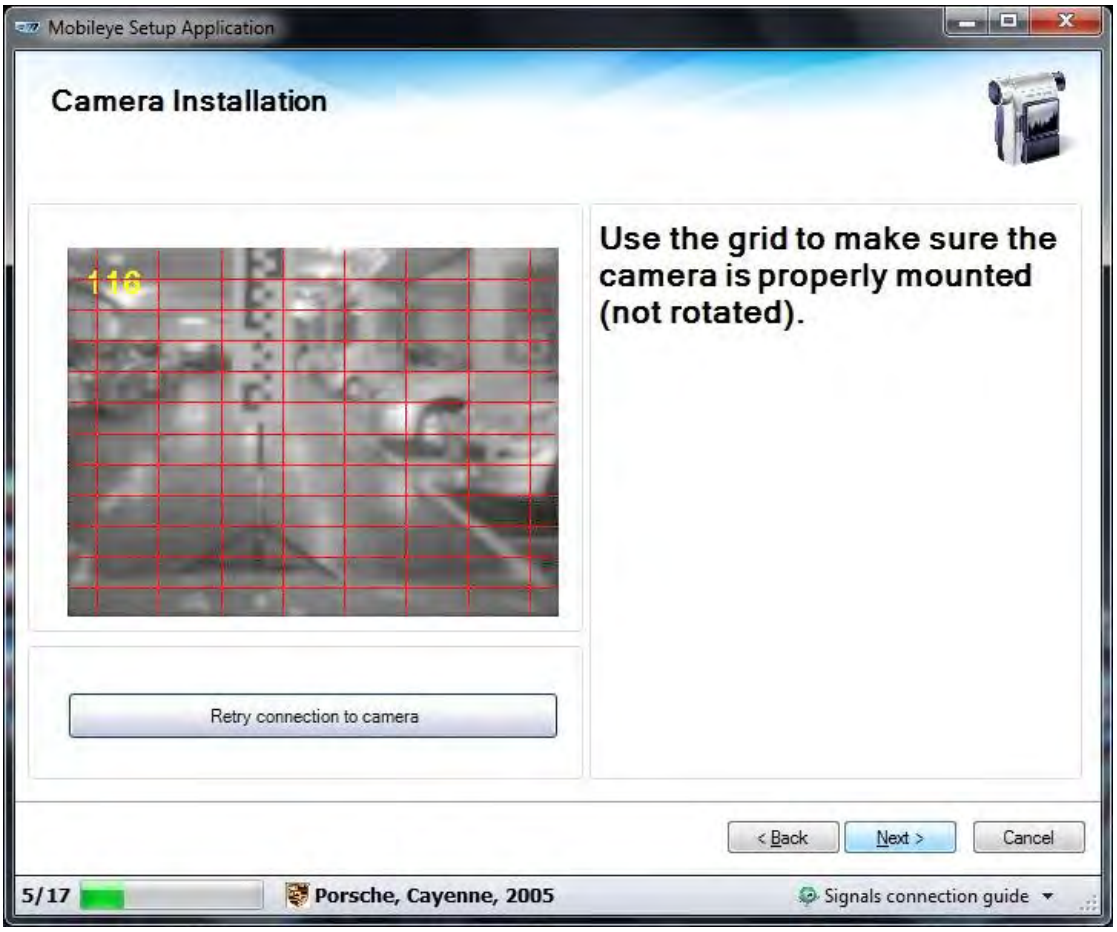


Figure 2-4 Mobileye C2 is connected to the Mobileye Setup Wizard

k. Place the Camera Unit accurately above the horizontal marking on the windshield (Do not remove the protective cover from the adhesive tape on the vision sensor mount yet).

l. Verify that the Vision Sensor Unit image is clear and that the vision sensor has no rotation about the optical axis (horizontal lines in the scene ahead should be horizontal in the image).

m. If the image is rotated, adjust the horizontal marker and repeat steps (k) and (l) above until the Camera has no axial rotation.

n. Remove the protective cover from the adhesive tape on the Camera Unit mount and firmly attach the Camera Unit to the windshield. Start gluing from the top down, maintaining the horizontal lines in the scene ahead as the horizontal lines in the image window.

Figure 1-1 shows the Camera unit and MAM attached to the front windshield, typically behind the rear view mirror. The Green L.E.D on the back of the Vision Sensor Unit indicates that the C2-270 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 components are wired and all C2-270 components are attached to the vehicle and connected to the notebook PC.

3.2.10. Adjusting the MAM Angle

To adjust the MAM angle slightly loosen the Angle Fixation Screws, adjust it to the desired angle (between 3° to 5° degree angle) by sliding the camera up or down and then fully tighten the screws in order to keep the slider in the adjusted angle.

3.2.11. How to Adjust the MAM Angle

The desired MAM angle is 3° to 5° degrees for all vehicles.

These 3° to 5° degrees define the angle of the camera's downward field of view.

To measure the 3° to 5° degrees angle, follow the instructions below:

a. Slightly loosen the Angle Fixation Screws so that the Adjustable Slider is kept in a fixed position but could also move when applied with reasonable force (as seen in the image above).

NOTE: Do not release the Angle Fixation Screws completely from the Adjustable Slider

b. Attach the Angle Measuring Tool to the Adjustable Slider as shown in the image below

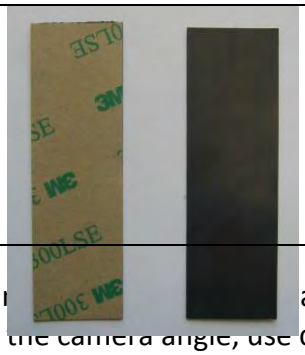
c. Adjust the slider to the desired location (between 3° to 5° degrees) and only then fully tighten the Angle Fixation Screws.

3.2.11. Finalizing the MAM installation

This step should be done only after the Calibration is completed successfully!!!

After Calibration was completed successfully the MAM installation needs to be finalized with the attachment of the Adhesive Rail Cover. To attach the Adhesive Rail Cover to the MAM's Main Body follow the instructions below:

a. Cover the camera rail with the Adhesive Rail Cover starting from the closest side of the camera (supplied with the MAM) as described in the image below:

1. Adhesive Rail Cover	2. MAM Without Rail Cover	3. MAM With Rail Cover
		

Note that in r ave to ve rail riate length depending on the camera angle, use cutter knife or scalpel to cut the leftovers.

CHAPTER 4

SYSTEM CALIBRATION PROCEDURE

CAUTION: When Performing System Calibration DO NOT:

- **Disconnect the CAN-A connection**
- **Move the laptop carelessly**
- **Turn off the vehicle or in any other way turn off power to the Mobileye C2 system**

NOTE: The C2-270 is calibrated manually. As a rule of thumb, the accuracy required in all measured parameters is ~1cm.

4.1. Site preparation

1. After completing the physical installation of the system, the vehicle must be parked on a leveled surface for the calibration procedure.
2. Once the vehicle is parked on a leveled surface continue on as instructed by the Mobileye Setup Wizard application.

TAC target and vehicle positioned in a suitable setting

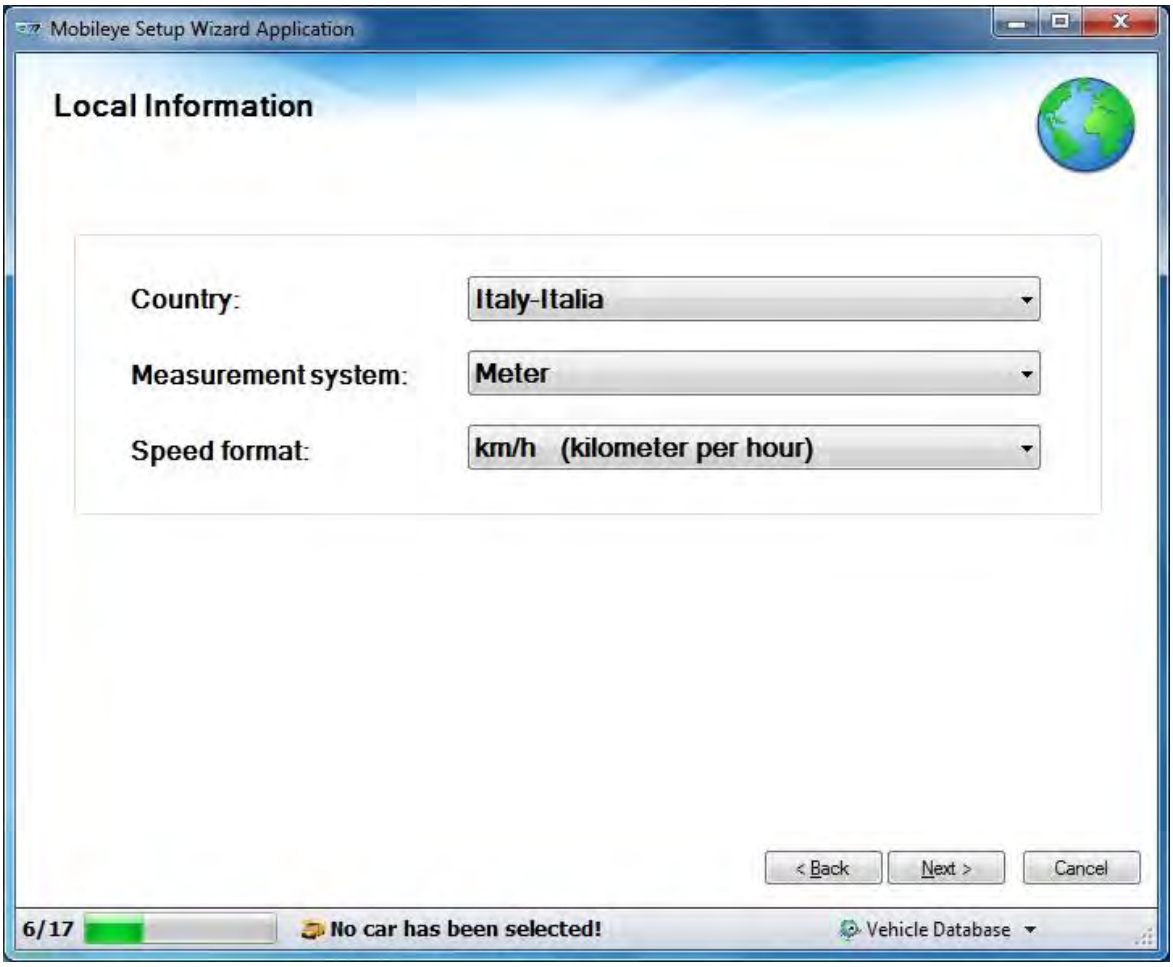
4.1.1. Local Information

In the "Local Information" slide please select the following:

a) Select the Country in which the installation is being done.

b) Select the Measurement system in which you choose to work in.

c) Select the Speed format in which you choose to work with (in accordance to the measurement system).

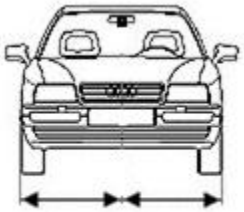


d) When done, click 'Next'

4.1.2. Car Information

In the '**Car Information'** Slide, please enter the following:

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


Front Wheel Base

b) **Front Wheel Base**
The distance between the outer edge of the Front Right wheel to the outer edge of the Front Left wheel).

c) **Road driving side**
Meaning the driving side of the road and not to the steering wheel side in the vehicle. For example, in the United Kingdom select "Left" and in the USA select "Right".

d) **Windscreen Angle**
As shown by the windscreen Angle measurement tools.

e) Insert the Car **Manufacture**, **Model**, and **Production Year**
Choose "**Other**" if the car is not in the automatic list and input the correct values.

When done, click 'next'.

4.1.3. 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).

Car hood alignment

When done, click 'Next'

4.1.4. Actual Camera Position

In the "Actual Camera position" slide set the following:

1. **Camera height**
2. **Camera distance from Left windshield edge** –

   Eenter the lateral distance from the camera to the Left windscreen edge (m).
3. **Camera distance from Right windshield edge** –

   Enter the lateral distance from the camera to the Right windscreen edge (m).
4. **Distance To Front Bumper** (m)

   The horizontal distance from the Camera to the front bumper of the vehicle.

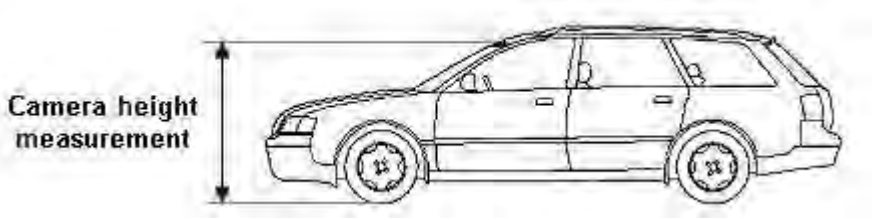
   For flat-nosed trucks and buses enter a minimum value of 0.1m;

When done, click 'Next'

4.1.5. Camera position measurements

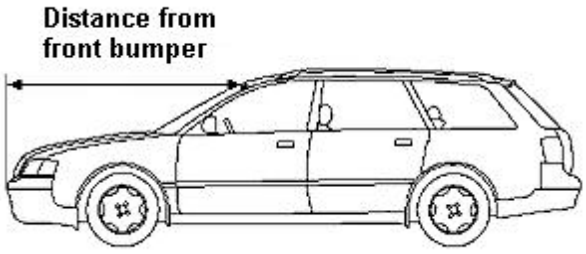
Measure the following dimensions using a measuring tape or any other appropriate measurement tool:

Camera Height from the ground:



Lateral distance from the camera to the right and left windshield edges:

Horizontal distance to the front end (i.e. end of front bumper) of the vehicle. For example, this value should be 0.1cm for flat nosed trucks.



4.1.6. Signals Source

The Signal source slide informs you about the source of each signal (Analog or CAN).

A) When performing an Analog installation (not CAN Bus) this slide is not active (see image 1 below).

Click “Next” to continue

B) If a vehicle was chosen from the CAN Database using the “Digital signals form” (see image 2 below), it is possible to switch CAN signals sources back to Analog signal sources.

If the installation is done using the vehicle’s CAN-Bus then at this stage signals which are available by the vehicle’s CAN-Bus can be configured back to work with an Analog connection. Analog signals cannot be re-configured to work with the vehicle’s CAN-Bus.

It is recommended not to make any changes if you followed the instructions in the Digital signals form” (CAN installation) unless a signal is not active and you choose to re-connect it using an Analog signal source.

Image 1

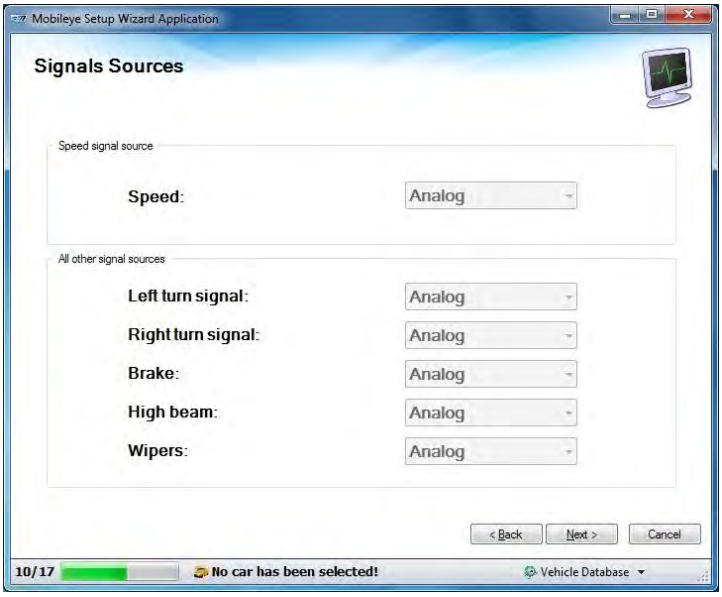
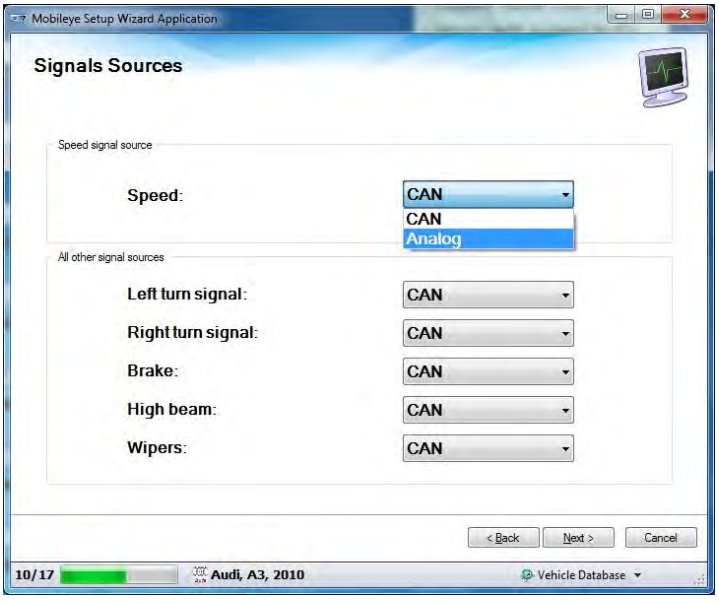


Image 2



When done, click ‘Next’

4.1.7. Signals Polarity Setting Step

A) When performing a **CAN** installation this slide is not active (see image 1 below).

Click “Next” to continue

B) When performing an **Analog** installation you need to set the following (see image 2 below):
Speed Signal Params -
Signals Polarity –

In the **Speed Params** box you need to enter the correct number of Pulses per Kilometer (or Pulses per Mile) the vehicle speed sensor emits.
If this value is unknown to you enter a default value of 5000 and wait until the Test Drive stage to find the correct value.

In the **Signals Polarity** section choose the polarity for each of the Signals (choose between **High**/**Low**/**Disable**).
If a signal has not been connected to the system choose "**Disable**".

Image 1

Image 2

When done, click ‘Next’,

4.1.8. Camera Calibration Step

NOTE: Please perform this process while seated in the drivers seat

1. Locate the STAND (**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 STAND (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).

3. Click on "**Calculate Close TAC**".

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

5. Now locate the STAND far from the front of the car (~1.0m),
   and click on "**Calculate far TAC**".

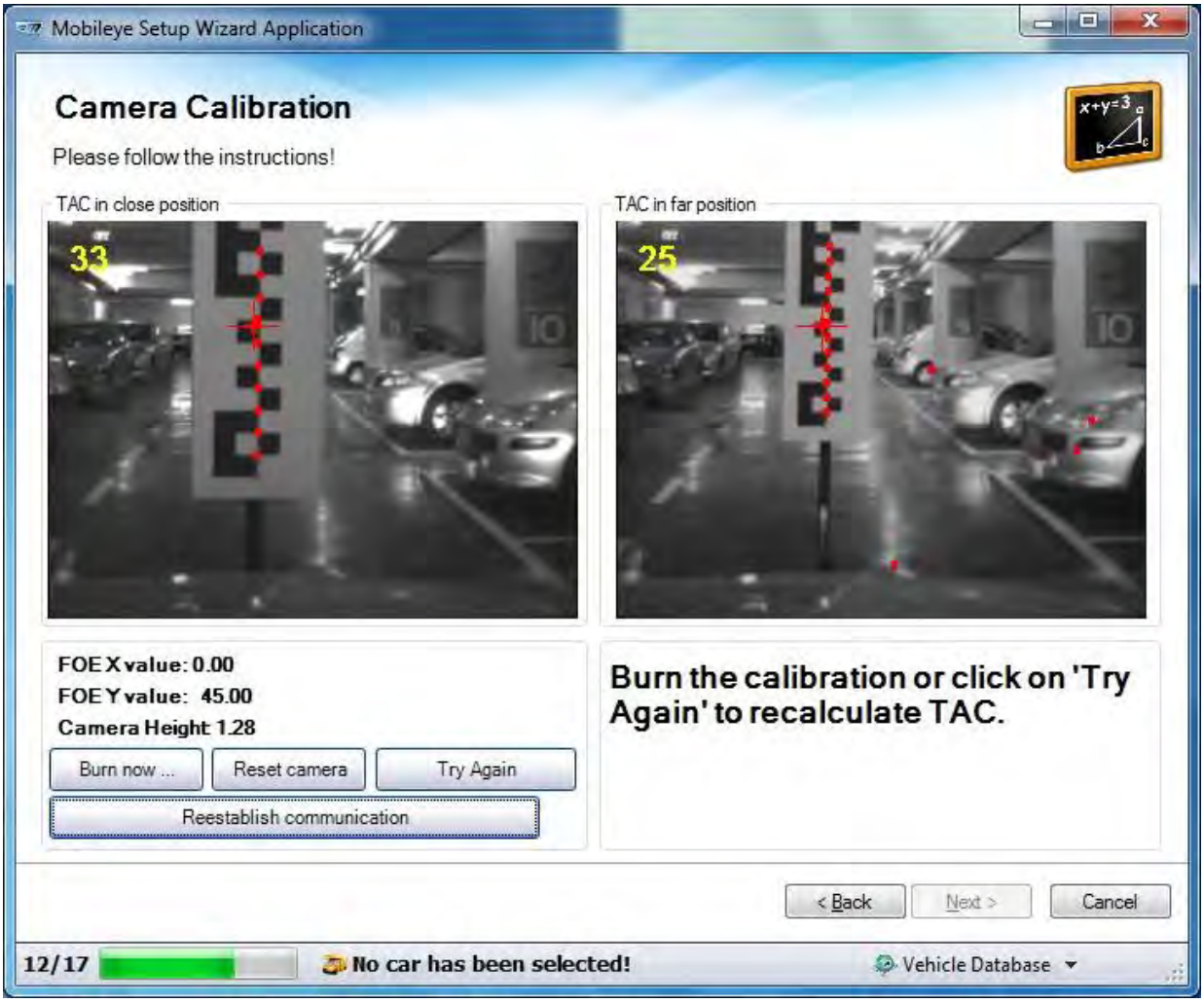
6. For Trucks and Buses with No Front Engine Hood (flat nose) locate the STAND (TAC Target) another 1 meter further away from the previous Close position.

7. When the "Calculate far TAC" is complete, you can see the F.O.E 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 Target is located as instructed above.

9. If the Calculation did not succeed check the Error Message displayed on the laptop screen. You may need to Adjust and Correct the MAM angle (see section 3.2.10 or ***Appendix D***).

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



11. When burning has been completed, click ‘Next’.

4.1.9. Signal Test & Configuration step

In this step you need to click on the "Start Test" button in order for the application to check the signals polarity.

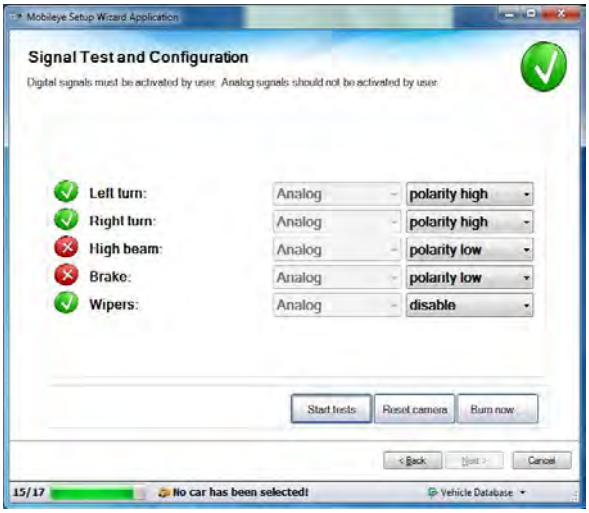
If one or more of the signals polarity is incorrect you will need to choose the Correct Polarity, Click "Burn Now" and then perform the Test again.

Only when all signals are labeled with a Green Check Icon beside them, may you proceed to the next stage.

At this stage you can also choose to change the Signal Source back to Analog if you are performing an installation trough the vehicle's CAN-Bus.

NOTE:

- When testing **Analog** Signals **Do Not Activate** the signal switches after clicking the "Start Test" Button.
- When testing **CAN** Signals **Activate** the signal switches after clicking the "Start Test" Button.
- Please be aware that if a Signal Polarity is set to High, it will pass the test even if the signal itself is not connected.



If the Signal Test has been successful, click 'Next'

4.1.10. Test Drive

In the "Test Drive" Slide you need to verify the following:

a) **Verifying Connection to Vehicle Signals**

b) **Verifying Speed Params**

A. VERIFYING CONNECTION TO VEHICLE SIGNALS

Checking the vehicles signals before leaving the installation site:

1. Turn on your vehicle left signal: the left signal indicator should turn Green.
2. Turn on your vehicle right signal: the right signal indicator should turn Green.
3. Press on the brake pedal: the brakes signal indicator should turn Red.
4. Turn on your vehicle High Beams signal: the High Beam signal indicator should turn Blue.
5. Turn on your vehicle Wipers signal: the Wipers signal indicator should turn Red/White.
6. If any of the signals are flipped or fail to show – check the physical connection of the cables. If you chose "Disable" in the Signals Polarity slide change it to the correct polarity.

B. CHECKING THE SPEED SIGNAL WHILE DRIVING ON THE ROAD:

1. Compare the speed indication to that of the host vehicle indicator
2. If no indication (000) – check the physical connection of the cables.
3. If the indication is too low, decrease the VSS value until it matches* that of the vehicle (can be a bit lower).
4. If the indication is too high, increase the VSS value until it matches[1] that of the vehicle (can be a bit lower).

[1] **Vehicle speed indicator** – Magnetic vehicle speed gauges are set to the proper value at o km/h and about 200 km/h. In the range in between, it indicates an increased speed of up to 10% (at about 100 km/h).

5. Every change of the Speed Params value requires the re-burning of the value. After setting the new value click "Burn Update" and wait about 1 minute until the system resets itself automatically and continues the image feed and speed indication.
6. When the Speed Indication in the Mobileye Setup Wizard application matches to the vehicles speedometer, then the correct Speed Params value has been found.

NOTE:

Please be aware that there is a 2 to 3 second delay between the vehicle speed to the speed indication in the Mobileye Setup Wizard Application. Therefore, the Speed indication check should be done on the Highway when the vehicle is travelling at a steady speed of 80 km/h for duration of at least 5 seconds.

7. If necessary, you can also change the speed signal source in this slide.
8. When all signals functionality is verified, and the speed indication matches to the vehicle's speed indication you can complete the Mobileye C2 installation by clicking "Next", and then "Finish".

Appendix A - Technical specifications

System Specifications

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
Signals Input – High Voltage (Pos)	3.3v – 28v
Signals Input – Low Voltage (Neg)	< 0.8v

EyeWatch Display Specifications

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:		120 Deg
Display colors:		Red, White, Green, Blue
Intensity	**Red:**	8mcd (min)
	White:	40mcd (min)
	Green:	15mcd (min)
	Blue	8mcd (min)

Vision Sensor Unit Specifications

SeeQ2 Buzzer (camera unit)	
Physical Characteristics	
Length:	68mm
Width (without lens):	35mm
Height:	39mm
Weight:	94g
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:	35° (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	

Appendix B

Signal level Adjustment Tips

This appendix explains the required electrical modifications in case one or more of the extracted signals is too weak (under 3 V at high level).

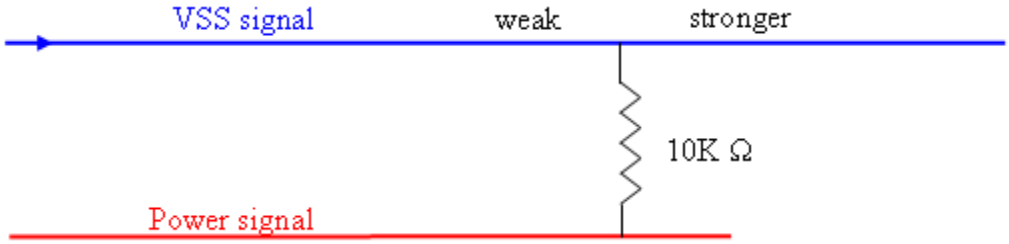
Amplifying a weak car signal

The following table summarizes electrical system requirements with respect to vehicle signals:

Item	Description	Value
Signals Cable	Car inputs	Speed, Left, Right, Brake, Wipers and Headlights car signals
Voltage	Input	12 - 24VDC
Signal Values*	On and Off voltage levels	27V > High ("1") > 5V 0V ≤ Low ("0") < 1.00V

Sometimes the vehicle signal is too weak and amplifying it will bring it to the expected voltage level.

To amplify it, here is a possible solution:



Decreasing a high signal (bias)

In case the car signal voltages are too high, for example:

Possible solution: add an 11V Zener Diode to the signal line.

Appendix C

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.

Appendix D

Verifying the MAM Angle

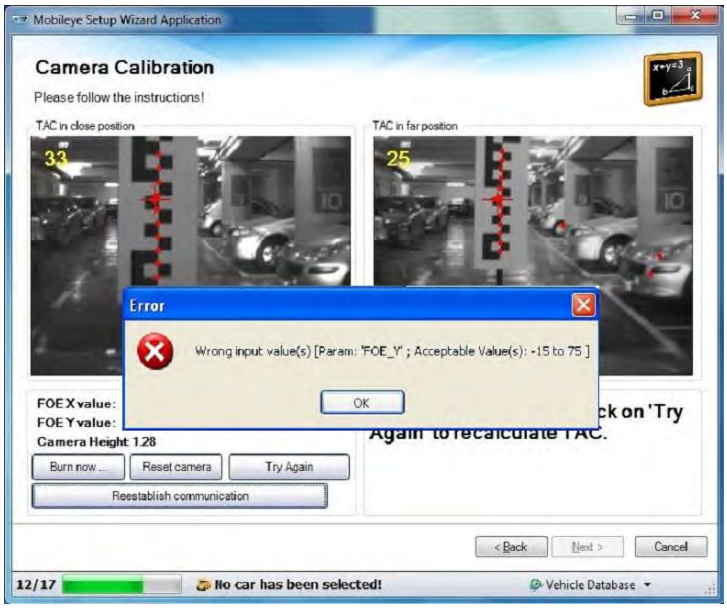
In order to verify the correct MAM angle we will refer to the calibration results which are displayed after the TAC Calculation process is completed.

For example:

If after the Close/Far TAC calculation the F.O.E- Y value is 70, we will prefer to change the MAM 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 MAM degree (if it was on 5 degrees, set it to 4 or 3 degrees).

If the MAM 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 figures below).



If such a case appears follow the below instructions:

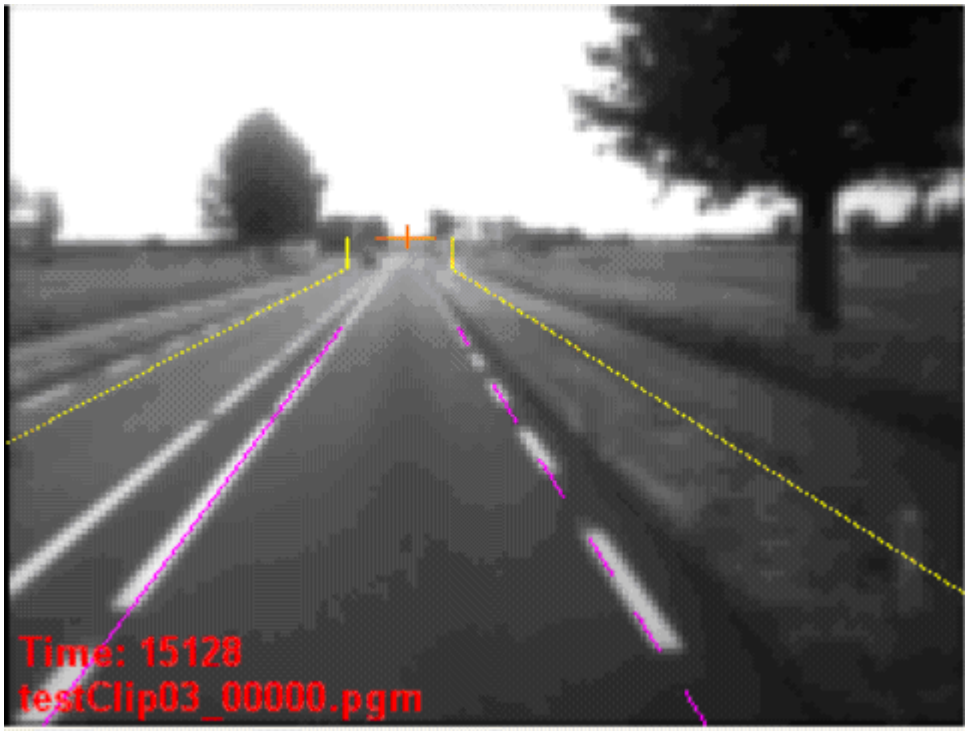
1. The Mobileye Setup Wizard will automatically return you to the “Camera Installation” step.

2. Adjust the MAM angle (refer to section 3.2.10) to increase/decrease the MAM 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).
3. Continue with the standard Calibration Process (as instructed in the Mobileye Setup Wizard).

A correctly adjusted MAN should produce an image approximately as shown below. The MAM should cover approximately 2/3 road and 1/3 sky.

Example of correct F.O.E (Focus of Expansion)

F.O.E (Orange +) is in the middle of the lane between the 2 lane markings at the horizon (see image below).



Appendix E

Attaching the Camera to the MAM

If the MAM unit does not include a pre attached Camera follow the below instructions to attach the Camera.

A. Insert the Camera into the MAM Adjustable Slider
B. Use the 4 Camera attachment screws to secure the camera into the MAM (see images below).

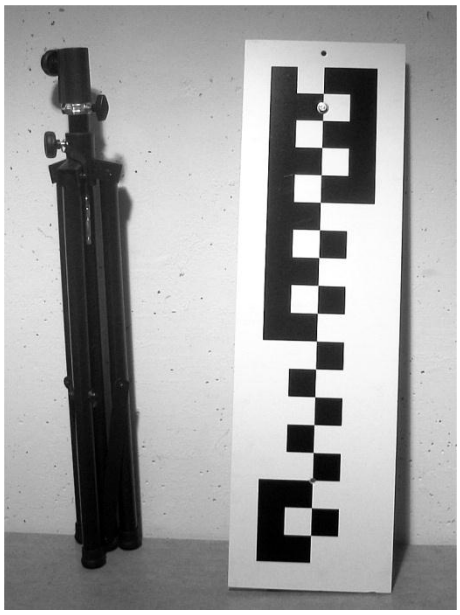
NOTE:
The Camera attachment screws are vital for securing the camera to the MAM.
Do not unscrew them after the Camera is attached to the MAM.


MOBILEYE
1211305017

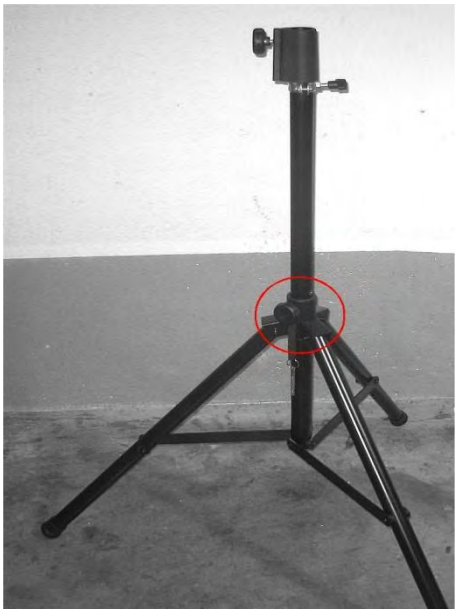
Appendix F

Mobileye TAC (Target Automatic Calibration) Assembly and Positioning Instructions

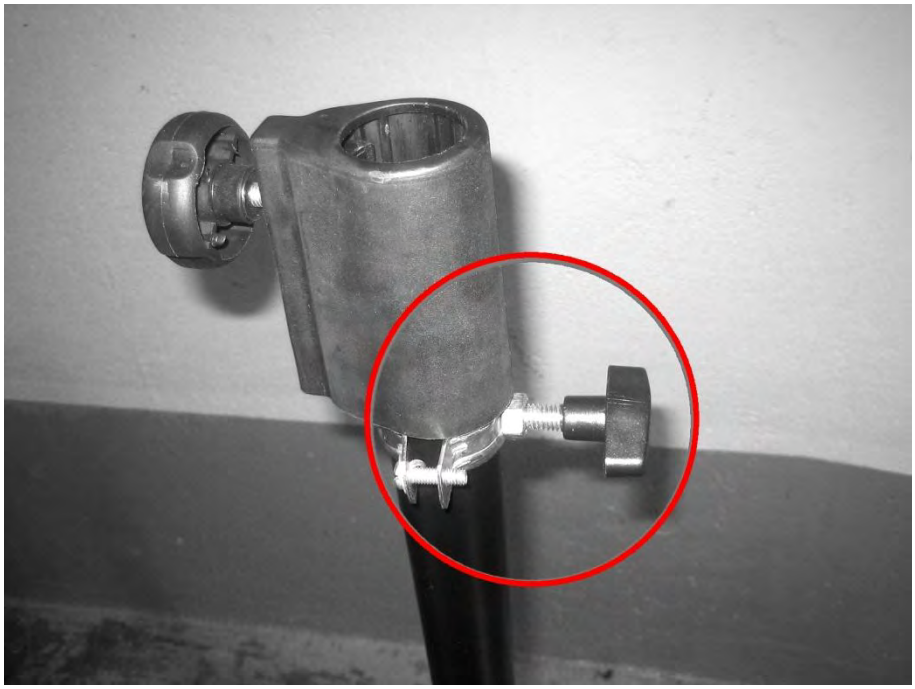
1) The TAC has 2 parts:
   a. The patterned target with connected pole.
   b. Tripod



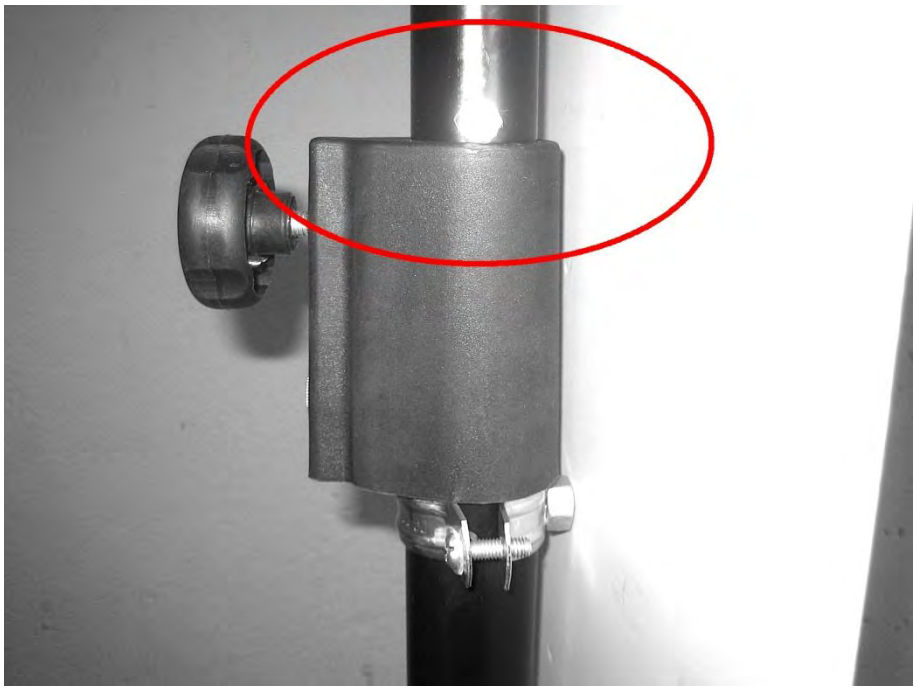
2) Open the tripod fully, and tighten the lowest black handle located on the tripod (Make sure the main hub stops at the big silver screw).



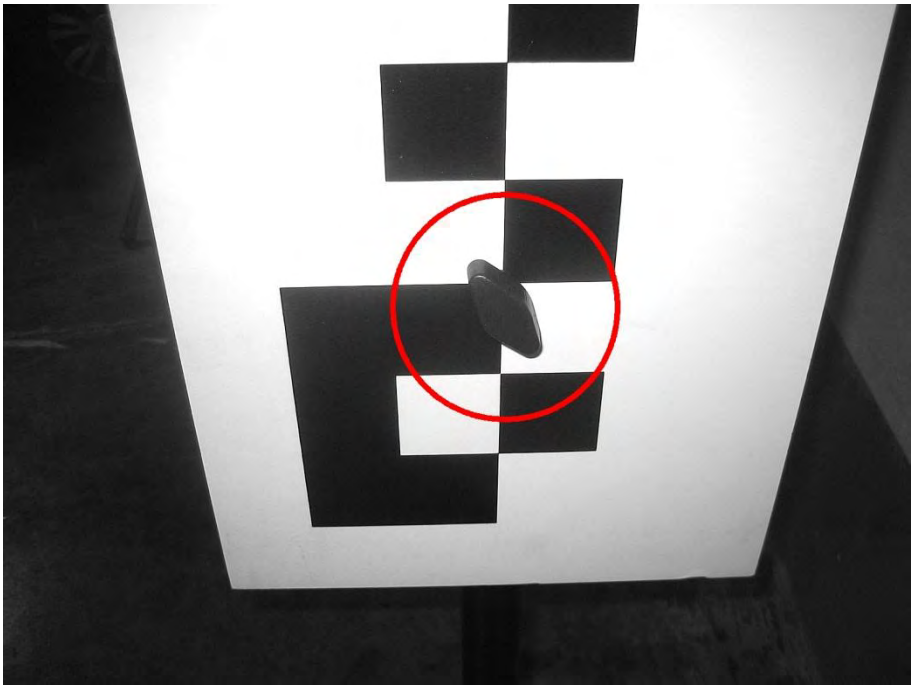
3) Unscrew the middle black handle located on the tripod.



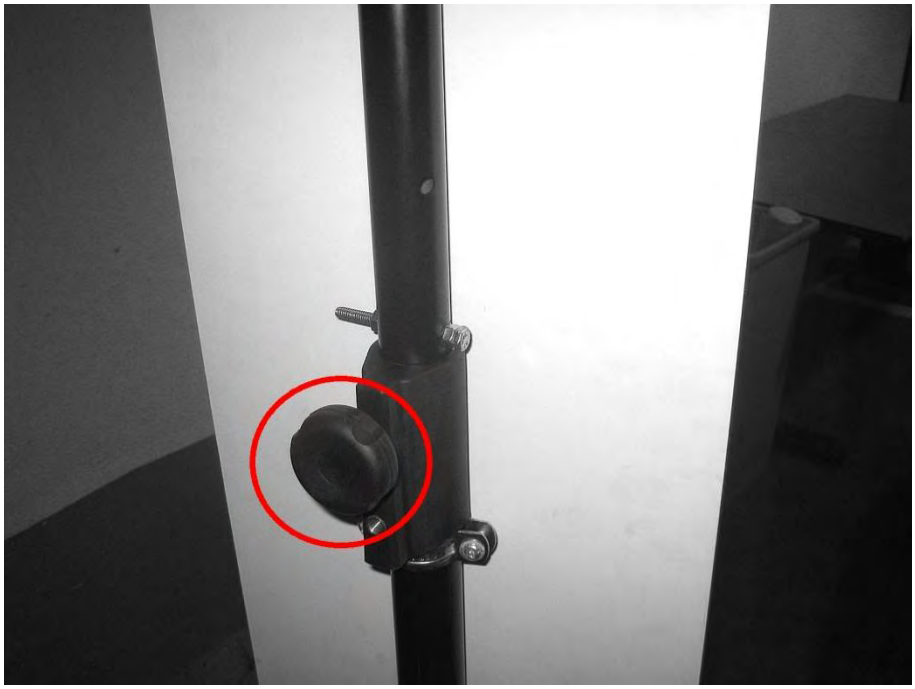
4) Assemble the patterned target's pole on the tripod.



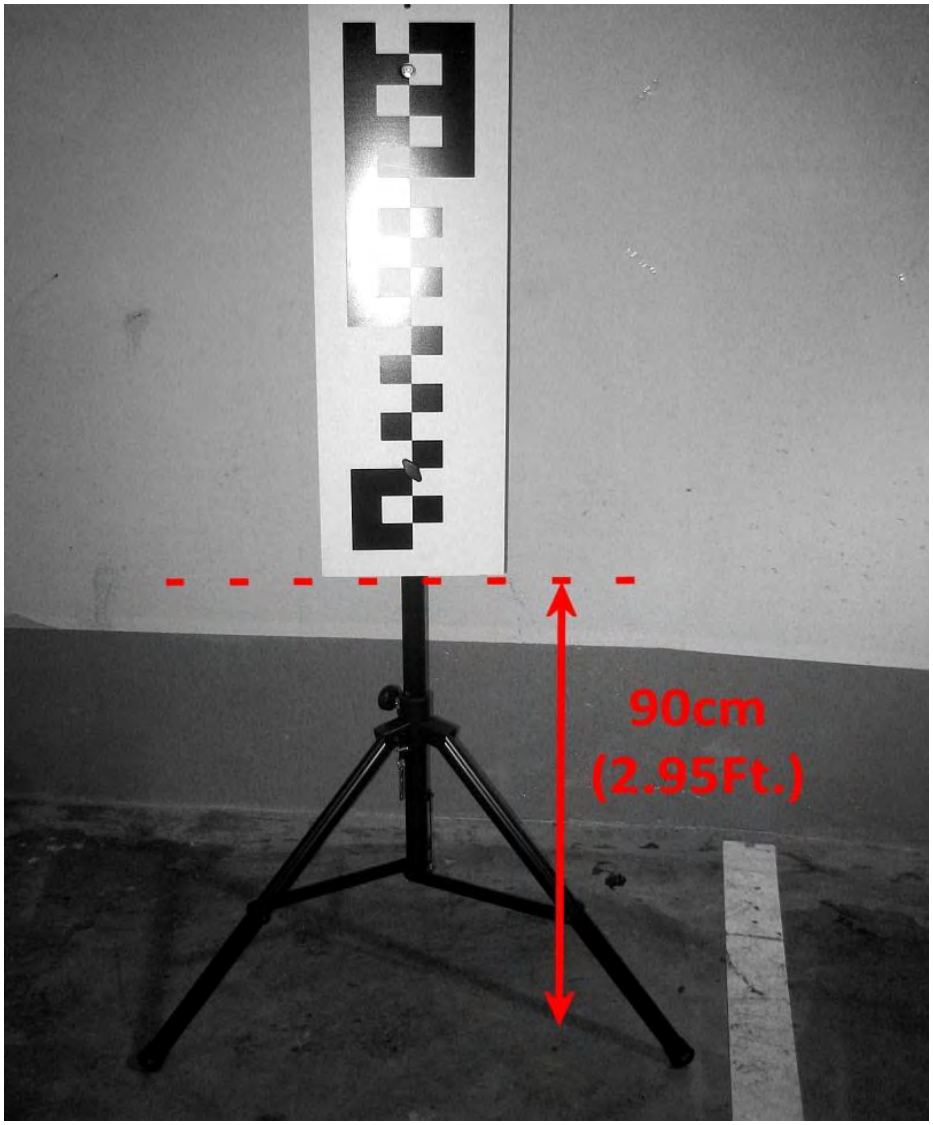
5) Fasten the patterned target on the tripod using the middle black handle.



6) Tighten the upper black handle located on the tripod.

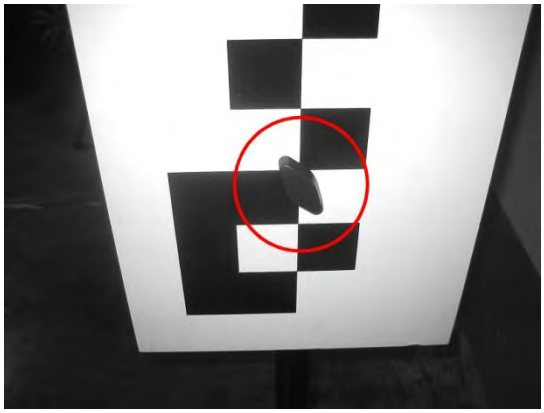


7) Make sure the bottom of the patterned target board is exactly 90cm (2.95 ft.) above the floor.

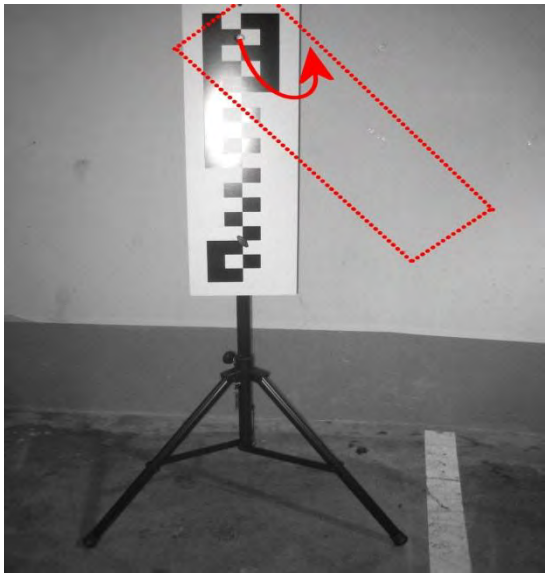


8) For commercial vehicles please follow the instructions below:

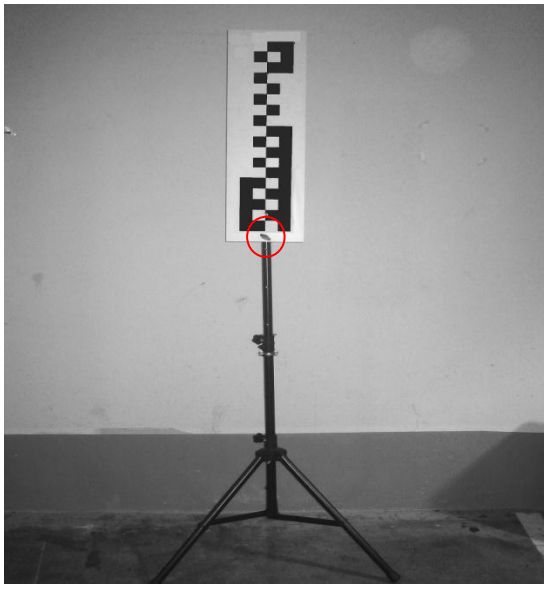
a. Unscrew the middle black handle.



b. Rotate the patterned target 180 degrees.



c. Fasten the patterned target onto the tripod using the middle black handle.



TAC Target positioning for Passenger vehicles and Trucks WITH Front Hood Engine

Close Target Position
Attached to Front Bumper

Far Target Position
1 Meter Away from Front Bumper

TAC Target positioning for Trucks without Front Hood Engine

Close Target Position
1 Meter from Front Bumper

Far Target Position
2 Meters Away from Front Bumper

Appendix G

Connecting to the Vehicles CAN-Bus Interface

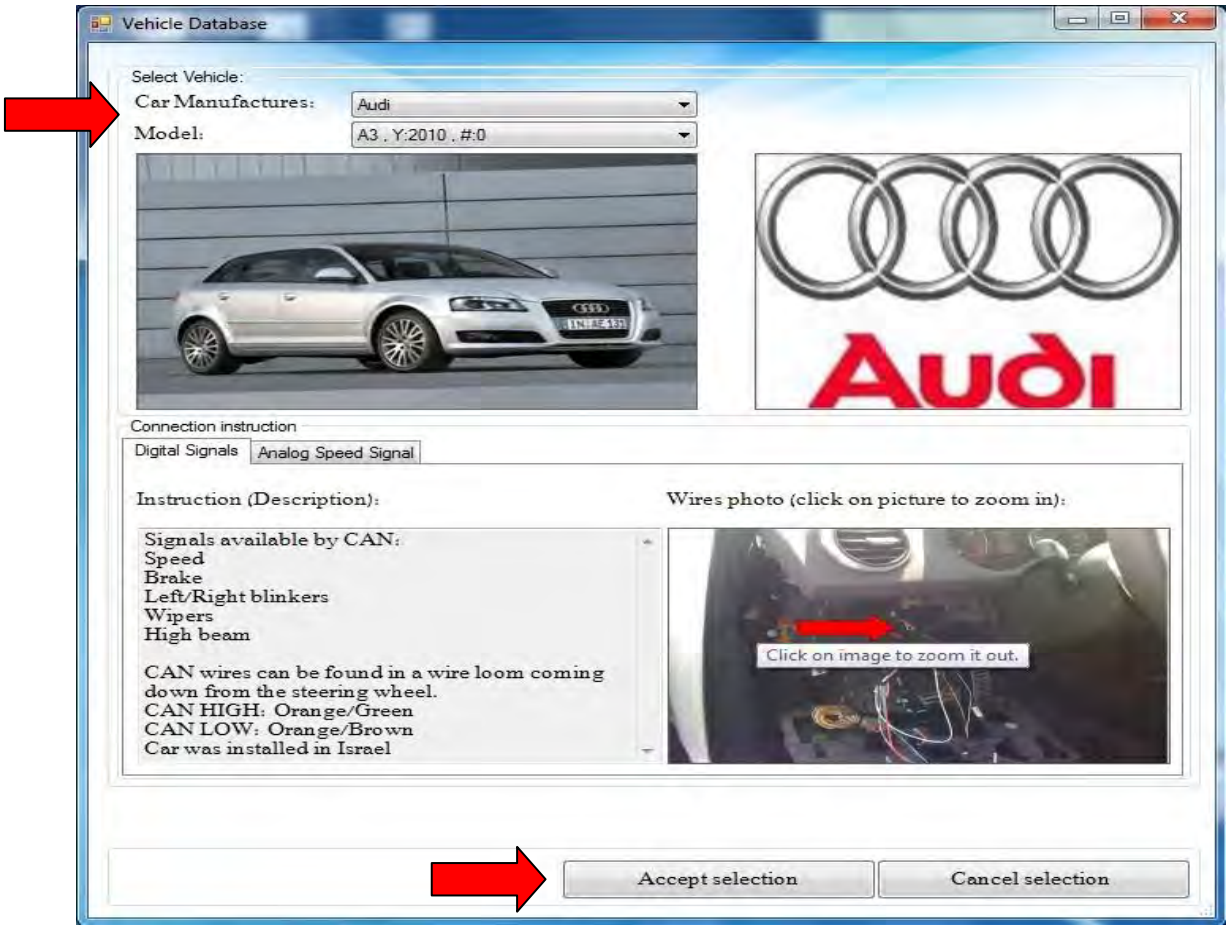
F.1. Choosing a vehicle from the Vehicle Database

Before connecting to the vehicle's signals you can open the Mobileye Setup Wizard application and check if the vehicle you are going to install is in the Mobileye Vehicle Database.

You can choose your vehicle and check which signals are available by CAN-Bus and receive information regarding the connections location in the vehicle.

To access the Mobileye Vehicle Database click on the "Vehicle Database" button in the Mobileye Setup Wizard "User Identification & Accessories" slide (slide 2).

Select the vehicle which you intend to install:



When accepting the selection of the vehicle, the installation will be performed using the connections and information of the selected vehicle.

It is possible to have a vehicle with some analog connections and some CAN BUS connections.

WARNING!

- **DO NOT CONNECT the Short CAN-B connector cable to the VSU Connector cable (Purple, CAN-B) until Calibration stage has been completed (calibration BURN is successful)**

In some vehicles CAN-Bus information might not be available. Please check availability of information regarding the Analog Speed Signal connection by pressing the "Analog Speed Signal" tab.

If no vehicle is chosen (CAN or Analog information) the installation will be Analog.

F.2. CAN-B cable

The C2-270 connects to the CAN BUS wires in the vehicle via the CAN-B cable".

The "CAN-B cable" is a means to connect the C2-270 to the vehicle's CAN High and CAN Low wires.

The main purpose we connect the C2-270 to the Vehicle CAN-Bus interface wires is to assist in retrieving the Vehicle Speed Signal (and other signals if available) for shortening installation time.

The following connections need to be performed in order to connect the C2-270 to the Vehicle's CAN wires:

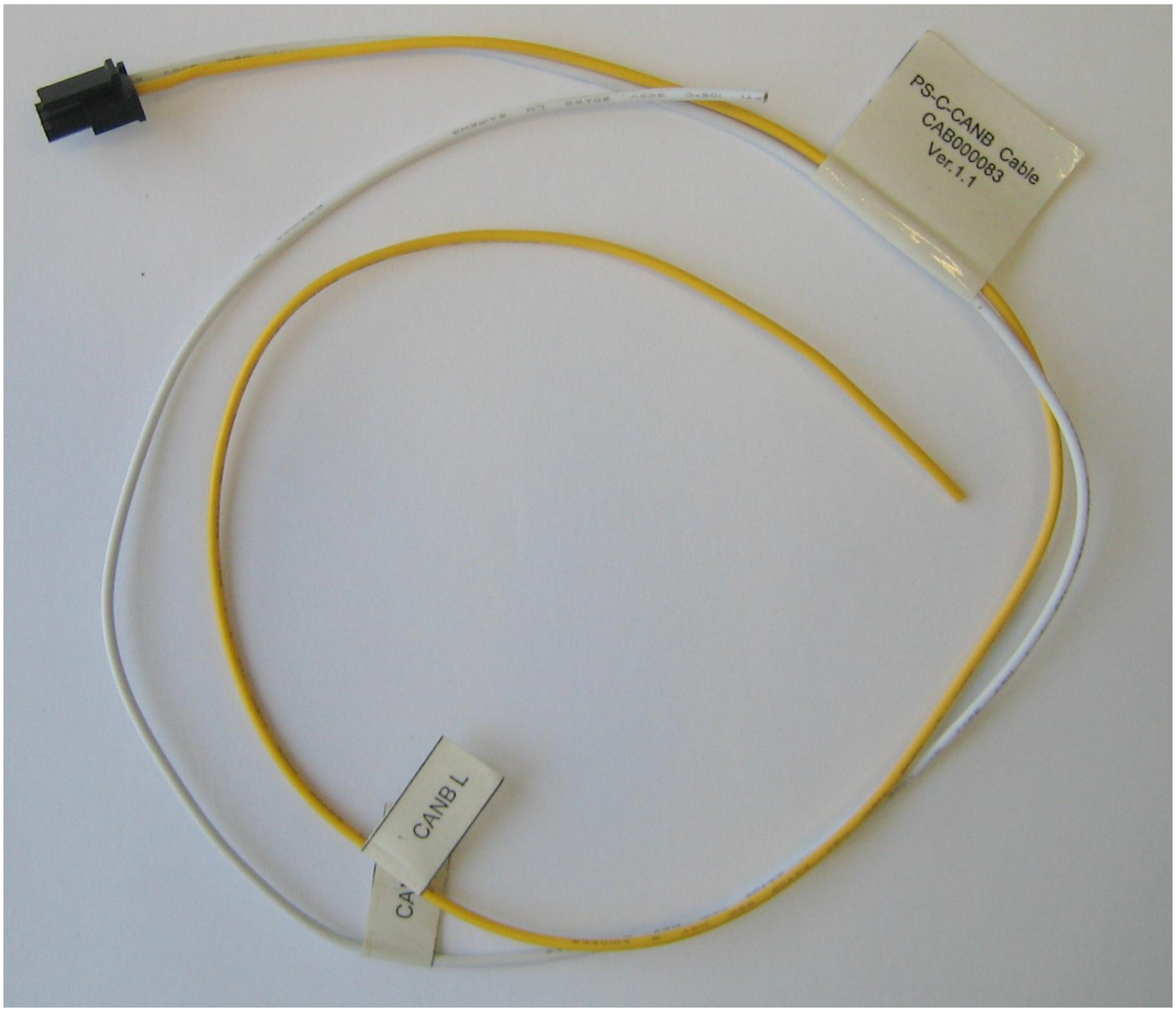
NOTE: Wires' colors are not guaranteed. Always refer to the wires' labels.

1. Locate the Vehicle's CAN BUS wires using the Mobileye Vehicle Database Only (CAN High, CAN Low, GND).
2. Connect the CAN High (White wire) and CAN Low (Yellow wire) wires of the "CAN-B cable" to the parallel wires in the vehicle.
3. Connect the 3 pin Connector end of the "CAN-B cable" to the PS3 unit connector C.

WARNING!

- **DO NOT CONNECT the CAN-B cable to the PS3 unit until Calibration stage has been completed (calibration BURN is successful)**

4. Connect all other system components as Usual.


PS-C-CANB Cable
CAB000083
Ver.1.1
CANB L

Appendix H

Intelligent High-Beams Control (IHC) Installation Instructions

Important Remarks:

- IHC is supported only on specific Mobileye C2 models
- IHC is supported from Mobileye C2-270 firmware version 2.85 (2823-V2.5) only!
- IHC is not supported in certain geographical areas (Japan, Israel)
- IHC is not supported in all vehicles models due to vehicles electrical limitations.

In order to connect and install the Intelligent High Beam Control, a 30 Amp Automotive Relay is required.

<u>Relay Specifications</u>: External Relay (standard automotive 12v SPDT relay):

Use any 30 Amp SPDT normally open automotive relay 5 terminals Bosch style relay together with appropriate Relay socket.

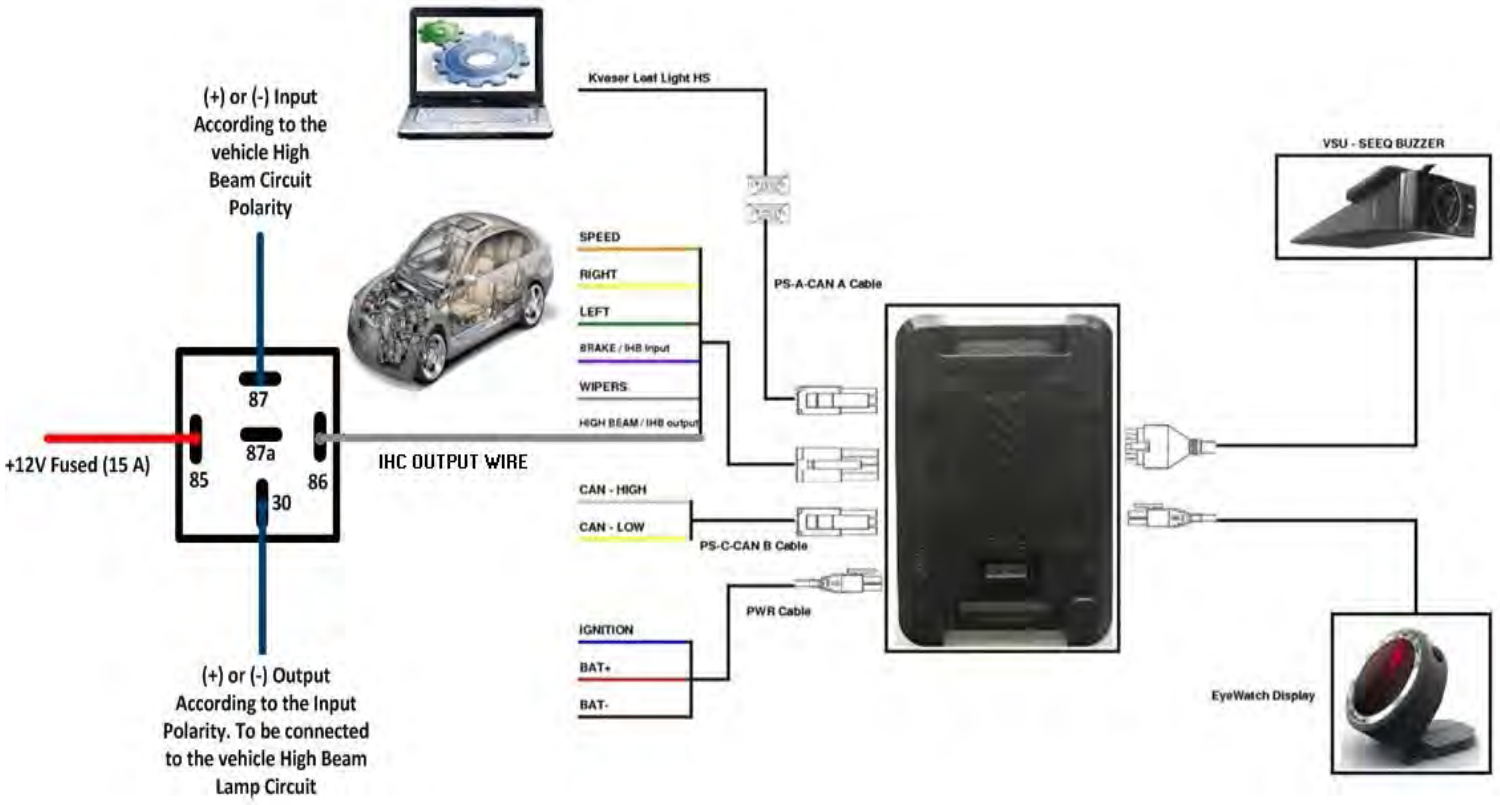
- 12 Volts DC
- Coil resistance: 90 Ohms

<u>Relay Specifications</u>: External Relay socket (such as "Delphi 12033871")

- Can be used with 4 or 5 terminal Bosch style relays.

The Relay is not supplied by Mobileye. It can be ordered directly and independently from any automotive electrical parts supplier.

External Relay Connection Scheme for Mobileye IHC



High Beams Signal Requirements for IHC activation:

What are we looking for?

1. A Positive (+) or Negative (-) High Beam Signal that will activate the vehicle's high Beam lights.

Or

2. A direct High Beam signal between the front Head Lamp and the vehicle's relay box or high beam lever.

Main challenges

1. Finding the direct High Beams signal and understanding if this High Beams signal is before or after the vehicle's High Beam relay box. The desired signal/wire should be **After** the relay box (meaning the closest possible signal coming directly from the Headlamp before any connection to any vehicle relay).

2. Identifying the High Beam signal's polarity (Positive or Negative).

3. The High Beam sensing signal and the output to the vehicle's High Beams lamp (for IHC activation) should never be connected to the same wire.
   The High Beam sensing signal should be connected **Before** the vehicle's relay box (usually at the High Beam activation lever near the steering wheel).
   The Output (IHC activation signal/wire) should be connected **After** the vehicle's relay box (usually directly to the vehicle's High Beam lamp.

Possible High Beam wire locations:

The required High Beam signal may be found in the following locations:

Option	Location	Remarks
Option 1	Front Head Lamps High Beam wire	
Option 2	High Beam Relay/Fuse box (Engine or Passenger compartment).	To Locate the High Beam Relay, activate the Low/High Beam repeatedly and try to hear the High Beam relay clicks to find the relay's exact location.
Option 3	High Beam activation lever/switch	In steering column

Determining/Identifying High Beam polarity (positive or negative)

Option 1: Positive polarity [Rest in GND [0v] (-)]
When High Beam is not active, the signal will show 0V (GND) and when High Beam is activated the signal will show 12V

Option 2: Negative Polarity (Rest in 12v).
When High Beam is not active the signal will show 12V and when High Beam is activated the signal drops to 0V (GND).

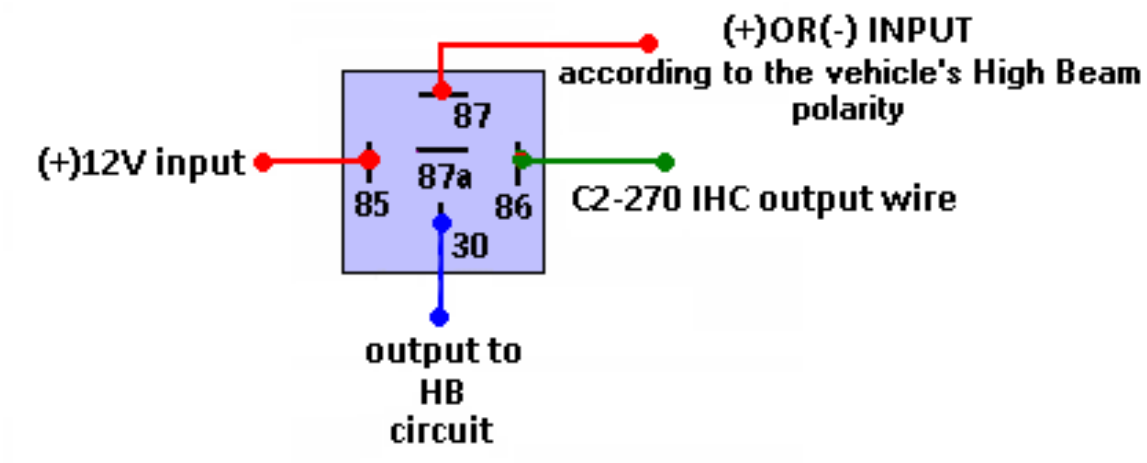
External Relay connections – (Mobileye IHC External Relay Scheme):

85 – Constant power for relay coil (12v)

86 – Connection to IHC Signal Output from Mobileye C2-270 Analog signals wire harness (High-Beam wire, White wire, number 2).

30 - Output to the vehicle's High Beam circuit

87 - (+) or (-) input according to the High Beam signal polarity

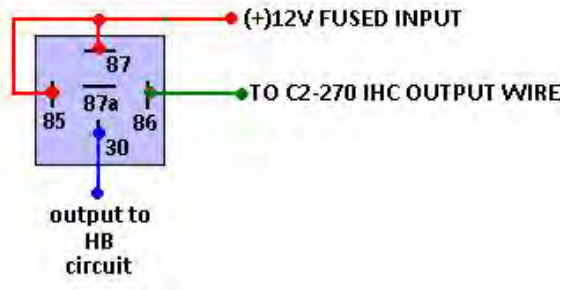


Relay Connection options:

Option 1:

Direct connection to the headlamp (assuming that 1 wire will activate both left and right high beam lights)

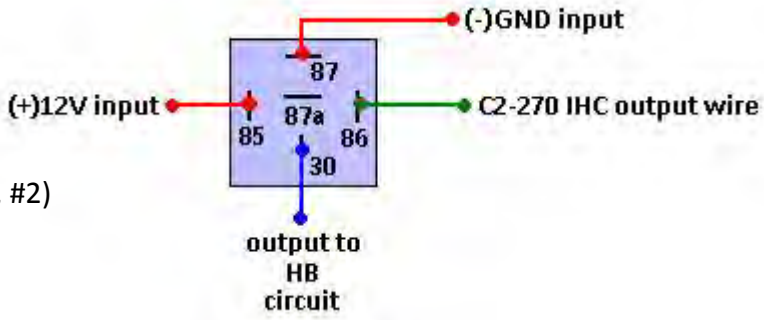
High Beam Positive polarity (most common)
- Connect **87** to constant 12V via 15A fuse
- Connect **30** to High Beam circuit
- Connect **85** to constant 12V via 15A fuse
- Connect **86** to C2-270 IHC Output wire (White, #2)



Option 2:

Direct connection to the headlamp (assuming that 1 wire will activate both left and right high beam lights)

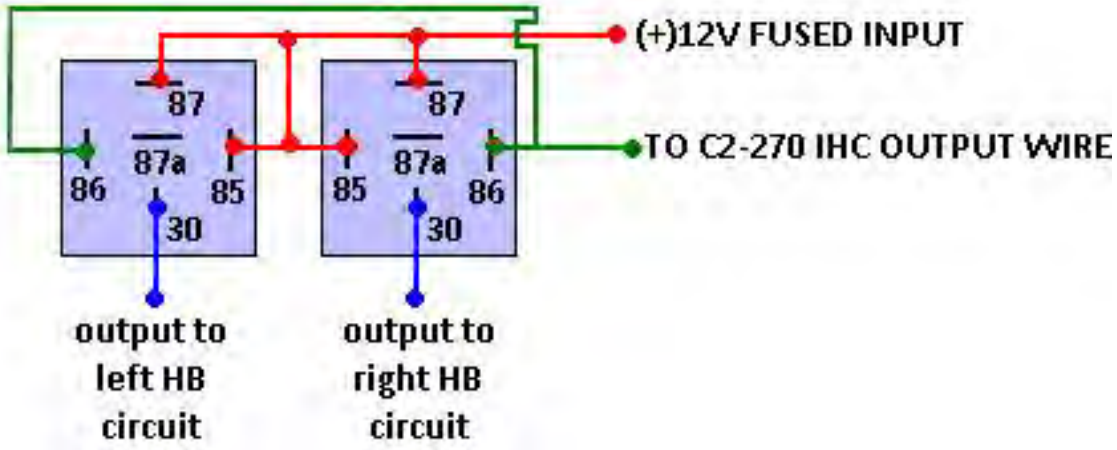
High Beam Negative polarity
- Connect **87** to Vehicle GND (-)
- Connect **30** to High Beam circuit
- Connect **85** to constant 12V via 15A fuse
- Connect **86** to C2-270 IHC Output wire (White, #2)



Option 3:

Using 2 Relays (assuming that 2 different wires will activate left and right High Beam lights separately)

- Connect **87** from both relays to constant 12V (via 15A fuse each) or GND (depending on the signals polarity)
- Connect **30** from the first relay to left high beam wire
- Connect **30** from the second relay to right high beam wire
- Connect **86** from both Relays to IHC signal output from the Mobileye C2-270 (white, #2)
- Connect **85** from both Relays to 12V (via 15A fuse)

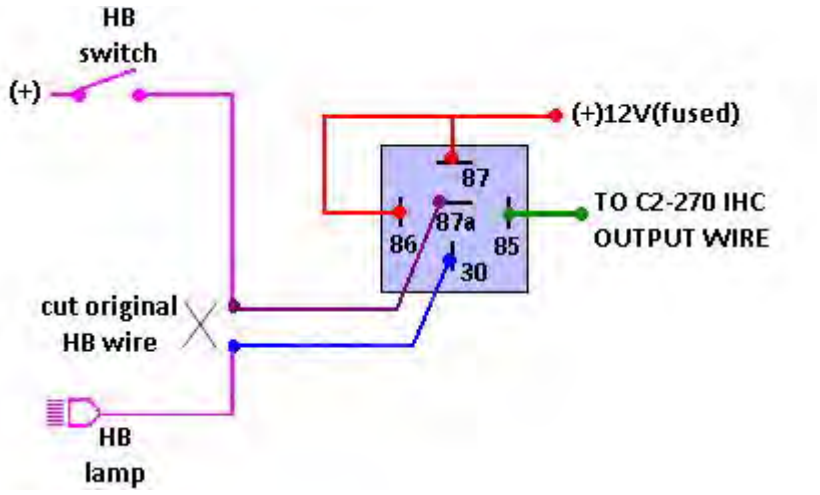


Option 4: Special connection scheme

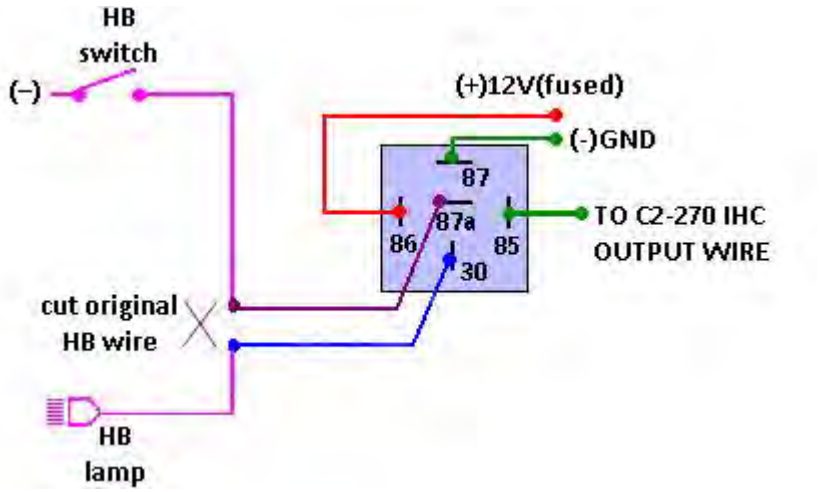
The following connection method is for Special cases in which the High Beam circuit is driven directly from the lever without any relay.

Note: cutting the vehicle wires is not recommended, and must be carried out as last option

- **High Beam lever Positive polarity**



- **High Beam lever Negative polarity**



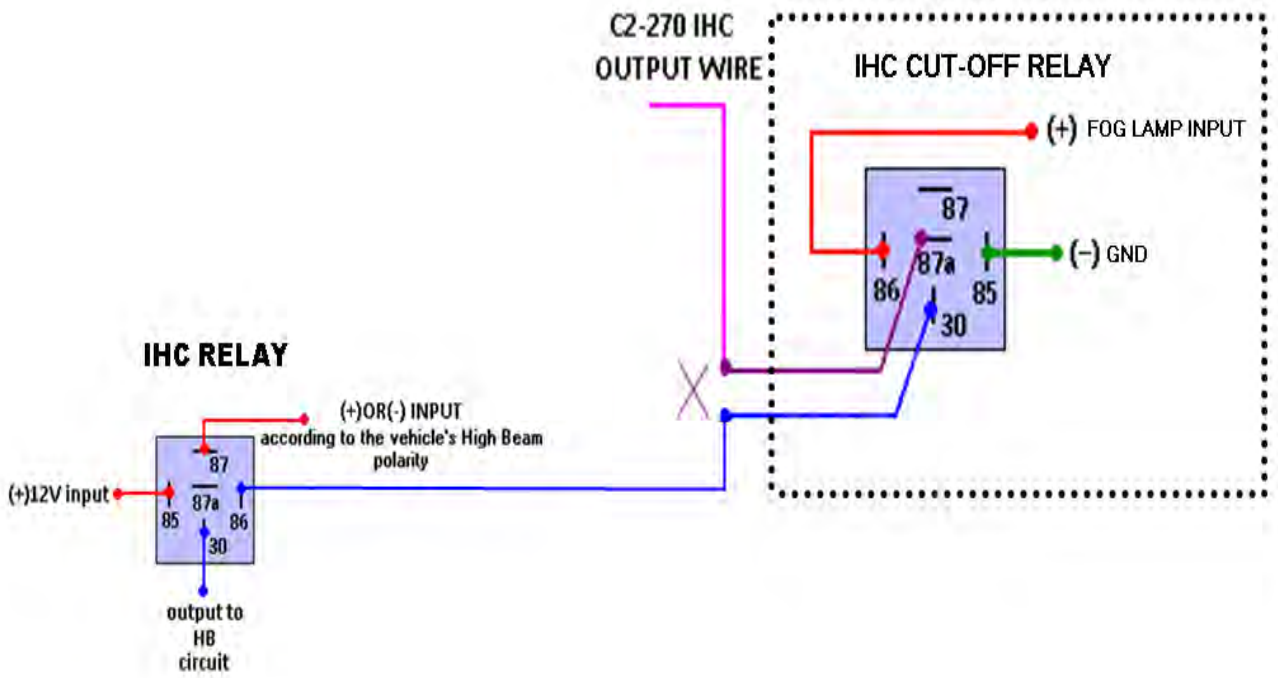
Option 5:

Disabling IHC when Fog Lamp is ON – IHC Cut-off Relay Connection Scheme

In some countries it is illegal to operate the vehicle Fog lamps together with the vehicle High-beams. In order to avoid such legal violation it is essential to add an additional relay that will disable the IHC output from the Mobileye system whenever Fog Lamps are ON.
See IHC Cut-off Relay Connection Scheme below for optional method of connection.

IHC Relay:
The IHC Relay connection is possible as shown in all option above with the exception:
- Connect **86** to the IHC Cut-off Relay **30**

IHC Cut-off Relay (Fog Lamp connection)
- Connect **30** to the IHC Relay **86**
- Connect **85** to vehicle GND (-)
- Connect **86** to the Fog Lamp Input (+)
- Connect **87a** to the C2-270 IHC Output wire (White, #2)



Note: In case the Fog lamps are operated by GND instead of 12V reverse the connections between **85** and **86** in the IHC Cut-off Relay (**85** will be connected to Constant 12V power and **86** will be connected to GND).

IHC Activation via Mobileye Setup Wizard

IHC activation will be performed as follows:

- At the "***Alerts configuration***" slide, switch to "***Enable***" in the IHC ON/OFF drop box.

- Click on "Burn new configurations…"

Mobileye IHC wiring methods

When connecting the IHC, the wiring method can vary between 3 connection options:

1. *Analog signals (Brake + High-beam signals are analog inputs):*

- Purple wire (#3) will be connected to the High Beam input of the vehicle (the High Beam sense signal normally used for the C2-270 system).

- White wire (2) will be connected to the **86** on the external relay

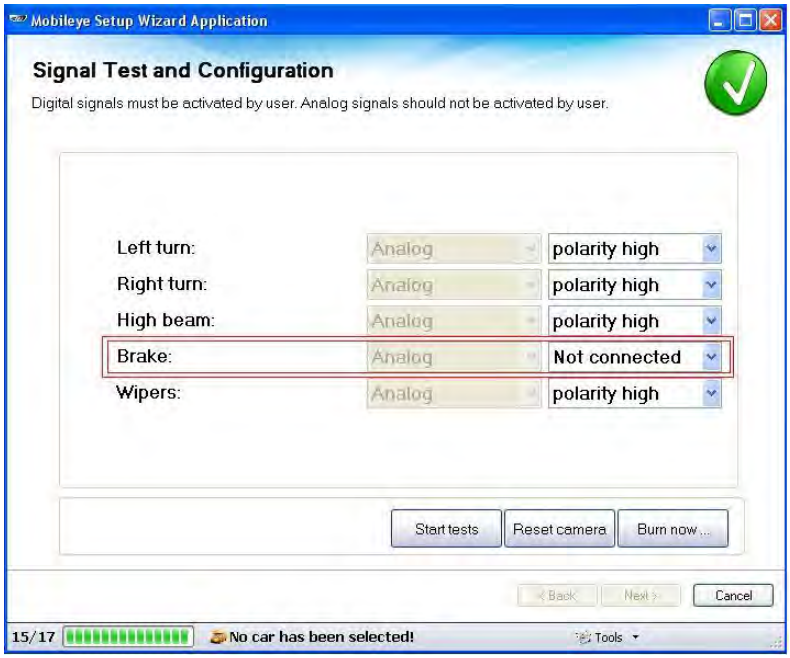
2. *Digital signals [CAN-Bus installation] - (brake + High-beam input by CAN):*

- White wire (#2) will be connected to the **86** on the external relay

3. *Mixed signals (brake input by CAN , High-beam input by analog)*

- Purple wire (#3) will be connected to the high beam input of the vehicle (the high beam sense signal normally used for the C2-270 system).
- White wire (#2) will be connected to the 86 on the external relay

Please note: When connecting the system to analog signals (option 1 above), brakes signal will be disabled automatically when activating the IHC feature.



Verifying IHC operation

In order to verify connections and operation of the IHC feature, please follow the instructions below:

1) Finalize system installation including IHC external relay.
2) Turn off the ignition switch.
3) Cover the camera from the outside using a small cardboard plate with black isolation tape
4) Turn on ignition switch.
5) Turn on IHC feature via the EyeWatch menu. Press the menu button (Mobileye icon) 5 times and switch from “0” to “1”.
6) Make sure the system has switched to night mode by verifying the green IHC icon is on.
7) Drive at speed grater then 35 km/h.
8) If the green IHC icon turned to blue and the vehicle’s High Beam lights switch on independently, the installation has been done correctly.

   NOTE: IHC is active only at Night, when No vehicles are in proximity to you and when there are no visible Road/Street light).
9) Remove the cover from the camera.

IHC enabled

IHC active

IHC Troubleshooting

Problem	Cause	Possible Solution
1) The vehicle's High Beam will switch on and immediately off.	1) The IHC signal output (wire number 3 in the car signals cable) and the High Beam sense wire (wire number 2 in the car signals cable) are connected to the same electrical circuit. ********** 2) Conflict between CAN BUS signal and output to the vehicle's high beam wire. 3) The output to the vehicle's high beam lamp is not between the lamp and the vehicle's High Beam relay box. 4)The High Beam is driven directly from the lever without any relay	1) **When high beam signal is via analog connection:** Find a different High-Beam signal wire that is not influenced by the IHC relay, and connect it to the High-Beam signal wire ********** 2) **When high beam signal is via CAN-Bus connection:** The CAN message that is used for sensing High beam status is influenced by the IHC relay. Switch high beam signal from CAN to analog (by using the Mobileye setup wizard) and find a different High-Beam signal wire that is not influenced by the IHC relay, and connect it to the High-Beam signal wire (wire number 2 in the car signals cable). 3) Connect the IHC relay output to the vehicle's High Beam circuit, directly to the headlamps (as close to head lamps as possible). 4)Use the special connection scheme from the appendix below
2) IHC activating signal can't be found.	The high beam of the vehicle will not switch on when injecting (+) or (-) to the suspected wires.	IHC can't be installed in this vehicle.(Can happen in HID or xenon lamps- equipped vehicles)
3) When activating the high beam suspected wire, only one head lamp will switch on.	The suspected wire will only activate one of the head lamps' high beams.	Refer to option "2" in the connection options section.
4) Green IHC icon will not show up on the EyeWatch.	1) The IHC function has not been switched on. 2) The system is not in night agenda (night mode)	1) Switch the feature on through the Eye Watch menu. 2) Cover the lens with a dark isolation tape to simulate night mode.

Appendix I

Basic Troubleshooting Guide

	Malfunction	**Possible cause**	**Steps to do**
A.	The Mobileye C2-270 will not turn on. *(The L.E.D on the VSU is not lit.)*	1. Is the GND good? Is it properly and firmly connected?	1. Verify the GND connection. 2. Try to get a better GND.
		2. Is the constant power firmly connected? Is the constant power voltage too low (12V)?	1. Verify the constant power connections. 2. Check the power signal with a voltage **meter** and verify that the power signal is 12V or higher.
		3. Is the 2A Fuse PS3 unit burned or loose?	Check the fuse on the PS3 unit. If it is burnt replace it.
		4. Is the ignition signal firmly connected? Is the ignition signal voltage too low (12V)?	1. Verify the ignition signal connections 2. Check the ignition signal with a voltage **meter** and verify that the vehicle's ignition signal is 12V or higher.
		Is the PS3 unit receiving Power?	Verify all power connections and power cable connection to PS3 unit.
B.	There is a "No Connection" error shown on the Eye Watch1 Display unit (NC Er)	1. Is the "SeeQ Cable" connected to the PS3 unit	Verify the connection.
		3. Is the VSU on?	Please refer to section A to verify connections.
C.	The EyeWatch does not turn on	1. Is the EyeWatch cable connected to the "PS3 unit" connector E/D ?	Verify connection
		2. Is the PS3 unit receiving Power?	Verify all power connections and power cable connection to PS3 unit.

	Malfunction	**Possible cause**	**Steps to do**
D.	The Mobileye Setup Wizard program fails to connect to the C2-270 system.	1. Is the "KVASER" cable properly connected to the laptop?	1. Verify that there are no loose connections between the “KVASER” cable and the CAN-A cable. 2. Verify that there are no loose connections between the “KVASER” cable and the laptop (the USB port or PCMCIA)
		2. Is the C2-270 powered off?	Turn on the ignition.
		3. Are the “KVASER” drivers installed on the computer?	Install “KVASER” drivers. (Supplied with Mobileye Setup Wizard software kit).
E.	There is no sound coming from the VSU/Buzzer unit	1. Is the system in "mute" mode? (The L.E.D on the bottom of the EyeWatch is flashing repeatedly).	Click on the volume increase button to exit the "mute" mode
F.	The VSU does not detect vehicles and/or lanes.	1. Are vehicle measurements incorrect?	Verify the vehicle's measurements and compare them to previous measurements using the Mobileye Setup Wizard program.
		2. Are you using the correct mounting adapter?	Use the Mobileye Setup Wizard program to ensure that the VSU is not tilted and the "car hood" is properly marked. Before doing this: Verify the vehicle is parked on a flat surface so the windshield angle can be measured correctly. Calibration when the vehicle and the TAC Target is not on a flat surface can cause a miscalculation of the windshield angle and the F.O.E.
G.	When trying to proceed to the next slide in the Mobileye Setup Wizard you get A “wrong value message”.	The numerical value you entered in one of the parameter fields is Incorrect.	Recheck all the values you entered and verify they are written according to the Measurement System (Meter / Inches). E.g. camera height 120 will give an error. The correct value is 1.20 or 1.2 .
H.	The Mobileye Setup Wizard fails to connect to the C2-270 in the Connection Phase	The Kvaser cable and CAN-A cable are not connected correctly to each other and/or to the PC.	Make sure that all C2-270 connections are connected correctly.

	Malfunction	**Possible cause**	**Steps to do**
	Slide (slide 3)	The C2-270 Power is OFF	Verify the C2-270 is receiving power and turns on when vehicle ignition is on.
I.	In the Test Drive Slide the speed indication in the Mobileye Setup Wizard does not match to that of the Vehicle.	The VSS Value (Speed Params) is not the Correct VSS value for this particular vehicle.	See Section 3.3.10 in the C2-270 Installation Guide.

	Malfunction	**Possible cause**	**Steps to do**
J.	Er 47 is displayed on the EyeWatch1 display unit *(The L.E.D on the VSU flashes after Ignition is initiated.)*	Mobileye system is not receiving the correct Vehicle CAN messages	1. Check you choose the correct vehicle from the Mobileye Database
		CAN-B cable is not connected to vehicle CAN-Bus wires correctly.	1. Verify connections to vehicle CAN Bus.
		CAN-B cable is not connected to the PS3 unit connector C correctly.	Verify connections Between CAN-B cable and PS3 unit.
		If the installation is Analog and you are using a used system that was installed in a different vehicle the system default files need to be uploaded.	In the Mobileye Setup Wizard application choose “Recover signals to Analog” in slide #4 (System Information slide).
K.	The EyeWatch Display unit shows any error message *(The L.E.D on the VSU flashes after Ignition is initiated.)*	Problem in one of the system configuration files	In the Mobileye Setup Wizard application choose “Recover signals to Analog” in slide #4 (System Information slide).