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Mobileye Shield+ v2.0

Technical Installation Guide

support@mobileye.com

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1. Warnings

1.1 General

NOTE →

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

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

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

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

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

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

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

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

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

NOTE →

The information and illustration images in this document are an example only and do not limit the installation to a specific vehicle type.
The use of bus in this document is for ease of illustrating only!

1.2 Installation and Safety Instructions

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

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

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

Only proper tools are to be used.

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

The use of light bulb voltage tester is prohibited.

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

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

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

1.3 Recommended installation tools

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

- self-drilling screws
- rivets + gun
- silicone for sealing
- Corrugated Tubing (for isolation)
- plastic ties
- Vinyl electrical tape
- 3M spare double-sided tape

- cordless drill driver
- mixed bit tips
- drill bit set
- step drill bit
- fish tape
- step ladder
- flashlight

- soldering iron
- shrink tube - mix

2. Acronyms & Terminology

Term	Description
ME	Mobileye
CAN	Controller Area Network
SeeQ	Mobileye 5/6 driver assistance system
VRU	Vulnerable road user
CIPV	Close-in Path Vehicle
LDW	Lane Departure Warning
FCW	Forward Collision Warning
HMW	Headway Monitor Warning
Ped	Pedestrian
DZ	Danger Zone (for Pedestrian's detection)
TSR	Traffic Sign Recognition
JB	Junction Box

3.Requirements

3.1 Required Software for installation, calibration, and configurations
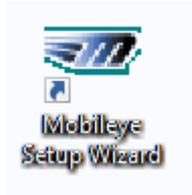
Mobileye Setup Wizard – calibration of the Master (main) camera only

Mobileye Clone Tool and relevant profiles to burn Master/Slave Cameras

ME Tool Kit – rear camera calibration

CANSee – diagnostic and system status verification

Click here to find all the above applications and any additional tools / manuals

or

copy the following link to your browser ftp://aftermarketguest@ftpclient.mobileye.com/

Use the following Login details to access the FTP: Username: aftermarketguest

Password: MEgu2018@rL

3.2 Clone tool profiles

Prior the calibration of both the master camera and the side camera/s, the cameras need to be burned with the relevant clone tool profile.

Please carefully follow the instruction below:

1. Download & install the clone tool application

2. Download the relevant clone profiles from Mobileye FTP site

Index of /technical_files/Mobileye Shield+/ShieldPlus 2.0/Profiles/

[parent directory]

Name	Size	Date Modified
UK Driving Side/		8/30/18, 1:59:00 PM
US Driving Side/		8/30/18, 1:59:00 PM

3. Copy the relevant profiles to the path "C:\ProgramData\Mobileye\clone tool\CARS"
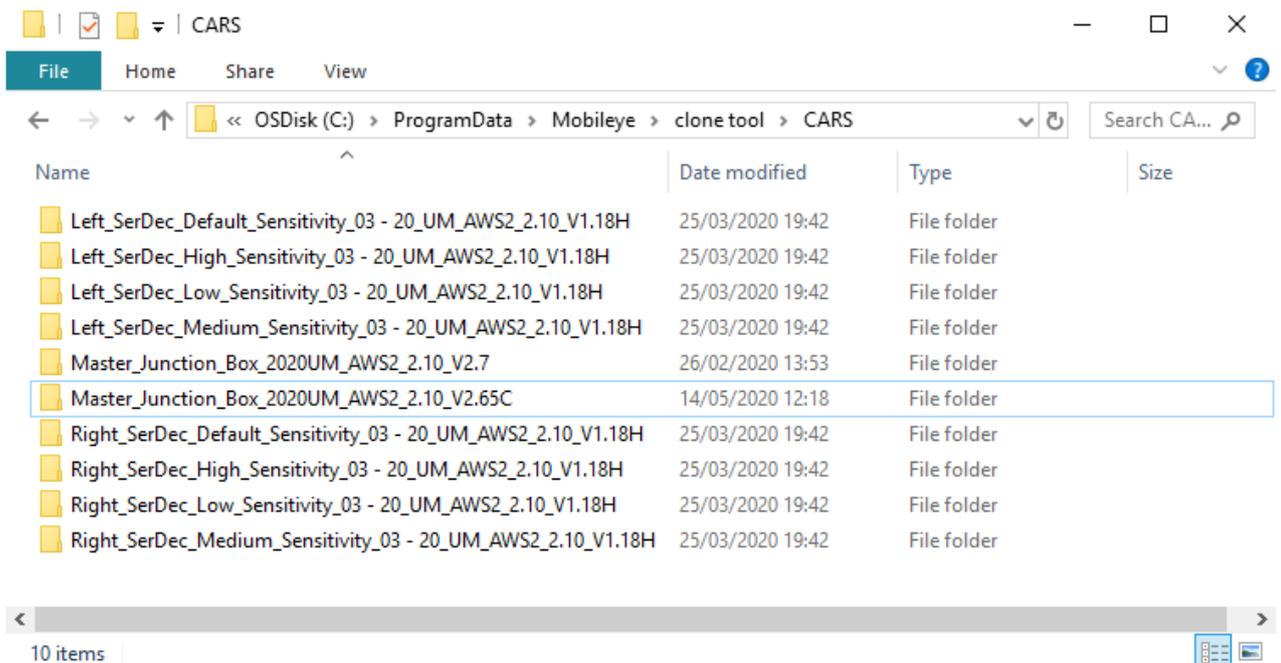
4. Mobileye Shield+ V2.0 components

4.1 Component's list

Package List	Component	Mobileye P/N
Master Camera PACMASTER	Master Camera	ASY000SHM
Master Camera Display unit	Master camera display - Eyewatch	ASY0130SH
	Cable of Master camera display	CAB000087
Rear camera PAC00267L/R	Rear right/left-side camera unit (SerDec)	ASY00267L/R
	Coax cable for rear camera (0.25m)	CAB000298
	Coax cable for rear camera (6.75m)	CAB000299
	Metal bracket	MEC000605
	Black rubber cover	MEC000611
	ISO 7045 M3X14 Screw (x4)	SCR000098
PACSIDESQ	Mobileye Shield+ SeeQ (bridge unit)	ASY000269
PACSHIELD	Junction box	ASY000120
	Power Cable	CAB000086
	CAN-B Cable	CAB000083
	Display Splitter Cables	CAB000305
	Extension Cable for side display unit	CAB000187
	CAN Reader	CANREADER1
	AUX/IHC cables connector	CAB000133
PAC000LED	LED display unit (Right side)	ASM00PLED
	Cable of LED display unit	ASY000274
cables	Bridge unit to Junction-Box (8 meter)	CAB000161
	Bridge unit to Junction-Box (3 meter)	CAB000162
	Bridge cable to JB Extension cable (17 meter)	CAB000163
	Bridge cable to JB Extension cable (3 meter)	CAB000164
	Connection cable between JB_1 to JB_2	CAB000165
E-box (optional - sold separately)	E-box unit	ME5ABOX001
	I/O signals cable	CAB000133
	Mobileye5 to A-box cable	CAB000131
PACSH002	Additional junction box (4 cameras and up)	ASY000120
	Connection cable between JB #1 to JB #2	CAB000165

4.2 Component's overview

Item description	Item image
PACMASTER (master camera)	ASY000SHM (master camera`s display unit)
PAC00267L/R (rear right/left-side camera)	PACSIDESQ (SeeQ bridge unit)
PAC000LED	PACSHIELD
CAB000163/4	CAB000161/2
Installer kit (EyeCAN, Laptop, TAC)	
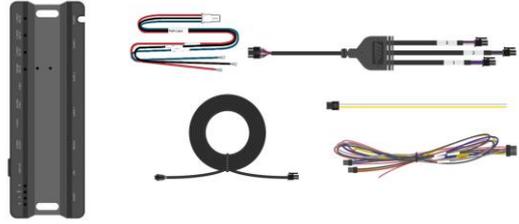
5.Connection scheme

5.1 Basic connection scheme
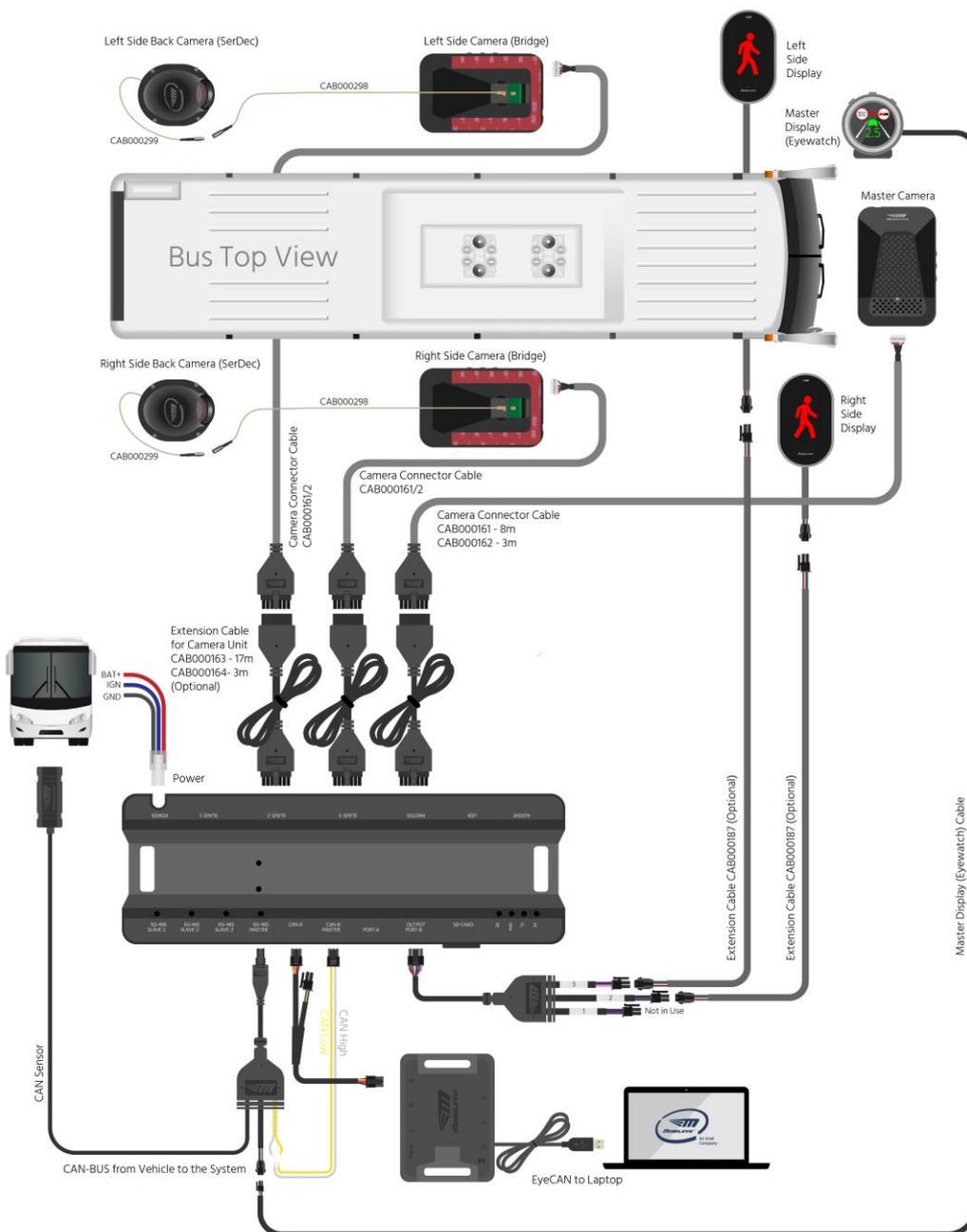
5.2 Mixed connection scheme

Mobileye Shield+
Mixed Input Installation Scheme
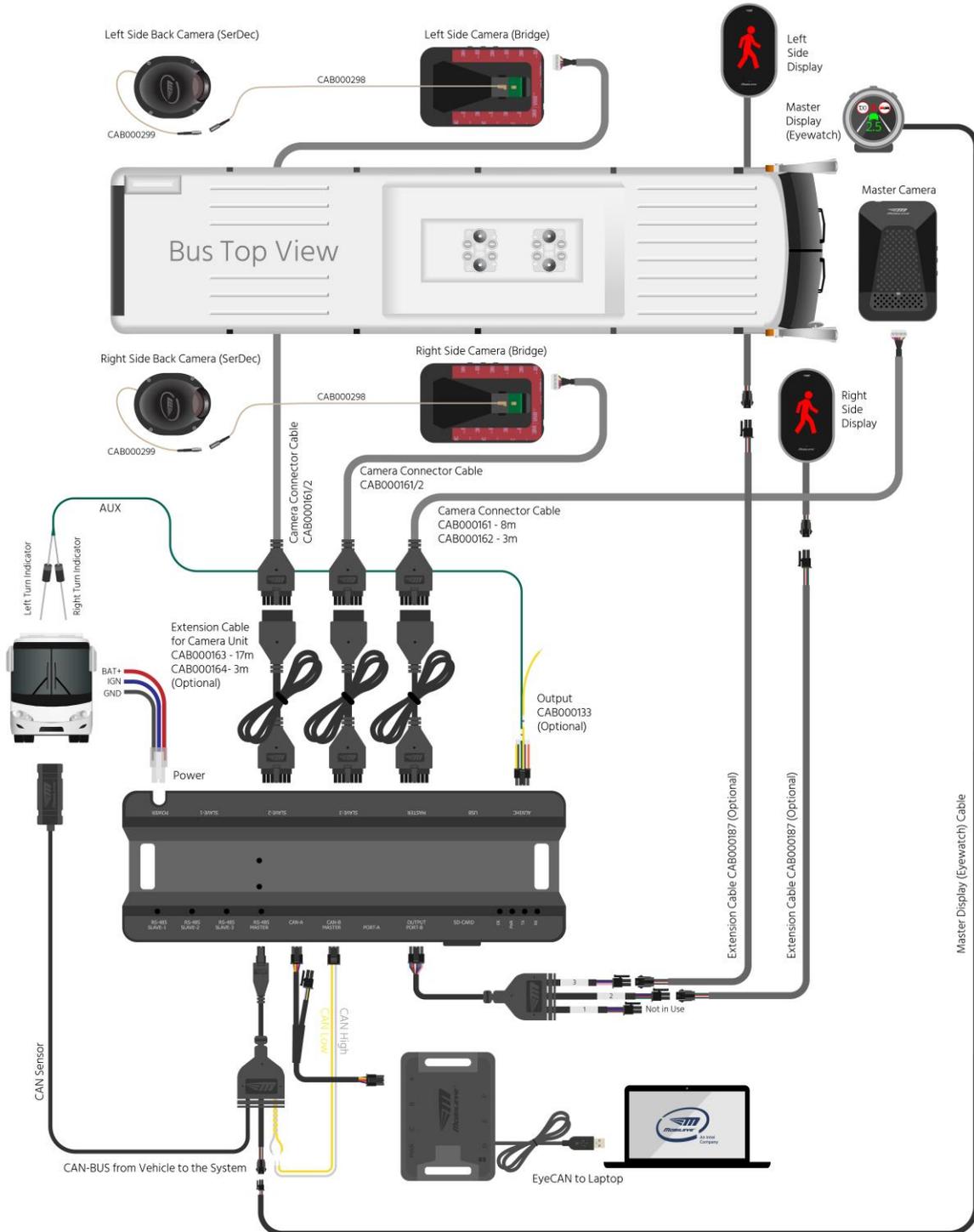
5.3 Analog input connection scheme
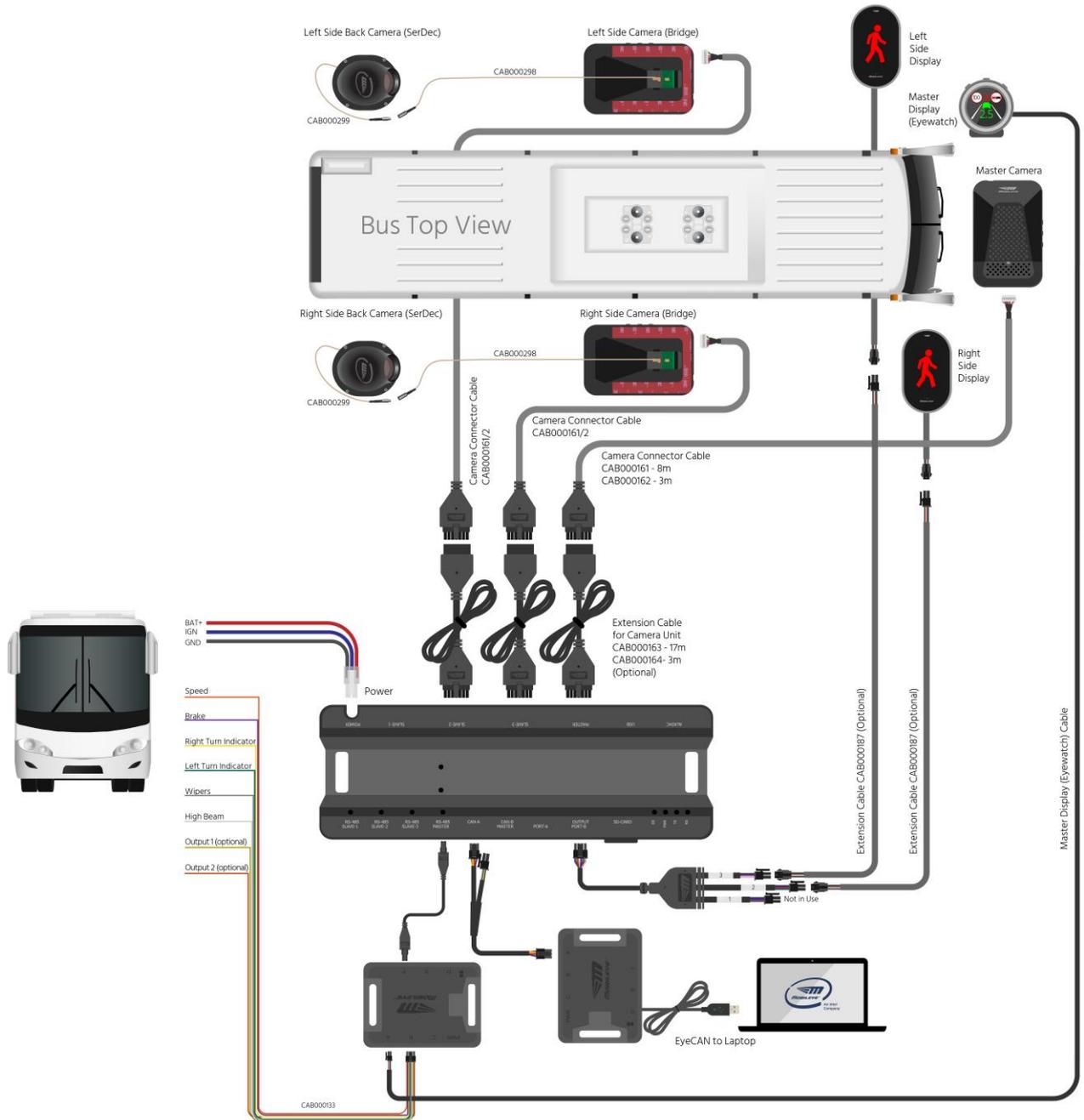
6. Guidelines

The following will provide clear guidelines for a standard Mobileye Shield+ V2.0 installation which does not require any additional fabricated brackets.

For non-standard installation, any fabrication of additional bracket will be added according to specific criterions describes further in the document.

6.1 Guidelines for Mobileye Shield+ master (front) camera installation

Mounting the camera correctly on the front vehicle windshield is critical and will affect the

system performance if not done according to the below guidelines:

✓ Camera height
   o Minimum installation height is 1.20meters
   o Maximum installation height is 2.80meters
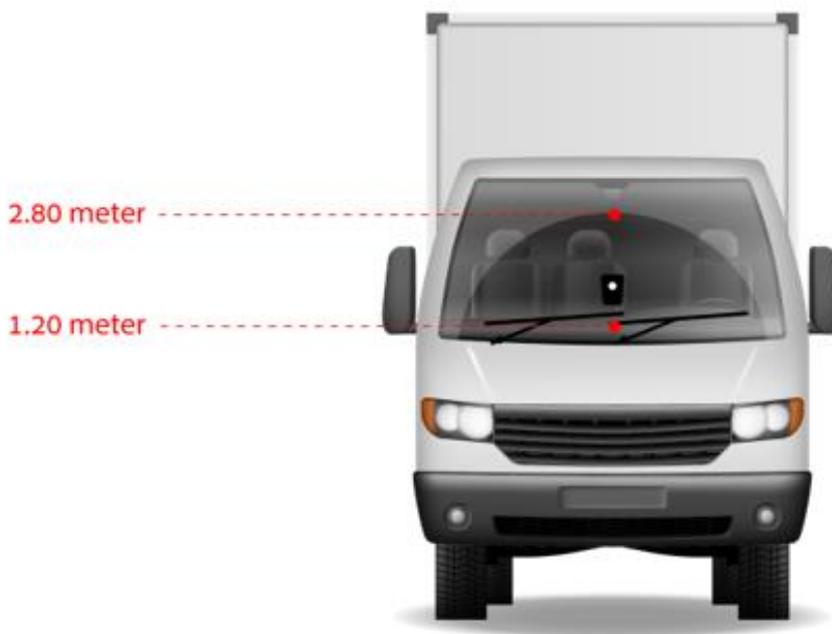
✓ Camera location
   o Mounting the camera in the area covered by the wipers and 5cm above the wipers off position
   o Mounting the camera in the center of the windshield or with ±10cm off center deviation

6.2 Eyewatch display unit installation

The Eyewatch display unit should be placed on the front windshield, close to the left side A pillar, parallel (or up to 10cm above) to top of the dashboard, facing the driver.
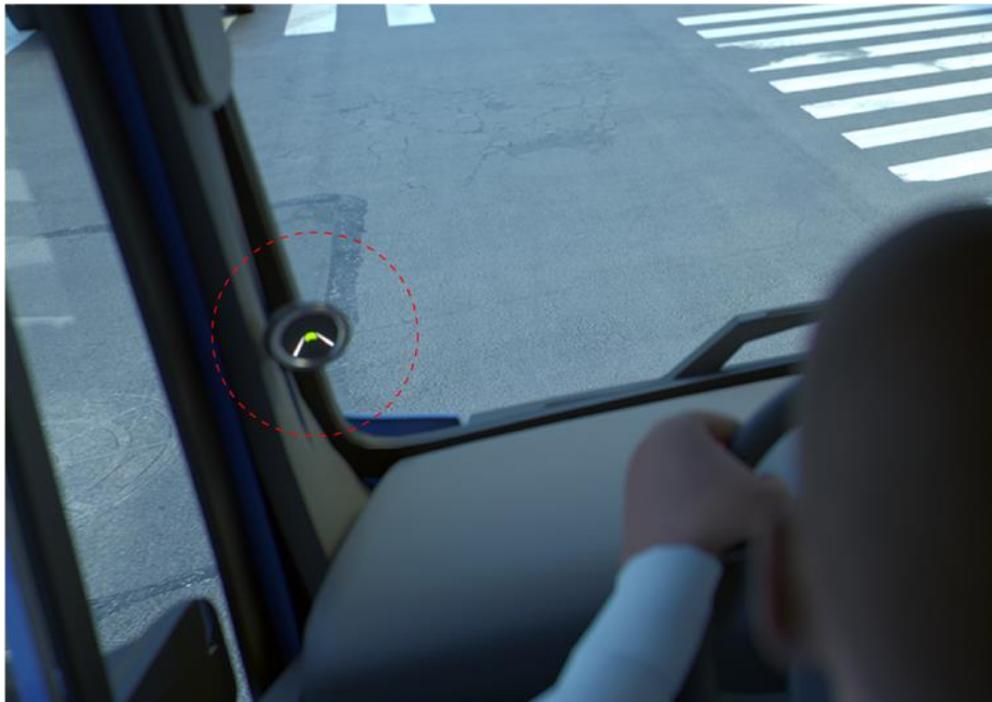
6.3 Guidelines for rear side camera installation

Mount the rear right-side camera at the back of the vehicle on an existing flat surface (non-flat surface cannot be used for installation as the calibration process cannot compensate the distortion and it will decrease system effectiveness) facing forward at height between 1.3-2.1m. Allowed tolerance from back end of vehicle – up to 1 meter.

**Installation height
1 - 2.3 meters**

Behind second axis
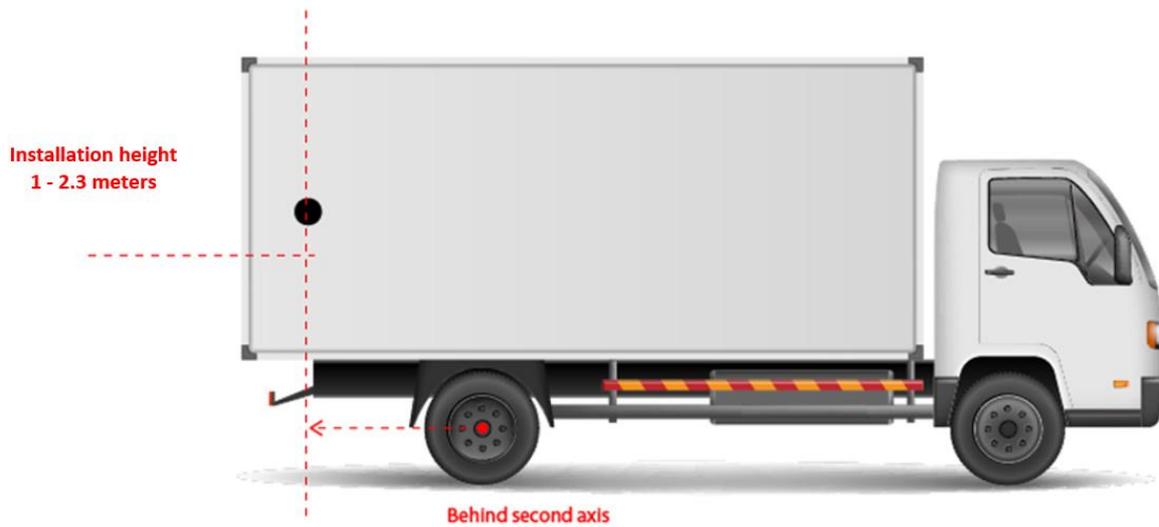
Minimum distance from side camera to the front of the vehicle	Side camera installation height
7-20 meters	1 meter - 2.3 meters

6.4 Side display installation

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

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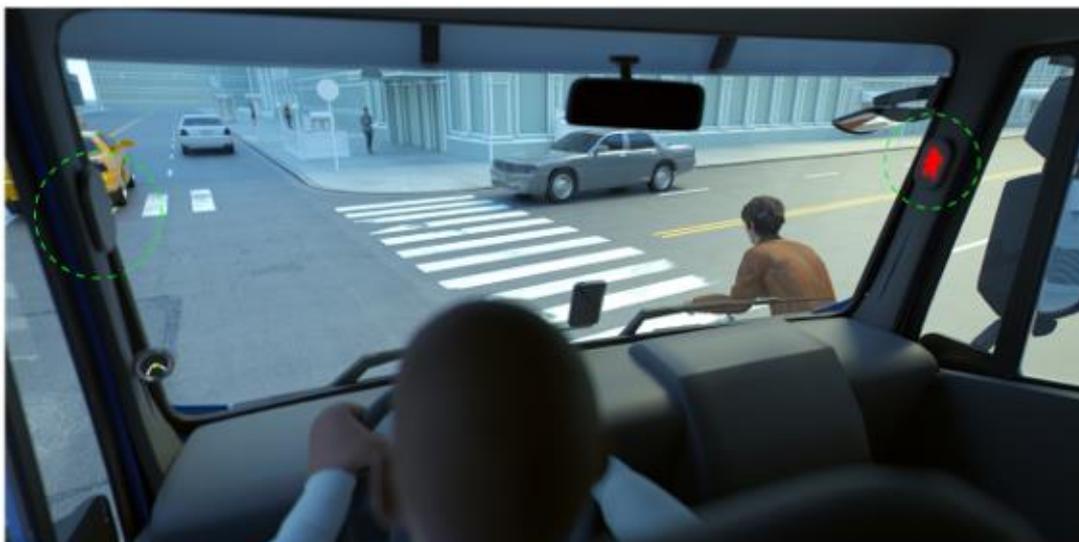
7. Installation procedure

7.1 Master camera installation & calibration

> **NOTE →**
> - Verify the vehicle is parked on a flat surface (no slope)
> - The vehicle should be adjusted via the air suspension to a standard driving mode prior to installation.

To calibrate the master camera, it is required first to use the Mobileye clone tool application (see requirements section #3 for further details) to burn the relevant clone tool profile prior to the calibration process.

Note that the installation and calibration of the Master camera will be performed according to the standard Mobileye 6 installation procedure (User & password: aftermarketguest | MEgu2018@rL) with the additional steps as described below.

Please carefully follow the steps below:

1. Remove the relevant panels to mount all the components and route the cables.
2. Run all the cables in the front cabin towards the Junction Box location – Master harness, Eyewatch and display cable/extension, CAN Sensor & E-Box (if connected).
3. Connect Power cable (BAT+, IGN and GND) to Junction Box.
4. Connect Signals (CAN or analog) and use the relevant harness - CAN-B cable (via CAN Reader) or analog signals cable (Via AUX or E-box).
5. Connect the Eyewatch to the Junction Box and mount it in the designated place according to the guidelines described in this document.
6. Connect master camera to Junction Box.
7. Connect the laptop, open to clone tool application to burn the Master clone file profile.
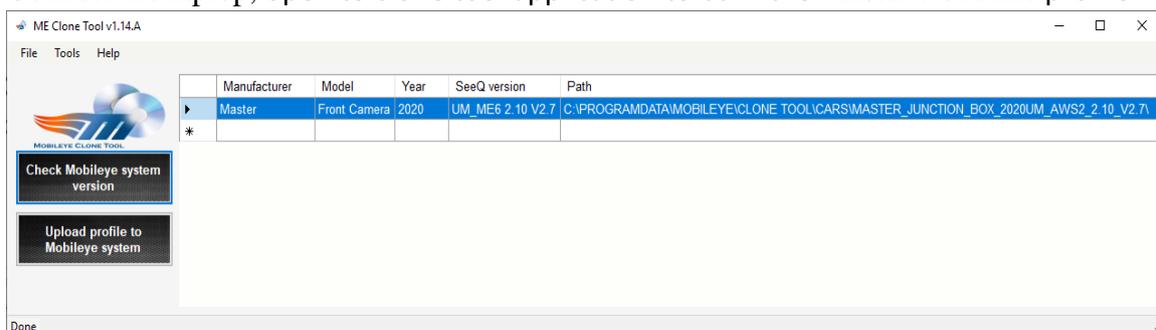
Note: Only one system can be connected to the JB when using the Clone tool / Mobileye setup wizard

8. Reset power to the junction box.
9. Open the Mobileye setup wizard to start with the calibration process of the Master camera.

Once the Junction box will be detected, an additional window will pop up at the "System Information" slide – see images below:
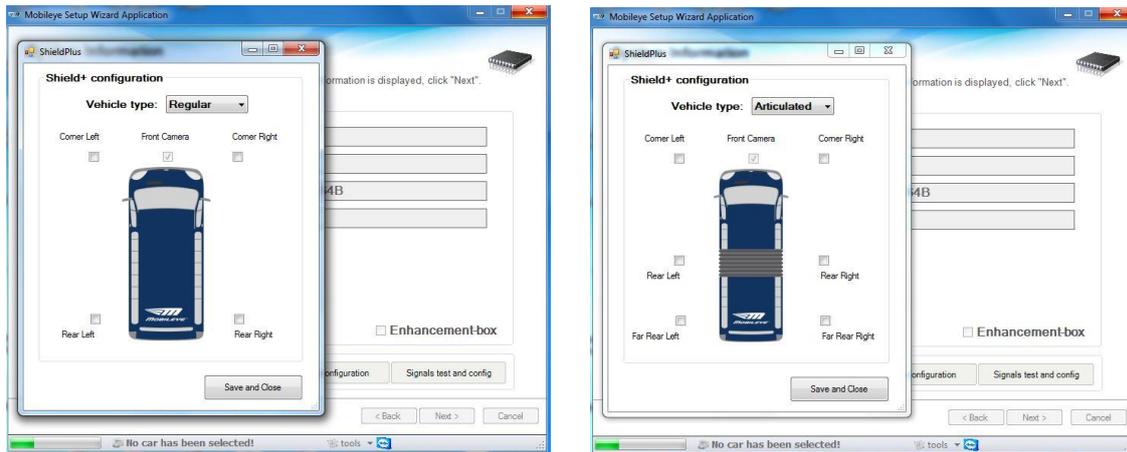
Configuration should be made according to the amount of camera units which will be installed in addition to the Master camera, and vehicle type (choose from the drop-down menu - regular or articulated) as described above.

10. Continue with the standard calibration process of the Mobileye 6 series.

7.2 Rear camera installation

❖ Remove the relevant panels to mount all the components and route the cables.

❖ Secure and firmly attach the Junction Box to its final position inside the trimming and make it accessible for future service and diagnostic purposes.

❖ Go outside and plan two drillings for the rear camera: one for the coax cable to be routed inside and one to place the metal bracket (screw or rivet) via the black rubber.

❖ Drill the holes, place the cameras on the metal bracket, make sure that the camera is located at the correct place and route the coax cable into the vehicle (without significant bending) towards the bridge unit.

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

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

Once completing to drill, use a screw or a rivet to firmly attach the metal bracket

❖ Temporarily place the bridge unit inside the trimming and plug in the coax connector coming from the Side camera.

❖ Connect the Coax cable from rear camera to Bridge board.

❖ Connect the side camera`s harness to any of the Slave ports.
❖ Mount the side display in the designated place according to the guidelines described in this document, route the cable, and connect it to the JB.

Warning

Disassembling of the side camera in the installation site is forbidden

7.3 Rear camera calibration

❖ Connect the bridge unit to the Junction Box (if a front or another slave camera is connected, please disconnect before continuing).
❖ Turn the power ON.

❖ burn the relevant "Shield rear side" profile using clone tool application
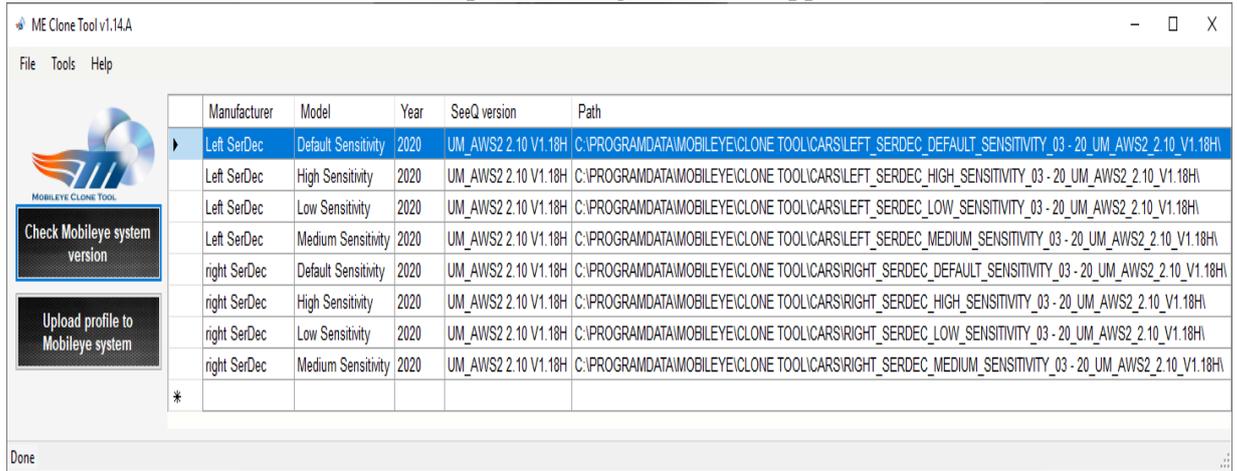
❖ Reset power to the Junction Box for changes to take effect.

7.3.1 Rear camera`s angle adjustment (Y axis):

For ideal calibration of the rear camera, each rear camera should be calibrated and adjusted according to the installation height based on the table below.

According to the installed camera height, place the TAC at the correct distance and make sure the TAC board stands at 90cm from the ground.

Distance of rear camera to the front of the bus	Installed Camera height	Distance of TAC from the camera
7-20 meters	2.3	2.39
	2.2	2.25
	2.1	2.1
	2	2.01
	1.9	1.87
	1.8	1.78
	1.7	1.67
	1.6	1.55
	1.5	1.42
	1.4	1.26
	1.3	1.1
	1.2	0.85
	1.1	0.67
	1	0.29
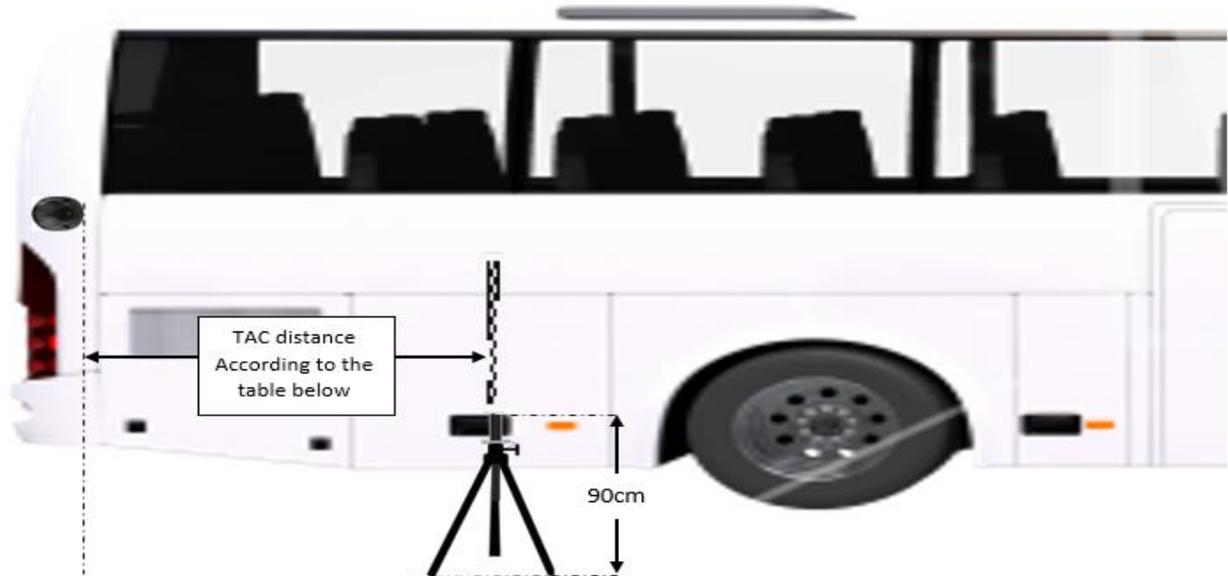
Follow the steps below for each of the installed rear cameras (note that each camera should be connected separately to the junction box when performing the calibration):

.

To verify the correct angel adjustment (Y axis) and adjust if needed, run the ME Toolkit application and check the image – good calibration will display the bottom part of the TAC board at the bottom part of the image.
If it does not, slightly change the camera angle (camera housing) physically up/down to adjust correctly.
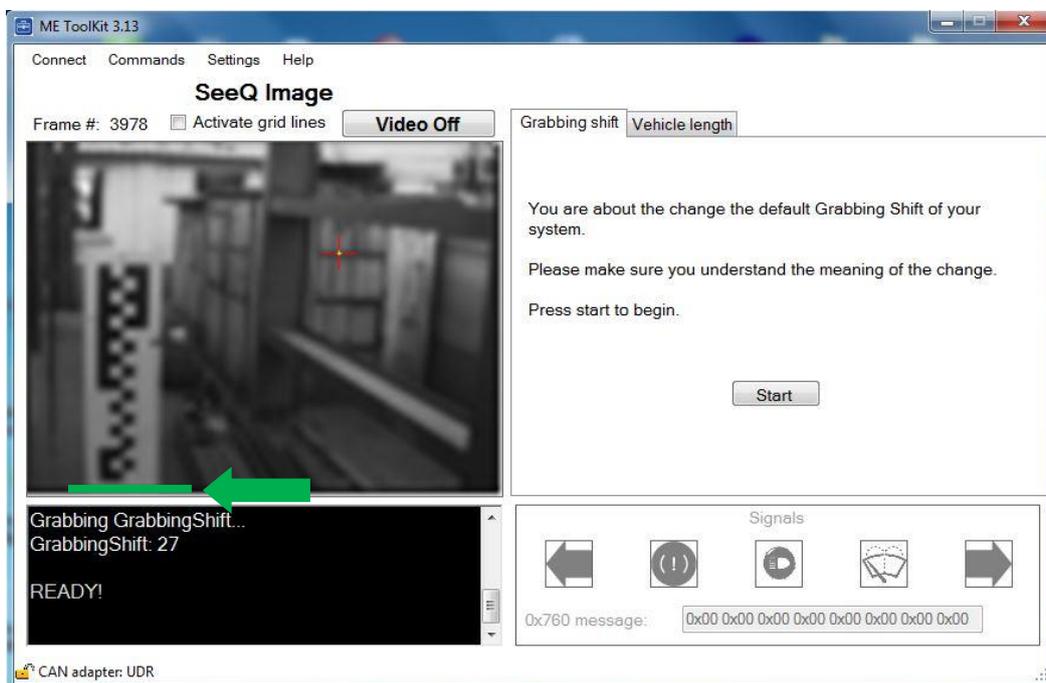
✓ **You should see the bottom of the TAC at the bottom of the image**

❖ Once the angle has been verified and fixed, drill & screw (or use rivets) the entire holes on the metal bracket.
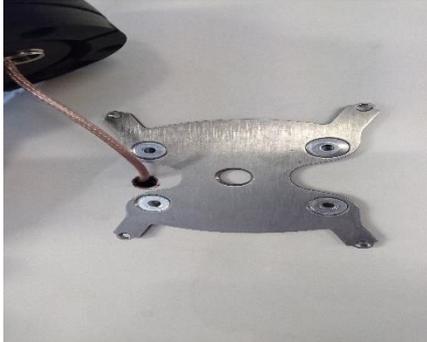
❖ Push 1-1/8" grommet into center hole.
❖ Feed the Mobileye Coax cable trough grommet into interior of the bus.
❖ Align camera housing mount with (4) mounting holes and screw the camera to the metal mounting bracket.

7.3.2 Rear camera`s tilt adjustment (X axis):

Tilt adjustment is done by software (ME Toolkit).

NOTE →

It is not allowed to open the rear camera housing to adjust manually the lens as it will lose the sealing and will void warranty.

Please carefully follow the steps below:

1. Run the ME Toolkit application and wait for the connection with the rear camera to be established.

2. Click "Video ON" to receive an image from the camera and then click "Start" button.
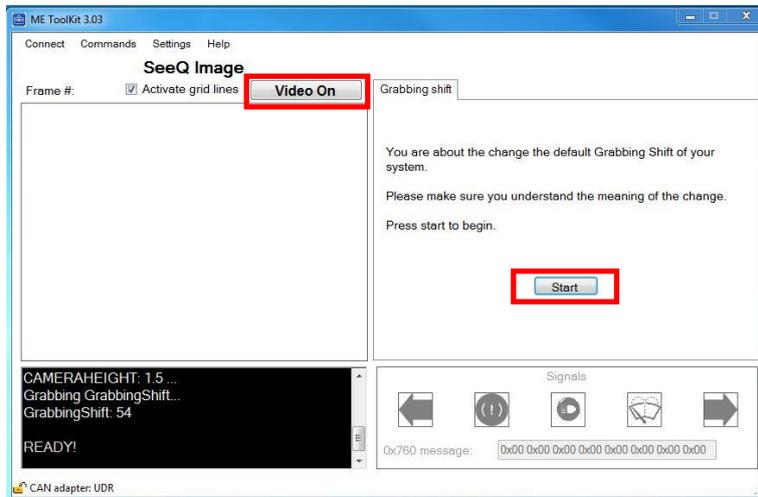
3. Place the TAC board as close as possible to the side of the vehicle. Put the TAC board in front of the camera according to the table as close as possible to the vehicle`s body and check Visibility
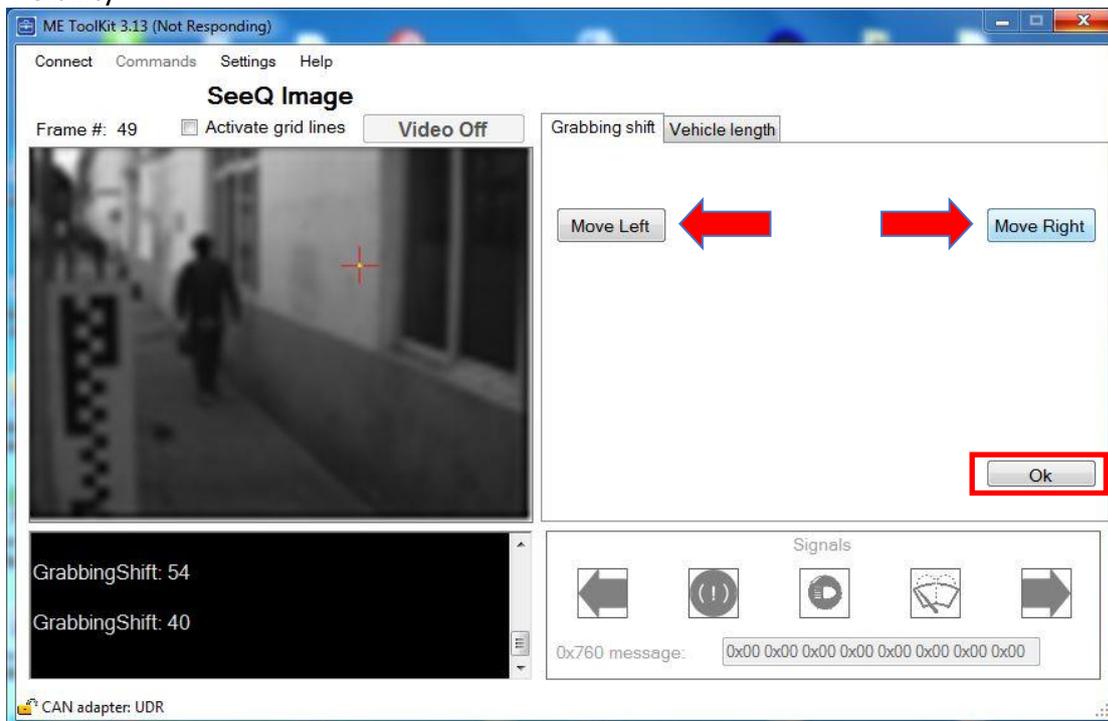
Click the "Move Right" or "Move Left" buttons (according to the scenario) to adjust the image and Click "OK" to save and burn new changes.

Correct camera angle line-
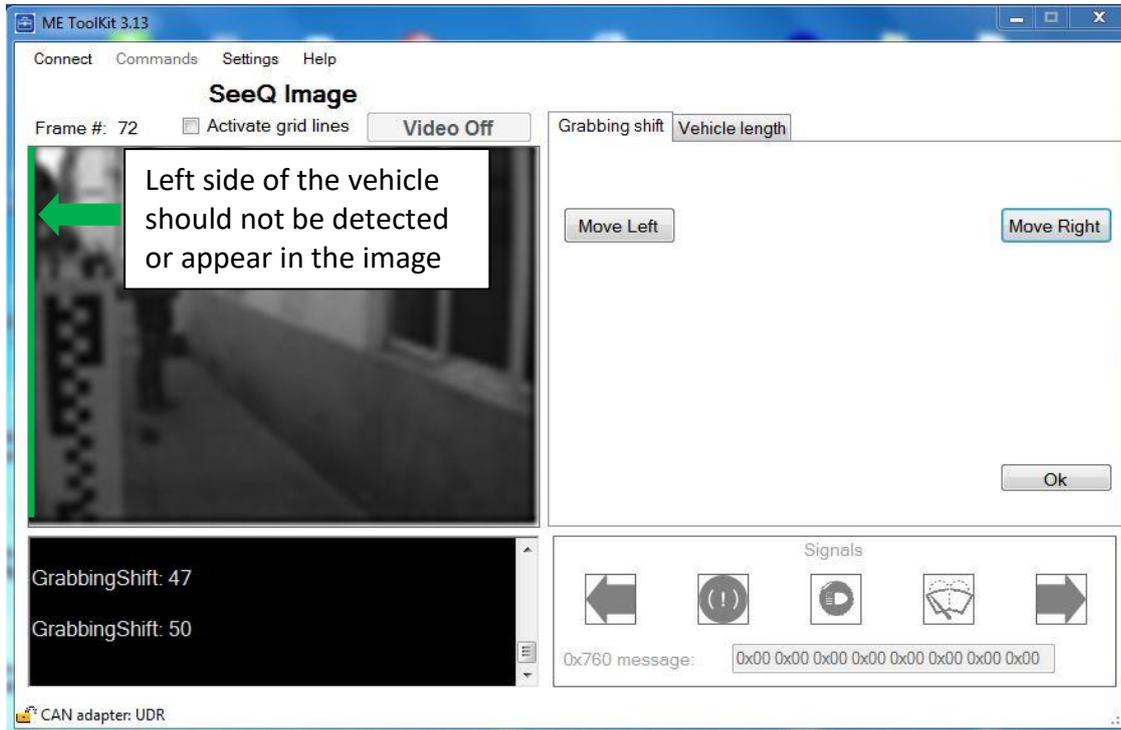
Wrong camera angle line-
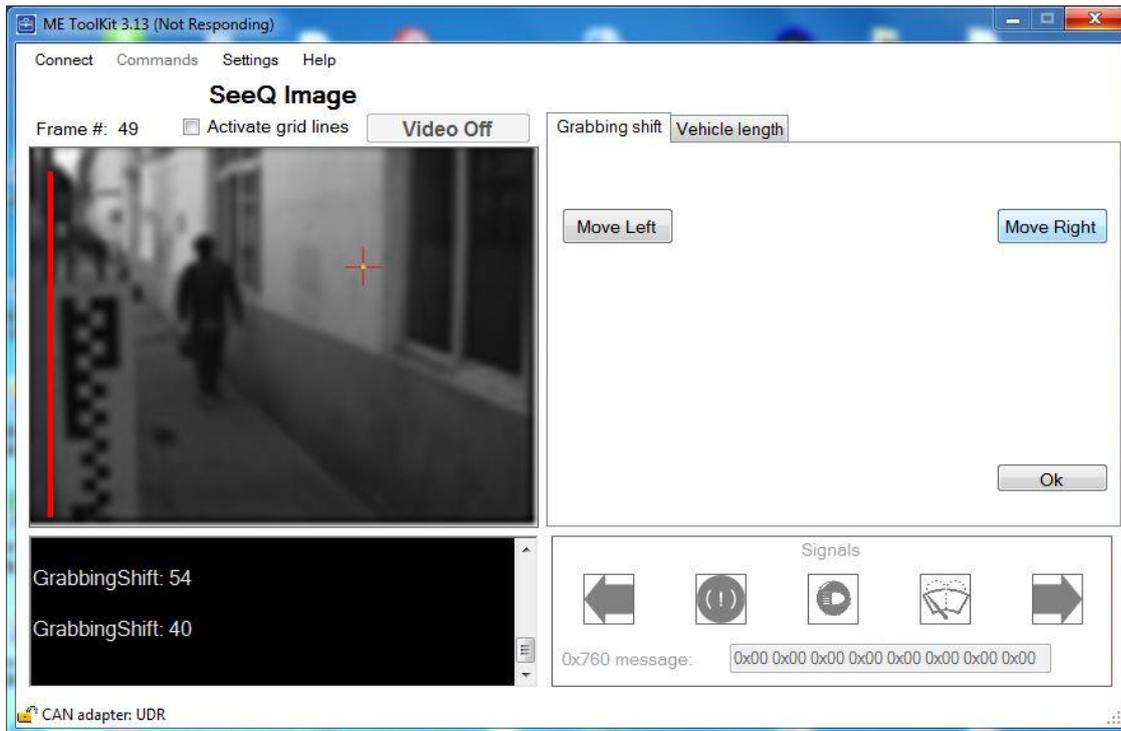
Red line is at the end of vehicle's side – too much of the vehicle is seen

Follow the steps below for each of the installed rear cameras (note that each camera can be connected separately to the junction box when performing the calibration):

7.3.2.1.1 Exterior housing check:

In extreme cases, when the offset is too big and ME Toolkit application cannot overcome this, a message bellow will appear:
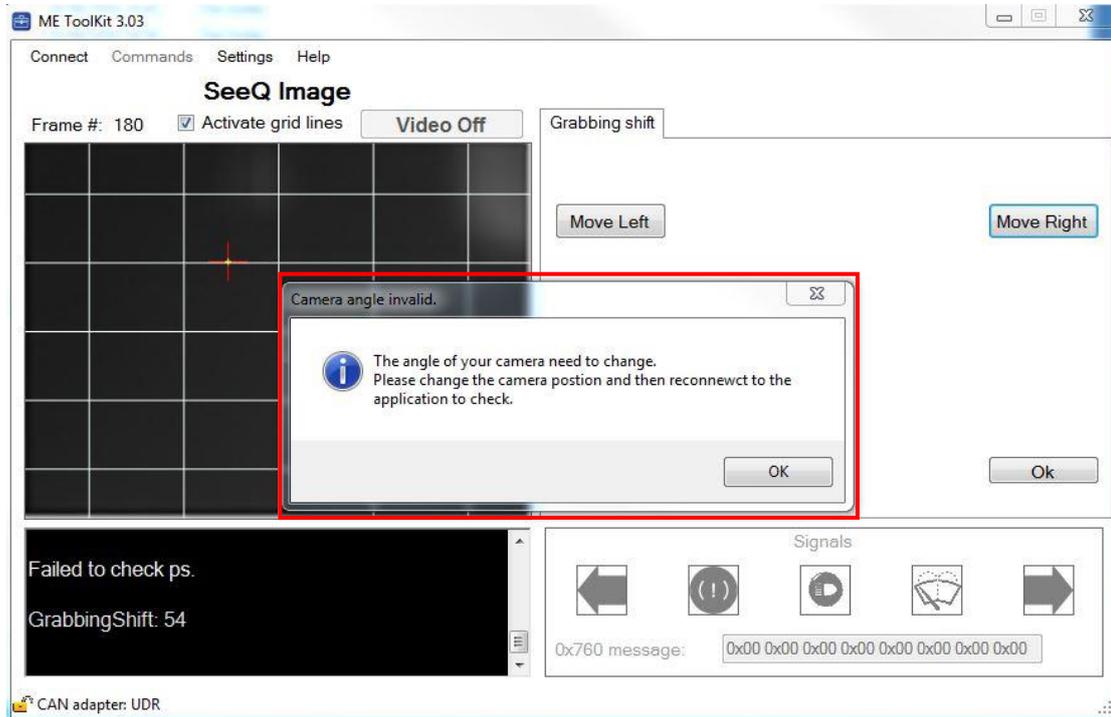
Although the side camera`s housing is pre-adjusted by Mobileye, you will need to confirm the housing angel before or after the installation.

Before verifying the angle, make sure that bracket housing is installed on a flat surface of the bus/truck without any slopes.

7.3.2.2   Set vehicle length

Click the "vehicle length" tab
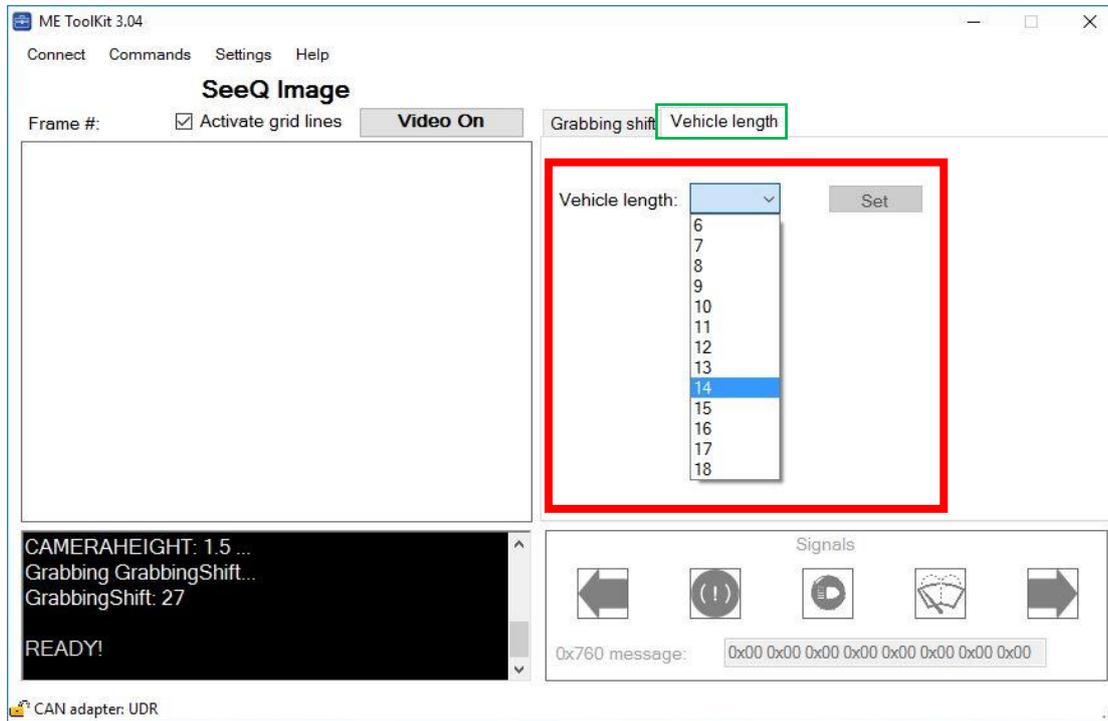
Measure the distance from the rear camera to the front of the vehicle:

Click "Set" to save changes.

8. Verification

8.1 System verification

Use the CANsee application to verify all system components are connected and detected by the JB and are communicate correctly.

Make sure all system components are connected to the JB and turn the power on.

Connect the EyeCAN adapter using the Y cable to the JB and open the CANsee application.

See example image below for a correct data output from CAN A output of the JB (when a standard shield+ is connected – front, left & right cameras).
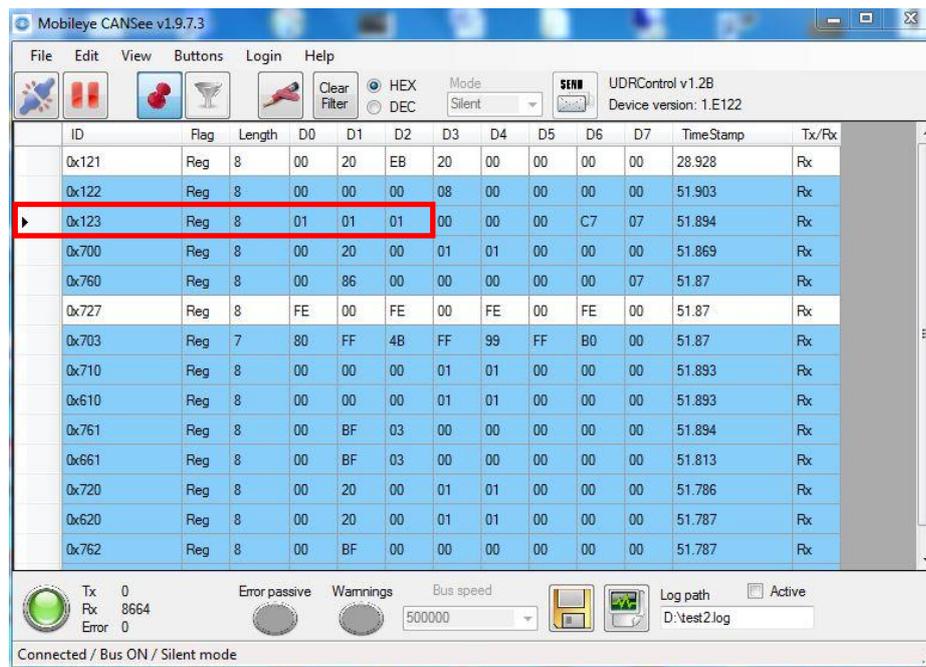
When additional cameras are connected, the relevant byte data will be changed accordingly to the table below - message ID 0x123 output protocol description.

	JB Diagnostic (0x123)							
Byte\Bit	7(msb)	6	5	4	3	2	1	0(lsb)
Byte 0	Master System Error Code							0x0:Error 0x1:NoError
Byte 1	Left Error Code							0x0:Error 0x1:NoError
Byte 2	Right Error Code							0x0:Error 0x1:NoError
Byte 3	Corner Left / Right Error Code							0x0:Error 0x1:NoError
Byte 4	Left Rear Back Error Code							0x0:Error 0x1:NoError
Byte 5	Right Rear Back Error Code							0x0:Error 0x1:NoError
Byte 6	Gyro "0x703" correctness	Gyro "0x703" availability	Right Rear Back availability	Left Rear Back availability	Corner availability	Right availability	Left availability	Master System availability
Byte 7	System Health Indicator	Right Rear Back	Left Rear Back	Corner Right	Corner Left	Right	Left	Master System

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8.2 System Status

Mobileye Shield+ V2.0 system has a status indication via the Eyewatch display unit.

This will indicate the driver if any error or visibility issue exist with the rear camera.

System Status	Icon on EW3	Possible Solution
No Errors – system is fully working		N/A
Error in System	Constant	Contact Mobileye technical support team
Low visibility on rear camera – VRU won't be detected	Blinking	Check rear camera's view – if needed, clean lens
Night mode – system is not detecting VRU's		Expected behavior – no action required

NOTE →

Status indication is available on Mobileye 6 series with firmware version 2.7.

The new icons are available ONLY on EyeWtach3 equipped with the latest EyeWatch FW

version.

The EyeWatch3 FW version cannot be upgraded on site.

8.3 Front camera functionality

Testing the front camera will be performed as instructed in the standard Mobileye 6 installation manual.

NOTE →

Please use extra caution when performing the test.

Mobileye does not recommend testing FCW due to safety issues.

8.4 Rear camera functionality

Once the installation & calibration is complete, a basic functionality test is required to confirm detection of cyclist (or pedestrian).

Testing Cyclist (or pedestrian) detection is available at vehicle speed of 0km/h. this can be achieved due to the supplying of speed (very low speed of 0.3km/h) to the rear camera. Simply drive (cyclist) or walk in the coverage area and confirm the rear right-side display will issue a visual alert.

9.Appendix A Mobileye Shield+ on Articulated vehicle

The Mobileye Shield+ system should function normally by considering vehicle's movement and angle changes according to driving path.

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

9.1 Guidelines for articulated Shield+ installation

- **Cables length and extensions** - In order not to exceed the CAN network length (which is approximately 100m), cable length adjustment should be in a proper way.

- **Termination resistors** – it will probably be required to use one or two termination resistors (120Ω or 60Ω) and connect it between CAN high & CAN low wires of CAB000165.

- **Display units** - the sides display unit will cover each side regardless of how many cameras are connected, therefore, there is no need for an additional sides display.

- **JB connection** – when installing a trailer that can be separated from the main cabin, we are using a retractable Suzi cable to connect between the junction box located in the trailer to the Junction box located in the main cabin.

- **External waterproof box** – when installing the JB or the bridge unit outside the vehicle (usually at the bottom of the vehicle), we will use an external waterproof box which comply with standard IP67. Also, possible to use Mobileye waterproof box (ITM000656).

- **Retractable Suzi cable** – physical design according to standard ISO 7638-1 / 7638-2 to allow CAN-bus communication. (Does not provided by Mobileye).

9.2 Calibration of far rear camera

The Mobileye Shield+ far rear calibration process is the same as the middle (rear) camera with <u>one difference</u> of the vehicle length measurement section.

Measure the distance from the far rear camera to the middle camera as shown in the picture below:
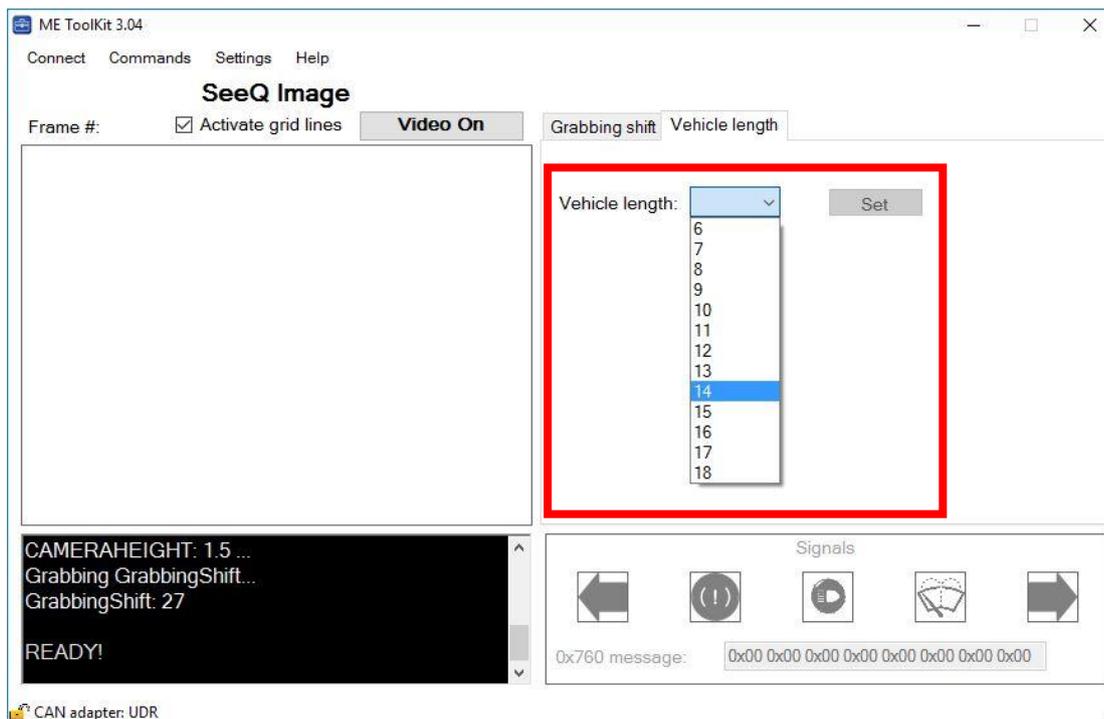
9.3 Far-rear`s Side display

The relevant side display will provide both audio & visual alert and cover both rear and far-rear camera.

9.4 Articulated bus - Connection scheme
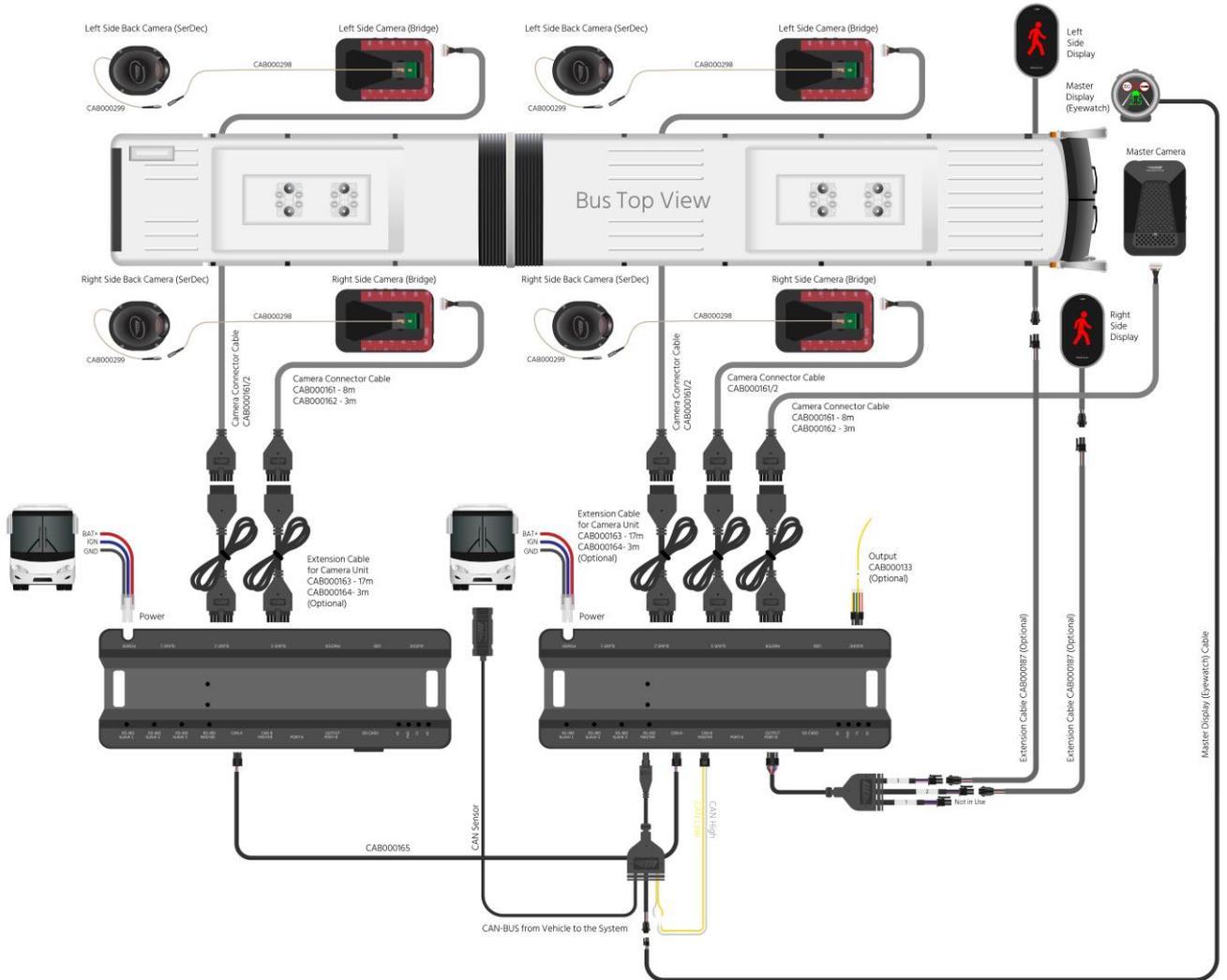
9.5 Artic-Trailer - Connection scheme
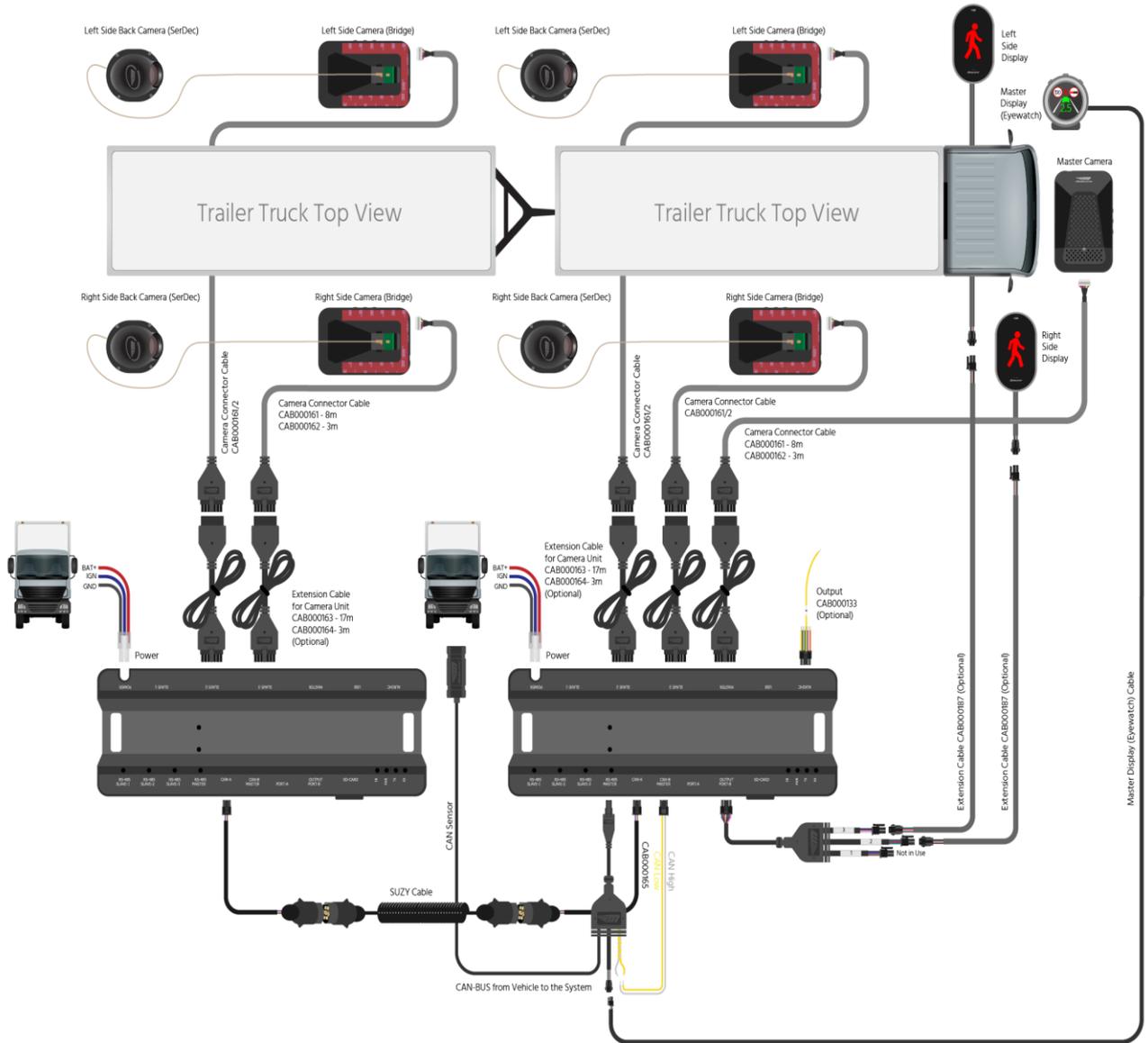
10. Appendix B - side display

10.1 Side display extension cable (CAB000187)

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

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

10.2 Side display unit`s dip-switches configuration

At the back part of the display unit a 6 dip switches can be found which are used to configure the audio and visual alerts.
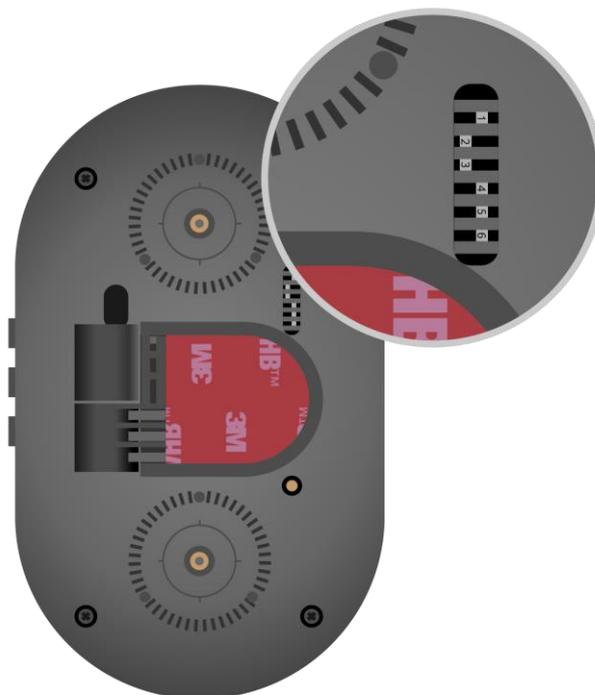
See below each dip switch combination and the relevant functionality:
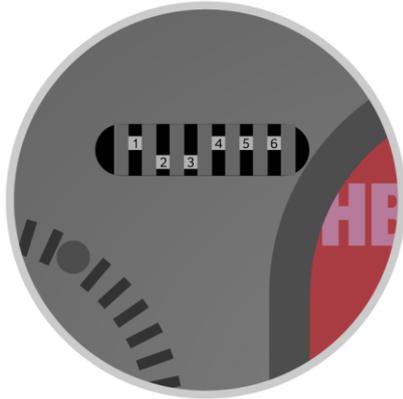
Dip Switches status:

Up position = ON

Down position = OFF

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

DZ = Danger zone alert – Yellow pedestrian icon

PCW = Pedestrian collision warning – Red pedestrian icon

11. Technical specification

Mobileye® Shield™ v2.0 Main Unit	
Physical Characteristics	
Length:	122mm
Width (without lens):	79mm
Height:	43mm
Weight:	200g
Color:	Black
Case material:	Aluminum/plastic
Cable length:	3m / 8m
Cable diameter:	4.8mm
Electrical Characteristics	
Input voltage:	10-36VDC
Input current min:	12v > 500mA, 24v > 250mA
Input current max:	12v > 700mA, 24v > 300mA
Max power:	8.5W
Environmental Characteristics	
Operating temperature:	-40°c to + 80°c
Storage temperature:	-40°c to + 100°c
Operation Humidity	Up to 95%
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 Synthesizer	
SPL minimum	86dB @ 10cm
EyeQ2® Vision Processor Main Features	
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	
Gyro	
3 Axis	X, Y, Z
Operating temperature:	-40°c to +85°c
Sensitivity Changes Vs. Temp	+/-2 %
Digital Zero-rate level	+/-10 dps
Measurement range	+/- 250 dps

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:	50mA
Environmental Characteristics	
Operating temperature:	-20°c to +80°c
Storage temperature:	-40°c to +100°c
Operating humidity:	Up to 95%
Display Characteristics	
Viewing angle:	100°
Display colors (backlighting):	LCD full color - 40 mcd (min)
Resolution:	128x128 pixels

Full system Electrical Characteristics	
Input voltage	10-36VDC
Input current (full operation)	12v > 750mA, 24v > 320mA
Input current (stand-by max)	12v > 0.4mA, 24v > 0.6mA
Max power consumption	9W

System idle current consumption	
Battery = 24V, IGN status = off	
Shield+ V2.0 configuration	
Only JB	20µA
JB + Master camera	40µA
JB + Master + Rear	95µA
JB + Master + 2x Rear	135µA
JB + Master + 2x Rear + Corner	178µA

Mobileye® Shield™ v2.0 Side SeeQ Unit (Bridge)

Physical Characteristics

Length:	100mm
Width (without lens):	82mm
Height:	55mm
Weight:	135g (without cable)
Color:	Black
Case material:	Aluminum/plastic
Cable length:	3m / 8m
Cable diameter:	4.8mm

Electrical Characteristics

Input voltage:	10-36VDC
Input current min:	12v > 500mA, 24v > 250mA
Input current max:	12v > 700mA, 24v > 300mA
Max power:	8.5W

Environmental Characteristics

Operating temperature:	-40°c to + 80°c
Storage temperature:	-40°c to + 100°c
Operation Humidity	Up to 95%

Mobileye® Shield™ v2.0 side SerDec camera

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

Physical Characteristics

length:	105.2mm	
height:	56mm	
Width:	87.7mm	
Case material:	Plastic	
Cable length:	7m or	0.25m (short cable) * 6.75m (main cable) *
Cable diameter	2.5mm	

Environmental Characteristics

Operating temperature:	-40°c to + 80°c
Storage temperature:	-40°c to + 100°c
Operation Humidity	Up to 95%
Water resistance:	Outdoor ambient, standard IP-67, IP-69

Mobileye® Shield™ Rear Camera`s Display Unit

Physical Characteristics

Diameter:	145mm
Width:	87mm
Depth (leg closed):	35mm
Depth (leg open):	72mm
Weight:	205g
Color:	Black
Case material:	Plastic
Cable length:	3m
Cable diameter:	4mm

Electrical Characteristics

Input Voltage:	12VDC
Input Current:	16mA on idle, 500mA on alarm
Input Voltage:	24VDC
Input Current:	8mA on idle, 250mA on alarm

Environmental Characteristics

Operating temperature:	-20°c to +80°c
Storage temperature:	-40°c to +100°c
Operating humidity:	Up to 95%

Display Characteristics

Resolution:	LEDs

Mobileye® Shield™ Junction Box unit

Physical Characteristics

Length	180mm
Width	70mm
Height:	20mm
Weight:	155g
Color:	Black
Case material:	Plastic

Electrical Characteristics

Input Voltage:	12-28VDC
Input Current:	12v → 29mA, 24v → 20mA

Environmental Characteristics

Operating temperature:	-20°c to +80°c
Storage temperature:	-40°c to +100°c
Operation Humidity	Up to 95%

* Depending on type of the coax cable which has a quick connect/disconnect connector

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