

Mobileye Intelligent High-Beams Control (IHC)

- Installation Instructions -





Mobileye IHC

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1 Intro to Mobileye IHC

1.1 Mobileye Intelligent High-Beams Control (IHC)

Mobileye Intelligent High-Beam Control controls a vehicle's driving lights by automatically switching them from **low-beam** to **high-beam** on dark roads without nearby traffic.

1.2 When is IHC active?

Mobileye IHC is active at night, on dark roads (with no street lights), without nearby traffic.

Mobileye IHC is active at speeds greater than 30 km/h (18.6 mph).

Mobileye IHC is active only if enabled during the installation (see section 2.7 below).

There is no need to manually activate the HB when starting the drive.

If IHC is enabled, IHC will automatically turn the HB when required.

1.3 How does IHC work?

IHC mechanism works only at night at speeds above 30 km/h on a road without street lights when your vehicle low-beams are in the ON position.

During this status a Green IHC icon will appear on the EyeWatch Display unit.

If no vehicle is detected in front (rear lights of a vehicle or oncoming vehicle), the system will automatically turn ON HB.

The IHC icon on the EyeWatch Display will turn from Green to Blue to notify the driver that the Mobileye system is controlling the HB.

If the driver thinks that the system decision is wrong he can disable the current decision for 12 seconds by momentary pushing the HB lever from low to high (the system will sense this change only if the high beam wire is connected).

The Blue icon disappears for 12 seconds and after 12 second will appear again in Green.

If a vehicle is detected in front (rear lights of a vehicle or oncoming vehicle), or we are entering a well light area, the system will automatically turn OFF the HB.

1.4 Remarks

- Mobileye IHC compatibility is subject to vehicle electrical system compatibility. Different vehicles have different electrical systems and limitation of the IHC installation is not a Mobileye system limitation but a vehicle electrical limitation.
- Locating the appropriate IHC connection point in order to connect the external relay that will mimic the HB lever operation is mandatory for a successful IHC installation and is subject to the technician expertise, professionalism and know-how.
Mobileye does not supply exact connection instructions for each vehicle but a general layout explaining the connection methods (see upcoming sections).
- IHC activation is triggered by a GND (minus -) signal sent from the Mobileye system to the external Relay
- Mobileye IHC is available only in certain geographical areas (not supported in Japan, Israel)
- IHC is supported from Mobileye C2-270 firmware version 2.85 (2823-V2.5) only!
- Mobileye recommends to use at a minimum a 1.5mm (16 gauge) electrical cable or higher when connecting between External Relay and vehicle High Beam circuit.

2 IHC Installation

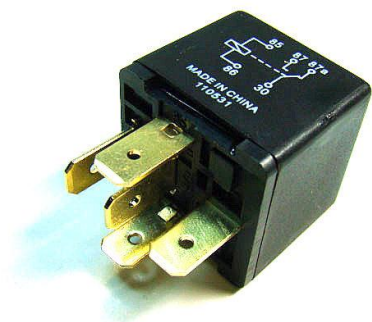
To install the Mobileye Intelligent High Beam Control, a 30 Amp Automotive Relay is required.

2.1 Relay Specifications:

2.1.1 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



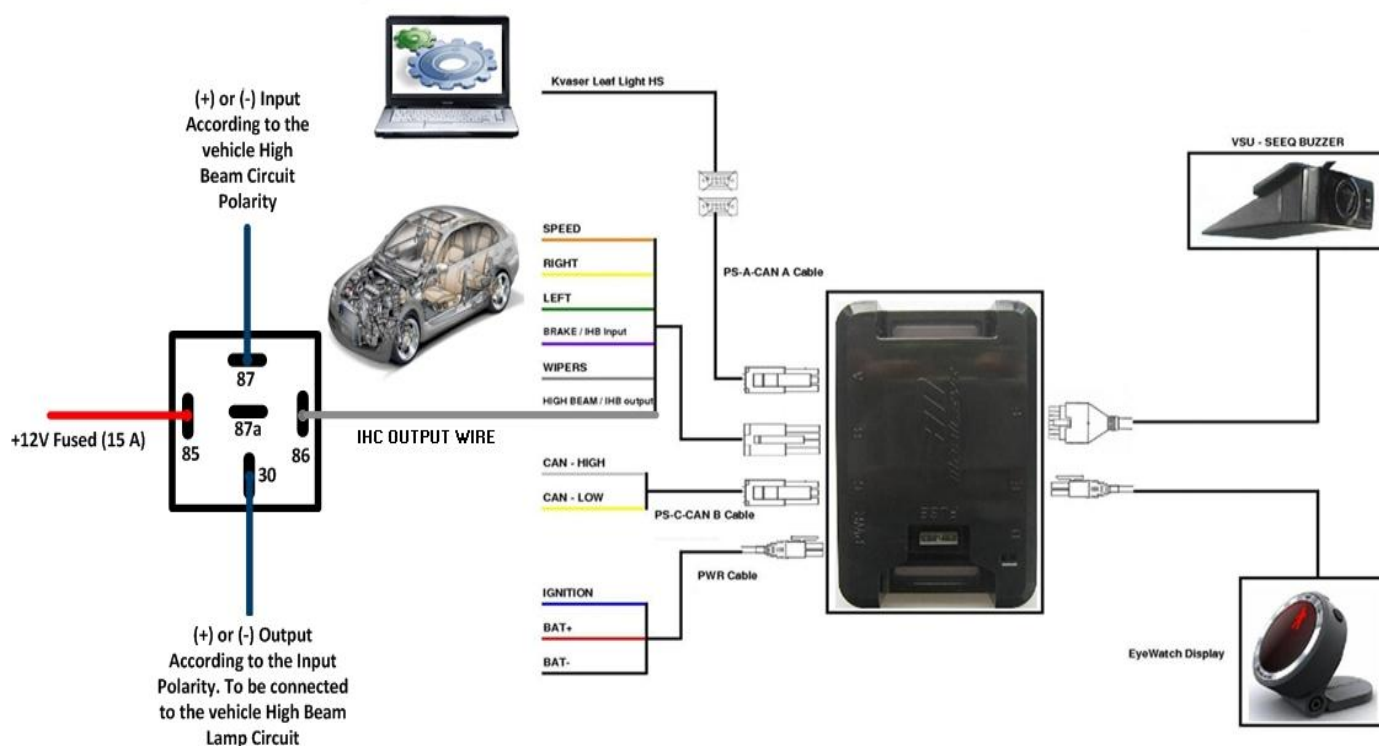
2.1.2 External Relay socket (such as “Delphi 12033871”)

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



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

2.2 External Relay Connection Scheme for Mobileye IHC



2.3 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.

2.3.1 Main challenges

1. Finding the direct High-beam signal and understanding if this High-beam 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).

2.4 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

2.5 Determining/Identifying High Beam polarity (positive or negative)

Option 1: Positive polarity [Rest in GND [0v] (-)]

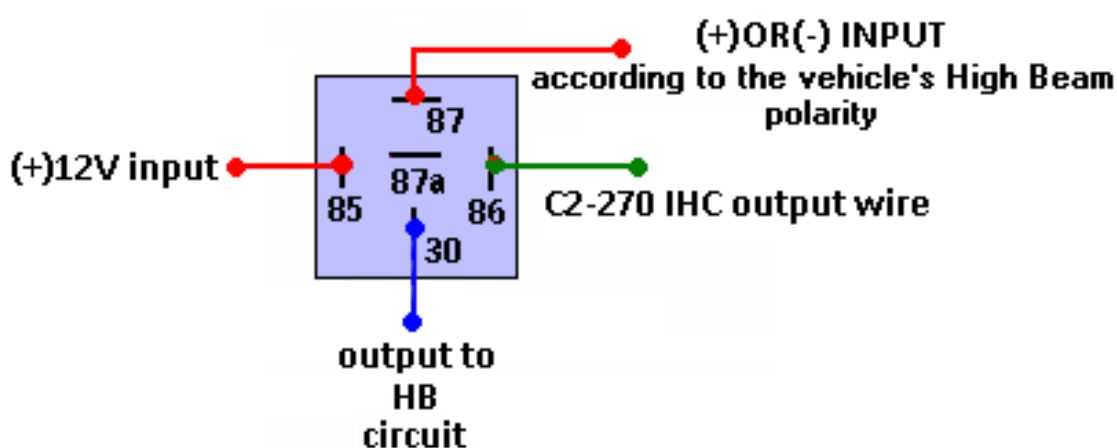
When High Beam is not active, the signal will show 0V (GND) and when High Beam is activated the signal will show 12V

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).

2.6 Mobileye IHC External Relay Connection 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



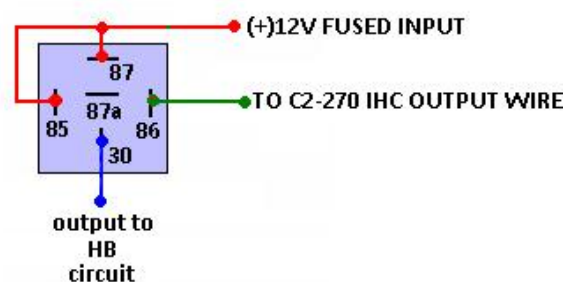
2.6.1 Relay Connection options:

2.6.1.1 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)

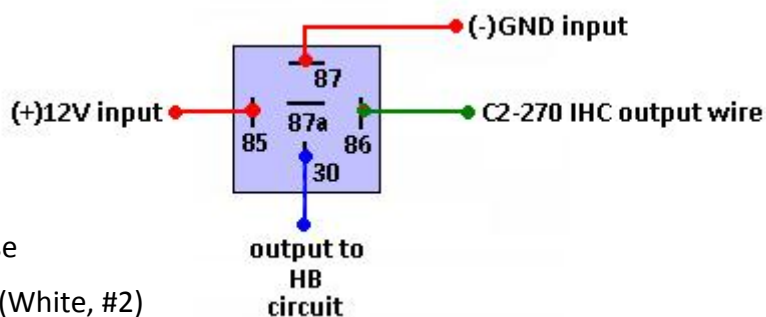


2.6.1.2 Option 2:

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

High Beam Negative polarity

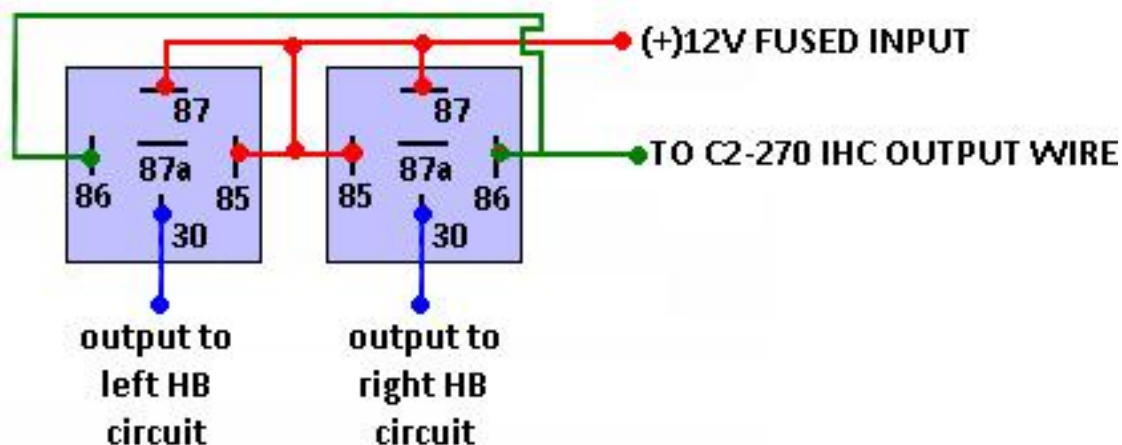
- Connect **87** to Vehicle GND (-)
- Connect **30** to High Beam circuit
- Connect **85** to constant 12V via 15A fuse
- Connect **86** to C2-270 IHC Output wire (White, #2)



2.6.1.3 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)

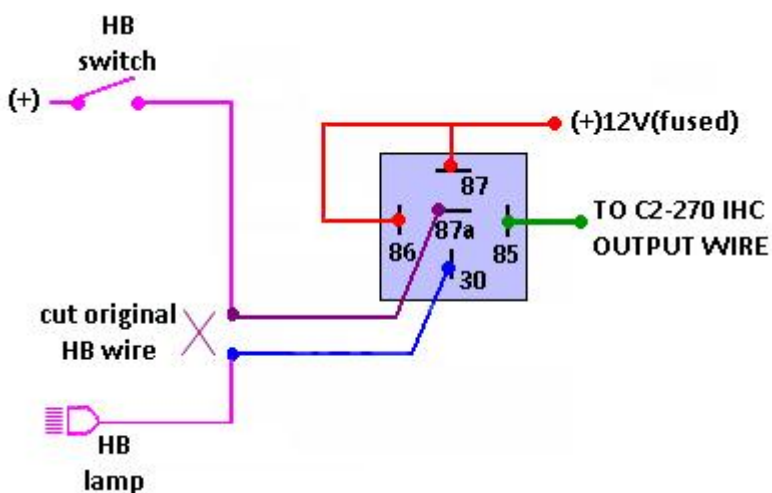


2.6.1.4 Option 4: Special connection scheme

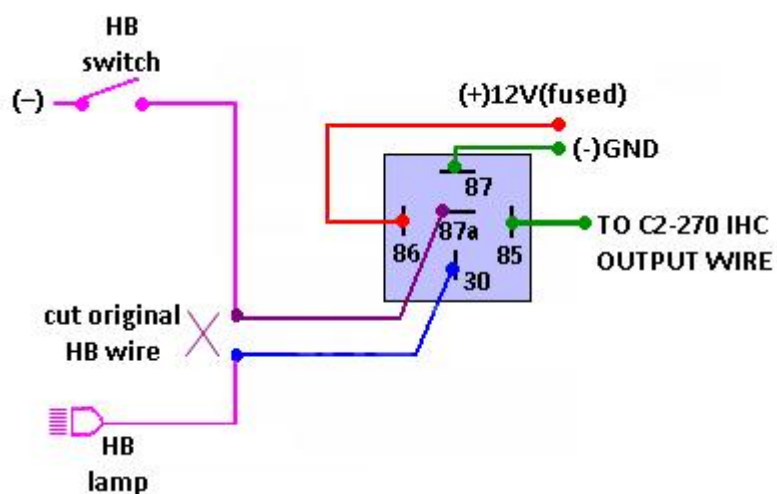
The following connection method is for Special cases in which the High Beam circuit is driven directly from the lever without any relay.

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

- High Beam lever Positive polarity



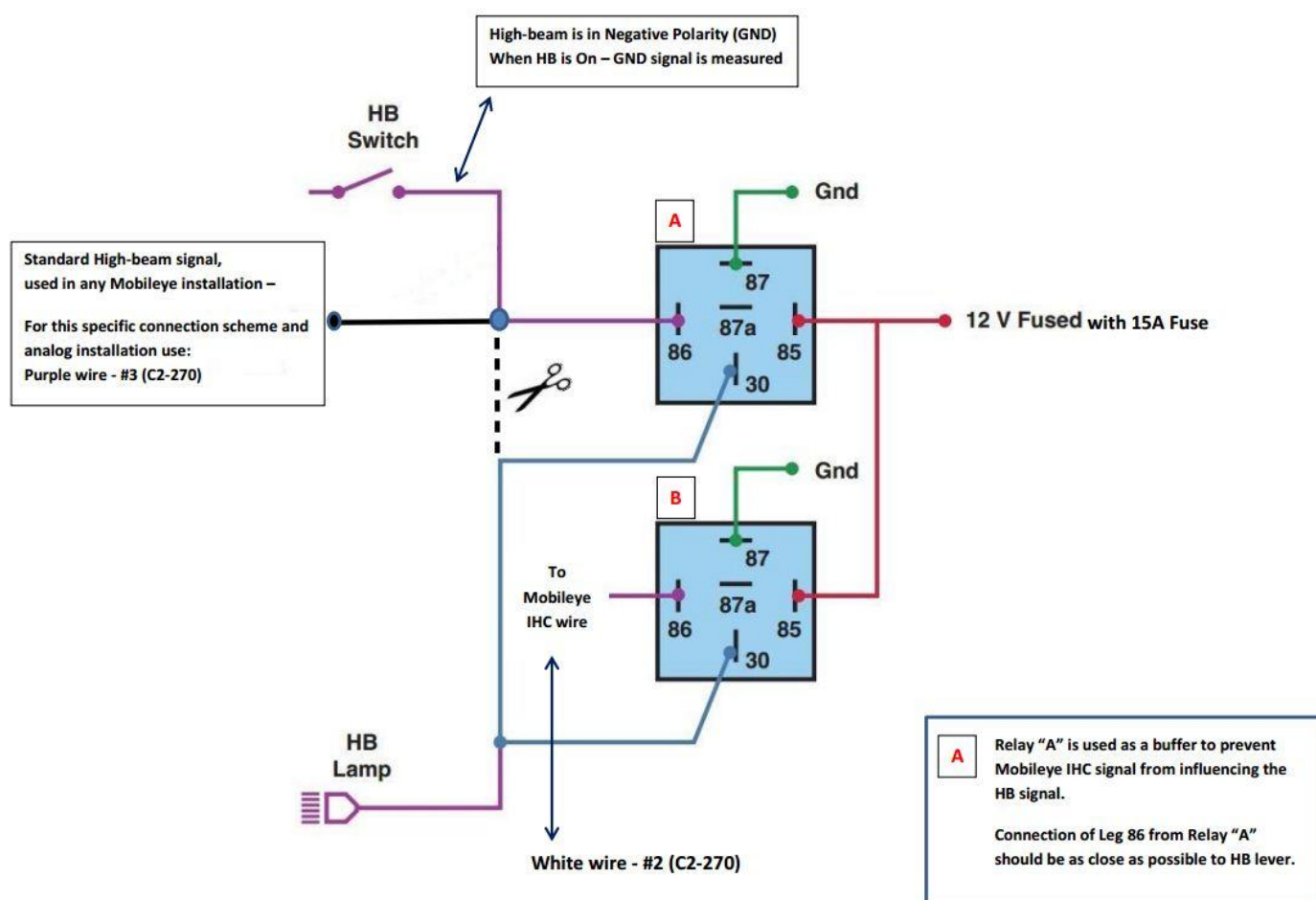
- High Beam lever Negative polarity



2.6.1.5 Option 4.a: Special connection scheme for Analog Installation

The following connection method is for special cases in which the High Beam circuit is driven directly from the HB lever.

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



2.6.1.6 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-beam. 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.

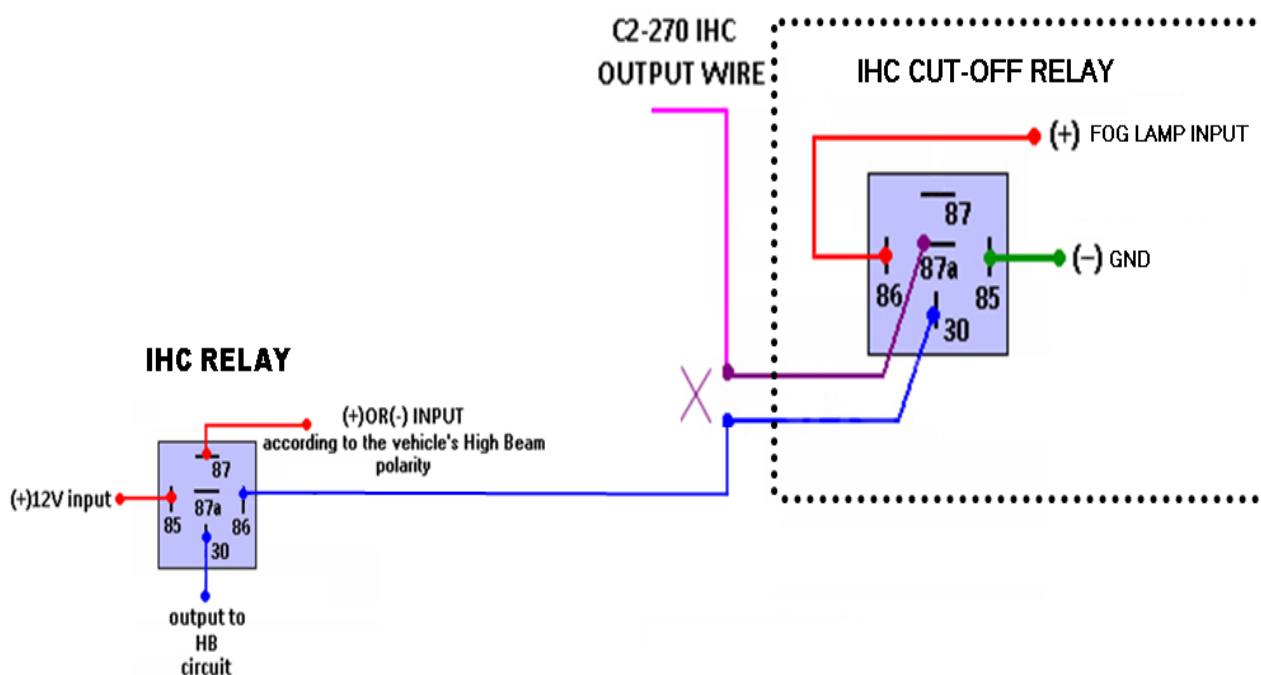
IHC Relay:

The IHC Relay connection is possible as shown in all option above with 1 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)

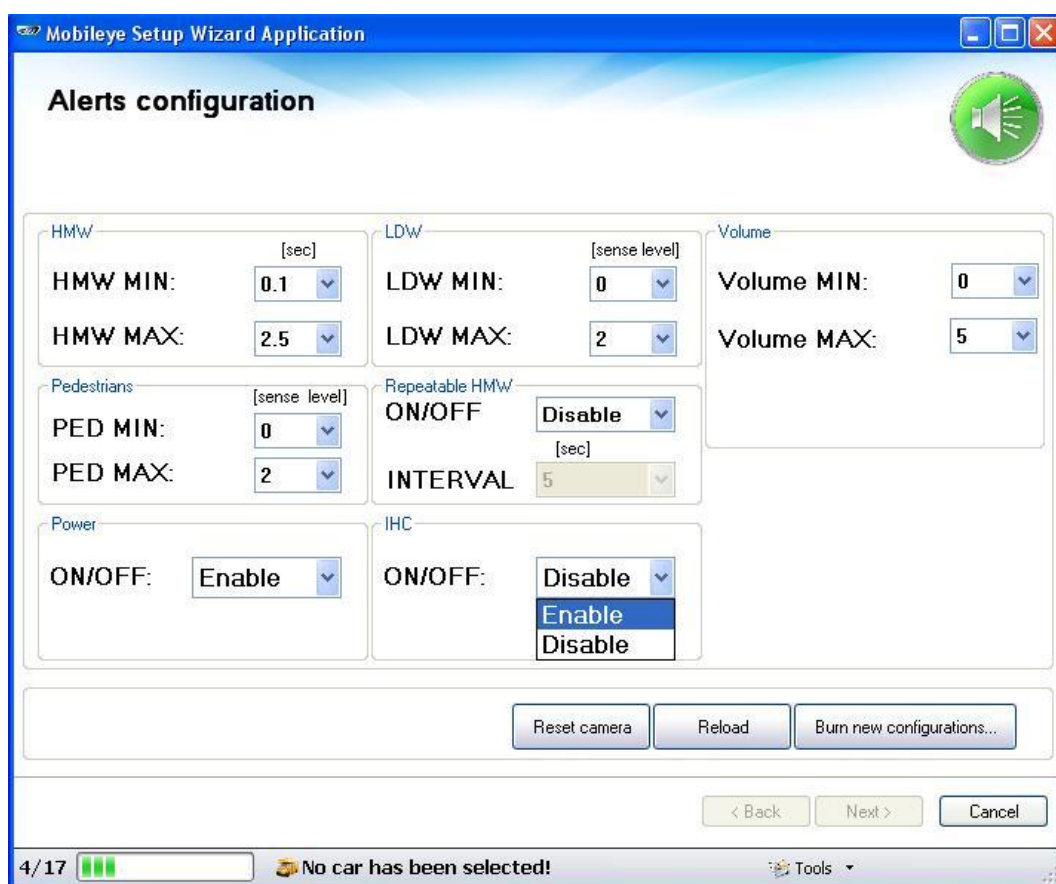


Note: In case the Fog lamps are operated by GND instead of 12V reverse the connections between **85** and **86** in the IHC Cut-off Relay (**85** will be connected to Constant 12V power and **86** will be connected to GND).

2.7 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...”



The screenshot shows the 'Alerts configuration' window of the Mobileye Setup Wizard. The window has a blue title bar and a green speaker icon in the top right corner. The main area is divided into several sections with configuration options:

- HMW** (Headway Monitoring Warning):
 - HMW MIN: 0.1 [sec]
 - HMW MAX: 2.5 [sec]
- LDW** (Lane Departure Warning):
 - LDW MIN: 0 [sense level]
 - LDW MAX: 2 [sense level]
- Pedestrians**:
 - PED MIN: 0 [sense level]
 - PED MAX: 2 [sense level]
- Repeatable HMW**:
 - ON/OFF: Disable
 - INTERVAL: 5 [sec]
- Power**:
 - ON/OFF: Enable
- IHC** (Intelligent Cruise Control):
 - ON/OFF: A dropdown menu is open, showing 'Disable', 'Enable' (highlighted), and 'Disable'.
- Volume**:
 - Volume MIN: 0
 - Volume MAX: 5

At the bottom of the configuration area, there are three buttons: 'Reset camera', 'Reload', and 'Burn new configurations...'. Below these are navigation buttons: '< Back', 'Next >', and 'Cancel'. The status bar at the very bottom shows '4/17' with three green bars, a warning icon and text 'No car has been selected!', and a 'Tools' dropdown menu.

2.8 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

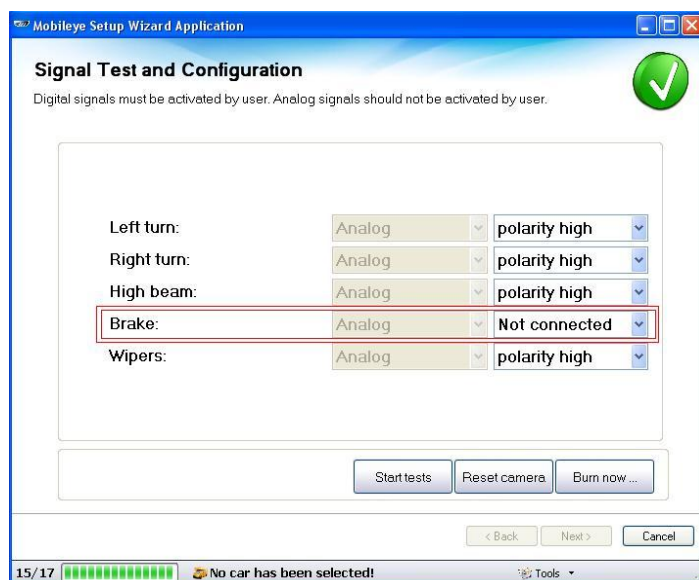
2. Digital signals [CAN-Bus installation] - (brake + High-beam input by CAN):

- 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.



2.9 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 greater than 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

3 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) <u>When high beam signal is via analog connection:</u> 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) <u>When high beam signal is via CAN-Bus connection:</u> 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	The suspected wire will only activate one of the head lamps' high beams.	Refer to option "2" in the connection options section.

on.		
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.