October 2024

Mobileye 8

ISA Overview v0.2

Table Of Contents

1. ISA – Introduction

The Intelligent Speed Assistance is a regulation (EU 2021/1958) designed to ensure that all new vehicles are to be equipped with a system, that continuously informs the driver of the legal speed limit of the road driven and alerts the driver when over speeding.

ISA is part of the General Safety Regulation (GSR), covering 29 European countries.

2. ISA – General Information

ISA regulation ensures that the system:

- **Understands different types of speed limit signs, both implicit and explicit, while encountering various road types and as the local country`s speed limit accordingly.**

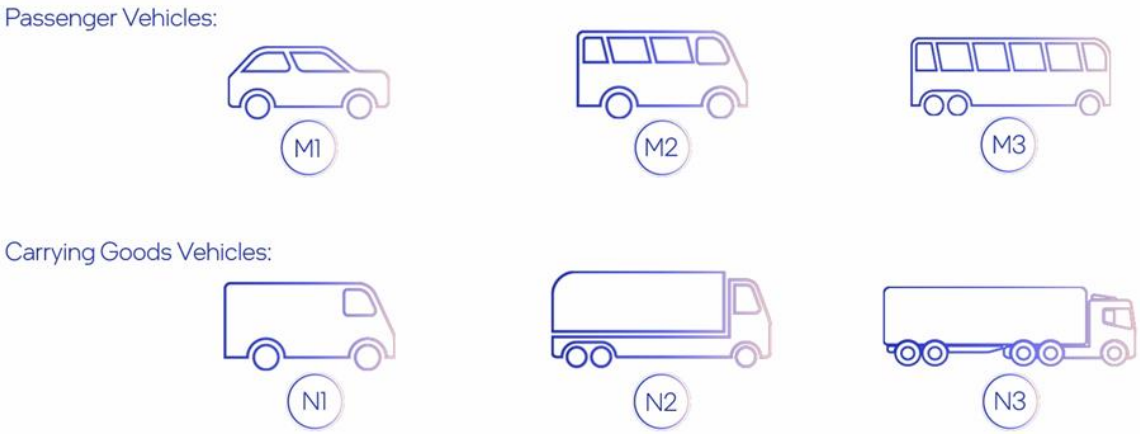
Explicit sign

Road signs with a numerical value

Implicit sign

Road signs with no numerical value

- **Differentiate between vehicle types**



3. ISA - Functions

ISA is comprised of 2 functions:
Speed Limit **Information** Function (**SLIF**)
Speed Limit **Warning** Function (**SLWF**).

SLIF constantly perceives the legal speed limit based on detected traffic signs, road types, and the host country's speed limits.

SLWF will alert the driver with both audio and visual alerts when the vehicle's speed exceeds the legally permitted speed limit (and according to the regulation criteria).

ISA is operational when the system is active, and at all speeds, only within the supported countries.

ISA technologies in ME8:
The ME8 ISA system is vision only technology using GPS to detect the current location and then apply the appropriate speed sign information to the driver according to the vehicle' classification. The ME8 does not use any map data.

The vision system uses 3 technologies to determine the legal speed:

1. **Traffic sign recognition** – vision-based recognition of the traffic sign on the road.

2. **Lane relevancy** – vision-based recognition of whether the detected traffic signs are relevant to the lane driven by the vehicle.

3. **Road type classification** – vision-based recognition of the road type and classifying the road to regulatory road types: Motorway/Highway; Expressway; inter-urban; Urban; and Residential.

Explanation of the system configuration during installation to support ISA:

Vehicle category – the Mobileye 8 Connect contains a conversion table inside its file system, containing the full logic of the "Catalogue of Road Signs" from Annex II of the ISA regulation, which defines the correct legal speed per vehicle category for all road signs in the Catalogue. This enables the system to determine the legal speed for the relevant vehicle category. The system supports the following vehicle categories: M1, M2, M3, N1, N2 and N3.

During installation of the Mobileye 8, the vehicle category of the host vehicle is a required input; so, the system knows the relevant vehicle category. The following additional inputs are also mandatory for system configuration:

- For vehicle categories M2 and M3 – the vehicle class (Class I, Class III, or Class III).
- For vehicle categories M2, M3, N2, and N3, the weight of the vehicle; and
- For vehicle categories M2, M3, N2, and N3, equipped with speed limitation device and tachograph per regulation (EU) No. 165/2014- the applicable speed limitation setting of the host vehicle.

4.Speed Limit Information Function - SLIF

What is SLIF?
The SLIF will display the legal speed limit based on the detection of signs and road signals and is active at speeds above 5km/h.

Visual alert
The SLIF visual alert should be displayed no later than 2 seconds after passing the traffic sign. If the vehicle is driving at a speed of 20 km/h or less, the SLIF visual alert should be displayed no later than 10 meters after passing the traffic sign.

Acoustic alert
Will be issued every time a new speed limit is detected.

How is the legal speed determined?
The Legal Speed is determined according to the National Sign catalog (Annex 2)
The Annex 2 of the National Sign catalog defines all impact factors as defined below.

- Sign catalog per country.
- Sign determination per vehicle type
- Explicit signs
- Implicit signs
- End of speed limit sign (and other signs that their expected output in the catalog is "N" – National Speed) –
  National Speed which means the legal speed for the detected sign, by the road type and vehicle type. For example, the national speed for vehicle type M3 in France is 80 in road type INTERURBAN and 50 in URBAN. The system shall identify the correct road type, by several factors as mentioned above. If “End of” sign appears and not sign after that, system will define allowed Speed as “N” according to various factors above.
- Suspended "S" output (S – Speed suspenders):
  Example: The suspended speed for vehicle type M3 in France is 100. There is an exception for this feature, if there is a hardware limitation that is lower than the configured suspended speed. In this case, the lower value will be considered as the S value. For example, if the M3 vehicle in France is equipped with a tachograph limiting the top speed to 90, this will take precedence over the 100.
- Link to Annex 2 – Catalog of Road
  https://static.mobileye.com/website/us/corporate/files/ANNEX2.pdf

- **Signs must be conforming to standards and regulation or otherwise might be ignored:**
  Road sign conditions at the time of the assessment (per section 3.4.2.2 of the regulation):
  (a) Of a design and size conforming to the applicable standards in the Member state concerned.
  (b) Positioned in a way conforming to the applicable standards in the Member state concerned.
  (c) Showing no significant damage (e.g. fading, reduced retro-reflectivity, bending, cracking, vandalism) that materially affects their visual properties; and
  (d) Not partially or fully covered (e.g. foliage, snow, or dirt obscuring the sign, or deliberate invalidation during roadworks).

Meaning - any sign not compliant with the above might be ignored

- **Complementary signs – Not applicable** (per section 3.4.2.3.2 per the regulation):
  The SLIF is not required to consider special variable conditions influencing the national speed limit (i.e. conditions that require information going beyond the current country of operation and the current road type, e.g. trailer status, prevailing environmental conditions, time of day, time of year, driver age or experience, standing passengers, dangerous goods, oversized load) In the case that special variable conditions that may be present and the system is not capable of taking them into account, the speed limit determination shall default to the assumed most common condition in typical normal operation.

- **Speed limit determination is kept until a new speed limit sign is detected.**

5. Speed Limit Warning function - SLWF

What is SLWF

The system will generate a Speed Limit Warning Function (SLWF) when the driving speed exceeds the permitted legal speed, per the alert's specifications.
The SLWF is active while driving at speeds above 20km/h.

Visual warning

The SLWF visual warning will be provided no later than 1.5 seconds after the speedometer speed exceeds the perceived speed limit.

Acoustic warning

i. Trigger and start time

For constant vehicle speed that exceeds the perceived legal speed, the SLWF acoustic warning will be triggered after 3-6 seconds, depending on the speeding violation's level.

ii. Duration

The SLWF acoustic warning will last at least 3 seconds, but not more than 5 seconds, if the SLWF suppressors (described here below) aren't active.

iii. Termination

The SLWF acoustic warning will be suppressed under the following conditions:

1. The vehicle speed is equal to or less than the legal speed limit
2. The brake pedal is pressed.
3. The accelerator is fully released.
4. The cruise control is disengaged.

SLWF for vehicles with speed limiter:

NOTE!

In respect of any vehicle in categories M2, M3, N2 or N3 that is equipped with a speed limitation device and tachograph, the SLWF will not operate at all if the vehicle speed equals or greater than 9km/h below the vehicle's speed limitation device setting, in case of either (a) implicit speed limit signs or (b) explicit speed limit signs with numeric value not relevant for the hosting vehicle's category (as pre-defined at the time of the System installation