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**Provisions for the installation of lighting and light-signalling  
devices for motorcycles and mopeds**

摩托车和轻便摩托车道路照明及光信号装置的安装规定

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# **Provisions for the installation of lighting and light-signalling devices for motorcycles and mopeds**

## **1 Scope**

This document specifies the general requirements, special provisions, inspection rules, requirements for determining the same type of lighting and light signaling devices for motorcycles and mopeds.

This document applies to two-wheeled mopeds (L1 category), front-wheeled three-wheeled mopeds (L2 category), two-wheeled motorcycles (L3 category), sidecar three-wheeled motorcycles (L4 category), front-wheeled three-wheeled motorcycles (L5 category).

## **2 Normative references**

The contents of the following documents, through normative references, constitute essential provisions of this document. For dated references, only the version corresponding to that date applies to this document. For undated references, the latest version (including all amendments) applies to this document.

GB 4599 Road illumination devices and systems for motor motorcycles

GB 4785 Prescription for installation of the external lighting and light-signalling devices for motor motorcycles and their trailers

GB/T 5359.1 Term for motorcycles and mopeds - Part 1: Types of motorcycles

GB 5920 Light-signalling devices and systems for motor motorcycles and their trailers

GB 17510 Photometric characteristics of light-signalling devices for motorcycles

GB 19152 Motor motorcycle headlamps emitting a symmetrical passing beam or a driving beam or both

GB 20073 Performance and measurement method for braking of motorcycles and mopeds

## 3 Terms and definitions

The terms and definitions defined in GB 4785 and GB/T 5359.1, as well as the following terms and definitions, apply to this document.

### 3.1

#### **Extreme outer edge**

A plane parallel to the longitudinal plane of symmetry of the motorcycle and in contact with the outer edge of the motorcycle.

Note: The outer edge of a motorcycle does not include the following protrusions: rearview mirrors, turn signal lamps, front position lamps, rear position lamps, retroreflectors.

### 3.2

#### **Horizontal inclination**

The angle between the headlamp beam of an unladen motorcycle and the headlamp beam when the motorcycle is tilted.

Note: A schematic diagram is provided in Appendix A.

### 3.3

#### **Horizontal inclination adjustment system (HIAS)**

A device that maintains the horizontal inclination of a motorcycle's headlights at zero.

### 3.4

#### **Bank angle**

The angle between the longitudinal plane of symmetry and the vertical plane when the motorcycle is tilted.

Note: A schematic diagram is provided in Appendix A.

### 3.5

#### **HIAS signal**

Any control signal or additional control signal input to the HIAS, or a control signal output from the HIAS to the motorcycle.

Note: This is referred to as "HIAS signal".

### 3.6

#### **HIAS signal generator**

A device used for HIAS testing that repeatedly generates one or more horizontal inclination signals.

Note: This is referred to as "HIAS signal generator".

### 3.7

#### **HIAS test angle**

The angle between the low-beam cutoff line and the H-H line of a headlamp.

Note: This is referred to as the "HIAS test angle". In Figure A.1,  $\delta$  is used to represent the HIAS test angle.

### 3.8

#### **Exterior courtesy lamp**

A lamp that provides auxiliary lighting for the driver and passengers when entering or exiting a motorcycle or loading or unloading cargo.

### 3.9

#### **Adaptive driving-beam (ADB)**

A high beam, which adjusts the beam according to oncoming or preceding motorcycles to improve the driver's visibility at longer ranges, without causing discomfort, glare, or distraction to other road users.

### 3.10

#### **Illuminated logo**

An illuminated graphic mark, emblem, text, or combination of these elements used to represent the motorcycle manufacturer's brand or model logo.

## **4 General requirements**

**4.1** The installation of lighting and light-signaling devices shall comply with the requirements for the installation of the respective devices in this document under normal use, even when subjected to vibration.

**4.2** Lighting devices shall be mounted so as to facilitate correct adjustment of their aim.

**4.3** The reference axes of all lighting and light-signaling devices installed on a motorcycle must be parallel to the motorcycle's resting surface on the road. Except for side retroreflectors, the reference axes of all lighting and light-signaling devices must be parallel to the motorcycle's longitudinal plane of symmetry; the reference axes of side retroreflectors must be perpendicular to the motorcycle's longitudinal plane of symmetry. The tolerance in each direction is  $\pm 3^\circ$ .

**4.4** When inspecting the mounting height and orientation of lamps, the motorcycle under test must be unloaded and placed on a level surface, with its longitudinal plane of symmetry vertical and the handlebars or front wheels in the forward-facing, straight-ahead position. Tire inflation pressure must comply with the motorcycle manufacturer's specifications.

**4.5** The installation of single or multiple lamps on a motorcycle must meet the following requirements.

- a) For single-mounted lamps (for Category L4 motorcycles, only single lamps installed on the main motorcycle are considered), their reference center shall be located on the motorcycle's longitudinal plane of symmetry, with the following exceptions:
  - 1) High beam lamps installed in accordance with 5.1.3.1.1 or 5.1.3.1.2;
  - 2) Low beam lamps installed in accordance with 5.2.3.1.1 or 5.2.3.1.2;
  - 3) Front fog lamps installed in accordance with 5.3.3.1.1;
  - 4) Daytime running lamps installed in accordance with 5.4.3.1.1 or 5.4.3.1.2;
  - 5) Front position lamps installed in accordance with 5.5.3.1.1 or 5.5.3.1.2.
- b) Lamps installed in pairs on L1, L2, L3, L5, L4 main motorcycles shall meet the following requirements.
  - 1) They shall be installed symmetrically on the motorcycle with respect to the motorcycle's longitudinal plane of symmetry.
  - 2) The luminaire's shape and light-transmitting surface must be symmetrical relative to the motorcycle's longitudinal plane of symmetry. For luminaires with illuminated logos, the illuminated logos themselves may be asymmetrical.
  - 3) They must meet the same chromaticity requirements and have consistent photometric characteristics.
  - 4) They must illuminate and deactivate simultaneously (except for turn signals).
- c) For luminaires mounted on the sidecars of category L4 motorcycles, and for category L5 motorcycles with a front track greater than 460 mm equipped with

three or four rear retro-reflectors, the provisions for the corresponding luminaires in Chapter 5 must apply.

**4.6** Combined, mixed, or hybrid luminaires, as well as single luminaires, must meet the following requirements.

- a) Luminaires may be combined, hybrid, or composited with each other, provided that their respective light color, mounting position, orientation, geometric visibility, circuit connection, and other requirements are met, meanwhile the following requirements are met.
  - 1) When all other luminaires in the combined, hybrid, or composite are off, the luminaire must meet its photometric and chromaticity requirements. For the case where the front position lamp or rear position lamp is mixed with one or more functions and operates simultaneously, it shall be ensured that the chromaticity requirements of the function are met when the function and the front position lamp or rear position lamp are turned on at the same time.
  - 2) "D"-shaped rear position lamps shall not be mixed with brake lamps.
  - 3) If a brake lamp is combined with a turn signal lamp, the boundaries of adjacent areas of different colors formed by the projection of their visual surfaces in a direction perpendicular to the reference axis shall ensure that no horizontal or vertical straight line crosses the aforementioned boundaries more than twice. Furthermore, the visual surfaces based on the light-transmitting surfaces in the direction of the reference axis shall not overlap.
- b) For single lamps, the following requirements must be met.
  - 1) For the same lamp, if the visual surface is composed of several separate parts in the direction of the reference axis, the following requirements must be met: the sum of the minimum convex polygonal areas of the projections of the luminous surfaces of each part, in the direction of the reference axis, must not be less than 60% of the minimum convex polygonal area of the projection of the functional boundary, in the direction of the reference axis; or, the spacing between the projections of each part in the direction of the reference axis must not exceed 75 mm. This requirement does not apply to retroreflectors and license plate lamp functions.
  - 2) Two independent retro-reflectors or two "D"-shaped lamps must meet the following requirements: The sum of the minimum convex polygonal areas of the projections of the luminous surfaces of each portion, along the reference axis, must not be less than 60% of the minimum convex polygonal area of the projections of the functional boundary along the reference axis; or the spacing must not exceed 75 mm.
  - 3) For a mutual-lamp system, the requirements of 4.6 b) 1) must be met. A lamp

**4.19** For category L5 motorcycles with two front wheels and a front wheelbase no greater than 460 mm, the installation of exterior lighting and light signaling devices shall be in accordance with the installation requirements for exterior lighting and light signaling devices for category L3 motorcycles.

**4.20** Unless otherwise specified, the "motorcycle's longitudinal symmetry plane" for category L4 motorcycles in this document refers to the main motorcycle.

**4.21** Illuminated logos shall be the motorcycle manufacturer's brand or model logo. There shall be no more than two illuminated logos facing the front or rear of the motorcycle.

## **5 Special provisions**

### **5.1 High beam**

#### **5.1.1 Quantity**

**5.1.1.1** For categories L3, L4, L5 motorcycles, one or two (paired) A, B, CS, or DS-class high beams are permitted. Two (paired) CS-class high beams are recommended. For category L5 motorcycles with a width greater than 1300 mm, two (paired) A, B, CS, or DS-class high beams shall be installed.

**5.1.1.2** For categories L1 and L2 motorcycles, one or two (in pair) A, B, BS, CS, or DS class high-beam headlights are permitted.

#### **5.1.2 Layout**

For categories L4 motorcycles, the headlights must be installed on the main motorcycle.

#### **5.1.3 Position**

##### **5.1.3.1 Lateral**

**5.1.3.1.1** If a single high-beam headlight is installed, it must be located above, below, or to the side of the other front lamps. If these lamps are arranged vertically, the reference center of the high-beam headlight must lie on the motorcycle's longitudinal plane of symmetry; if these lamps are arranged horizontally, their reference centers must be symmetrical to the motorcycle's longitudinal plane of symmetry.

**5.1.3.1.2** If a single high-beam headlight is installed and integrated with the motorcycle's other front lamps, its reference center must lie on the motorcycle's longitudinal plane of symmetry. When a motorcycle is equipped with a single low-beam headlight or a low-beam headlight integrated with a front position lamp and located near the high-beam headlight, its reference center must be symmetrical to the

motorcycle's longitudinal plane of symmetry.

**5.1.3.1.3** If two high-beam headlights are installed, regardless of whether they are intermixed with other front-mounted lamps, the reference centers of the two high-beam headlights shall be symmetrical with respect to the motorcycle's longitudinal plane of symmetry.

#### **5.1.3.2 Height**

The ground clearance shall not exceed 1300 mm and shall not be less than 500 mm.

#### **5.1.3.3 Longitudinal**

Located at the front of the motorcycle, the emitted light shall not directly or indirectly pass through the rearview mirror or other reflective surfaces of the motorcycle, causing discomfort to the driver.

#### **5.1.3.4 Spatial distance**

In any case, the distance between the edge of the luminous surface of any one high-beam headlight and the edge of the luminous surface of the low-beam headlight (if only one is installed) or the edge of the luminous surface of the low-beam headlight on the same side (if two are installed), shall not exceed 200 mm. For categories L1, L3, L4 motorcycles equipped with two high-beam headlights, the distance between the edges of the high-beam headlights' luminous surfaces shall not exceed 200 mm.

#### **5.1.4 Geometric visibility**

Vertical Angle  $\alpha$ : 5° upward, 5° downward.

Horizontal angle  $\beta$ : 5° to the left, 5° to the right.

#### **5.1.5 Direction**

**5.1.5.1** Forward-facing. Turnable with the steering wheel.

**5.1.5.2** High beams may be equipped with HIAS.

#### **5.1.6 Circuit connection**

**5.1.6.1** When high beams are ON, low beams may remain ON. When secondary high beams are ON, low beams shall remain ON.

**5.1.6.2** High beams may be automatically turned on and off. The control signal shall be generated by a sensor system that detects and responds to the following:

- a) Ambient light conditions;
- b) Light emitted by oncoming motorcycles, front lighting devices and light signaling

devices;

- c) Light emitted by motorcycles ahead, from rear light signaling devices.

Additional sensor functions that enhance performance are permitted.

Note: "Motorcycle" in this article refers to L, M, N, O category motorcycles and electric bicycles. These motorcycles are deemed to be equipped with retroreflectors and have their lighting and light signaling systems activated.

**5.1.6.3** The high beam headlights shall be manually turned on and off at any time; the automatic high beam control function shall be manually deactivated. Manually deactivating the high beam headlights or the automatic high beam control function shall be simple and straightforward, with no secondary operations.

### **5.1.7 Indicators**

**5.1.7.1** An ON indicator shall be provided, which shall be a non-flashing blue indicator.

**5.1.7.2** Motorcycles equipped with a high-intensity autonomous driving system (HIAS) shall be equipped with a flashing amber HIAS fault indicator. The HIAS fault indicator may be shared with the low beam headlights. When an HIAS fault signal is detected, the high beam headlights shall automatically activate and remain on, until the fault is resolved.

**5.1.7.3** If the high beam headlights have an automatic control function, a message indicating that the automatic high beam control function is activated shall be provided to the driver; this message shall remain displayed while the function is on.

### **5.1.8 Other requirements**

**5.1.8.1** When the high beams are simultaneously on, the maximum luminous intensity shall not exceed 430000 cd. This value shall be obtained by measuring the maximum luminous intensity of each high beam headlight individually and summing the two values while the motorcycle's power system is operating.

**5.1.8.2** When the HIAS function of the high beam headlights fails, the following requirements shall be met without the use of any special tools:

- Shut down and restart the HIAS unit as specified by the manufacturer;
- Reset the high beam lamps. All requirements for headlights without HIAS shall be met for horizontal or vertical alignment. The manufacturer shall provide detailed instructions for restarting the HIAS. Alternatively, the manufacturer may install an automatic system to achieve the above function. In this case, the manufacturer shall provide the necessary equipment and documentation for testing such a system. The effectiveness of the system may be demonstrated by a demonstration test.

**5.1.8.3** Automatically activated high beams must meet the following requirements.

- a) The sensor system used to control the automatic activation and deactivation of the high beams must meet the requirements of 5.1.6.2, within at least the following spatial range:

- 1) Horizontal angle: 15° to the left, 15° to the right;
- 2) Vertical angle: 5° upward, 2° downward.

The above angles are measured relative to a horizontal line passing through the center of the sensor aperture and parallel to the longitudinal plane of symmetry of the motorcycle.

- b) The sensor system must be able to detect the following motorcycles on a straight horizontal path:

- 1) Oncoming motor vehicles at a distance of at least 400 m;
- 2) A motor vehicle or vehicle with a trailer traveling ahead within a distance of at least 100 meters;
- 3) An oncoming electric bicycle within a distance of at least 75 meters.

When testing according to the above requirements, oncoming or preceding motor vehicles or vehicles with trailers must activate their position lights and low-beam headlights. For electric bicycles, a white lamp with a luminous intensity of 150 cd, a luminous surface area of  $(10 \pm 3) \text{ cm}^2$ , a height of 0.8 m above the ground may be used instead.

- c) Automatic switching between high and low beams shall be achieved without causing discomfort, distraction, or glare to the driver.
- d) When the automatic high beam control function is activated, the following conditions must be met when illuminated: When the ambient illumination is no greater than 7000 lx, the sensor must not detect any motorcycles specified in 5.1.6.2 within the area and distance ranges described in 5.1.8.3 a) and 5.1.8.3 b).
- e) When the high-beam automatic control function is activated and in the illuminated state, it shall automatically shut off when the following conditions are met: the sensor detects a motorcycle meeting the requirements of 5.1.6.2 within the area and distance range described in 5.1.8.3 a) and 5.1.8.3 b); or the ambient illuminance exceeds 7000 lx.

**5.1.8.4** The high-beam automatic control system shall be tested as follows.

- a) The requirements of 5.1.8.3 shall be verified by test or by a simulation method approved by the testing organization to demonstrate product compliance. If a test

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