GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 43.020

CCS T 04

GB/T 17867-2023

Replacing GB/T 17867-1999

Location of Hand Controls, Indicators and Tell-tales in Motor Vehicles

汽车手操纵件、指示器及信号装置的位置

(ISO 4040:2009, Road vehicles - Location of hand controls, indicators and tell-tales in motor vehicles, MOD)

Issued on: November 27, 2023 **Implemented on: March 1, 2024**

Issued by: State Administration for Market Regulation;

Standardization Administration of the People's Republic of China.

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Location of Hand Controls, Indicators and Tell-tales in Motor Vehicles

1 Scope

This document specifies the requirements for the arrangement location of vehicle controls, the requirements for stalk control mode, the requirements for the functional combination of multi-function controls, and the display visibility requirements for indicators and tell-tales.

This document is applicable to Category-M and Category-N vehicles.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB 4094 Symbols for Controls, Indicators and Tell-tales of Motor Vehicles

GB/T 4094.2 Electric Vehicles - Symbosl for Controls, Indicators and Tell-tales

GB/T 4782 Road Vehicles - Controls, Indicators and Tell-tales - Vocabulary

GB/T 12673 Motor Vehicle Main Dimensions Measurement Method

GB/T 15089 Classification of Power-driven Vehicle and Trailers

GB/T 29120 Procedure for H-point and R-point Determination (GB/T 29120-2012, ISO 6549:1999, ISO 20176:2006, MOD)

3 Terms and Definitions

The terms and definitions defined in GB 4094, GB/T 4094.2, GB/T 4782, GB/T 12673, GB/T 15089 and GB/T 29120, and the following terms and definitions are applicable to this document.

3.1 reference plane

A vertical plane parallel to the longitudinal axis of the motor vehicle, passing through the steering-wheel axis, and within an area of 50 mm on either side of the designed R-point of the driver's seat.

Description of indexes:

1---display area used by the pointer;

2---display area for other information.

Figure 2 -- Example of Indicator Display Area

3.4 steering-wheel plane

The plane tangent to the upper surface of the steering wheel rim as set by the vehicle manufacturer, with the wheels in a straight-ahead position.

3.5 steering-wheel axis

A straight line passing through the center of rotation of the steering wheel rim and perpendicular to the steering-wheel plane.

3.6 zone 1

The zone located on the left side of the reference plane, and enclosed by the following planes:

---a plane parallel to the steering-wheel plane and at a distance of 20 mm above it;

---a plane parallel to the steering-wheel plane and at a distance of 170 mm below it;

---a cylindrical surface extending 100 mm outward along the outer edge of the steering wheel rim, with its axis coinciding with the steering-wheel axis;

---a cylindrical surface extending 130 mm inward along the inner edge of the steering wheel rim, with its axis coinciding with the steering-wheel axis;

---two planes passing through the steering-wheel axis, and the intersection of the two planes with the steering-wheel plane and the reference plane constitute 40° and 130°.

EXAMPLE: see Figure 3.

3.7 zone 2

The zone enclosed by the following planes:

---a plane parallel to the steering-wheel plane and at a distance of 20 mm above it;

---a plane parallel to the steering-wheel plane and at a distance of 170 mm below it;

---a cylindrical surface with a radius of 50 mm, with its axis coinciding with the steering-wheel axis.

EXAMPLE: see Figure 3.

NOTE 2: see Figure 4.

4 Requirements for the Arrangement and Location of Controls

4.1 The controls include mechanical controls and virtual controls.

4.2 The arrangement and location of the mechanical controls shall satisfy the requirements of 4.3 ~ 4.16. The arrangement and location of the virtual controls should be visible and easy to operate.

4.3 For Category-M_1 vehicles, all controls listed in 4.4 ~ 4.16 shall be arranged within the driver's hand control area. For Category-M_2, Category-M_3 and Category-N vehicles, the controls listed in 4.4 ~ 4.16 shall be arranged within the driver's hand control area when wearing a seat belt.

4.4 If the following devices are controlled by the controls, the operational area of the controls shall be arranged in zone 1:

---headlights (high beam, switching between high beam and low beam, and low beam);

---headlight warning (instantaneous high beam warning);

---turn-signal indicator.

4.5 The master lighting switch shall be arranged on the left side of the reference plane.

4.6 Part of the operational area of the audio (for example, honking horn) controls shall be arranged in zone 1 or zone 2. The auxiliary audio (for example, low-speed tone) controls may be arranged elsewhere, or the operational area can be extended beyond zone 1 and zone 2.

4.7 The parking brake hand control devices shall be arranged on the right side of the reference plane. If space is required, the parking brake hand control devices may also be arranged on the left side of the reference plane.

4.8 The retarder hand controls should be arranged on the right side of the reference plane.

4.9 The shift controls (except paddle shifters) shall be arranged on the right side of the reference plane.

4.10 The windshield washer and wiper controls may be arranged on either side of the reference plane. If there are two or more stalk controls (except the gear shift lever) in zone 3, the windshield washer or wiper shall be operated by the stalk control closest to the steering wheel rim in the operational area of control.

4.11 The ignition switch controls shall be arranged on the right side of the reference plane. For

Category-M_2, Category-M_3 and Category-N vehicles, the ignition switch controls may be arranged on the left side of the reference plane, so as to facilitate operation from outside the vehicle.

NOTE: when starting the vehicle from the outside, additional safety measures shall be considered.

4.12 All or part of the hazard warning controls shall be arranged on the right side of the reference plane. For Category-M_2, Category-M_3 and Category-N vehicles, the hazard warning controls may be arranged on the left side of the reference plane, so as to facilitate operation from outside the vehicle.

4.13 The longitudinal center plane of the head-up display controls should be arranged near the reference plane.

4.14 The panoramic image monitoring controls should be arranged on the right side of the reference plane.

4.15 The reversing assist controls should be arranged on the right side of the reference plane.

4.16 The full-speed self-adaptive cruise controls should be arranged on the left side of the reference plane.

4.17 When the stalk controls arranged on or near the steering column operate various functions (see Figure 4), they should comply with the following stipulations:

a) When operating the master lighting switch, avoid implementing it by the secondary operational surfaces (such as: protective covers and recessed surfaces, etc.) that may be accidentally touched through operation;

b) When switching the headlight beam (high beam, high beam to low beam, and low beam), it shall be approximately parallel to the steering-wheel axis, avoid pointing to the steering-wheel axis, and avoid implementing it by the secondary operational surfaces through operation;

c) When operating the audio (for example, honking horn) control, avoid being approximately parallel to the steering-wheel plane, approximately rotating around the steering-wheel axis, and avoid implementing it by the secondary operational surfaces through operation;

d) When operating the windshield wiper, avoid being approximately parallel to or pointing toward the steering-wheel axis (when the washer starts, the wipers can automatically work), avoid implementing it by the secondary operational surfaces (such as: protective covers and recessed surfaces, etc.) that may be accidentally touched through operation (turn on / off only);

e) When operating the windshield washer, point it toward the steering-wheel axis or approximately parallel to the steering-wheel axis, and avoid implementing it by the

5 Requirements for Functional Combination of Multi-functional Controls

5.1 The following paired functions shall be operated by the same control:

---windshield wiper on / off and windshield washer on / off;

---headlight warning and headlight high beam on / off.

5.2 The master lighting switch shall not share the same control with any of the following devices:

---audio (for example, honking horn);

---windshield wiper;

---windshield washer;

---turn-signal indicator.

If the master lighting switch adopts a certain operation mode that needs to be avoided in 4.17, then, the combination of the master lighting switch with the switch of the above device is allowed.

5.3 For Category-N vehicles, the turn-signal light and retarder functions should not be operated by the same control.

6 Display Visibility Requirements

6.1 At least one type of speed indicator display area shall comply with the visibility requirements when there is no head movement.

6.2 When the following indicators display a critical state, the display area required to identify and indicate the critical state shall comply with the visibility requirements when there is no head movement; the remaining part of the display area shall also comply with the visibility requirements during head movement:

---fuel quantity;

---power battery capacity;

---oil pressure;

---engine coolant temperature;

---air brake tank pressure.

6.3 When the following tell-tales display an alarm / fault / failure status, their identifications shall comply with the visibility requirements when there is no head movement; the remaining part of the display area shall also comply with the visibility requirements during head movement:

---brake system fault;

---brake anti-lock system fault;

---engine on-board diagnosis or engine fault;

---fuel quantity alarm;

---low state-of-charge alarm;

---oil pressure alarm;

---engine coolant temperature alarm;

---power battery fault;

---drive motor fault;

---power battery high-temperature alarm;

---tyre pressure abnormality alarm;

---forward collision warning fault / failure;

---automatic emergency brake fault / failure;

---lane departure warning fault / failure;

---lane departure suppression fault / failure;

---driver attention monitoring fault / failure;

---blind spot monitoring fault / failure;

---door opening warning fault / failure;

---lane centering control fault / failure.

6.4 For Category-M_1 vehicles, the identifications of the following indicators shall comply with the visibility requirements when there is no head movement. For Category-M_2, Category-M_3 and Category-N vehicles, the identifications of the following indicators shall comply with the visibility requirements when head movement is allowed. The remaining part of the display area shall also comply with the visibility requirements during head movement:

---power battery temperature;

---engine coolant temperature.

6.5 For Category-M_1 vehicles, the identifications of the following tell-tales shall comply with the visibility requirements when there is no head movement. For Category-M_2, Category-M_3 and Category-N vehicles, the identifications of the following tell-tales shall comply with the visibility requirements when head movement is allowed. The remaining part of the display area shall also comply with the visibility requirements during head movement:

---parking brake;

---front high beam signal lamp;

---turn-signal lamp;

---hazard warning light;

---seat belt alert;

---fuel quantity;

---power battery capacity;

---automatic transmission (if arranged on the dashboard);

---loading and dumping;

---cab lock alarm;

---forward collision warning on / off / alarm;

---automatic emergency braking on / off / activated;

---lane departure warning on / off / alarm;

---lane departure suppression on / off / alarm;

---driver attention monitoring on / off / alarm;

---door opening warning on / off / alarm;

---emergency steering assist activated;

---release-grip alarm.

6.6 When a certain function is displayed with both indicators and tell-tales, it only needs to comply with one of the stipulations of 6.2, 6.3, 6.4 or 6.5.

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