INTERNATIONAL STANDARD

ISO 4040

Third edition
1997-06-01

Passenger cars — Location of hand controls, indicators and tell-tales

Voitures particulières — Emplacement des commandes manuelles, des indicateurs et des témoins

Reference number
ISO 4040:1997(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4040 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 13, *Ergonomics applicable to road vehicles.*

This third edition cancels and replaces the second edition (ISO 4040:1983), which has been technically revised.

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Introduction

There is a recognized potential for errors in the selection of controls essential to the safe operation of a vehicle if these controls are not similarly located in all vehicles. Therefore the standardization of these control locations must be considered a logical and beneficial design objective since drivers have an ever-increasing opportunity to change from one vehicle to another.

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Passenger cars — Location of hand controls, indicators and tell-tales

1 Scope

This International Standard lays down the location of the controls in road vehicles, by subdividing the space within reach of drivers into specific zones to which certain controls essential to the safe operation of vehicles are assigned.

It also specifies certain combinations of functions for multifunction controls and the degree to which certain indicators and tell-tales shall be visible.

A specification for a control, indicator or tell-tale does not imply that the item must be fitted.

This International Standard applies to hand-operated controls, to indicators, and to tell-tales for left and right-hand drive passenger cars as defined in ISO 3833.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2575:1995, *Road vehicles — Symbols for controls, indicators and tell-tales.*

ISO 3833:1977, *Road vehicles — Types — Terms and definitions.*

ISO 3958:1996, *Passenger cars — Driver hand-control reach.*

ISO 4513:1978, *Road vehicles — Visibility — Method for establishment of eyellipses for driver's eye location.*

ISO 6549:—[1], *Road vehicles — Procedure for H-point determination.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 reference plane: Vertical plane parallel to the longitudinal axis of the car within a zone 50 mm to either side of the centre of the designated seating position for the driver at the R-point as defined in ISO 6549.

1) To be published. (Revision of ISO 6549:1980)

3.2 operational area of a control: Area swept by those parts of a control which are activated by the hand while the possible modes or positions are selected in the manner intended by the designer. (See figure 1, for example.)

3.3 display area of an indicator or tell-tales: Area which includes the identification of the quantity displayed and those portions required to determine its level at any point within the usable capacity of the instrumentation. It need not include, for example, bezels or the manufacturer's type number. (See figure 2, for example.)

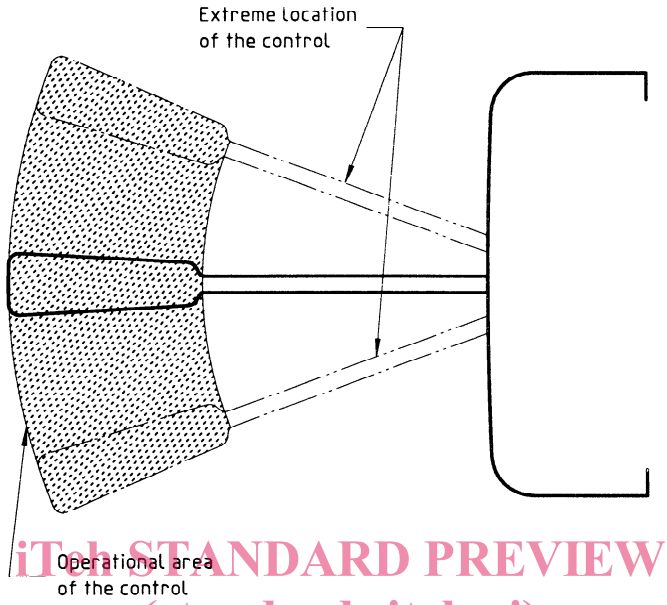

Figure 1 — Example of operational area of a control

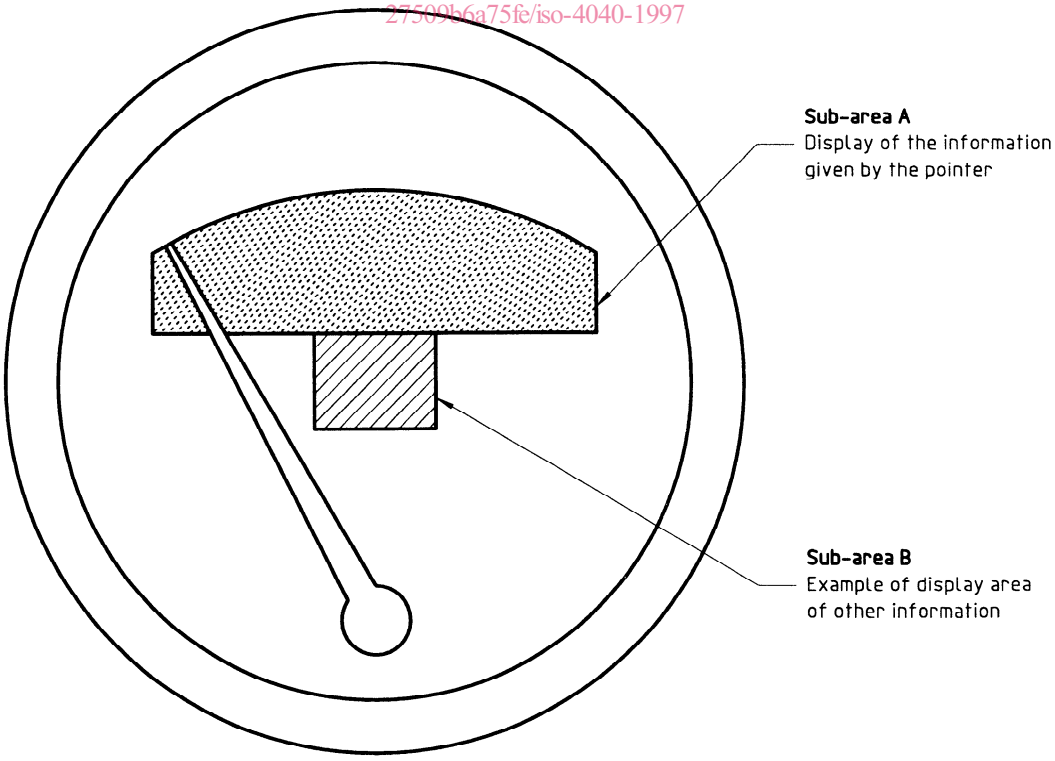

Figure 2 — Example of display area of indicators

3.4 steering-wheel plane: Plane passing through the upper surface of the steering-wheel rim in the design condition, as designated by the vehicle manufacturer, and with the vehicle wheels in the straight-ahead position.

3.5 steering-wheel axis: Line at right angles to the steering-wheel plane, passing through the centre of rotation of the steering-wheel rim.

3.6 zone one: Volume to the left of the reference plane bounded by the following surfaces (see figure 3):

— a plane parallel to the steering-wheel plane and 20 mm above it;

— a plane parallel to the steering-wheel plane and 170 mm below it;

— a cylinder which extends 100 mm beyond the periphery of the steering-wheel rim and whose axis is on the steering-wheel axis;

— a cylinder which lies 130 mm inside the periphery of the steering-wheel rim, and whose axis is on the steering-wheel axis;

— two planes which intersect along the steering-wheel axis, and whose intersections with the steering-wheel plane are at 40° and 130° from the reference plane.

3.7 zone two: Volume bounded by the following surfaces (see figure 3):

— a plane parallel to the steering-wheel plane and 20 mm above it;

— a plane parallel to the steering-wheel plane and 170 mm below it;

— a cylinder of 50 mm radius whose axis is on the steering-wheel axis.

3.8 zone three: Volume to the right of the reference plane bounded by the following surfaces (see figure 3):

— a plane parallel to the steering-wheel plane and 20 mm above it;

— a plane parallel to the steering-wheel plane and 170 mm below it;

— a cylinder which extends 100 mm beyond the periphery of the steering-wheel rim and whose axis is on the steering-wheel axis;

— a cylinder which lies 130 mm inside the periphery of the steering-wheel rim and whose axis is on the steering-wheel axis;

— two planes which intersect along the steering-wheel axis and whose intersections with the steering-wheel plane are at 40° and 130° from the reference plane.

3.9 visible: Seen with one eye or the other, not necessarily both eyes simultaneously, from all positions within the 95th percentile eyellipses (see ISO 4513) with the gear selector in top gear or drive position and the steering-wheel in the straight-ahead position.

3.10 head movement: Movement required to overcome a geometric obstruction. (For the purposes of this International Standard, it does not include the movement when the target is more than 30° from the line of sight.)

3.11 identification: Symbol, written label, or some portion of the pointer and scale by which a driver can distinguish the characteristic displayed by the control, the indicator, or the tell-tale.

3.12 passive restraint readiness indicator: Tell-tale or indicator which indicates a malfunction that will prevent or impede the operation of a passive restraint in the designed manner.

Dimensions in millimetres

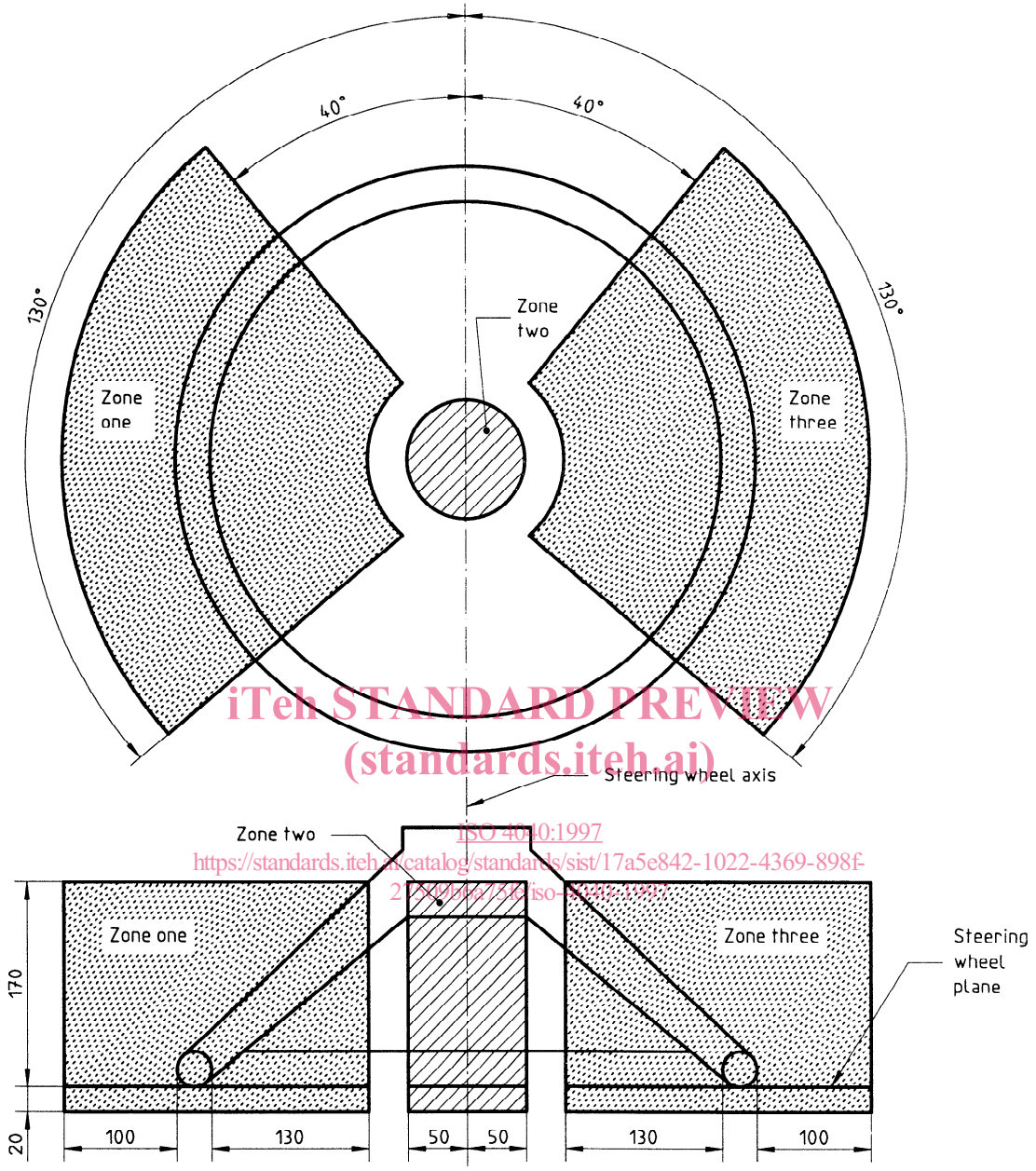

Figure 3 — Location of zones

3.13 stalk control: Rigid, elongated control device with a visible length at least five times as great as the least cross-sectional dimension. This device may be fixed or movable and located on the steering column or instrument panel. The operational area is located within the restrained reach of the driver (see ISO 3958).

3.14 touch control: Control requiring minimal displacement to operate.

3.15 proximity control: Control which requires no displacement to operate.

3.16 operational surface: Interface (of the knob, lever, button, etc.) used to activate a control system.

3.17 secondary operational surface: Operational surface mounted on, and external to, another operational surface. This does not include buttons on the end of a stalk control. (See figure 4.)

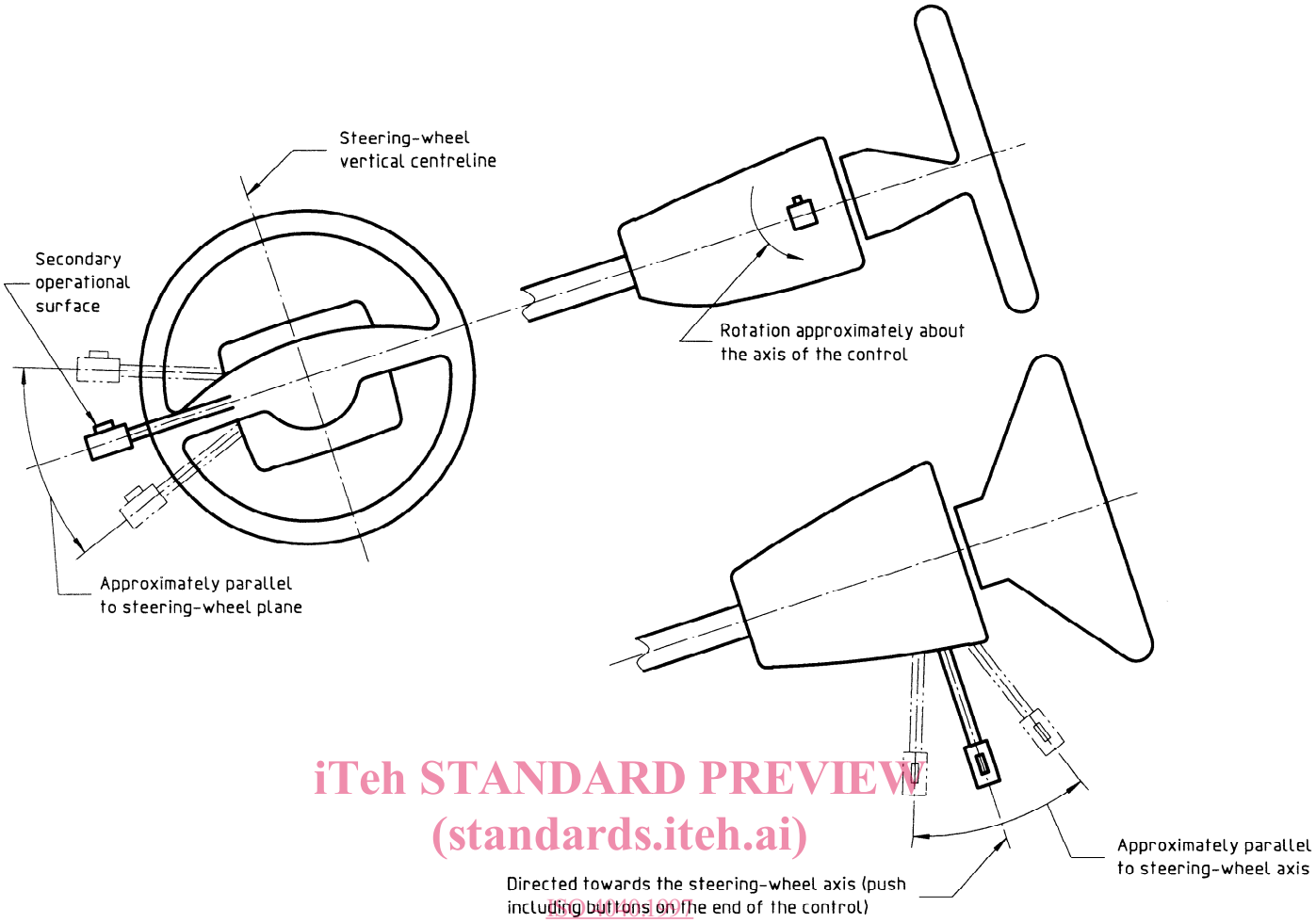

Figure 4 — Modes of operation for stalk controls

4 Requirements for location of controls

4.1 The controls listed in subclauses 4.2 to 4.9 shall be within the restrained reach of drivers as defined in ISO 3958.

4.2 The operational areas of the following controls shall be located in zone one:

— headlights beam switching;

— headlights optical warning;

— turn signal direction indicator.

4.3 The operational area of the following controls shall be located to the left of the reference plane:

— master lighting control (left-hand drive only);

— hand-operated parking brake (right-hand drive only).

4.4 A portion of the operational area of a control for the audible warning (horn) shall be located either in zone one or in zone two.

Additional audible warning controls may be located elsewhere, or may have operational areas that extend beyond these zones.