



Technical Report

ISO/TR 7997

Road vehicles — Control type and layout of transmission gear shifters and drive mode selectors

*Véhicules routiers — Type de commande et disposition des
sélecteurs de vitesse de transmission et des sélecteurs de mode de
conduite*

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Foreword

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 39, *Ergonomics*.

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Introduction

The operation of road vehicle transmission gear shifters (referred to simply as shifters) results in changes to vehicle motion: parked, moving rearward, freewheeling (neutral), or moving forward. Drive mode selectors (referred to as selectors) change the vehicles' driving characteristics without changing the direction of motion. Therefore, shifter and selector types, layouts, directions of control motion, locations, and feedback displays are designed to promote intuitive control usage.

Mechanical transmission gear shifters for manual and automatic transmissions have been industry standards until recently when electro-mechanical and electronic shifters (e-shifters) were introduced with a range of novel shifter types, layouts and locations. The concern is that when customers drive unfamiliar or newly purchased vehicles, novel usage of electronic shifters can be confusing or using it results in misoperations.

Moreover, operation of a transmission gear shifter to make changes to vehicle motion, can be coupled with the selection of different drive modes. Similar to electronic shifters, current drive mode selectors also appear in a wide variety of control types, locations, labelling and feedback types. However, unstandardized naming such as sport, eco, comfort and off-road among others, creates potential for confusion and lack of understanding the consequences of selecting specific drive modes.

In an effort to reduce or eliminate misoperations of vehicle motion and drive mode controls, this document presents a state-of-the-art survey, with an analysis of the most common features, as well as trends on control motion patterns as a function of control type, layout, location, and feedback type, for both transmission gear shifters and drive mode selectors.

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Road vehicles — Control type and layout of transmission gear shifters and drive mode selectors

1 Scope

This document describes the type, layout, location, and feedback display of available electro-mechanical and electronic transmission gear shifters found in passenger cars (including sport utility vehicles and light trucks) and in commercial vehicles (including heavy trucks and buses). The transmission gear shifters are located on the steering column, instrument panel, floor and centre consoles. Specifically, this document addresses shift by-wire electro-mechanical selectors that adapt the control of vehicle movement according to road conditions and personal preference. Conventional mechanical shifters are also referenced so correspondence between traditional linear P, R, N, D, L, M/S control types, layouts, locations and direction of control motions and electro-mechanical/electronic transmission gear shifters (simply, e-shifters) can be established.

This document is based on observations and survey results described in [Annexes A](#) and [B](#) for passenger cars and commercial vehicles respectively. The results are independent of vehicle propulsion systems and define the layout, spatial orientation and control movement patterns for the following drive functions:

- drive (D=forward movement),
- reverse (R=rearward movement),
- park (P=stationary),
- neutral (N=freewheeling to allow stationary or forward-reverse without drive functions engaged),
- low (L=remain in low gear),and/or
- manual or sequential (M or S to engage manual drive mode).

The control types of the transmission gear shifters that are within scope of this document are lever (pivot, slider and gated), dial/rotary, push button and toggle switch. Paddle shifters and 'automatic-manual shifters' are not specifically included in the scope. However, they are referenced so that if a transmission gear shifter has a 'manual mode' by which drive gear control is transferred to or shared with the paddle or automatic-manual transmission it is identified.

This document also identifies control types, location and feedback displays of drive mode selectors. Their control types within scope are lever, dial/rotary, push button, toggle/rocker switch, touch screen and steering wheel paddle switches. These are located in the centre console, steering wheel or instrument panel of the vehicle. Various types of visual, auditory or haptic feedback correspond to display activations, control positions, and graphical representations in the head-up display, centre console, instrument panel, display audio or instrument cluster display. This document does not specifically include head-up displays, but it is foreseeable that graphical representations could appear in future head-up displays.

Leaving the limitations of mechanical shifters means control freedom gets bigger. It is therefore likely that control types as well as the combination of transmission and brake functions will continue to develop. In this document, specific details about hybrid or electric drives are excluded. The same is in general valid for engine brake, auxiliary brake, or regeneration/recuperation programs. However, brake functions are to some extent still mentioned as part of drive modes found in the surveys. For commercial vehicles, and with the continued introduction of electric drivelines, these brake programs are likely to get even more related to different drive modes. It is foreseen that more information can be added at later stage, as separate ISO documents.