INTERNATIONAL STANDARD

ISO 21281

First edition
2005-02-15

Construction and layout of pedals of self-propelled sit-down rider-controlled industrial trucks — Rules for the construction and layout of pedals

Construction et configuration des pédales des chariots de manutention automoteurs à conducteurs assis — Règles de construction et de configuration des pédales

Reference number
ISO 21281:2005(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 21281 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 150, *Industrial trucks — Safety*, in collaboration with Technical Committee ISO/TC 110, *Industrial trucks*, Subcommittee SC 2, *Safety of powered industrial trucks*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Introduction

The use of industrial trucks differs essentially from that of road vehicles, which are mainly driven in the forward direction. Industrial trucks, especially forklift trucks as working machines, have

— a high share of movement in the backward direction,

— frequent change of direction of movement, and

— relatively low speed.

They often are used with attachments. According to the specific requirements, industrial trucks are equipped with optimized controls. In certain types of driving units (e.g. hydrostatic, electrical), the driving mechanism also acts as a brake.

This International Standard covers the most frequently used pedal layouts. Other pedal arrangements for travelling are possible provided that the new ergonomic results are considered.

Construction and layout of pedals of self-propelled sit-down rider-controlled industrial trucks — Rules for the construction and layout of pedals

1 Scope

This International Standard specifies the layout of pedals of self-propelled sit-down rider-controlled industrial trucks, as defined in Parts 1, 2, 3 and 6 of ISO 3691.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3691-1:—[1)], *Industrial trucks — Safety requirements and verification — Part 1: Self-propelled industrial trucks, other than driverless, variable-reach trucks and burden-carrier trucks*

ISO 3691-2, *Industrial trucks — Safety requirements and verification — Part 2: Self-propelled variable-reach trucks*

ISO 3691-3, *Industrial trucks — Safety requirements and verification — Part 3: Additional requirements for trucks with elevating operator position and trucks specifically designed to travel with elevated loads*

ISO 3691-6, *Industrial trucks — Safety requirements and verification — Part 6: Burden and personnel carriers*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The forward direction of travel is defined in ISO 3691-1:—, Annex A.

3.1
pedal
exclusively foot-operated control

3.2
service brake pedal
pedal controlling the service brake

3.3
clutch pedal
pedal controlling the engagement of the engine to the transmission

NOTE The final movement may also apply the service brakes.

1) To be published. (Revision of ISO 3691:1980)

3.4
inching pedal
pedal controlling slow travel of the truck at any engine speed

NOTE The final movement applies the service brakes.

3.5
accelerator pedal
pedal controlling the rotational speed of the engine or motor

NOTE It may, where applicable, control the transmission ratio and/or the direction of travel.

3.6
direction-control pedal
pedal controlling the direction of travel only

4 Requirements

The pedal layout and construction shall ensure a comfortable position for the operator, moderate operating efforts and a small number of operations, taking ergonomic principles into consideration.

If a service brake pedal is fitted, it shall be depressed to apply the brakes and shall be capable of being activated by the operator's right foot. The service brake may also consist of two adjacent pedals capable of allowing braking of the left and right wheels separately or both together. If a combined brake pedal for inching and braking is used, it shall be capable of being operated with the left foot or both feet. Operation of the service brake pedal(s) shall not be hindered by the simultaneous use of other controls.

If service braking is effected by means other than a brake pedal, the area normally occupied by the brake pedal shall remain free.

If a clutch pedal is fitted, it shall be depressed to declutch. The final movement may also, when the facility is provided, apply the service brake. It shall be capable of being operated by the operator's left foot.

If an inching pedal is fitted, it shall be depressed to disengage the transmission and apply the service brake. It shall be capable of being operated by the operator's left foot. If there is no separate means of applying the service brake, the inching pedal shall be a single pedal capable of being operated equally by either foot.

If an accelerator pedal or pedals is/are fitted, depression of the pedal shall increase the speed, but may also reduce the speed when the truck is in motion and reverse traction is selected. Release of the pedal may provide retardation of travel speed.

If a hand-operated direction control and an accelerator pedal are fitted (see Table 1, Type I), the accelerator pedal shall be located to the right of the brake pedal.

If foot-operated direction control is fitted, the direction of travel may be selected by actuating either a direction change pedal or one or two pedals that select the direction of travel and also perform the function of the accelerator pedal (see Table 1, types II and III).

5 Identification

Pedal function shall be clearly indicated in the operator's manual. Where the travel direction is controlled by pedal(s), its/their function(s) shall also be clearly and durably marked on the truck. This marking may be direction arrow(s) on the relevant pedal(s).

6 Design and manufacture

Pedals shall be designed and constructed in such a way that their strength is compatible with the forces to which they are normally subjected.

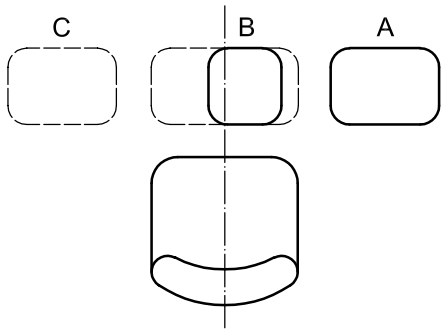
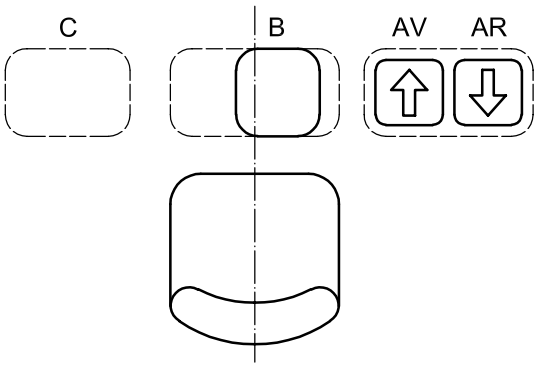
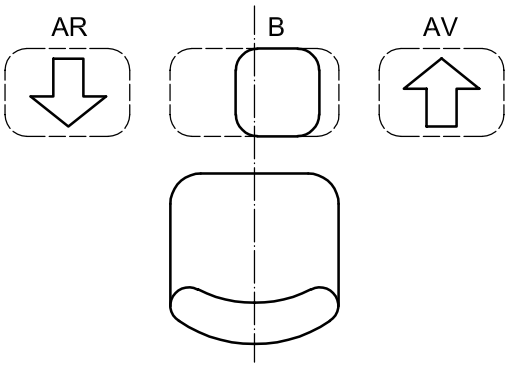
The release of all pedals shall ensure their automatic return to their original positions.

The surface of all pedals shall be slip resistant.

7 Pedal layouts

The pedal layouts in common use to date, shown in Table 1, comply with the requirements of this International Standard. Other pedal arrangements resulting from technical progress or new operating conditions are admissible only if they comply with the general requirements of this International Standard and allow an equivalent degree of safe truck control.

Table 1 — Pedal layout

Type	Example	Description
I		Direction change controlled by hand Accelerator controlled by right foot
II		Direction change controlled by right foot Accelerator controlled by right foot
III		Direction change controlled by both feet Accelerator controlled by both feet

A = Accelerator pedal

AV = Accelerator pedal for forward direction of travel

AR = Accelerator pedal for reverse direction of travel

B = Brake pedal or inching (and brake) pedal, or free space, or optional combined brake pedal

C = Clutch pedal or inching pedal

The minimum requirements for pedal layouts are shown by solid lines.

The dotted lines indicate:

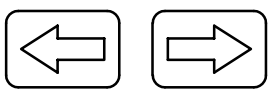
— optional clutch pedal C for types I and II;

— optional combined accelerator pedal AV/AR for type II;

— for all types, brake pedals B may extend partly to the left of the seat longitudinal axis.

NOTE 1 The shape may differ in practice from the representations.

NOTE 2 When the operator is seated sideways in a stationary driving position, 90° from the travel direction, and the travel direction is selected by the pedals, the arrows on the pedals correspond to the travel direction selected.



ICS 53.060

Price based on 4 pages