INTERNATIONAL STANDARD

ISO 12643-5

Second edition
2023-11

Graphic technology — Safety requirements for graphic technology equipment and systems —

Part 5: Manually-fed stand-alone platen presses

Technologie graphique — Exigences de sécurité pour les systèmes et l'équipement de technologie graphique —

Partie 5: Presses à plateaux autonomes manuelles

Reference number
ISO 12643-5:2023(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 130, *Graphic technology,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 198, *Printing and paper machinery — Safety,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 12643-5:2010), which has been technically revised.

The main changes are as follows:

— in Clause 3, definitions for different operation modes (single stroke mode, dwell mode, continuous operation mode) have been added;

— in 4.2, figures showing examples for safeguarding side access have been included;

— in 4.3, the requirements for safeguarding access from the front side have been revised, differentiating the requirements for small platen presses with a platen table width less than or equal to 1 m and large ones with a platen table width wider than 1 m;

— in 4.4, requirements for the positioning of laser scanners have been included;

— in 4.5, requirements when using vision based protective devices (VBPD) for the detection of persons on the platen, including calculation of the safety distance have been included;

— in 4.6, the requirements for timer controlled operation have been revised;

— in 4.7, the requirements for stopping distance and performance have been revised;

— in Clause 6, requirements for the content of the instruction handbook have been added;

— the list of significant hazards has been moved to an informative Annex A.

This document is intended to be used in conjunction with ISO 12643-1:2023.

A list of all parts in the ISO 12643 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is a type-C standard as stated in ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organisations, market surveillance, etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e. g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

During the development of this document, existing relevant standards of other countries were taken into consideration. In cases where it was known that there is a national requirement that differs from this document, that has been noted.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

The full set of requirements for graphic technology equipment and systems are those given in the part of ISO 12643 applicable to that type, together with the relevant requirements from ISO 12643-1:2023, to the extent specified in the Scope of the applicable part of the ISO 12643 series.

This document supplements and modifies the general requirements of ISO 12643-1:2023. Where a requirement of this document conflicts with a requirement of ISO 12643-1:2023 the requirement of this document will take precedence.

Graphic technology — Safety requirements for graphic technology equipment and systems —

Part 5:
Manually-fed stand-alone platen presses

1 Scope

This document provides safety requirements specific to stand-alone platen presses.

This document provides additional safety requirements for the design and construction of manually-fed stand-alone platen presses, for single stroke mode, dwell mode, and continuous operation mode for cutting and creasing, embossing, foil stamping and/or printing of paper, board and other materials processed in a similar manner.

This document does not apply to presses designed to handle metal material other than foil.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 12643-1:2023, *Graphic technology — Safety requirements for graphic technology equipment and systems — Part 1: General requirements*

ISO 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design*

ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

ISO 13856-2:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

IEC 61496-1:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests*

IEC 61496-3:2018, *Safety of machinery — Electro-sensitive protective equipment — Part 3:Particular requirements for active opto-electronic protective devices responsive to diffuse reflection (AOPDDR)*

IEC/TS 61496-4-3:2015, *Safety of machinery — Electro-sensitive protective equipment — Part 4-3: Particular requirements for equipment using vision based protective devices (VBPD) — Additional requirements when using stereo vision techniques (VBPDST)*

IEC 62061:2021, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12643-1:2023 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
protective device
safeguard other than a guard

Note 1 to entry: Examples of protective devices include, but are not limited to, hold-to-run controls, two-hand controls, ESPDs, etc.

3.2
trip bar
knee bar
protective bar that, when pushed, activates the interlocking safety system of the machine

Note 1 to entry: A trip bar can be a metal bar or a pressure sensitive edge.

3.3
stand-alone platen press
self-contained machine not intended to be used as part of an integrated manufacturing system

3.4
single stroke mode
operation mode of platen presses in which the movable platen is operator activated for each stroke

3.5
dwell mode
operation mode of platen presses in which the movable platen operates with time-controlled operation before each stroke with a time delay pre-set by the operator

3.6
continuous operation mode
operation mode of platen presses in which the movable platen operates each stroke without any time delay between preceding and following stroke

3.7
width
<platen press> outer dimension of the movable platen table on the operator side

Note 1 to entry: See Figure 1.

3.8
depth
<platen press> dimension from the outer edge of the movable platen table on the operator's side to the die cutting plane when fully open

Note 1 to entry: See Figure 1.

4 Safeguarding of significant hazards

4.1 General safeguarding requirements

Safeguarding shall be provided in those areas where it is recognized that operators are exposed to significant hazards. The guarding requirements of ISO 12643-1:2023 apply. Guard construction shall meet the requirements as specified in ISO 14120:2015. All manually-fed stand-alone platen presses with a platen table width less than or equal to 1 m and with a platen table depth less than or equal to 850 mm shall have trip bar(s) or other protective devices in accordance with 4.3 and located where access to a hazard is possible.

For platen presses greater than 1 m width and where the depth of the platen table is longer than 850 mm U-shaped trip bars are not accepted as the only safeguard. In this case, presence detection, such as electro-sensitive protective device (ESPD), shall be provided.

The hazards created by the movable platen shall be guarded by the use of an interlocking knee bar (see Figure 1, key item 7) and a U-shaped trip bar (see Figure 1, key item 2).

The length of the knee bar shall be equal to or greater than the width of the movable platen. The knee bar shall be constructed such that it will retain its shape to ensure actuation of the trip function throughout its length. With the movable platen in the open position, the clearance between the knee bar and front surface of the movable platen shall be at least 120 mm. (see Figure 1, key item 7).

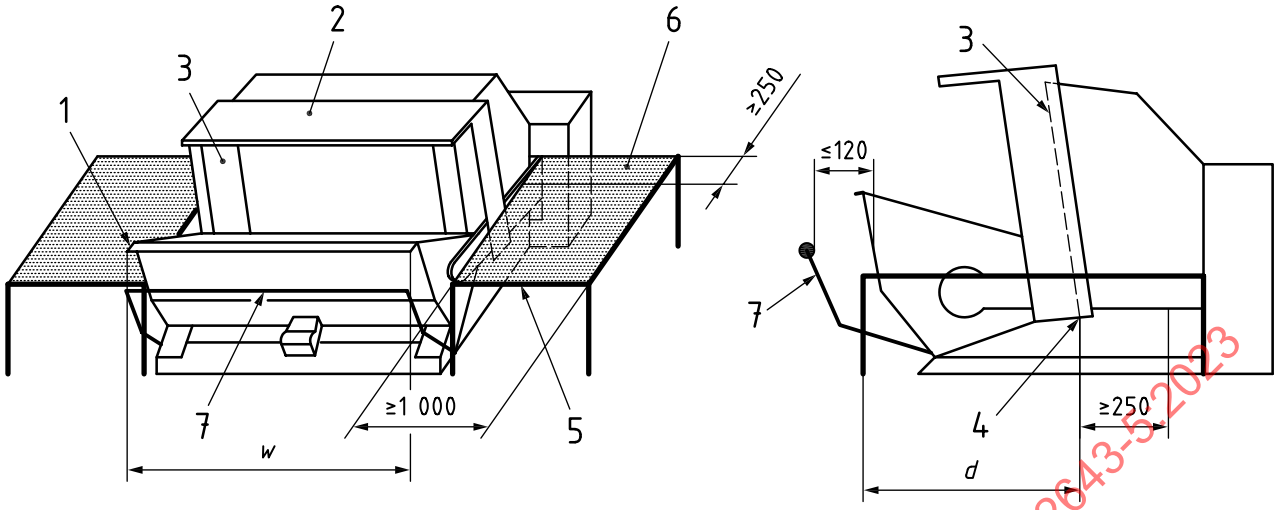
On platen presses with a platen table width greater than 1 m presence detection shall detect anyone on the bed of the movable platen and prevent start-up when the presence of a person is detected, and the platen press is stopped. Further movement shall require the operation of a reset control and a separate manual restart.

Presence detection can be by means of (a) laser scanner(s), vision based protective devices (VBPD) or another equally effective electro-sensitive protective device(s) (ESPD).

All mechanical trip bars shall be provided with a switch mounted on each end of the trip bar.

Trip functions using mechanical devices (including knee bars) shall satisfy the requirements of ISO 13856-2:2013 and PL e of ISO 13849-1:2023 or SIL 3 of IEC 62061:2021. Trip functions or presence sensing functions using laser scanners, VBPD or light curtains shall satisfy the requirements of PL d of ISO 13849-1:2023 or SIL 2 of IEC 62061:2021.

Dimensions in millimetres



Key

1	trip bar on movable platen	6	interlocking table
2	U-shaped trip bar on fixed platen	7	knee bar
3	fixed platen	*w*	width of platen press
4	lower edge of fixed platen	*d*	depth of platen press
5	front edge of interlocking table		

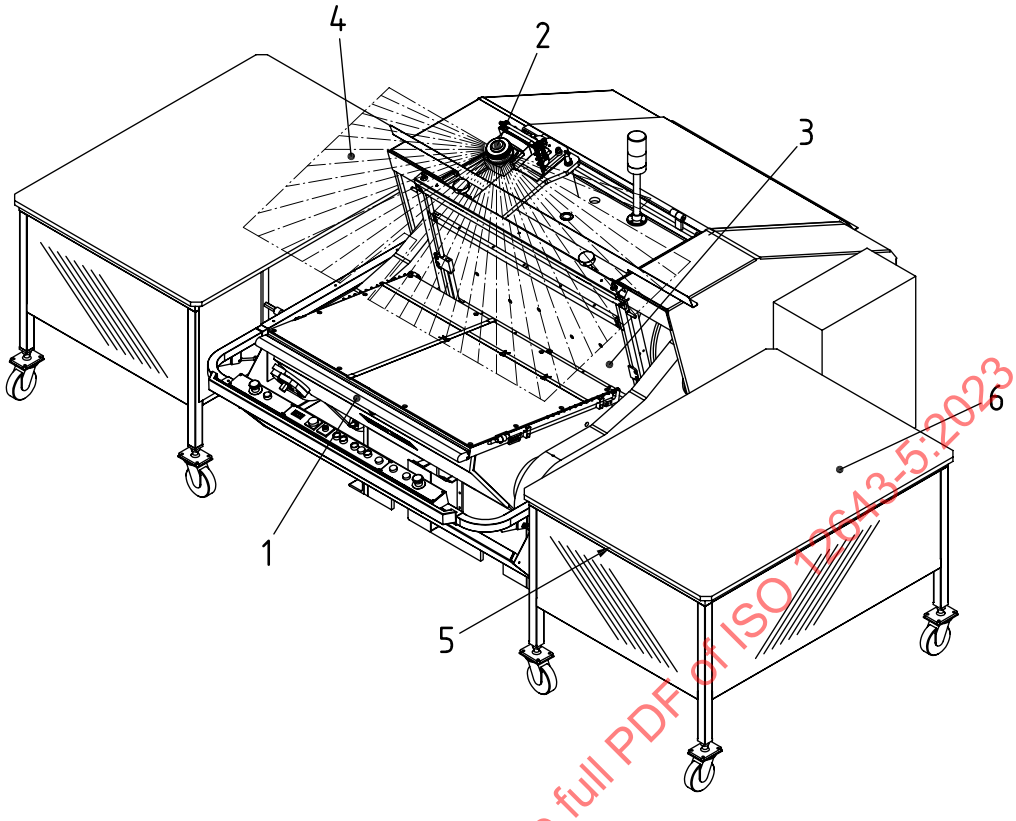
Figure 1 — Trip bars, interlocking tables and position of knee bar

4.2 Safeguarding side access

The access from the side of the platen press shall be prevented. This can be realized by one or a combination of the following measures:

a) interlocking tables that prevent access, from either side of the press according to ISO 13857:2019, Tables 2 and 4. See Figure 2 and Figure 3.

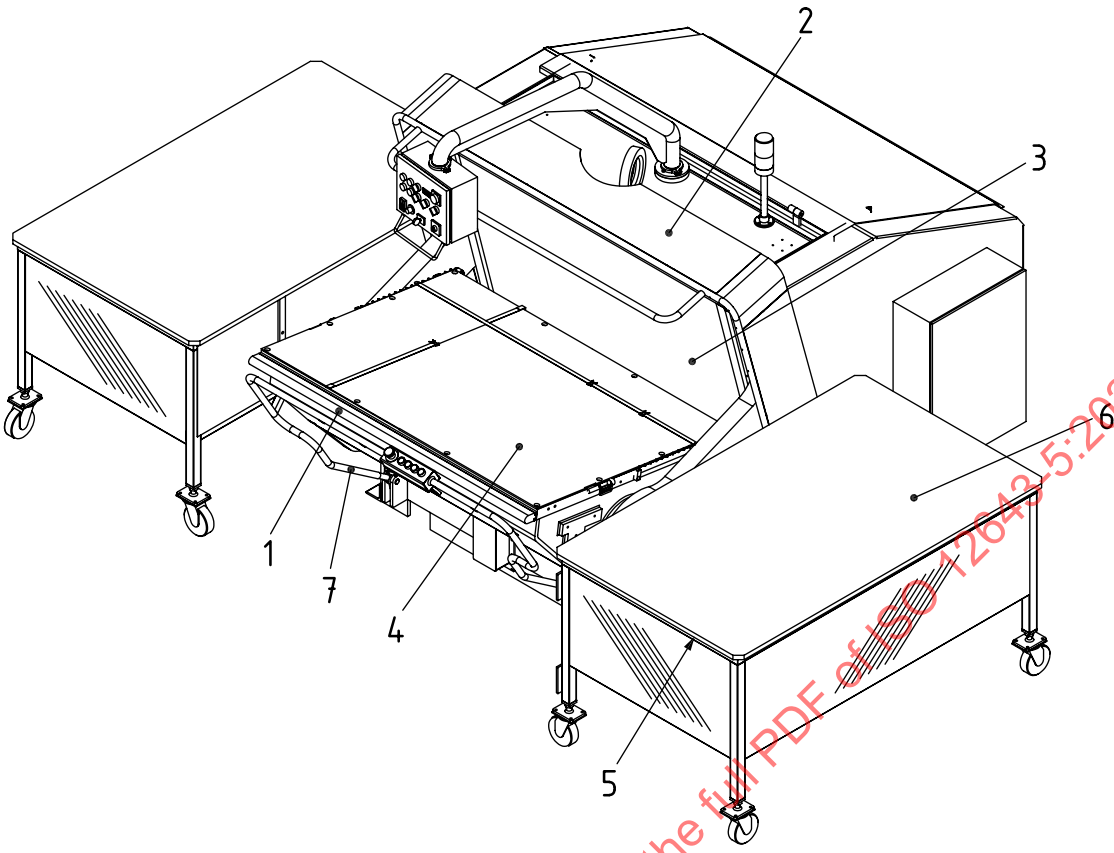
   The minimum height of the interlocking tables shall be 1 000 mm. The interlocking tables shall be designed in such a way that it prevents a person crawling underneath or climbing on top of the interlocking table. This can be achieved, for example, by completely covering the sides of the interlocking tables.



Key

1	trip bar on movable platen	4	scanned area on the top
2	laser scanner on the top	5	front edge of interlocking table
3	fixed platen	6	interlocking table

Figure 2 — Use of a combination of interlocked tables at the side and laser scanner on the top (personal detection device) to safeguard side access on platen presses with a platen table width greater than 1 m

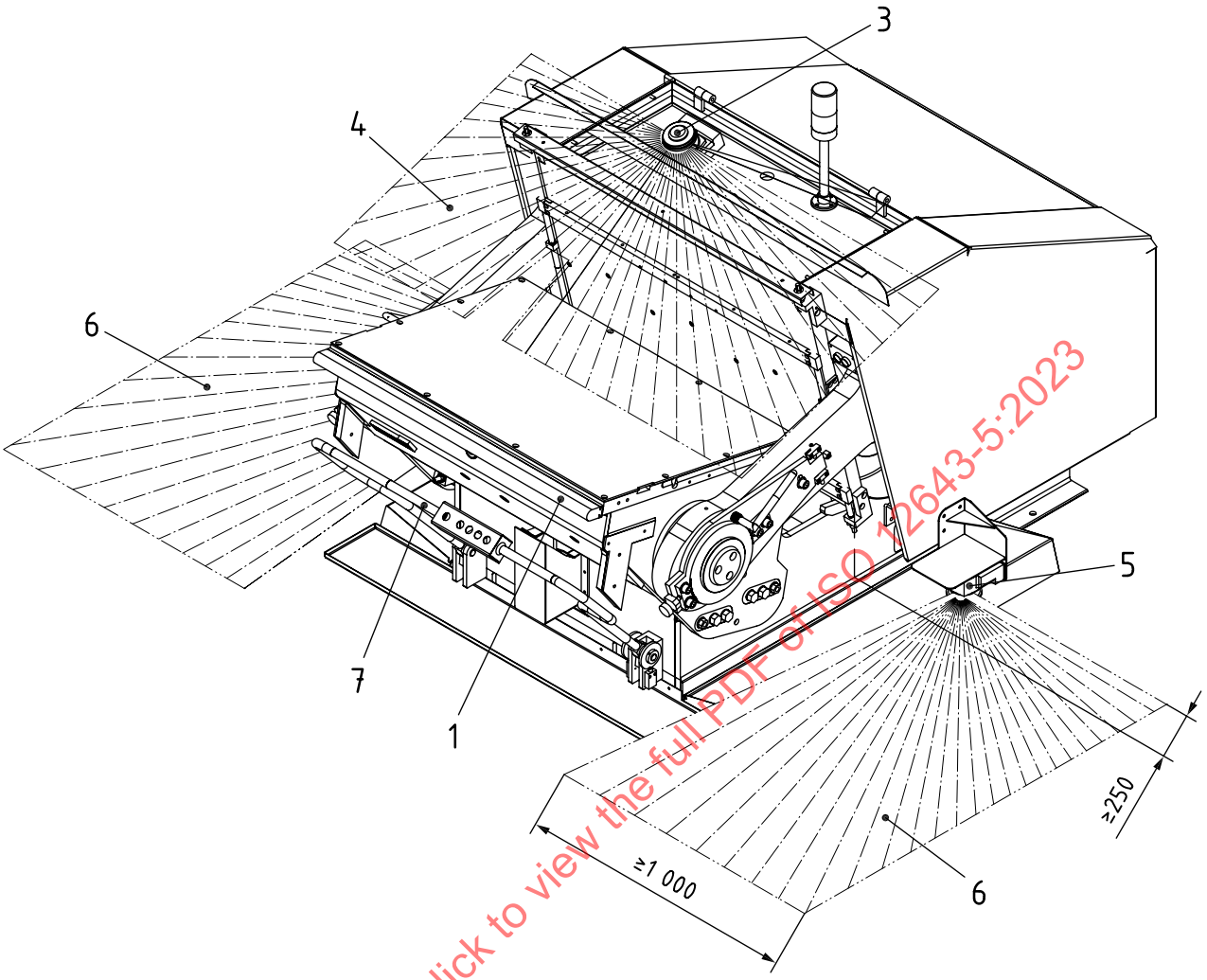


Key

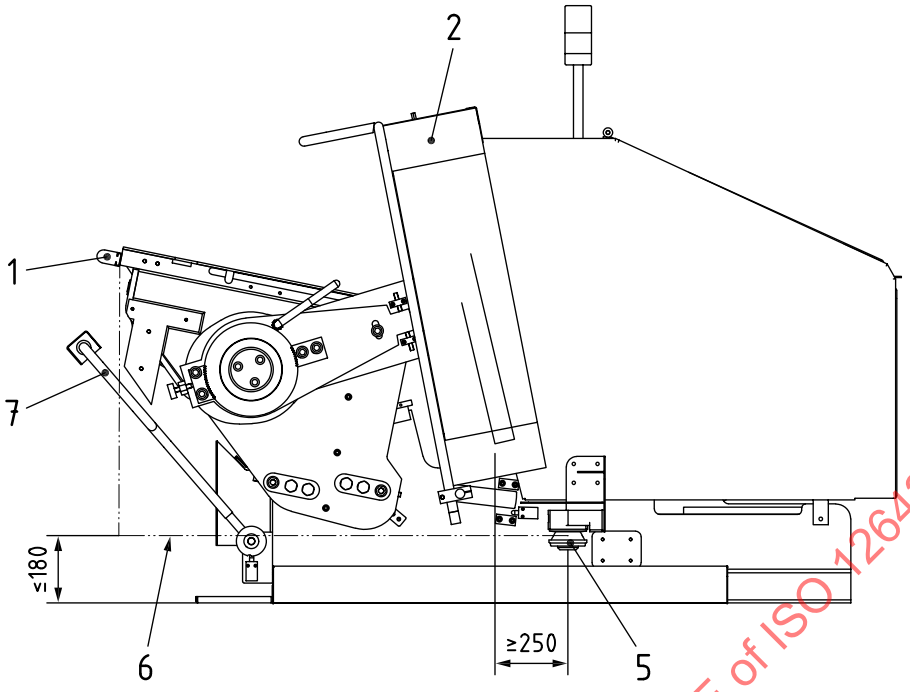
1	trip bar on movable platen	5	front edge of interlocking table
2	U-shaped trip bar on fixed platen	6	interlocking table
3	fixed platen	7	knee bar
4	moveable platen		

Figure 3 — Use of interlocking tables to safeguard side access on platen presses with a platen table width less than or equal to 1 m

b) Laser scanners on the side that detect access sideways and positioned in such a way that the scanned field is parallel and at a maximum distance of 180 mm to the floor. See Figures 4 a) and 4 b).



a) General view



b) Side view

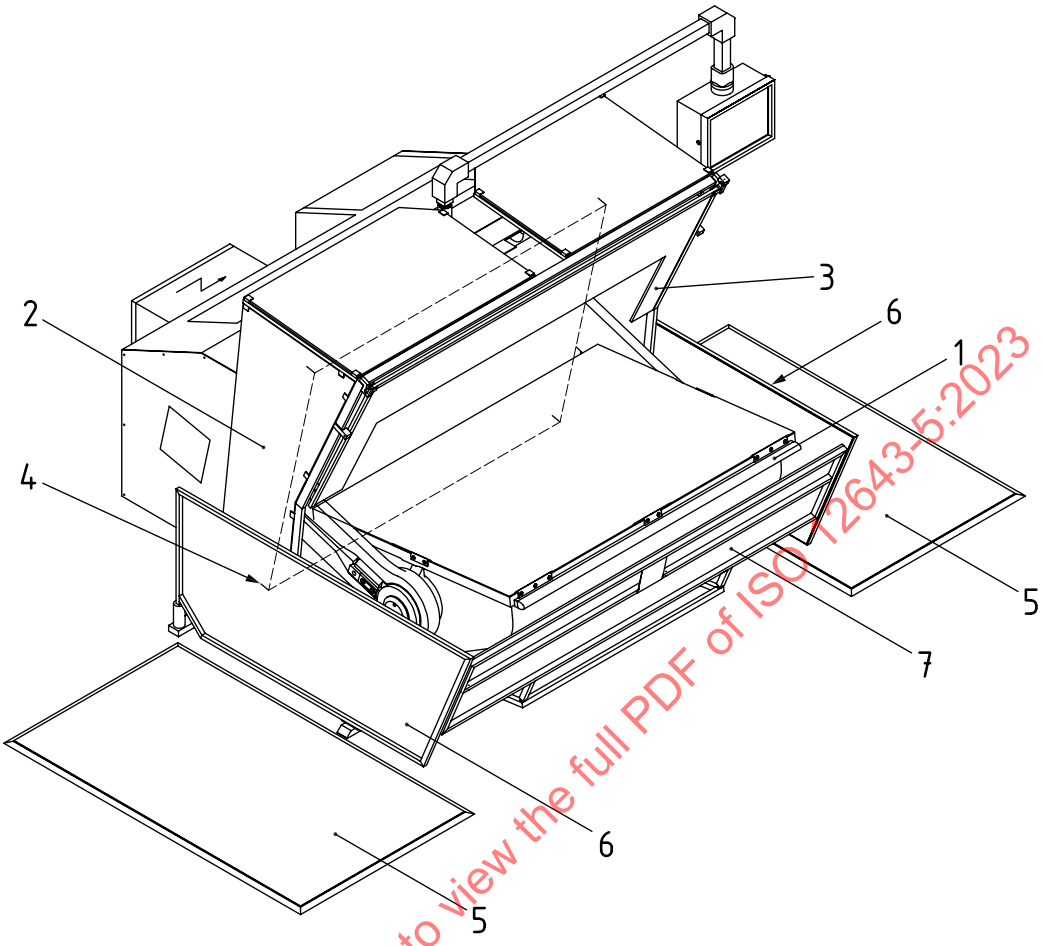
Key

1	trip bar on movable platen	5	laser scanner above the floor
2	U-shaped trip bar on fixed platen	6	scanned area above floor level
3	laser scanner on the top	7	knee bar
4	scanned area on the top		

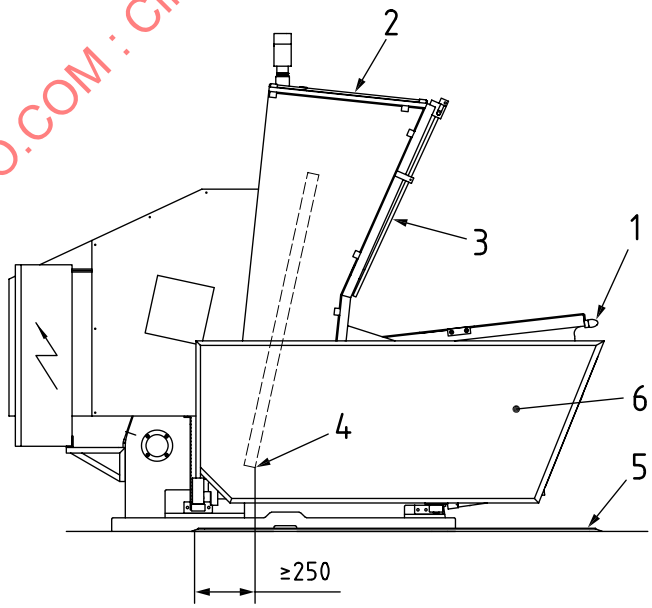
Figure 4 — Use of laser scanners to safeguard side access

c) pressure sensitive mats in accordance with ISO 12643-1:2023, 5.3.4.7, in combination with interlocked guards, and which shall meet at least ISO 13849-1:2023, PL d. See Figures 5 a), 5 b) and 5 c).

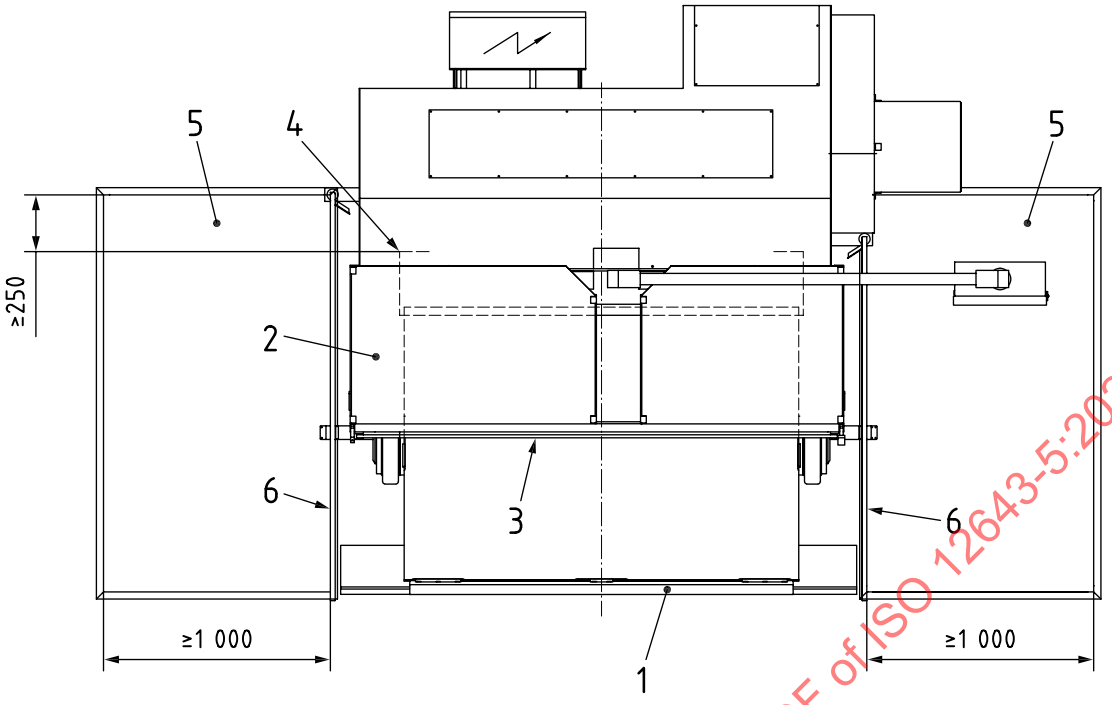
Dimensions in millimetres



a) General view



b) Side view



c) Top view

Key

1	trip bar on movable platen	5	pressure sensitive mats on the side
2	U-shaped trip bar on fixed platen	6	interlocked guards at the side
3	hinged polycarbonate panel in U-shaped trip bar	7	knee bar
4	lower edge of fixed platen		

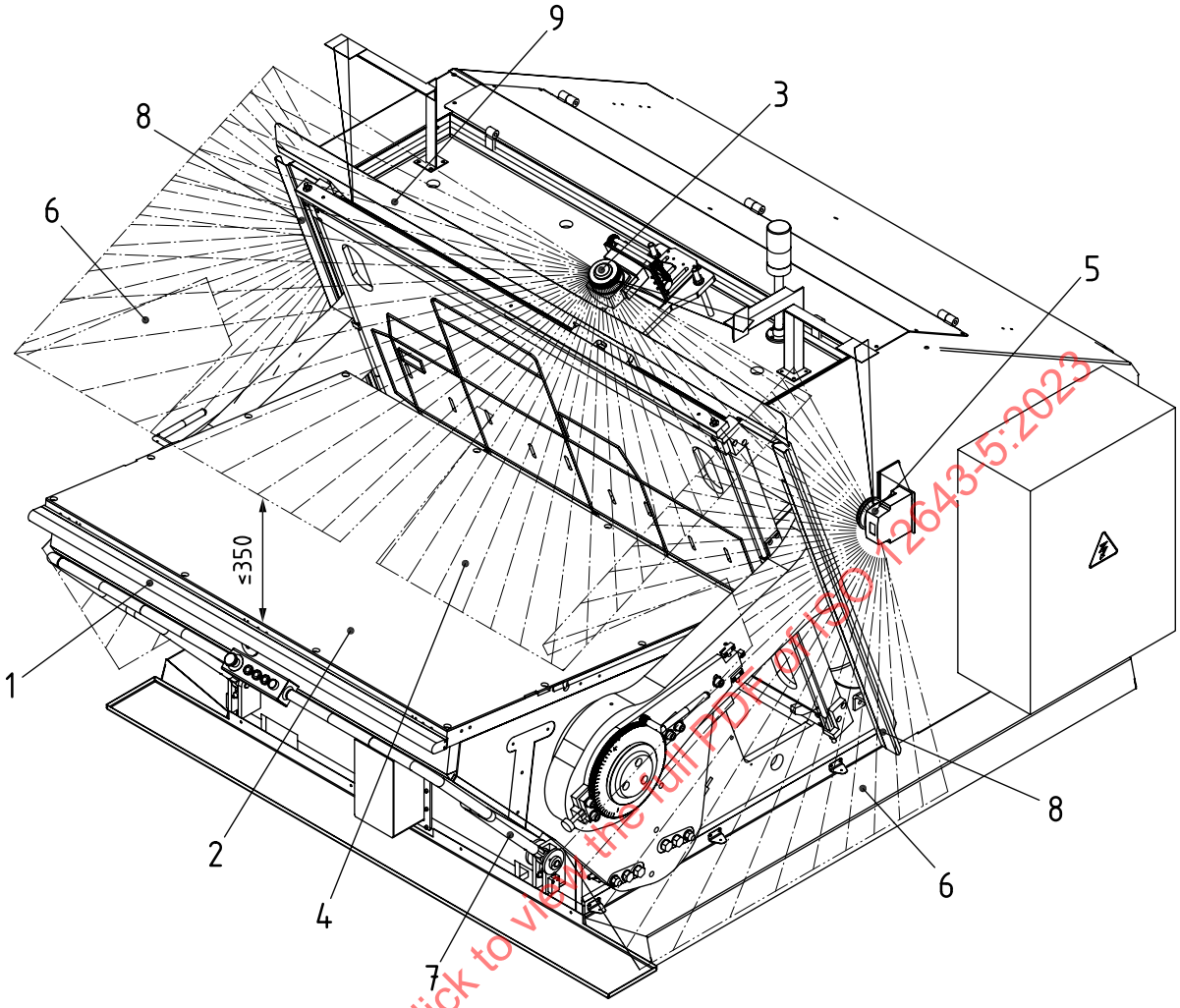
Figure 5 — Use of pressure sensitive mats in combination with interlocked guards to safeguard side access

If a), b) or c) is applied, the following additional requirements shall be fulfilled to prevent climbing onto the platen. The interlocking tables, scanning fields near the floor [see Figure 4 a)] or pressure sensitive mats shall extend a minimum of 1 000 mm from the side frame outward and over the depth of the platen press, reaching from the front edge of the open position of the movable platen to at least 250 mm behind the backward edge of the fixed platen. See Figures 4 a), 4 b), Figure 5 b) and Figure 5 c).

d) Laser scanners on both sides of the platen with a vertical scanning field. See Figure 6.

The size and shape of the scanned areas on the sides shall be such as to detect and safely stop any hazardous movements before the danger point(s) can be reached."

Fixed guards shall be fitted to prevent reach access from the rear of the machine through the gaps created by the laser field and the platen in accordance with ISO 13857:2019. (See Figure 6, key items 8 and 9)



Key

1 trip bar on movable platen
2 movable platen
3 laser scanner on the top
4 scanned area on the top
5 laser scanner on the sides
6 scanned area on the sides
7 knee bar
8 fixed guard on the side
9 fixed guard on the top

Figure 6 — Use of ESPD, for example laser scanners, mounted on each side of the machine to safeguard side access

e) Vision based protective devices (VBPD) in accordance with 4.5.

4.3 Safeguarding front access

For all manually-fed platen presses, a trip bar, located on the front edge of the movable platen, shall be provided (see Figure 1). The trip bar shall pass under the U-shaped trip bar in its operating position with a clearance of 12 mm maximum.

One of the following configurations shall also be provided:

a) On platen presses with a platen table width less than or equal to 1 m wide, an interlocking protective device (U-shaped trip bar) that covers both the sides and the top of the fixed platen (see Figure 1). The mechanism of the U-shaped trip bar shall be rated such that a force of 20 N applied to the top contact edge of the device is sufficient for actuation and triggering of the clutch/brake device. The

pivot of the U-shaped trip bar shall be below the fixed platen. The horizontal part of the U-shaped trip bar shall be wide enough to ensure that the leading edge of the trip bar is at least 350 mm away from the fixed platen (see 4.7).

or

b) On platen presses with a platen table width greater than 1 m, laser scanners in accordance with 4.4;

or

c) On platen presses with a platen table width greater than 1 m, VBPD in accordance with 4.5 (see Figure 9).

The machine stroke shall be arrested to prevent crushing between the moveable platen and the cutting plane (see 4.7).

If a U-shaped trip bar is used, then it shall be activated within 10 mm of movement measured at the furthest point from the pivot point in order to initiate the position switches to stop the movement.

An opening between the top of the movable platen and the bottom of the top scanned area can be provided to allow loading and unloading of work pieces. This aperture shall have a maximum height of 350 mm.

4.4 Access detection using laser scanners

a) A laser scanner shall be provided mounted on the top of the fixed platen [see Figure 7 a) and Figure 7 b) and Figure 8]. The gap between the front edge of the scanned area and the movable platen in its open position shall be a maximum of 350 mm measured vertically.

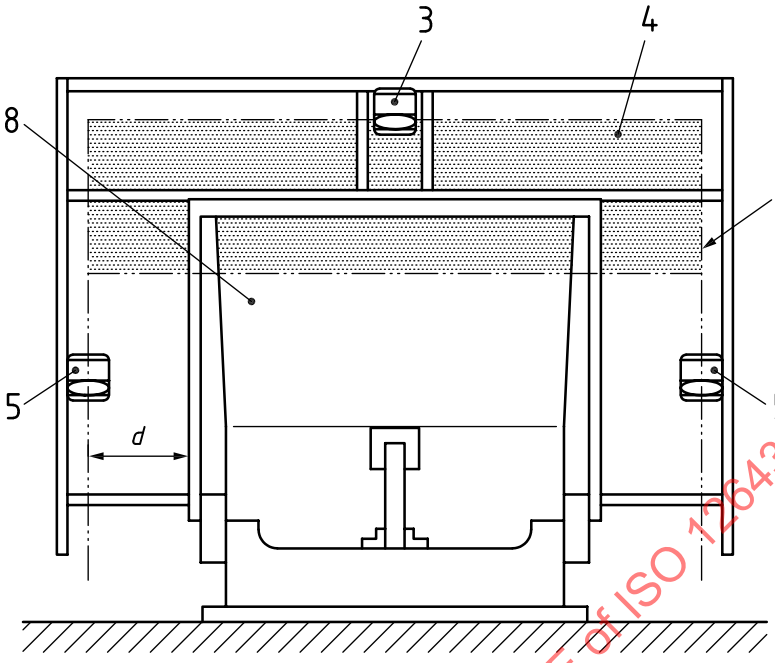
b) A laser scanner shall be provided mounted on each side of the fixed platen [see Figure 7 a) and Figure 7 b) and Figure 8]. The distance *d* between the vertical scanned area and the sides of the movable platen shall be 200 mm minimum and 250 mm maximum [See Figure 7 a)].

c) If the distance between the vertical scanned area and the side of the movable platen is greater than 250 mm then whole-body access between the laser beam and the side of the manually-fed platen press shall be prevented.

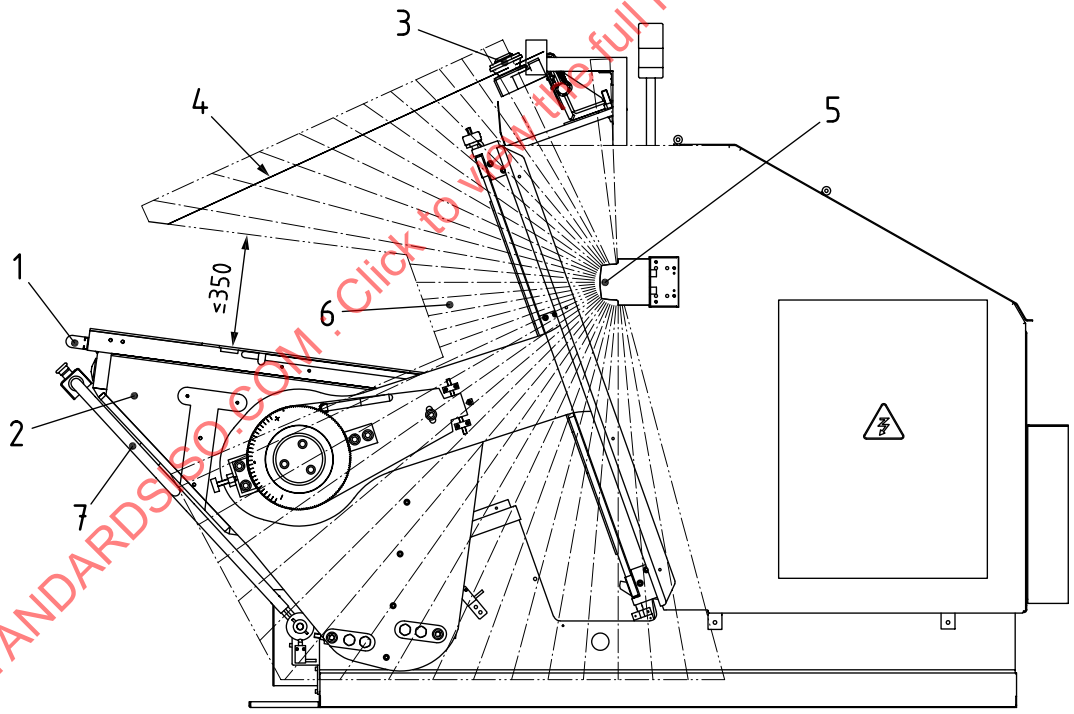
The necessary reaction time to stop the hazardous movement shall be implemented in consideration of ISO 13855:2010.

Laser scanners shall meet the requirements as specified in IEC 61496-1:2020 and IEC 61496-3:2018. Laser scanners shall be provided with a warning sign as described in ISO 12643-1:2023, 5.4.8.1.

Dimension in millimetres



a) Front view



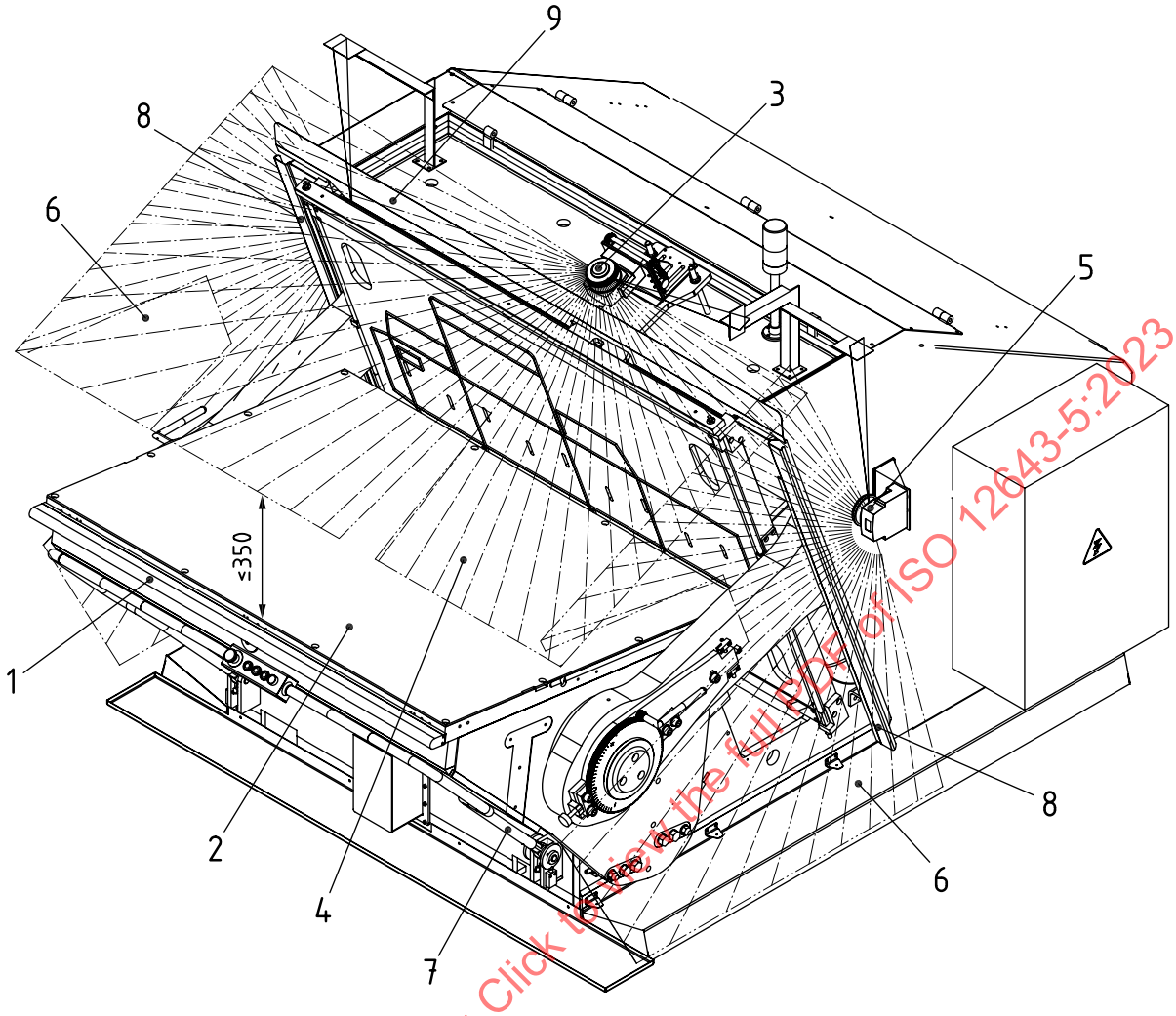
b) Side view

Key

1 trip bar on movable platen
2 movable platen
3 laser scanner on the top
4 scanned area on the top
5 laser scanner on the sides
6 scanned area on the sides
7 knee bar
8 fixed platen
d distance to scanned area on the side
200 ≥ d ≥ 250 mm

Figure 7 — Platen press equipped with laser scanners

Dimension in millimetres



Key

1	trip bar on movable platen	6	scanned area on the sides
2	movable platen	7	knee bar
3	laser scanner on the top	8	fixed guard on the side
4	scanned area on the top	9	fixed guard on the top
5	laser scanner on the sides		

Figure 8 — Use of laser scanners to safeguard both side and front access

4.5 Access and presence detection using vision based protective devices (VBPD)

A VBPD shall be mounted over the centre of the movable platen (see Figure 9).

Four zones shall protect the person(s) present.

— Detection zone above the front edge of the movable platen for presence detection of person(s) accessing from the front side. The gap between the movable platen and detection zone shall not be larger than 350 mm.

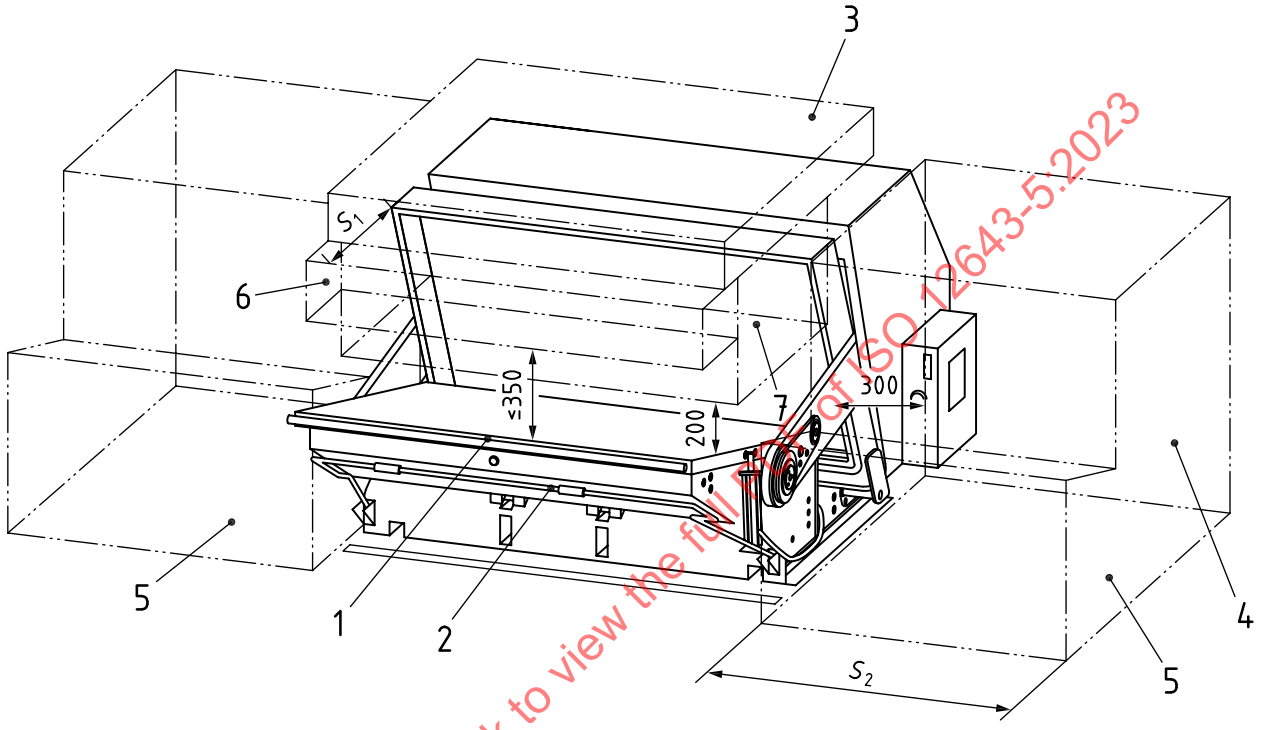
— Detection zone between the movable platen and the fixed platen for presence detection of person(s) on the movable platen before motion starts. The gap between the movable platen and detection zone shall not be larger than 200 mm.

— Detection zone over the rear cover of the platen press prevents climbing over the press from the rear side.

— Detection zones on the left and right side of the platen press prevent access from the sides of the press.

VBPD shall meet the requirements as specified in IEC 61496-1:2020 and IEC/TS 61496-4-3:2015.

Dimensions in millimetres



Key

1	movable platen	5	detection zone left/right on the machine
2	knee bar	6	detection zone access movable platen
3	detection zone above the machine	7	detection zone presence detection of person on the movable platen before motion starts
4	detection zone access from the back side	S_1, S_2	minimum safety distance

Figure 9 — Use of VBPD to safeguard both side and front access

The minimum safety distance S (see Figure 9, S_1 and S_2) shall be calculated according to Formula (1):

$$S = (K \times T) + C + Sa \quad (1)$$

where

S is the minimum distance (mm);

K is a parameter, in millimetres per second (mm/s), derived from data on approach speeds of the body or parts of the body;

T is the overall stopping performance of the system, in seconds (s);

C is the intrusion distance, in millimetres (mm);

Sa is the measurement tolerance provide by the manufacturer of VBPD in millimetres (mm).

For systems where S is less than or equal to 500 mm and the sensor detection capability is (d) ≤ 40 mm, Formula (2) can be used:

$$S = (2\,000 \times T) + 8 \times (d - 14) + Sa \quad (2)$$

For systems where S exceeds 500 mm and the sensor detection capability is (d) ≤ 40 mm, Formula (3) can be used:

$$C = 8\,(d - 14), \text{ but not less than } 0 \quad (3)$$

where d is the sensor detection capability of the device, in millimetres (mm).

Then

$$S = (1\,600 \times T) + 8 \times (d - 14)$$

4.6 Platen presses with dwell mode (timer-controlled operation)

On platen presses with timer-controlled operation, the open dwell time shall be as short as possible and not exceed 6 s in accordance with the requirements of Clause 4. The warning requirements of 4.12 shall be met.

4.7 Stopping distance and performance

Activation of any of the trip devices shall stop the machine before any crushing between the moveable platen and the cutting plane can occur.

When the press is in motion and the U-shaped trip bar is actuated, the machine shall stop. The stopping distance of the platen press shall not exceed 120 mm. This shall be measured between the leading edge of the movable platen and the top of the fixed platen.

When the press is in motion and an ESPD trip device is activated, the machine shall stop. Where applicable, the positioning of the trip device shall be in accordance with ISO 13855:2010, 5.2.

Further movement of the platen shall require the manual operation of a reset control and the press shall not automatically restart.

The stopping distance and stopping performance shall be monitored automatically at the end of each cycle. If the stopping distance or stopping performance specified by the manufacturer to meet the requirement of the previous paragraph is exceeded, start-up shall be prevented. This requirement shall be met at all operating speeds of the press.

NOTE A cycle begins in the stopped position and is completed when the moveable platen returns to the stopped position.

4.8 Main drive braking and clutch/brake mechanism

Manually-fed platen presses shall be equipped with a fail-safe clutch/brake mechanism to disconnect the stored energy in the flywheel from the moving platen and bring the platen to a stop thereby preventing press motion.

On presses with flywheels, this mechanism shall be located on the flywheel shaft.

When using a clutch/brake mechanism, electric power supply failure, or loss of pneumatic or hydraulic pressure shall activate the brake and disengage the clutch (i.e. fail-safe). The brake shall be of sufficient strength to maintain the platen in any position in which it can stop due to the failure.

If a pneumatic or hydraulic system is used for the combined clutch and brake system (stopping closing movement of the platen) two pneumatic or hydraulic valves directly controlling combined clutch/