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Machine tools — Straight-sided high-speed mechanical power presses from 250 kN up to and including 4 000 kN nominal force — Characteristics and dimensions

Machines-outils — Presses mécaniques rapides à bâti en arcade, de force nominale comprise entre 250 kN *et* 4 000 kN *inclus — Caractéristiques et dimensions*

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Foreword

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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 9189 was prepared by Technical Committee ISO/TC 39, *Machine tools*.

Annex A of this International Standard is for information only.

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Introduction

Values are not specified in this International Standard for all the dimensional, geometric and operational characteristics of high-speed straight-sided mechanical power presses owing to the restrictions that this would place on the performance and development of these presses. Those features which are not not covered by this International Standard are listed below, and the reason(s) for their exclusion are given.

a) Hole in bed and bedplate, and bedplate thickness

These directly influence the rigidity of the press and as such are often dimensioned to suit the production of a specific component. One common practice, which is employed to maintain maximum bed stiffness, is to machine discharge holes only where they are required as dictated by the pitch of the press tooling.

b) Height of bedplate from floor

The use of automatic feeding and unloading mechanisms makes the specification of floor-to-bedplate height undesirable.

c) Tool fixing holes and T-slots

Owing to the relatively high stroking speed of these presses, the designer always endeavours to minimize the mass of the reciprocating parts. It is usually impracticable to achieve total balance of these masses and as a result the press members will be subjected to high disturbing forces.

By specifying the tool fixing holes, the die and press designer would be restricted in achieving the optimum solution for each application.

d) Passage through uprights, and strip width

These may be standardized at a later date if there is sufficient support for this work.

e) Stroking rate

Standardization would impede further technical progress since this characteristic depends on the specific application of the press (feed length, type of feed; gripper, roller, step motor; type of die, length of stroke, feed-out of parts, etc.).

Modern high-speed presses can be provided with a variable adjustable stroking rate from 1 to 10.

f) Energy

The working energy cannot be fixed since the stroking rate is variable over a wide range. For example, for an adjustable range of stroking rate of 1 to 10 as mentioned in e), the working energy changes at a ratio of 1 to 100.

g) Rated force travel

Energy is only a result of the rated force and the rated force travel. Since the rated force has a constant value, but energy is dependent on the stroking rate, no fixed value can be given for the rated force travel (the rated force travel can, for example, be increased by raising the stroking rate).

h) Slide ejection distance, and die cushion force

Ejectors are usually built into the tooling, and die cushions are rarely fitted to these presses.

i) Strip feeders and scrap shears

The specification of strip feeders and scrap shears is not given here, as it is available in documents on accessories.

j) Geometric accuracy, and deflection under load

Some high-speed presses are manufactured to very stringent geometric tolerances. To apply these tolerances to all high-speed presses would limit freedom in design and inhibit commercial competition. These properties may be standardized at a later date if there is sufficient support for this work. characteristics.

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Machine tools — Straight-sided high-speed mechanical power presses from 250 kN up to and including 4 000 kN nominal force — Characteristics and dimensions

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1 Scope

This International Standard specifies the characteristics and dimensions for straight-sided high-speed mechanical power presses from 250 kN up to and including 4 000 kN nominal force.

2 Definitions

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

2.1 high-speed press: Automatic, continuous-running, fixed-stroke straight-sided press for the production of components from strip material fed into the press by a strip feed mechanism. These presses are not intended for single-stroke operation.

2.2 nominal force, F_n: Maximum allowable pressing force which may act, before the bottom of the stroke, as frequently as required without damaging the press.

2.3 shut height, normal slide stroke, e_n: Distance from the bedplate surface to the slide surface measured with the normal slide stroke, stroke down and slide adjustment up.

2.4 adjustable feed height, h_f: The height measured from the top of the bedplate.

NOTE 1 The following formula may be used as a guide for determining fixed feed heights:

$$h_f = \frac{h_b - 0{,}75h_v}{2}$$

where h_b is the bedplate-to-slide height at mid-stroke.

3 Characteristics and dimensions

Straight-sided high-speed mechanical power presses may be provided with either cranks or eccentric drive mechanisms.

Figure 1 shows a typical construction of a straight-sided high-speed mechanical power press; this figure is a schematic representation only and is not intended to affect the manufacturer's design.

The characteristics and dimensions shall be selected from table 1; values given in parentheses are non-preferred.

NOTE 2 All the values appearing in the same column in table 1are directly related and values from different columns should not be used in combination, with the exception of x_0 [see footnote 6) to table 1].

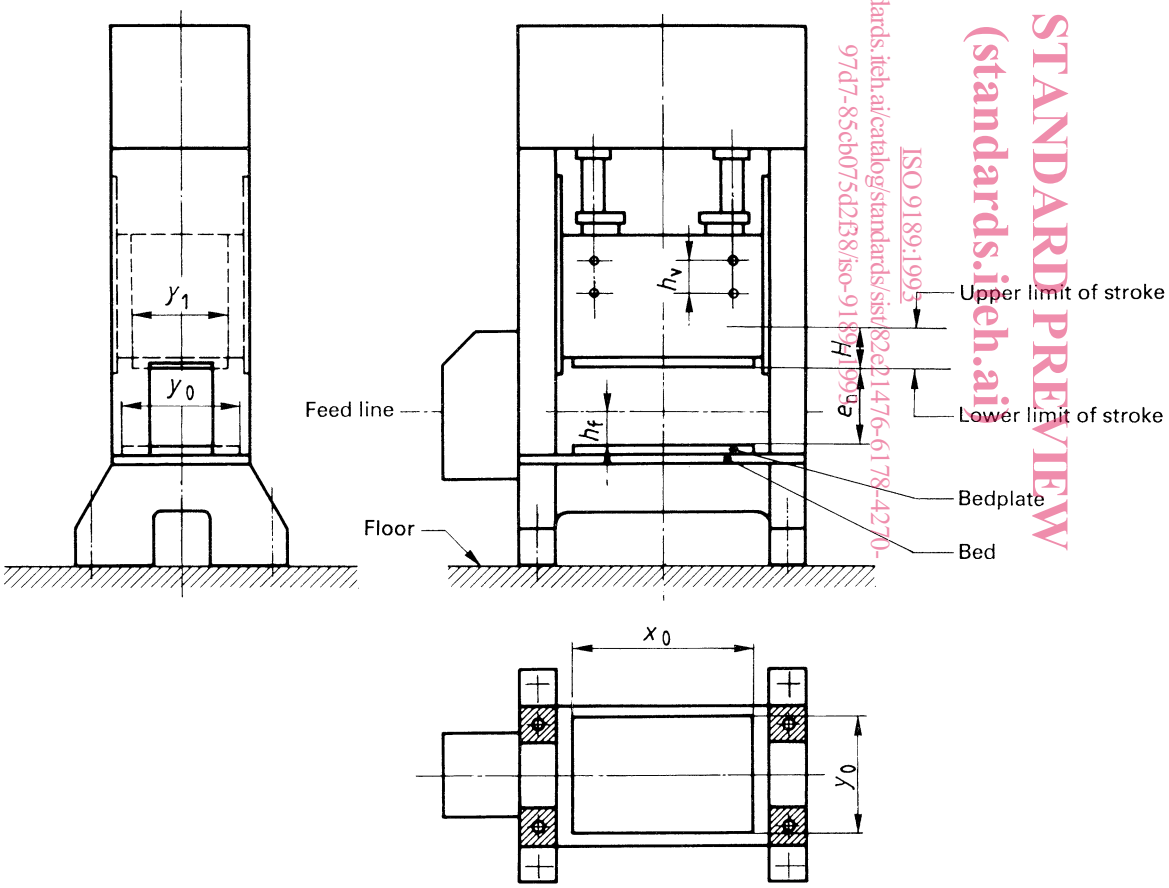

Figure 1 — Typical construction of a high-speed press

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Table 1

Nominal force, F_n [1] (see 2.2)	kN	250	400	630	(800)	1 000	(1 250)	1 600	(2 000)	2 500	(3 150)	4 000
Normal slide stroke, H [2]	mm	20	20	25	25	25	25	30	30	30	35	35
Maximum slide stroke, H_{max} [3]	mm	50	50	50	50	50	50	60	60	60	60	60
Slide adjustment, h_v [4]	mm	50	60	60	60	60	60	60	80	80	100	100
Shut height, normal slide stroke, e_n [5] (see 2.3)	mm	275	300	325	350	350	375	375	400	400	450	500
Bedplate and slide width (left to right), x_0 [6]	mm	630	710	800	900	1 000	1 120	1 250	1 400	1 600	1 800	2 000
Bedplate depth (front to back), y_0 [7]	mm	530	560	600	630	670	710	800	900	1 000	1 120	1 250
Slide depth (front to back), y_1 [8]	mm	425	450	475	500	530	560	630	710	800	900	1 000
Adjustable feed height, h_f [9] (see 2.4)	mm	95 to 155	95 to 155	95 to 155	110 to 170	110 to 170	130 to 190	130 to 190	150 to 210	150 to 210	170 to 230	170 to 230

1) The preferred values correspond to the R5 series of preferred numbers.

2) This is a fixed stroke and values are based on known and practical requirements.

3) Optional instead of the normal slide stroke and it is also fixed.

4) The values of h_v are based on known and practical requirements. To permit easier access to the tools when in the press, it is recommended that the tools be designed with a shut height equal to $e_n - 0{,}75\ h_v$

5) The values of e_n are based on known and practical requirements.

6) Values in accordance with the R20 series of preferred numbers. When the standard width for a given press capacity is not suitable, then the next larger or smaller value may be selected from table 1. The suitability of the bedplate and slide width will be dependent on the number of tool positions and the pitch of these tool positions.

7) Values in accordance with the R40 (530 ... 710) and R20 (710 ... 1 250) series of preferred numbers. It is not intended that this dimension be varied when the width x_0 is non-standard.

8) Values in accordance with the R40 (425 ... 560) and R20 (560 ... 1 000) series of preferred numbers. It is not intended that this dimension be varied when the width x_0 is non-standard.

9) The values of h_f are based on known and practical requirements.

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Annex A
(informative)

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