

INTERNATIONAL STANDARD

**ISO
9188**

First edition
1993-04-01

Machine tools — Straight-sided single-action mechanical power presses from 400 kN up to and including 4 000 kN nominal force — Characteristics and dimensions

*Machines-outils — Presses mécaniques à bâti en arcade, à simple effet,
de force nominale comprise entre 400 kN et 4 000 kN inclus —
Caractéristiques et dimensions*



Reference number
ISO 9188:1993(E)

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International Standard ISO 9188 was prepared by Technical Committee ISO/TC 39, *Machine tools*.

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International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Machine tools — Straight-sided single-action mechanical power presses from 400 kN up to and including 4 000 kN nominal force — Characteristics and dimensions

1 Scope

This International Standard specifies the characteristics and dimensions of straight-sided single-action mechanical power presses from 400 kN up to and including 4 000 kN nominal force. It applies to machines intended for single or continuous operation and to geared or ungeared 1-, 2- or 4-point machines.

2 Definitions

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

2.1 nominal force, F_n : Maximum allowable pressing force which may act, before the bottom of stroke, through a given distance [the nominal force travel h_n (see 2.7)], as frequently as required without damaging the press.

2.2 bed cushion force, F_t : Force related approximately to the nominal force, at an air pressure of 0,5 MPa, as follows:

$$F_t \approx 0,2F_n$$

2.3 slide knockout force, F_k : Force related approximately to the nominal force as follows:

$$F_k \approx 0,1F_n$$

2.4 nominal energy, W_n : Energy output obtained during a slide stroke in continuous operation. It is related to a given reduction in the flywheel speed of rotation.

The nominal energy W_n is related to the nominal force F_n (see 2.1) and to the nominal force travel h_n (see 2.7) and, where a cushion is used, to the bed cushion force F_t (see 2.2) as well as to that part of the cushion travel h_t which can be utilized with maximum cushion force.

The nominal energy is selected according to the type of work for which the press is required.

2.5 shut height, e_1 : Distance from the bedplate surface to the slide surface measured with the maximum variable stroke, stroke down and slide adjustment up.

Since in general the shut height is adjusted by the use of sub-bolsters or packers, it is useful to specify values in accordance with an arithmetic progression in preferred steps of 100 mm.

2.6 bed to slide distance, e_2 : Distance from the bed surface to the slide surface measured with the maximum variable stroke, stroke down and slide adjustment up.

2.7 nominal force travel, h_n : Maximum distance, above the bottom of the stroke of the slide, from which point downwards the nominal force F_n may act as frequently as required without damaging the press.

The nominal force travel h_n , together with the nominal force F_n , indicate the rating of the drive.

The nominal force travel is not directly related to the nominal energy W_n .

3 Characteristics and dimensions

Mechanical single-action straight-sided power presses may be provided with a crank, eccentric, toggle or knuckle-joint drive mechanism.

Figure 1 shows a typical construction of a straight-sided single-action 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 tables 1 to 8; values given in parentheses are

non-preferred. Manufacturers are free to choose those combinations of characteristics and dimensions to best suit their own requirements.

The nominal pressure is the gauge pressure and is above atmospheric pressure (see ISO 2944:1974,

Fluid power systems and components — Nominal pressures). To allow tool interchangeability, the pitch p of slide knockouts shall be 225 mm. The number of slide knockouts is dependent on the machine design.

Dimensions in millimetres

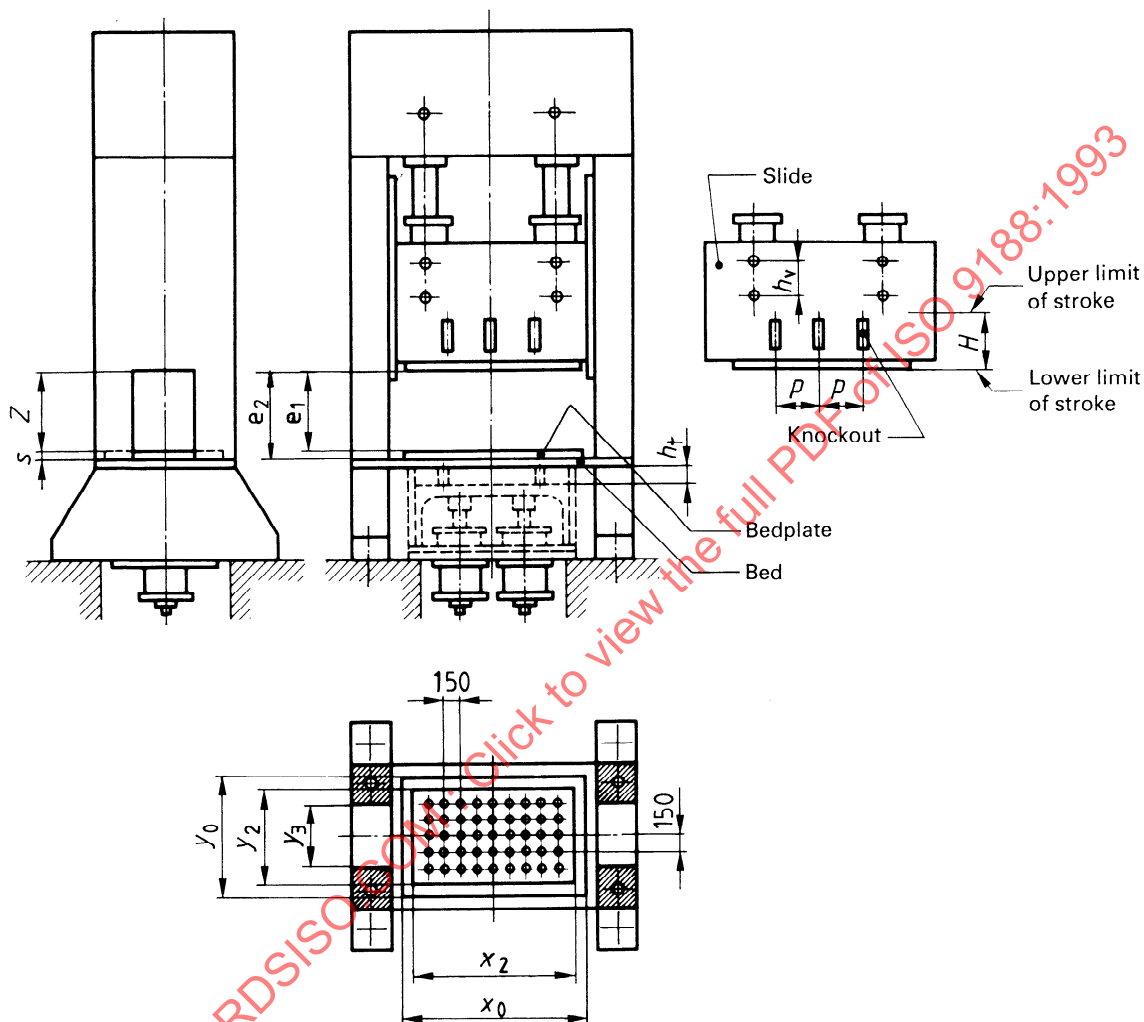


Figure 1 — Typical construction of a press

Table 1

Force in kilonewtons

Nominal force, F_n ¹⁾ (see 2.1)	400	630	(800)	1 000	(1 250)	1 600	(2 000)	2 500	(3 150)	4 000
Bed cushion force, F_t ²⁾ (see 2.2)	80	125	160	200	250	315	400	500	630	800
Slide knockout force, F_k (see 2.3)	40	63	80	100	125	160	200	250	315	400

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

2) At an air pressure of 0,5 MPa.

Table 2

Energy in kilojoules

Nominal energy, W_n ¹⁾ (see 2.4)	1,25	1,6	2	2,5	3,15	4	5	
	6,3	8	10	12,5	16	20	25	
	31,5	40	50	63	80	100	125	160

1) Values correspond to the R10 series of preferred numbers

NOTES

1 The values given are those most frequently used in practice.

2 The number of strokes per minute and the reduction in the flywheel speed shall be specified, together with the nominal energy.

Table 3

Bedplate and slide width (left to right), x_0 ¹⁾ mm	630	800	1 000	1 300	1 600	1 900	2 200	2 500	2 800	3 100
Pressure pin plate width, x_2 ²⁾ mm			700	1 000	1 300	1 600	1 900	2 200	2 500	2 800
Pressure pin rows, r_x			5	7	9	11	13	15	17	19

1) Values in accordance with an arithmetic series for hole spacings for pressure pins of 150 mm. For values greater than 1 000 mm, the preferred step is 300 mm.

2) Values related to the bedplate and slide width x_0 .The values for x_2 are found from the relationship

$$x_2 = (r_x - 1) 150 + 100 \text{ for } r_x = 5, 7, 9, \dots$$

Table 4

Bedplate and slide depth (front to back), y_0 ¹⁾ mm	500	630	800	1 000	(1 150)	1 300	(1 450)	1 600	(1 750)	1 900	2 200
Pressure pin area depth , y_2 ²⁾ mm				700	700	1 000	1 000	1 300	1 300	1 600	1 900
Pressure pin rows , r_y				5	5	7	7	9	9	11	13
Upright opening width , y_3 ³⁾ mm	250	315	400	550	550	550	700	850	1 000	1 150	1 300

1) Values in accordance with an arithmetic series for hole spacings for pressure pins of 150 mm. For values greater than 1 000 mm, the preferred step is 300 mm.

2) Values related to the bedplate and slide depth y_0 . The values for y_2 are found from the relationship

$$y_2 = (r_y - 1) 150 + 100 \text{ pour } r_y = 5, 7, 9, \dots$$

3) The upright opening is not intended for tool removal.

Table 5

Dimensions in millimetres

Shut height , e_1 (see 2.5)	300	400	500	600	700	800
Slide adjustment , h_v ¹⁾	75	100	125	150	175	200
Upright opening height , Z ²⁾	$Z = e_1 - h_v$					

1) As this results in a reduction in the shut height, it is useful to associate it with the shut height in steps of 25 mm.

2) The upright opening is not intended for tool removal. The height Z of the upright opening should not exceed the minimum shut height.

Table 6

Dimensions in millimetres

Bedplate thickness , s ¹⁾	75	100	125	150	175	200
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1) Depends on the size of the pressure pin area (bed opening), the nominal force and the required deflection characteristics. An arithmetic progression is selected in preferred steps of 25 mm.

Table 7

Dimensions in millimetres

Slide stroke, H ¹⁾	80	100	125	160	200	250	315	400	(450)	500
Bed cushion travel, h_c ²⁾	40	40	63	63	100	100	125	125	160	160
Slide knockout travel, h_k ³⁾	16	20	25	32	40	50	63	80	90	100

1) The preferred values correspond to the R10 series of preferred numbers.

2) When dimensioning the nominal energy W_n , that part of the cushion travel through which the cushion force acts shall be additionally specified.

3) The slide knockout travel h_k is equal to

$$h_k \approx 0,2H$$

Table 8

Dimensions in millimetres

Nominal force travel, h_n (see 2.7)	3,5	7	12,5	25
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Annex A

(informative)

Bibliography

- [1] ISO 6898:1984, *Open front mechanical power presses — Capacity ratings and dimensions*.
- [2] ISO 8540:—¹⁾, *Open front mechanical power presses — Vocabulary*.
- [3] ISO 9189:1993, *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) To be published.

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