

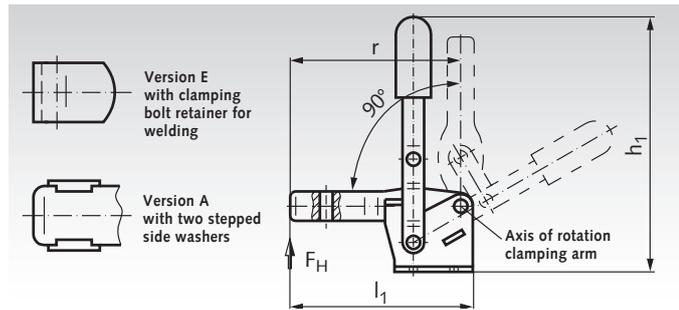
## Quick Clamps (Vertical Clamp with Horizontal Base, without Clamping Bolts)

**Material:** Steel-sheet parts: Case-hardened steel C10, zinc-plated. Bearing pins: Hardened, from size 200 case hardened.

All moving parts lubricated with special grease.  
Handle with plastic sleeve, red, oil resistant.

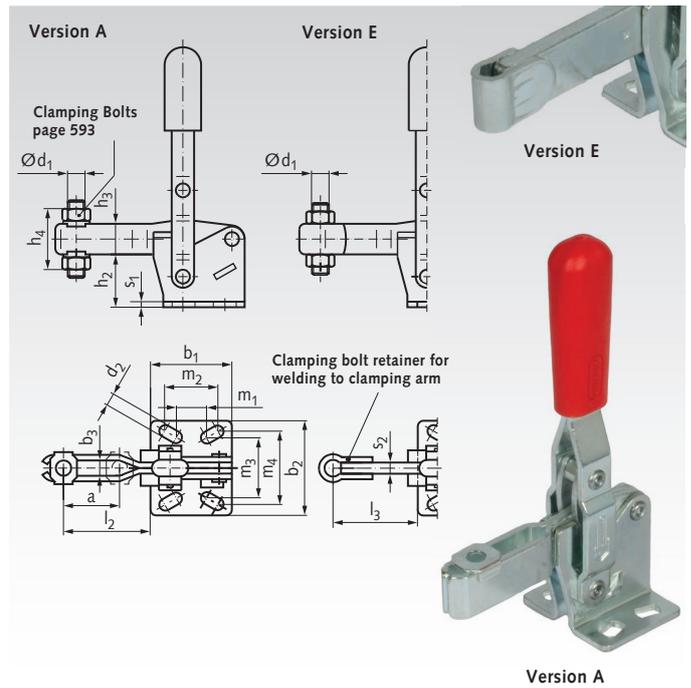
Operating handle and clamping lever move in the same direction. In the clamping position the operating handle is vertical. Vertical clamps are available for holding forces  $F_H$  from 90 daN up to 460 daN.

Note: Worth pointing out is the clamping arm on all vertical clamps: It is blanked out from full and reinforced on the points of highest load. During the closing movement it is guided on both sides to prevent being affected by possible side thrusts.



Version A: forked clamping arm.

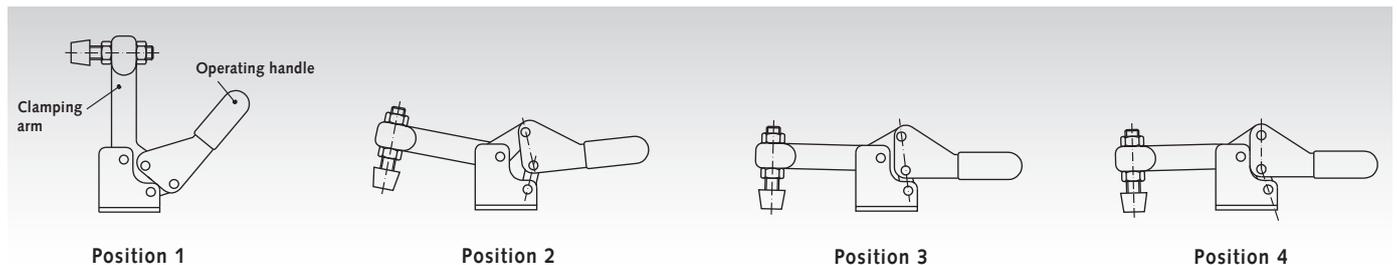
Version E: solid clamping arm.



Product No. Version A	Product No. Version E	Size	$F_H$ N	$a \approx$ mm	$b_1$ mm	$b_2$ mm	$b_3$ mm	$d_1^*$ mm	$d_2 \approx$ mm	$h_1 \approx$ mm	$h_2$ mm	$h_3$ mm	$h_4$ mm	$l_1 \text{ max}$ mm	$l_2 \approx$ mm	$l_3 \text{ max}$ mm	$m_1$ mm	$m_2$ mm	$m_3$ mm	$m_4$ mm	$r$ mm	$s_1$ mm	$s_2$ mm	Weight g
676 003 00	676 043 00	70	900	20	29	34	5,2	M5	4,5	98	20	11	21	67	32	41	15	16	24	24	63	2	4	95
676 006 00	676 046 00	130	1600	28	35	42	6,2	M6	5,5	142	28	16	27	86	42	54	12,5	19	27	29	80	2,5	5	210
676 010 00	676 050 00	230	2200	40	43	45	8,5	M8	6,5	168	33	18	31	112	58	73	19	20	32	32	104	3	6	350
676 015 00	676 055 00	330	2700	43	50	65	10,5	M10	8,5	195	43	22	38	131	66	86	29	32	46	45	122	3,5	7	550
676 020 00	676 060 00	430	3000	64	58	65	12,5	M12	8,5	247	55	26	45	166	88	114	32	32	54	45	156	4	10	1000
676 025 00	676 065 00	530	4600	90	80	95	12,5	M12	12,5	303	84	32	51	225	125	152	50	51	70	70	212	7	10	1960

\* Clamping bolt page 593 has to be ordered separately.

## Operating Principle



**Position 1:** By using the toggle link principle, these quick clamps offer essential advantages:

The clamping arm retracts to such an extent, that the workpiece can be inserted and removed completely unobstructed.

**Position 2:** Even the slightest forward movement of the operating handle moves the clamping arm with the contact pad over the workpiece.

As can be seen from the sketch, the position of the toggle links leads to a multiple of the input force at the operating handle being applied to the clamping arm.

In this position the quick clamp is not yet fully locked, i.e., any counter force applied to the operating handle will open the clamp.

**Position 3:** In this position all three pivots are perfectly aligned yielding the maximum clamping force (dead centre point). The clamping force applied to the workpiece is mainly dependent on:

- the input force applied to the operating handle,
- the position of the clamping bolt on the clamping lever.

The clamping force can be altered by readjusting the position

of the clamping bolt: It increases if the entire contact area of the bolt touches the workpiece before the dead centre point is reached. This effect is clearly illustrated when using an elastic clamping pad.

**Position 4:** In this position the toggle link has arrived in the over-centre lock position, and the operating lever has reached a firm stop. This leads to a secure locking (self-blocking) of the quick clamp, preventing it from opening until it is released by the operator. The force which the clamping element is capable of withstanding in this over-centre lock position without suffering permanent deformation is known as holding force  $F_H$ . The holding force  $F_H$  is a characteristic value (co-efficient) for toggle clamps, and this value is mainly dependent on:

- the size (dimensions, geometry) of the quick clamp,
  - the position of the clamping bolt on the clamping arm.
- In the tables, the maximum holding force  $F_H$  is stated in relation to a particular position of the clamping arm.