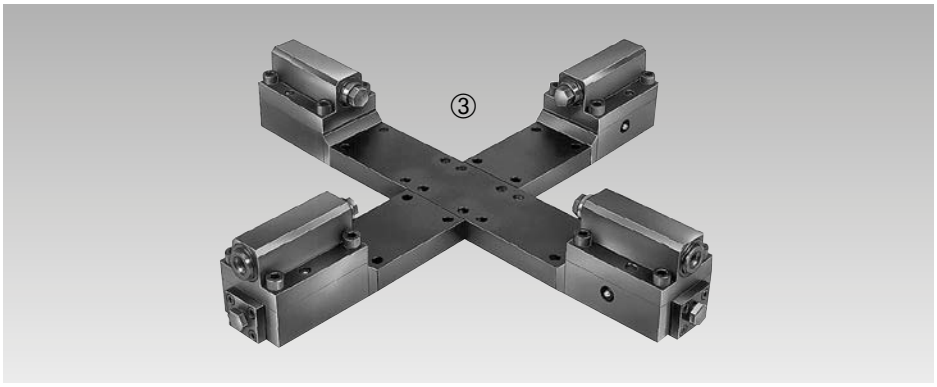
Concentric Positioning and Clamping Elements

with variable range of clamping, hydraulically operated double acting, max. operating pressure 500 bar



Figures

① Double clamping element for concentric interior clamping

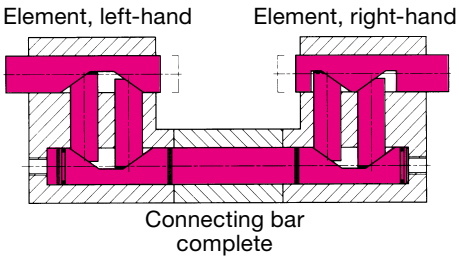
② Double clamping element with prolonged connecting bar for exterior clamping

③ By means of the double clamping elements modular fixtures can be composed which position and clamp concentrically in several dimensions, e.g. in direction of the x- and y-axis.

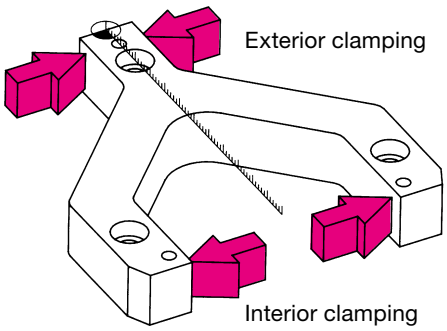
Description

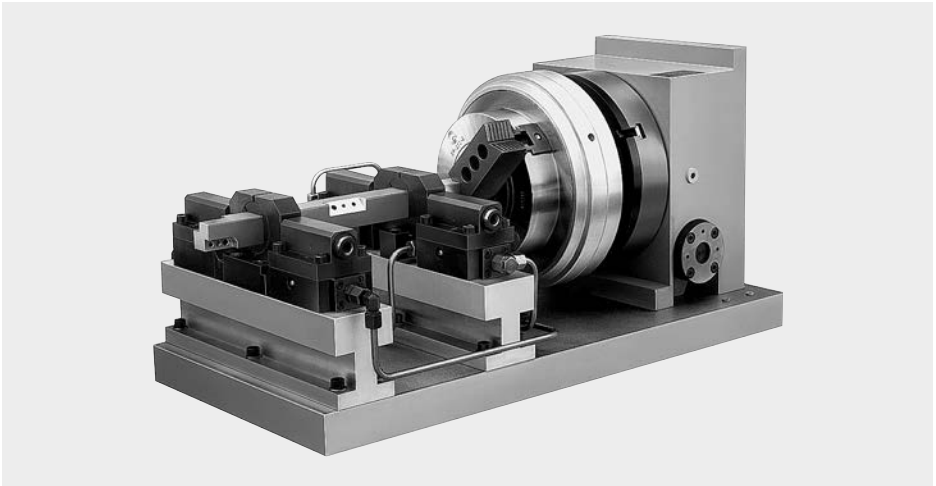
Concentric positioning and clamping with two or three-jaw chucks on stationary fixtures is nothing new. In many applications, however, it is not possible to place the relatively large chuck bodies on the fixture. Often the smaller clamping strokes are an additional obstacle.
In our development, the individual parts can be connected to a two or multiple-element version. In the multiple-jaw version, each pair of jaws clamps independently of the remaining ones, thereby concentric clamping is obtained.
The opening can be determined by means of a connecting bar. The clamping strokes of the several sizes are designed such that manual or automatic loading and unloading can be effected to clamp blanks with large tolerances. Also single-acting elements are available on request.

Active principle



Clamping possibilities

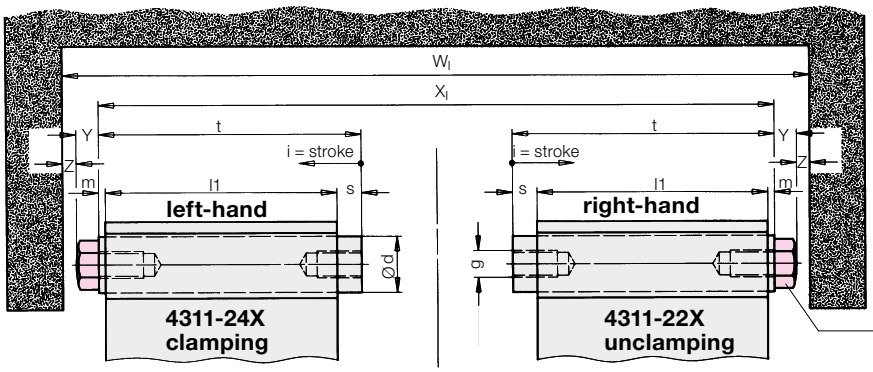




Application example

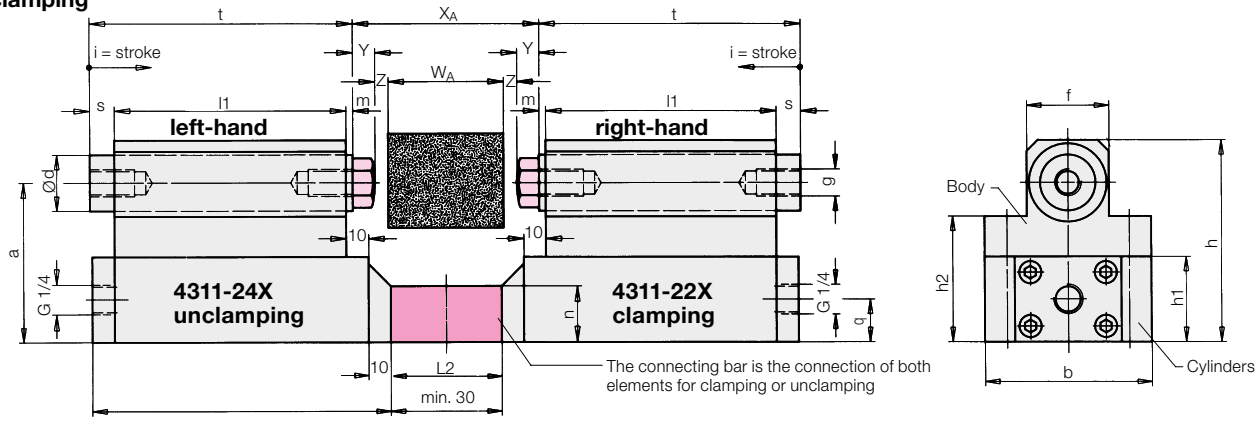
The flexible clamping unit is used to clamp bars which can be machined in every position, e.g. drilled, milled, threaded, etc.
In conjunction with a pneumatic two-jaw chuck the rotary indexing table is used to determine the machining position of the workpiece.
The two-jaw chuck and the right-hand concentric clamping element keep the bars in the exact working position.
The floating clamping element in the centre supports the bar. For this purpose it must work in a floating way, that means without centring function, what can be obtained by omitting the connecting bar.
(Available on request)

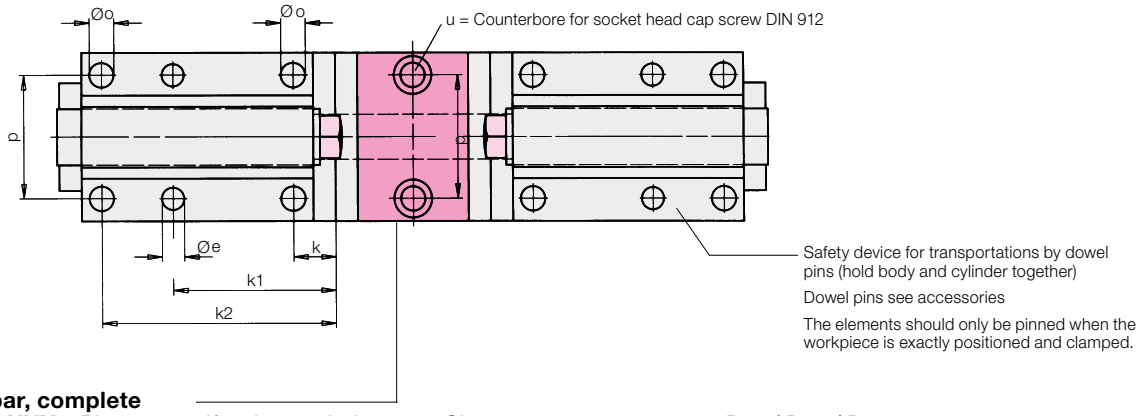
– Interior clamping



Repetitive accuracy ±0.005 mm

- Exterior clamping





Connecting bar, complete
Part no. 0432-XXX Please specify when ordering: 1. Size D16 / D25 / D32
2. Length of connecting bar L2 / L3 / L4 = ___ mm

After ordering a connecting bar, you will receive an installation drawing that shows the position of the fixing screws.

Calculation of the length of connecting bar L

Size	2 elements	3 elements + crossing for 3 elements	4 elements + crossing for 4 elements
D 16	$L2 = X2_{I/A} - X2\min_{I/A} + 30$	$L3 = \frac{X3_{I/A} - X3\min_{I/A}}{2} + 24.2$	$L4_{a/b} = \frac{X4_{I/A\,(a/b)} - X4\min_{I/A}}{2} + 20$
D 25	$L2 = X2_{I/A} - X2\min_{I/A} + 30$	$L3 = \frac{X3_{I/A} - X3\min_{I/A}}{2} + 26$	$L4_{a/b} = \frac{X4_{I/A\,(a/b)} - X4\min_{I/A}}{2} + 20$
D 32	$L2 = X2_{I/A} - X2\min_{I/A} + 30$	$L3 = \frac{X3_{I/A} - X3\min_{I/A}}{2} + 26$	$L4_{a/b} = \frac{X4_{I/A\,(a/b)} - X4\min_{I/A}}{2} + 25$

Dimension X... for

Interior clamping	$X2_I = W_I - 2Y - 2Z$	$X3_I = W_I - 2Y - 2Z$	$X4_{I\,(a/b)} = W_{I\,(a/b)} - 2Y - 2Z$
Exterior clamping	$X2_A = W_A + 2Y + 2Z$	$X3_A = W_A + 2Y + 2Z$	$X4_{A\,(a/b)} = W_{A\,(a/b)} + 2Y + 2Z$

W_I, $W_{I\,(a/b)}$ = workpiece inside dimension
W_A, $W_{A\,(a/b)}$ = workpiece outside dimension
(a/b) = only applies to crossing for 4 elements
For rectangular section (a x b) two different lengths of connecting bars L_a and L_b are required

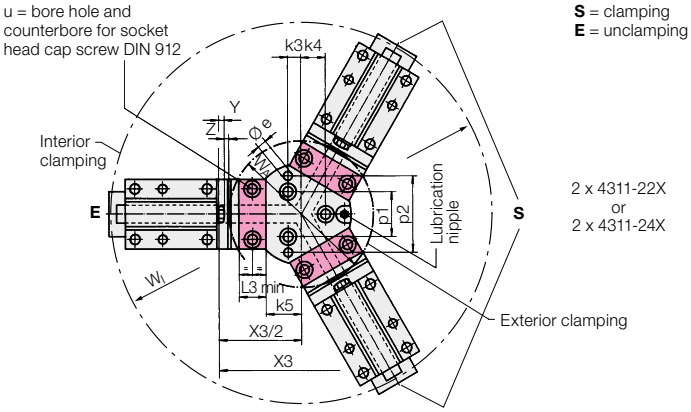
$X2\min_I, X3\min_I, X4\min_I$ = minimum dimension interior clamping (chart)
$X2\min_A, X3\min_A, X4\min_A$ = minimum dimension exterior clamping (chart) (bolt retracted without contact bolt)

Y = height contact bolt

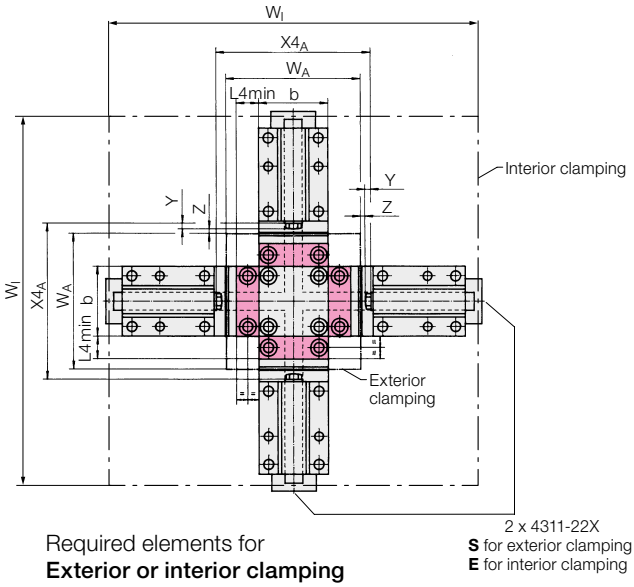
Z = ideal stroke per clamping bolt up to the workpiece (< clamping stroke)

Size		**D16**	**D25**	**D32**
Clamping force per pair of elements	[kN]	5	12	20
at max. operating pressure	[bar]	500	500	500
A centre height	[mm]	52	71	87
			Larger centre height on request	
b	[mm]	62	75	86
Piston/bolt Ø d	[mm]	16	25	32
E Ø pin hole	[mm]	8 H7	10 H7	12 H7
f	[mm]	28	37	45
g	[mm]	M 8 x 18	M 12 x 30	M 16 x 22
h	[mm]	66	90	111
h1	[mm]	27	38	47
h2	[mm]	41	56	72
i clamping stroke	[mm]	6	8	8
k	[mm]	18.5	19	22.5
k1 ±0.05	[mm]	58.5	73	81.5
k2	[mm]	83.5	105	117.5
k3	[mm]	12	15	18
k4	[mm]	22	30	35
k5	[mm]	32	40	50
l	[mm]	117	134	152
l1	[mm]	82	104	120
m	[mm]	2	3	3
n	[mm]	20	25	30
o Ø	[mm]	9	11	13
p ±0.02 (only Ø e)	[mm]	45	55	65
p1	[mm]	40	52	60
p2	[mm]	68	86	100
q	[mm]	14	19	24
s	[mm]	8	11	11
t	[mm]	92	118	134
u (counterbore for)	[mm]	M 8	M 10	M 12
$X2_{min.I}$ / $X2_{min.A}$	[mm]	238/66	284/64	316/64
$X3_{min.I}$ / $X3_{min.A}$	[mm]	320.4/148.4	386/166	438/186
$X4_{min.I}$ / $X4_{min.A}$	[mm]	310/138	369/149	422/170
$L2_{min.}$	[mm]	30	30	30
$L3_{min.}$	[mm]	24.2	26	26
$L4_{min.}$	[mm]	20	20	25
Weight	[kg]	2.2	4.5	9
Element, right-hand	**Part no.**	**4311-221**	**4311-222**	**4311-223**
Element, left-hand	**Part no.**	**4311-241**	**4311-242**	**4311-243**
Crossing for 3 elements	**Part no.**	**0432-300**	**0432-301**	**0432-302**
Crossing for 4 elements	**Part no.**	**0432-400**	**0432-401**	**0432-402**
Accessories				
Contact bolt (y = 10 mm)	**Part no.**	**3614-001**	**3614-028**	**3614-003**
Dowel pin DIN 6325	**Part no.**	**3300-313**	**3300-489**	**3300-617**

Crossing for 3 elements



Crossing for 4 elements



Required elements for

Exterior clamping		**Interior clamping**	
2 elements	**4311-22X**	1 element	**4311-22X**
1 element	**4311-24X**	2 elements	**4311-24X**
1 crossing for 3 elements	**0432-30X**	1 crossing for 3 elements	**0432-30X**
3 connecting bars L3	**0432-XXX**	3 connecting bars L3	**0432-XXX**

The 3 connecting bars must have the same length.

Required elements for

Exterior or interior clamping	
2 elements	**4311-22X**
2 element	**4311-24X**
1 crossing for 4 elements	**0432-40X**
4 connecting bar L4(a/b)	**0432-XXX**

For a rectangular section, always 2 connecting bars have the same length.