

FORKARDT

F+

Manual Chucks



WORKHOLDING SOLUTIONS WORLDWIDE

This catalogue describes the key components of a power chucking system featuring the following FORKARDT manual chuck:

F+

Should you require further information beyond the data contained in this catalogue, please contact FORKARDT.

The colleagues of our sales department will be pleased to help you.

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• For more information visit our website at:

www.forkardt.com

As we are constantly striving to improve our products, the dimensions and specifications in this catalogue cannot always represent the latest state of the art; they are therefore given as an indication only and are not binding.

F+ manual wedge block chuck

with open centre

The wedge block principle, invented by FORKARDT, has for decades formed the basis of diverse workholding systems, all of which are indispensable in modern production technology today.

Over several generations, experts at FORKARDT have made ongoing improvements to the wedge block chuck and adapted it to advances in the machine tool construction sector.

The latest addition to the successful family of FORKARDT hand-operated chucks is the F+:

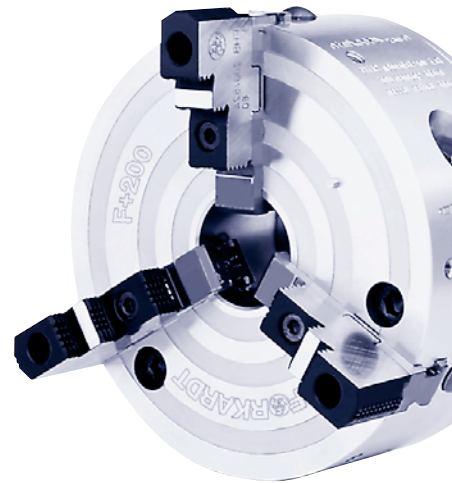
A new chuck with a long tradition, it combines all the advantages of the thoroughly tried and tested F chuck, and enhances them with new materials and modern production engineering expertise.

Technical features:

- Hardened steel chuck body for high precision and long life performance.
- Internal components made of high-quality steels for maximum gripping force.
- Large through bore hole for bar work.
- F+ manual chucks are compatible with virtually all lathes.

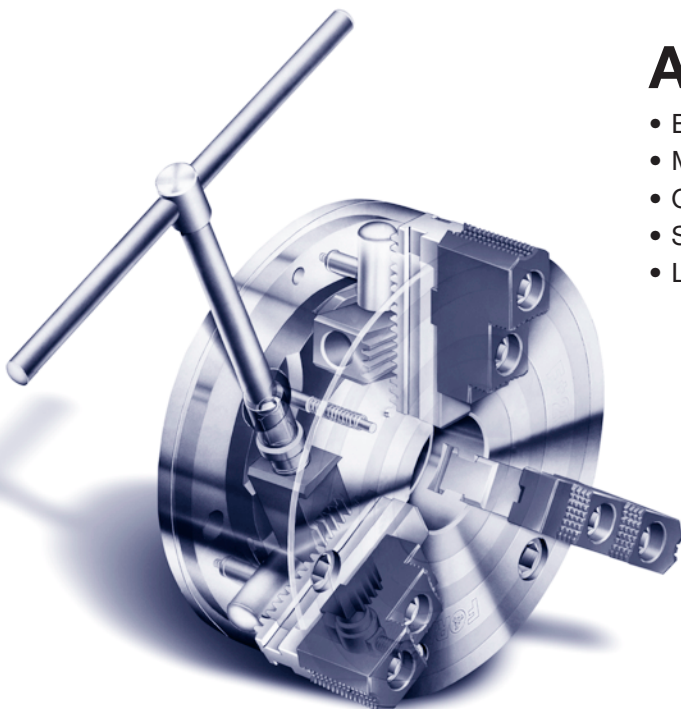
For non-standard spindle noses, special mounting parts are available on request.

- Tried and tested F jaw system in an unchanged design.
- Jaw types for diverse applications.
- Maximum repeat accuracy when reusing jaws.
- Easy use of existing sets of jaws.
- Wedge blocks moving transversely to the jaws allowing, after a short link out stroke, the jaws to be relocated, turned or changed.
- Maximum operating speeds due to low jaw weight.
- Single jaw locking device for safe handling.
- The gripping force is transmitted over generously dimensioned surfaces (no point or linear contact).

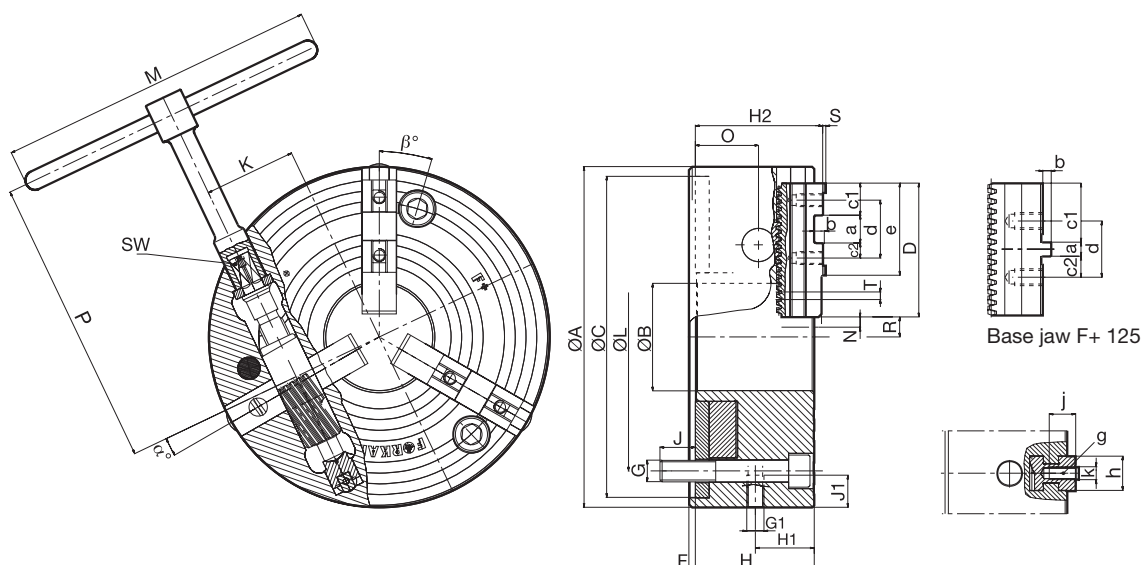


Advantages at a glance:

- Backlash-free mechanism for maximum accuracy.
- Maximum loadability and wear resistance.
- Quick jaw change within seconds.
- Suitable for use on all types of lathes.
- Long service life.



F+ manual chucks



Chuck dimensions with cylindrical spigot mounting recess

Chuck type F+			125	160	200	250	315	400	500	630
Chuck size	A	mm	125	161	206	255	318	400	500	630
Bore	B ^{+0.1}	mm	35	45	55	75	100	130	180	270
Centering - Ø	C ^{H6}	mm	115	145	185	235	300	380	460	580
Jaw connection			F125	F160	F200	F250	F315	F400	F400	F630
Base jaw length	D	mm	47	74	90	110	125	160	160	230
Height of centering	F	mm	4	5	5	6	6	6	6	6
Mounting bolts	G	mm	3xM8	3xM10	3xM12	3xM16	3xM20	3xM24	3xM24	3xM24
Eyebolt thread	G ₁	mm	-	-	-	-	M16	M16	M16	M20
Chuck height	H	mm	46.5	63	81.3	92	111	118	119	143
Clearance	H ₁	mm	-	-	-	-	55	55	55	70
Clearance	H ₂	mm	53.1	69	88	99	119	129	130	155
Thread length	J	mm	11	13	18	27	33	34	34	34
Thread depth	J ₁	mm	-	-	-	-	30	30	30	35
Centre distance of chuck key	K	mm	33	43	54	67	86	111	153.5	196
Hole circle - Ø	L	mm	100	125	160	200	250	315	235*/400	330.2*/520
Lever length	M	mm	150	200	280	450	500	600	600	710
Jaw stroke	N	mm	4.8	6.3	6.8	7.5	9.6	12	12	14.1
Clearance	O	mm	22.5	31.5	43	47	59	57.5	58.5	72
Distance of lever	P	mm	115	180	210	300	310	360	520	570
Position of base jaw	R min	mm	9.2	12.1	13.2	14.8	18.7	24.7	41.6	33.4
	R max	mm	23.6	31.5	42.6	51	68	93.1	135.7	169.8
Dimension	S	mm	-	2.5	3	3	3	4	4	4
Width across flats	SW	mm	8	10	12	14	16	19	19	24
Serration pitch	T	mm	3.6	4.8	4.8	6	7	8.5	8.5	8.5
Angle α°			6°36'	6°36'	3°	4°30'	4°30'	4°30'	4°30'	4°30'
Angle β°			21°36'	21°36'	18°	19°30'	16°30'	19°30'	14°30'	69°30'
Sloth width	a	mm	5	18	20	20	26	30	30	40
Sloth depth	b	mm	3	5	6	6	8	9	9	9
Dimension	c1	mm	21	19	23	26	30	35	35	52
Dimension	c2	mm	7.5	7	10	10	14	15	15	21
Hole spacing	d	mm	20	32	40	40	54	60	60	82
Length	e	mm	47	56	67	73	86	103	103	145
Thread	g	mm	M6	M8x1	M8x1	M12x1.5	M12x1.5	M16x1.5	M16x1.5	M20
Jaw width	h	mm	14	20	22	26	32	45	45	65
Thread depth	j	mm	10	16	20	23	25	30	30	32
Tongue	k	mm	14	8	10	12	12	18	18	24
Chuck constant	C1	daNmm/Nm	6,500	11,100	13,100	31,100	39,100	44,200	44,200	56,200
	C2	mm	165	260	320	390	440	570	570	820

* Hole circle to ASA B 5.9

Dimensions and Performance data

Chuck-type	Max. gripping force F _{sp} at maximum actuating torque	M ₀ max (maximum torque)	Maximum speed <i>n</i> _{max}	Weight (with jaws)	Mass moment of inertia	Outside diameter	Bore	Spindle connection	Chuck with undivided stepped jaws	Chuck with base and hard false jaws	Chuck with base jaws	Jaw width	Chuck height	Spindle square drive
	daN	Nm	1/min	kg	kgm ²	mm	mm		Ident-No	Ident-No	Ident-No	mm	mm	mm
F+ 125	3,700	40	6,000	3.7	0.0075	125	35	Z	D164662Z00B	-	D164662Z00D	14	46.5	8
								J3	D164662J03B	-	D164662J03D			
								J4	D164662J04B	-	D164662J04D			
								J5	D164662J05B	-	D164662J05D			
								D3	D164662D03B	-	D164662D03D			
								D4	D164662D04B	-	D164662D04D			
F+ 160	8,000	80	5,200	8.6	0.0325	161	45	Z	D164663Z00B	D164663Z00E	D164663Z00D	20	63	10
								J4	D164663J04B	D164663J04E	D164663J04D			
								J5	D164663J05B	D164663J05E	D164663J05D			
								J6	D164663J06B	D164663J06E	D164663J06D			
								D3	D164663D03B	D164663D03E	D164663D03D			
								D4	D164663D04B	D164663D04E	D164663D04D			
								D5	D164663D05B	D164663D05E	D164663D05D			
								D6	D164663D06B	D164663D06E	D164663D06D			
F+ 200	12,000	120	4,600	18.5	0.1025	206	55	D8	D164663D08B	D164663D08E	D164663D08D	22	81.3	12
								Z	D164664Z00B	D164664Z00E	D164664Z00D			
								J4	D164664J04B	D164664J04E	D164664J04D			
								J5	D164664J05B	D164664J05E	D164664J05D			
								J6	D164664J06B	D164664J06E	D164664J06D			
								J8	D164664J08B	D164664J08E	D164664J08D			
								D4	D164664D04B	D164664D04E	D164664D04D			
								D5	D164664D05B	D164664D05E	D164664D05D			
F+ 250	17,500	190	4,000	32.5	0.285	255	75	D6	D164664D06B	D164664D06E	D164664D06D	26	92	14
								D8	D164664D08B	D164664D08E	D164664D08D			
								Z	D164665Z00B	D164665Z00E	D164665Z00D			
								J4	D164665J04B	D164665J04E	D164665J04D			
								J5	D164665J05B	D164665J05E	D164665J05D			
								J6	D164665J06B	D164665J06E	D164665J06D			
								J8	D164665J08B	D164665J08E	D164665J08D			
								J11	D164665J11B	D164665J11E	D164665J11D			
F+ 315	21,500	210	3,200	62	0.8125	318	100	D4	D164665D04B	D164665D04E	D164665D04D	32	111	16
								D5	D164665D05B	D164665D05E	D164665D05D			
								D6	D164665D06B	D164665D06E	D164665D06D			
								D8	D164665D08B	D164665D08E	D164665D08D			
								Z	D164666Z00B	D164666Z00E	D164666Z00D			
								J6	D164666J06B	D164666J06E	D164666J06D			
								J8	D164666J08B	D164666J08E	D164666J08D			
								J11	D164666J11B	D164666J11E	D164666J11D			
F+ 400	23,400	260	2,200	102	2.2	400	130	D6	D164666D06B	D164666D06E	D164666D06D	45	118	19
								D8	D164666D08B	D164666D08E	D164666D08D			
								D11	D164666D11B	D164666D11E	D164666D11D			
								D15	D164666D15B	D164666D15E	D164666D15D			
								Z	D164668Z00B	D164668Z00E	D164668Z00D			
								J8	D164668J08B	D164668J08E	D164668J08D			
								J11	D164668J11B	D164668J11E	D164668J11D			
								J15	D164668J15B	D164668J15E	D164668J15D			
F+ 500	23,400	260	1,500	159	5.5	500	180	D8	D164668D08B	D164668D08E	D164668D08D	45	119	19
								D11	D164668D11B	D164668D11E	D164668D11D			
								D15	D164668D15B	D164668D15E	D164668D15D			
								Z	D164669Z00B	D164669Z00E	D164669Z00D			
F+ 630	28,000	315	1,000	293	17.5	630	270	J11	D164669J11B	D164669J11E	D164669J11D	65	143	24
								J15	D164669J15B	D164669J15E	D164669J15D			
								D11	D164669D11B	D164669D11E	D164669D11D			
								D15	D164669D15B	D164669D15E	D164669D15D			

F+ manual chuck with integral adaptor and mounting flange for short taper mounting

Chuck with integral mounting flange for bayonet-type fastening according to DIN 55027, ISO 702/III, ASA B 5.9 B

Spindle nose size	Chuck size	125	160	200	250	315	400	500L	630	Backplate J
3	Type	F125-J3								
	C1	59.5								
4	Type	F125-J4	F160-J4	F200-J4						
	C1	59.5	75.3	93.3						
5	Type	F125-J5	F160-J5	F200-J5	F250-J5					
	C1	66.5	79.3	95.3	107					
6	Type		F160-J6	F200-J6	F250-J6	F315-J6				
	C1		85.3	97.3	108	128				
8	Type			F200-J8	F250-J8	F315-J8	F400-J8	F500L-J8		
	C1			108.3	110	130	138	138		
11	Type					F315-J11	F400-J11	F500L-J11	F630-J11	
	C1					133	138	138	165	
15	Type							F500L-J15	F630-J15	
	C1							145	167	

Chuck with integral mounting flange for camlock fastening according to DIN 55029, ISO 702/II, ASA B 5.9 D1

Spindle nose size	Chuck size	125	160	200	250	315	400	500L	630	Backplate D
3	Type	F125-D3								
	C1	66.5								
4	Type	F125-D4	F160-D4	F200-D4						
	C1	67.5	85.3	99.3						
5	Type		F160-D5	F200-D5	F250-D5					
	C1		87.3	101.3	112					
6	Type		F160-D6	F200-D6	F250-D6	F315-D6				
	C1		103.3	106.3	117	146				
8	Type				F250-D8	F315-D8	F400-D8	F500L-D8		
	C1				122	138	143	143		
11	Type					F315-D11	F400-D11	F500L-D11	F630-D11	
	C1					143	148	148	170	
15	Type							F500L-D15	F630-D15	
	C1							153	175	

Chuck with cylindrical spigot mounting recess, with adaptor flange for mounting on spindle nose according to DIN 55026, ISO 702/I, ASA B 5.9 A1 and A2

Spindle nose size	Chuck size	125	160	200	250	315	400	500L	630	Adaptor flange ZWF
3	Type	F125-A3								
	C1	64.5								
	Ident. No	D1076104000								
4	Type	F125-A4	F160-A4	F200-A4						
	C1	64.5	81.3	110						
	Ident. No	D1070764001	D1070418002	-						
5	Type		F160-A5	F200-A5	F250-A5					
	C1		81.3	110	110					
	Ident. No		D1070419002	D1070417002	D1070352002					
6	Type			F200-A6	F250-A6	F315-A6				
	C1			112	112	136				
	Ident. No			D1070421002	D1070353002	D1070363002				
8	Type				F250-A8	F315-A8	F400-A8	F500L-A8		
	C1				117	136	148	154		
	Ident. No				D1070424002	D1070376002	D1070427102	D1070754002		
11	Type					F315-A11	F400-A11	F500L-A11	F630-A11	
	C1					143	150	*)154	183	
	Ident. No					D1070375002	D1070428002		D1070431002	
15	Type							F500L-A15	F630-J15	
	C1							159	**)167	
	Ident. No							D1070755002		

*) With register cover F500/700-J11

**) With register cover F630/400-J15

Chuck with integral adaptor plate for mounting on spindle nose according to DIN 55026, ISO 702/I, ASA B 5.9 A1 and A2

	Intermediate plate ZWS
Mounting plates for mounting F+ manual chuck on spindle noses according to DIN 55026 and ISO 702/I available on request!	

Calculations for manual chuck Type F+

Dynamic gripping force

The dynamic gripping force F_{sp} is thus calculated as:

$$F_{sp} = \frac{C1}{C2 + a} \times Md \pm 0.0008 \times \frac{(G \times Ra \times i)}{1000} \times n^2 \quad [\text{daN}]$$

+ for internal chucking | - for external chucking

Where the gripping force at standstill F_{sp0} (at spindle speed $n = 0$) is:

$$F_{sp0} = \frac{C1}{C2 + a} \times Md \quad [\text{daN}]$$

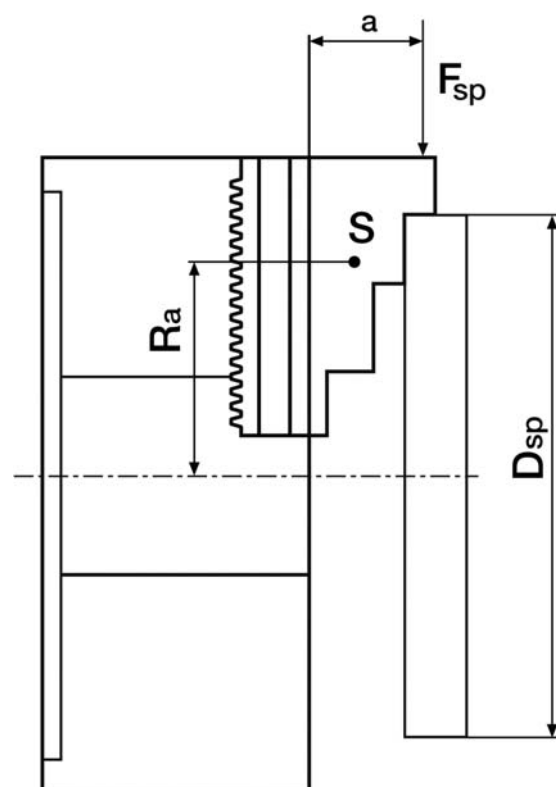
Please choose the maximum torque of the chuck in question for this formula.

and the loss of gripping force ΔF_{sp} at spindle speed n is:

$$\Delta F_{sp} = \pm 0.0008 \times \frac{(G \times Ra \times i)}{1000} \times n^2 \quad [\text{daN}]$$

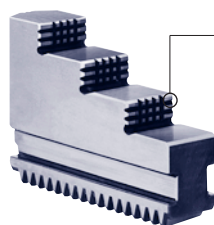
Terms used in the formula:

- F_{sp}** = dynamic gripping force [daN],
the total gripping force of all the jaws in rotation
+ for internal chucking
- for external chucking
- $C1, C2$** = Chuck constants
- Md** = Torque generated with chuck key [Nm]
- n** = spindle speed [min^{-1}]
- a** = Jaw overhang [mm]
(front edge of chuck to clamping position)
- G** = Weight of the jaw set [kg]
(e.g. one-piece stepped jaw FSTB)
- i** = Number of jaws
- Ra** = Distance of centre of gravity from chuck centreline [mm]
- D_{sp}** = Gripping diameter [mm]



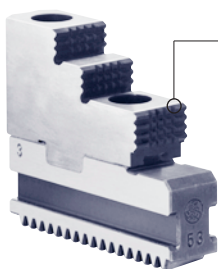
Jaws

F+ manual chucks are available either with FGB base jaws and FHB hard top jaws, or with one-piece FSTB stepped jaws. Further jaw types and special jaws are available on request.



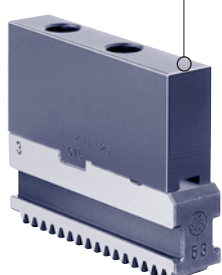
• One-piece stepped jaws
FSTB

- Hardened, one-piece gripping jaws for universal application
- Gripping jaws can be reground in the chuck.
- Increased driving force due to multiple teeth
- Reground in the chuck when delivered with a FORKARDT chuck
- Maximum stability



• Hard top jaws
FGB + FHB

- Hardened top jaws for universal application
- Gripping jaws can be reground in the chuck.
- Increased driving force due to multiple teeth
- Reground in the chuck when delivered with a FORKARDT chuck

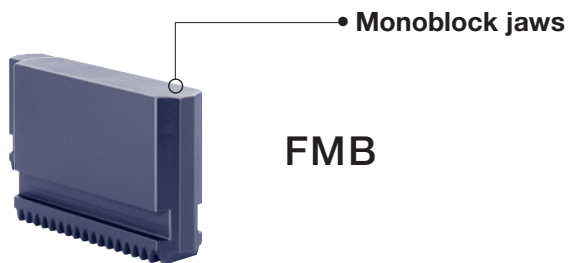


• Soft top jaws
FGB + FWB

- Hardened base jaws with soft top jaws for clamping finished machined workpieces
- High precision for finish-machining and precision work
- Internal turning of the chucking diameter in the chuck under clamping pressure

Jaws

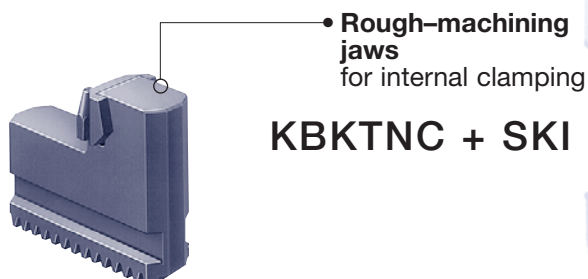
F+ manual chucks are also available either with FMB monoblock jaws and KBKTNC + SKA rough-machining jaws, or KBKTNC + SKI rough-machining jaws. Further jaw types and special jaws are available on request.



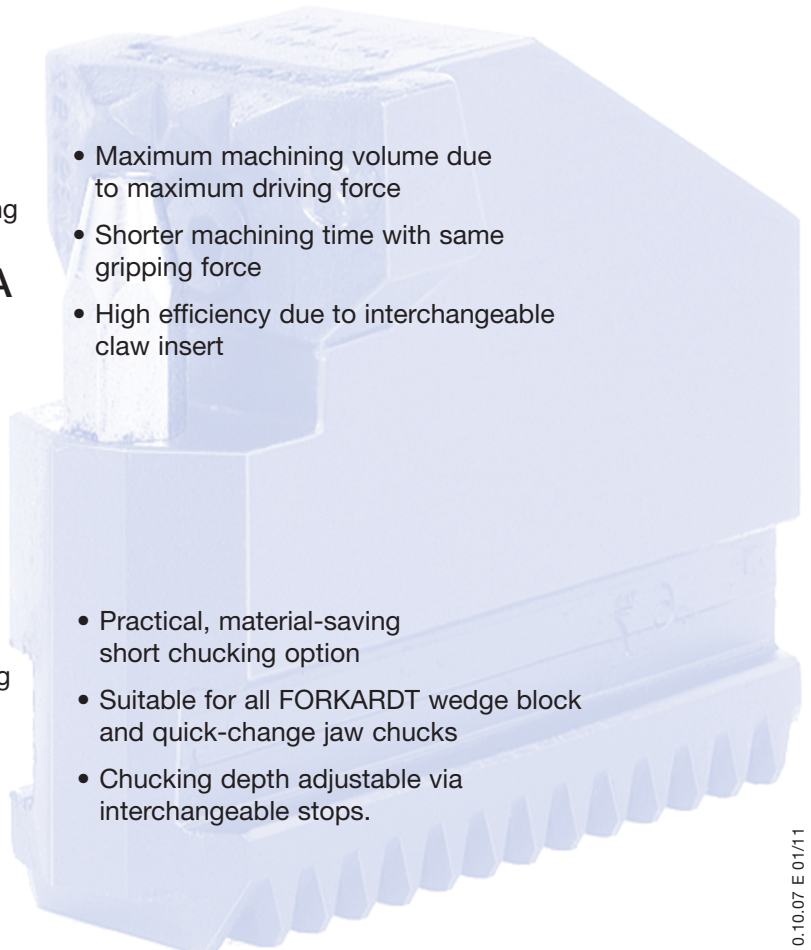
- Soft monoblock jaws for finish-machining
- High stability
- Greater use of jaw volume (no mounting bolts)
- Lower jaw centrifugal force through possible weight reduction
- Work pieces can be clamped closer to the chuck



- Maximum machining volume due to maximum driving force
- Shorter machining time with same gripping force
- High efficiency due to interchangeable claw insert



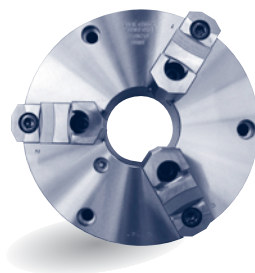
- Practical, material-saving short chucking option
- Suitable for all FORKARDT wedge block and quick-change jaw chucks
- Chucking depth adjustable via interchangeable stops.



Further manual chucks

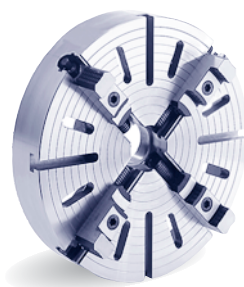
ATSC

- Universal scroll chuck for conventional machines
- Suitable for diverse chucking tasks in small-series production
- DIN and USA types
- Steel body
- Patented adjusting device *Ajust-Tru*®
- High-precision machine spindle alignment
- Good repetitive accuracy



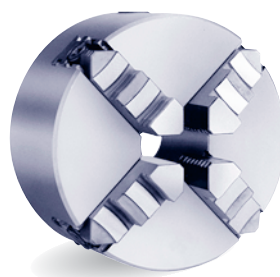
Bilsing independent chucks

- Four independently adjustable jaws for clamping round and irregular workpieces
- Suitable for numerous medium to heavy machining tasks
- Hardened die-cast steel body for long service life
- Quick-change jaws, easy changing from inside to outside chucking



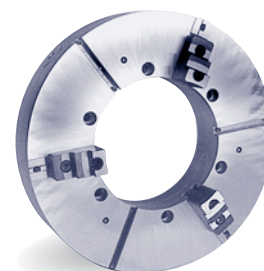
Wescott scroll chuck system

- 3 and 4-type jaw scroll chuck
- Centric chucking and additional individually adjustable jaws
- Suitable for virtually all turning operations and work piece shapes
- Standard sizes from 160 to 1600 mm



Hand operated cam-type chuck P with large bore

- 3, 4 or 6-jaw chuck for virtually all turning operations
- High loadability and repeat accuracy for clamping large and heavy workpieces
- Chuck diameter from 700 to 1250 mm
- Extremely large centre hole for machining, e.g. long tubes



Some other products by FORKARDT

Gripping force meter

- Electronic/mechanical compact unit for the routine testing of clamping devices
- Increases the safety of production processes
- Designed in C-MOS technology



SKM

Power chucks

- Highly developed universal chuck
- With open centre, centrifugal force compensation and integrated lubricant reserve
- Precise finish-machining at maximum speeds
- Chuck variants for diverse applications
 - type QLC/KS with extremely large bore
 - type QLC/LS with very long clamping stroke
 - type QLC/AG for compensating clamping
 - type QLC/KT the solid version for highest standards



3 QLC/K family

Special chucking systems

- Specially designed and manufactured to customer requirements
- Combined centering and clamping function for precise driving
- Example: Axle chuck for car body parts
- Sealed and oil-filled for continuous duty



Special chucks

Precision power chucks for grinding and hard turning

- Hermetically sealed, with permanent lubrication for freedom from maintenance and wear
- Chucking repeat accuracy < 0.0025 mm
- Jaw changing without loss of accuracy



High-precision chucks

Expanding mandrels/Collets

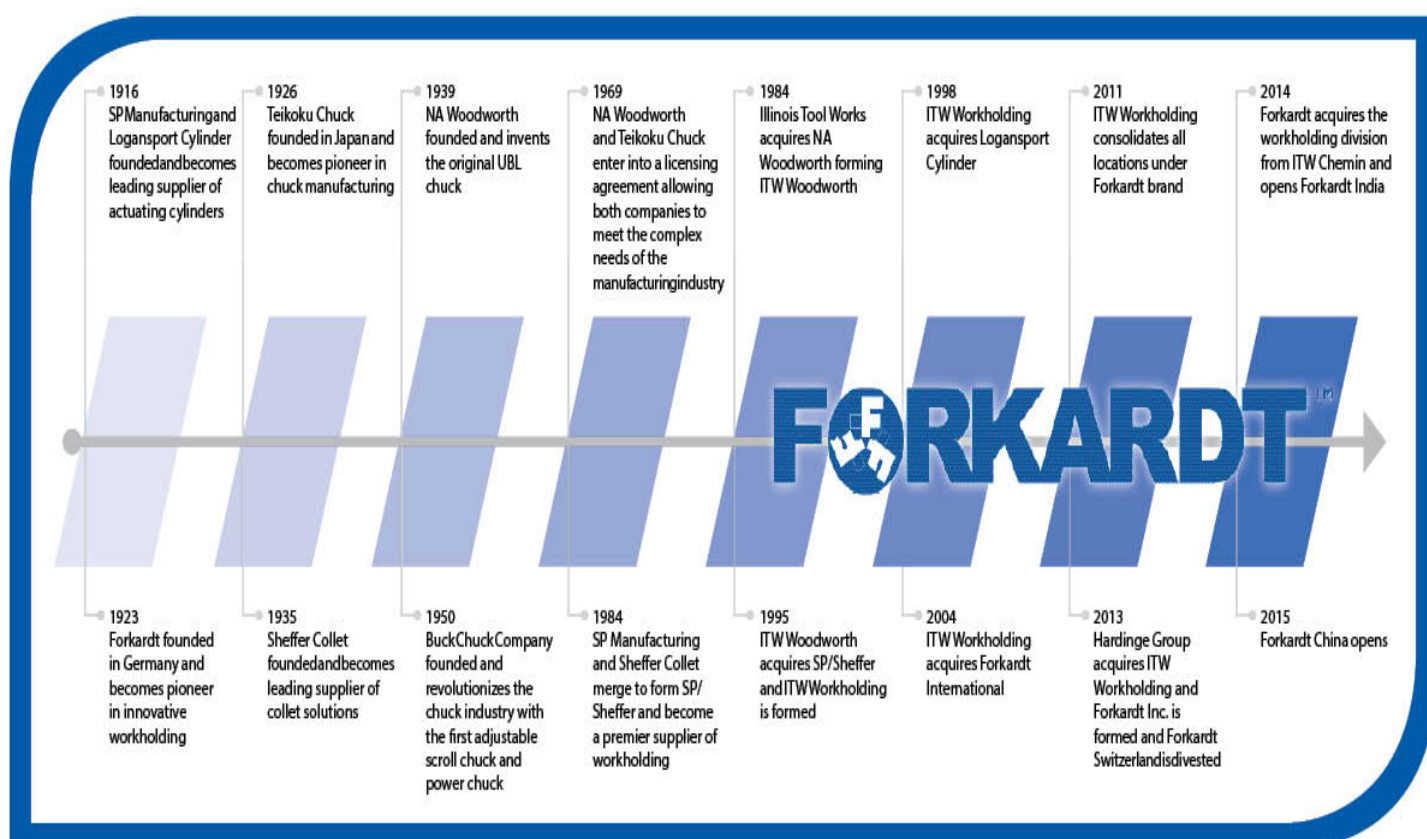
- Clamping range between 12.5-178.0 mm
- Double angle collet system with split sleeves
- Variable range for the development of optimal clamping systems
- Ground to customer requirements



EM



OUR HISTORY



Innovative Technology by **FORKARDT**

L O C A T I O N S W O R L D W I D E

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