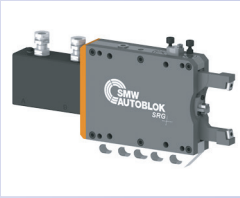


GRINDING 14E

Overview Grinding Applications



Chapter 1

SRG

High precision grinding Steady Rests
Grinding diameter Ø 20 - 85 mm

- Fine adjustment of the grinding center
- Retractable arms
- Suitable for follow down grinding
- High rigidity

Workpieces

Camshafts



Crankshafts



Shafts



Chapter 2

AcuGrind

High precision air chucks
Chuck sizes Ø 80 - 250 mm

- For OD and ID clamping
- Built-in pneumatic actuation
- For universal grinding applications

Workpieces

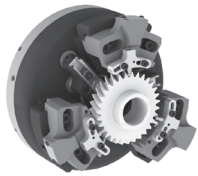
Bearing rings
Bearing parts



Bolts



Camshafts
Shafts



Chapter 3

Typ D

Diaphragm chucks
Chuck sizes Ø 210 - 400 mm

- Diaphragm technology for highest precision
- External or pitchline clamping
- With or without open center

Workpieces

Gears



Gear shafts



Chapter 4

FDG

High precision face drivers
for machining between center pins

- Machining of the entire surface of the workpiece with one single operation
- Power operated on the side of the spindle
- Highest round-out accuracy

Workpieces

Camshafts



Gear shafts



Shafts

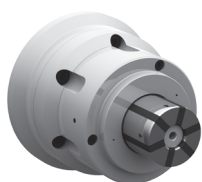


Chapter 5

CPG

Pneumatic pancake cylinder for
diaphragm chuck D-VARIO and face driver FDG

- Easy installation for grinding and turning machines without hydraulic unit
- Operating pressure 2-8 bar
- Medium feed for air / coolant



Chapter 6

EMS

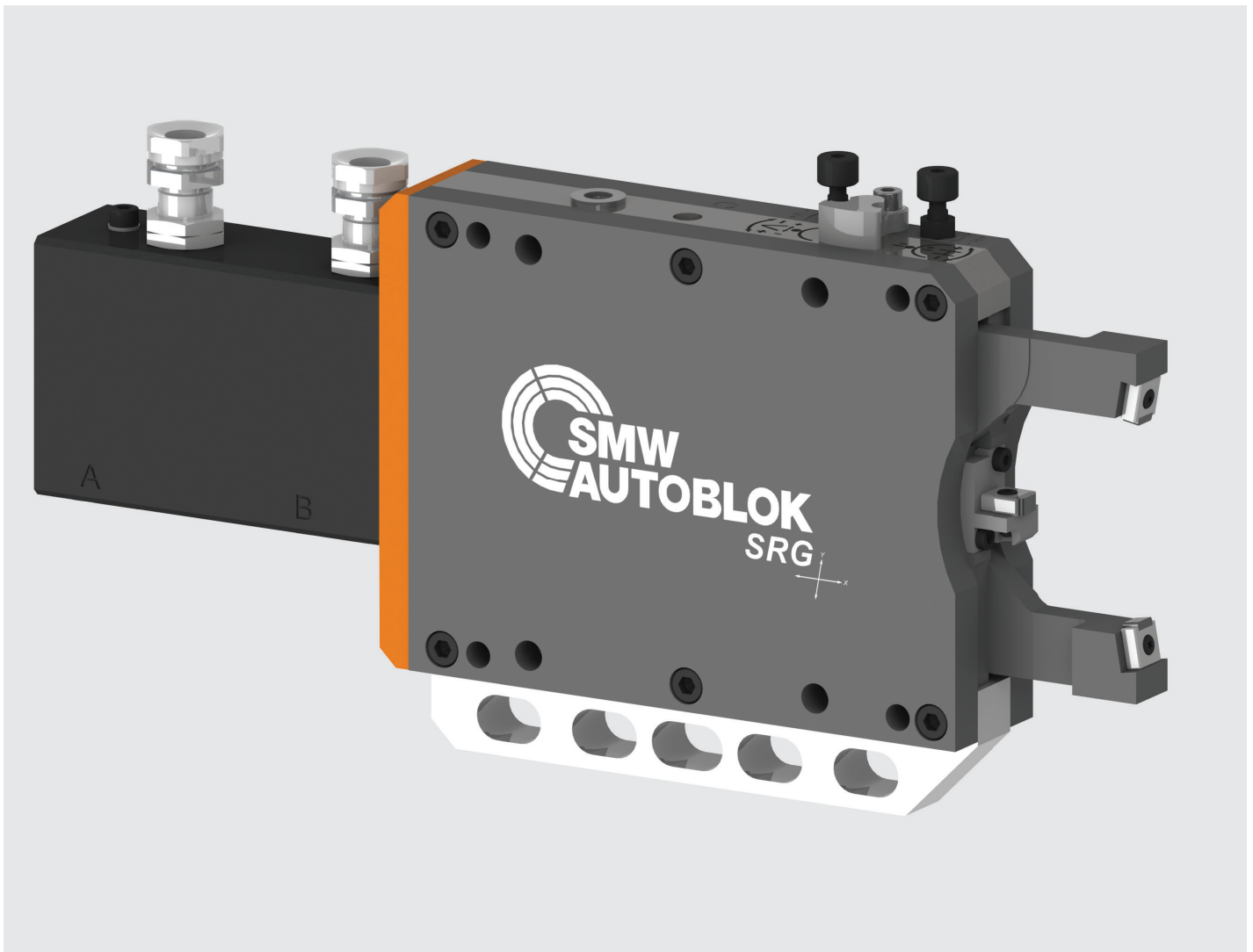
Segment sleeve mandrels
Clamping diameter Ø 18 - 105 mm

- For ID clamping
- Rigid design

Workpieces

Bearing rings
Bearing parts





SRG

High precision grinding Steady Rests

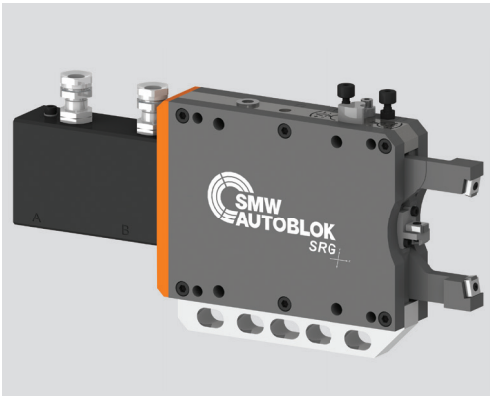
Grinding diameter \varnothing 20 - 85 mm

- Fine adjustment of the grinding center
- Retractable arms
- Suitable for follow down grinding
- High rigidity

New grinding Steady Rest with fine adjustment of the center

SRG

Grinding Steady Rest



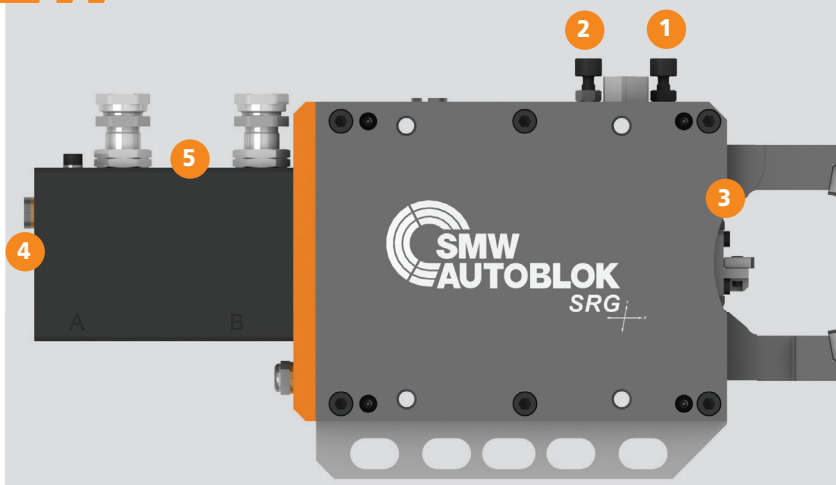
Application/customer benefits

- Support of shaft type workpieces on grinding machines
- Particularly suitable for the machining of crankshafts and camshafts
- Rapid set up of the Steady Rest to the grinding diameter due to the fine adjustment
- Suitable for Follow down grinding

Scope of delivery

- Basic Grinding Steady Rest SRG
 - Delivery in transport box
- (Padholder for the middle piece, Clamping Kit and Pad Kits are not scope of delivery. See therefor the overview for the configurations below.)

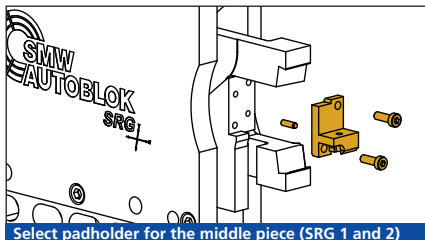
NEW



Technical Features

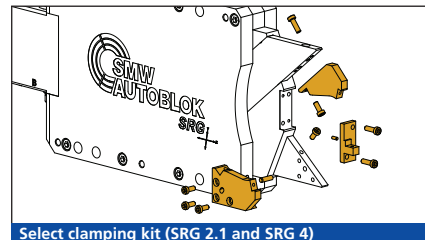
1. Horizontal fine adjustment of the grinding center
2. Vertical fine adjustment of the grinding center
3. Retractable Steady Rest arms
4. Port for compressed air against dust and coolant
5. Monitoring of end positions with standard proximity switches (switches not included)

Overview Configuration



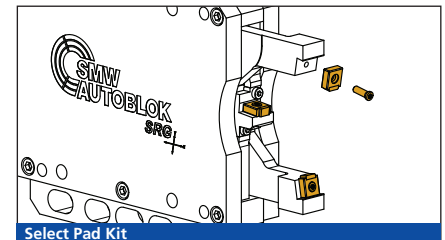
Padholder for the middle piece

- Consisting of padholder middle piece (incl. mounting material)
- 3 versions available:
 - 0 degree, ± 5 degree, ± 7 degree
- Can be rotated by 180 degrees



Clamping Kit for the arms

- Consisting of 2 nests for the arms and 1 padholder for the middle piece (incl. mounting material)
- The different clamping ranges can be covered by different clamping kits



Pad Kit

- Consisting of 3 pads incl. 3 mounting screws
- Standard for clamping range as shown on the Steady Rest
- Special for shifting of the clamping range -5 mm

SMW-AUTOBLOK Type		SRG 1 221175	SRG 2 221871	SRG 2.1 222260			SRG 4 221930				
Basic Steady Rest	Id.No.										
Clamping range	mm	20-35	30-60	12-60			43-85				
Padholder 0 degree	Id.No.	203977*	203985*								
Padholder ± 5 degree	Id.No.	203978*	203986*								
Padholder ± 7 degree	Id.No.	203979*	203987*								
Clamping kit				I	II	III	I	II	III	IV	
Clamping range	mm			12-28	28-44	44-60	43-55	49-61	61-73	73-85	
Clamping kit 0 degree	Id.No.			204383**	204382**	204381**	204165**	204164**	204163**	204162**	
Clamping kit ± 5 degree	Id.No.						204202**	204201**	204200**	204199**	
Clamping kit ± 7 degree	Id.No.						204206**	204205**	204204**	204203**	
Pad Kit Standard	Id.No.	203976	203976	203976			204161				
Pad Kit Special***	Id.No.	203939	203939	203939			-				
Working pressure	bar	15-30	15-30	15-30			7-25				
Follow down grinding		Yes	Yes	Yes			Yes				

* Consisting of padholder for the middle piece incl. mounting material

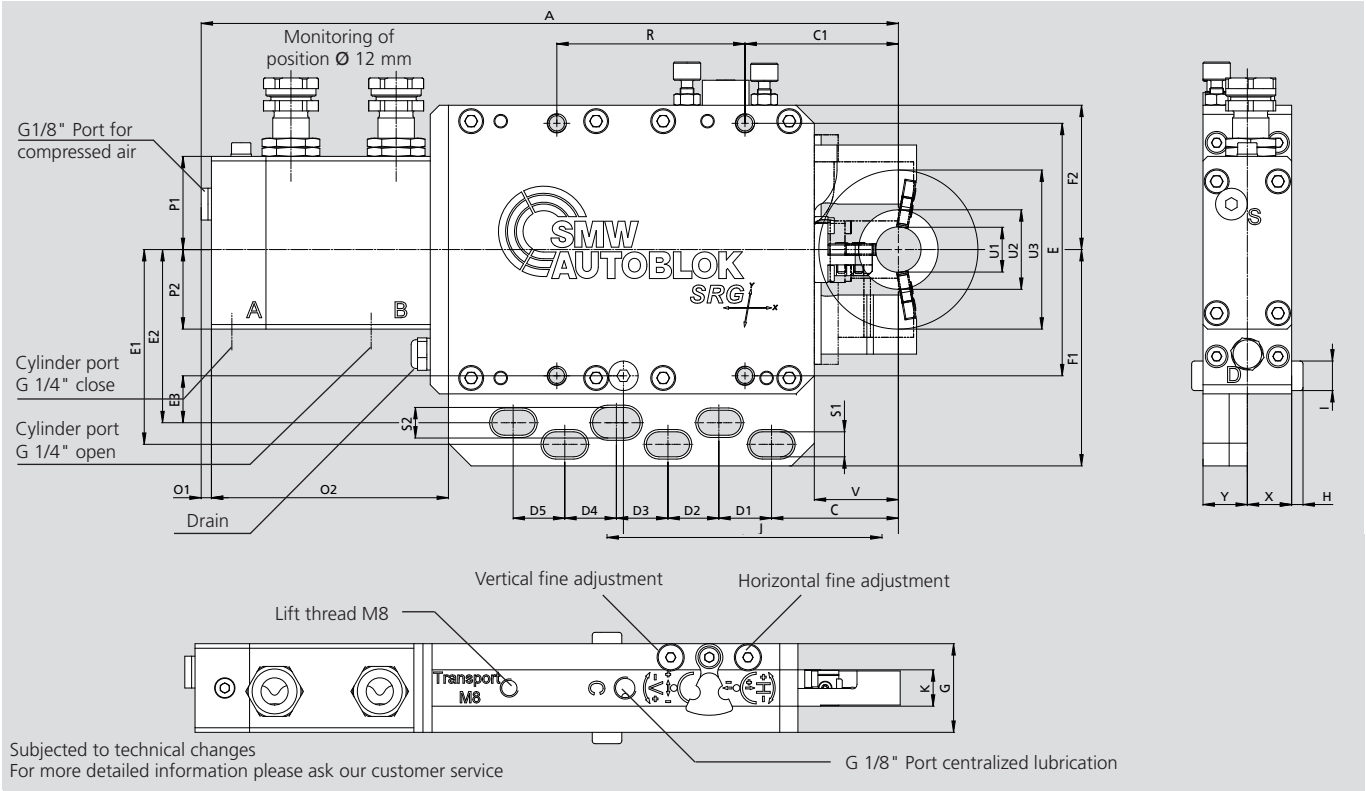
** Consisting of padholder for the middle piece and the nests for the arms incl. mounting material

*** Clamping range -5 mm

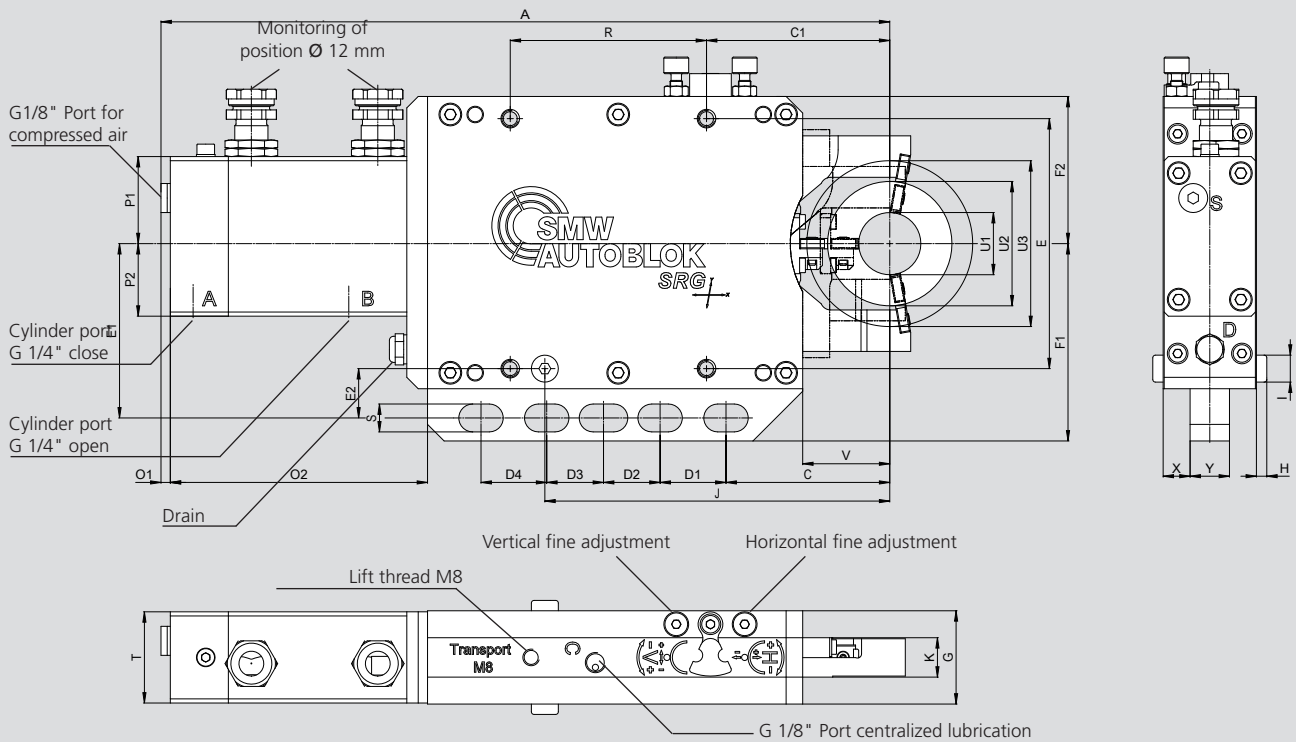
SRG 1

Grinding Steady Rest

Dimensions and technical data



SMW-AUTOBLOK Type Id. No.			SRG 1 221175
Minimum clamping diameter	U1	mm	20
Maximum clamping diameter	U2	mm	35
Clear for part loading	U3	mm	70
Horizontal adjustment range	mm	mm	± 0.20
Vertical adjustment range	mm	mm	± 0.10
	A	mm	306.8
	C	mm	55.9
	C1	mm	67.5
	D1	mm	22.8
	D2	mm	22.7
	D3	mm	22.7
	D4	mm	22.7
	D5	mm	22.6
	E	mm	111.1
	E1	mm	76.2
	E2	mm	85.7
	E3	mm	20.7
	F1	mm	95.2
	F2	mm	63.5
	G	mm	39
	H	mm	5
	I	mm	13
	J	mm	121.2
	K	mm	16
	O1	mm	4.5
	O2	mm	104.3
	P1	mm	41
	P2	mm	35
	R	mm	82.8
	S1	mm	11
	S2	mm	13.5
	T	mm	39
	V	mm	37
	X	mm	19.5
	Y	mm	19.5
Cylinder stroke		mm	69.9
Piston area		cm ²	6.38
Operating pressure	max	bar	45
Working pressure		bar	15-30
Repeatability accuracy		mm	0.001
Mass		kg	8.7



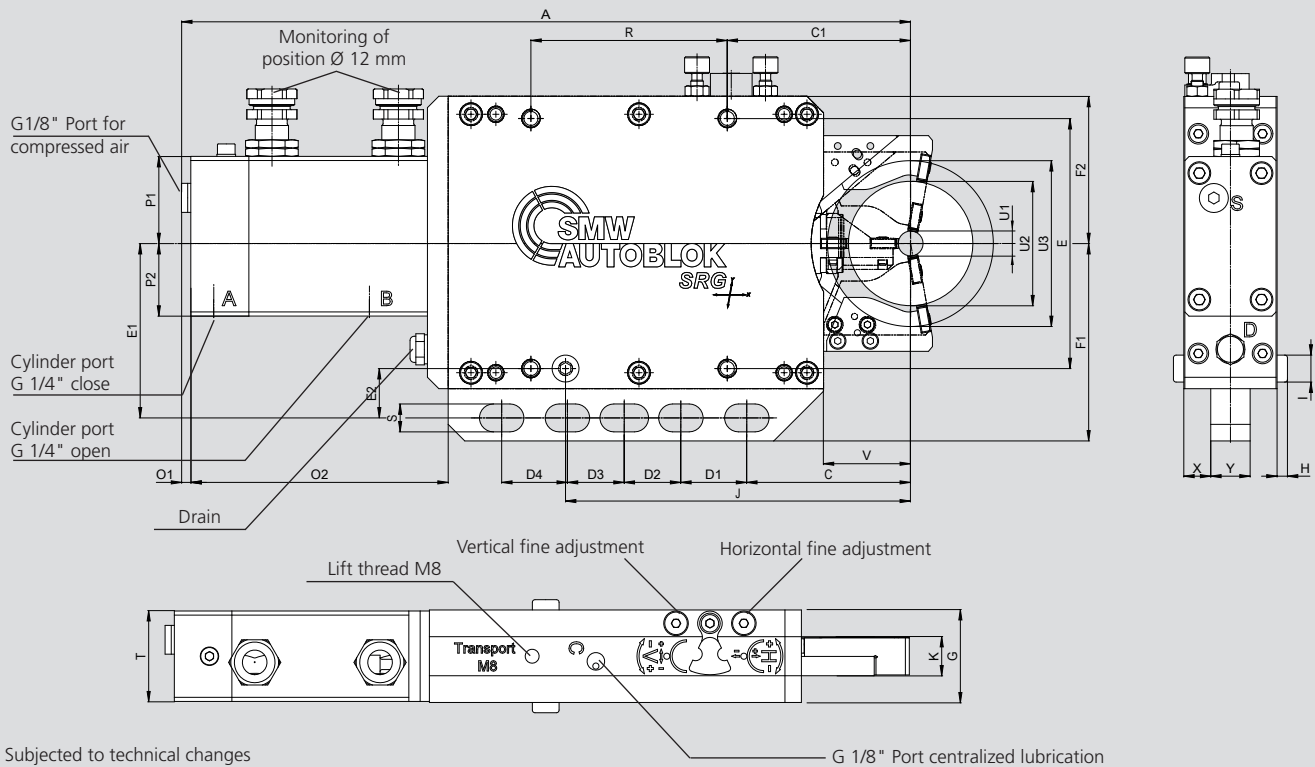
Subjected to technical changes
For more detailed information please ask our customer service

SMW-AUTOBLOK Type			SRG 2
Id. No.			221871
Minimum clamping diameter	U1	mm	30
Maximum clamping diameter	U2	mm	60
Clear for part loading	U4	mm	80
Horizontal adjustment range	mm	mm	± 0.20
Vertical adjustment range	mm	mm	± 0.14
	A	mm	351.6
	C	mm	79
	C1	mm	88.4
	D1	mm	31.8
	D2	mm	27.4
	D3	mm	27.3
	D4	mm	31.7
	E	mm	120.6
	E1	mm	84.1
	E2	mm	23.8
	F1	mm	95.2
	F2	mm	71
	G	mm	45
	H	mm	5
	I	mm	13
	J	mm	166.4
	K	mm	19
	M	mm	41
	O1	mm	4.5
	O2	mm	124.1
	P1	mm	42
	P2	mm	35
	R	mm	94.7
	S	mm	13.5
	T	mm	45
	V	mm	42
	X	mm	13
	Y	mm	19
Cylinder stroke		mm	73.4
Piston area		cm ²	7,07
Operating pressure	max	bar	45
Working pressure		bar	15-30
Repeatability accuracy		mm	0.001
Mass		kg	11.8

SRG 2.1

Grinding Steady Rest

Dimensions and technical data



Subjected to technical changes
For more detailed information please ask our customer service

SMW-AUTOBLOK Type Id.No.				SRG 2.1 222260	
Minimum clamping diameter	U1	mm	12 *	28 **	44 ***
Maximum clamping diameter	U2	mm	28 *	44 **	60 ***
Clear for part loading	U3	mm	30 *	46 **	62 ***
Horizontal adjustment range	mm	mm		± 0.20	
Vertical adjustment range	mm	mm		± 0.14	
	A	mm		351.6	
	C	mm		79	
	C1	mm		88.4	
	D1	mm		31.8	
	D2	mm		27.4	
	D3	mm		27.3	
	D4	mm		31.7	
	E	mm		120.6	
	E1	mm		84.1	
	E2	mm		23.8	
	F1	mm		95.2	
	F2	mm		71	
	G	mm		45	
	H	mm		5	
	I	mm		13	
	J	mm		166.4	
	K	mm		19	
	M	mm		41	
	O1	mm		4.5	
	O2	mm		124.1	
	P1	mm		42	
	P2	mm		35	
	R	mm		94.7	
	S	mm		13.5	
	T	mm		45	
	V	mm		42	
	X	mm		13	
	Y	mm		19	
Cylinder stroke		mm		66.4	
Piston area		cm ²		7,07	
Operating pressure		bar		45	
Working pressure		bar		15-30	
Repeatability accuracy		mm		0.001	
Mass		kg		11.2	

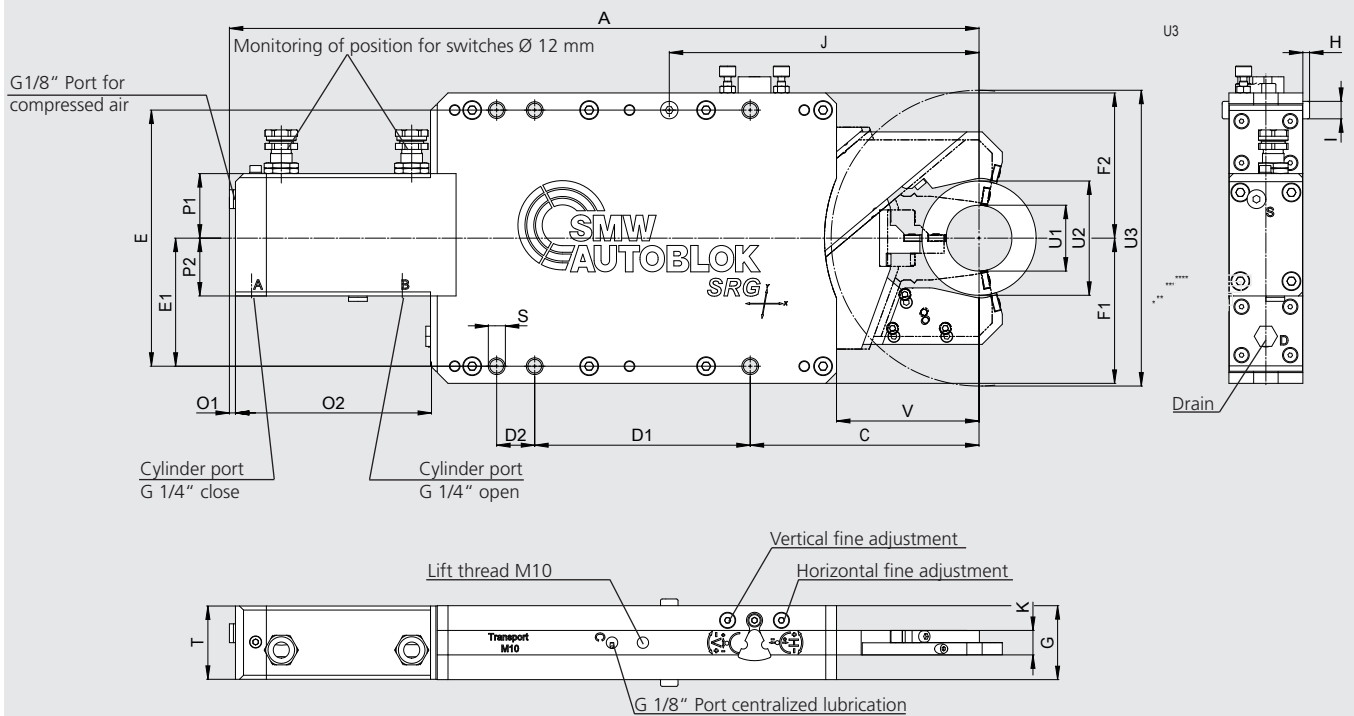
Modular nests for the arms:

- (*) 12-28 mm clamping range by using clamping kit I
- (**) 28-44 mm clamping range by using clamping kit II
- (***) 44-60 mm clamping range by using clamping kit III

SRG 4

Grinding Steady Rest

Dimensions and technical data

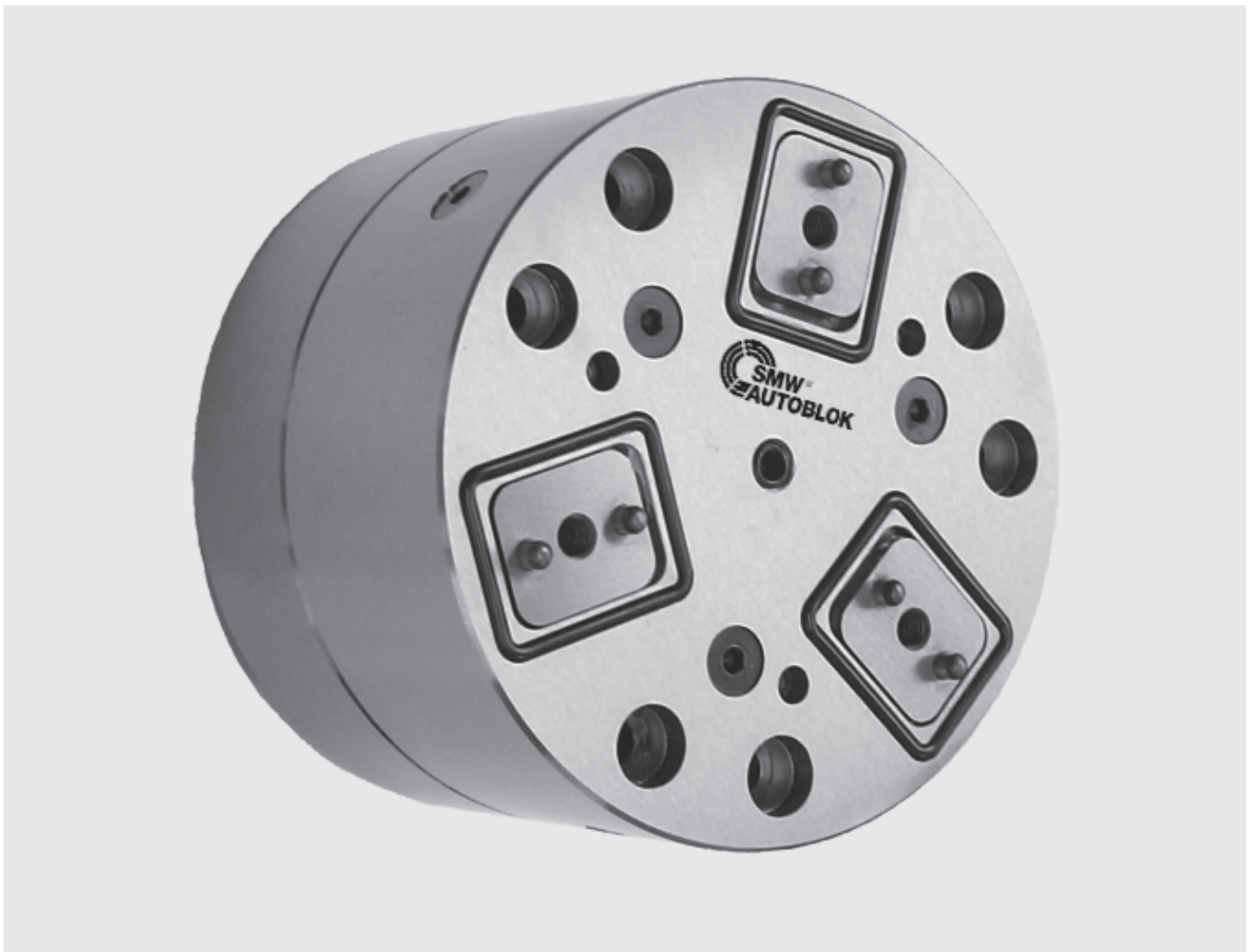


Subjected to technical changes
For more detailed information please ask our customer service

SMW-AUTOBLOK Type Id. No.			SRG 4 221930			
Minimum clamping diameter	U1	mm	43 *	49 **	61 ***	73 ****
Maximum clamping diameter	U2	mm	55 *	61 **	73 ***	85 ****
Clear for part loading	U3	mm	220			
Horizontal adjustment range	mm	mm	± 0.20			
Vertical adjustment range	mm	mm	± 0.14			
	A	mm	557.6			
	C	mm	170.2			
	D1	mm	160.3			
	D2	mm	28.3			
	E	mm	190.5			
	E1	mm	95.25			
	F1	mm	108			
	F2	mm	108			
	G	mm	55			
	H	mm	5			
	I	mm	13			
	J	mm	230.4			
	K	mm	18			
	O1	mm	4.5			
	O2	mm	145.1			
	P1	mm	48			
	P2	mm	43			
	S	mm	M12 (6x)			
	T	mm	54.5			
	V	mm	106			
Cylinder stroke		mm	127.2			
Piston area		cm ²	12.56			
Operating pressure	max	bar	30			
Working pressure		bar	7-25			
Repeatability accuracy		mm	0.001			
Mass		kg	20			

Modular nests for the arms:

- (*) 43-55 mm clamping range by using clamping kit I
- (**) 49-61 mm clamping range by using clamping kit II
- (***) 61-73 mm clamping range by using clamping kit III
- (****) 73-85 mm clamping range by using clamping kit IV



AcuGrind

High precision air chucks

Chuck sizes Ø 80 - 250 mm

- For OD and ID clamping
- Built-in pneumatic actuation, no hydraulic cylinder required
- For universal grinding applications

High precision air chuck Ø 80 - 250 mm

AcuGrind

- with built-in pneumatic actuating cylinder
- fully sealed



Application/customers benefits

- Sealed standard chuck for high-precision turning and grinding
- Highest accuracy - runout and repeatability
- Built-in pneumatic actuation, no hydraulic cylinder required

Technical features

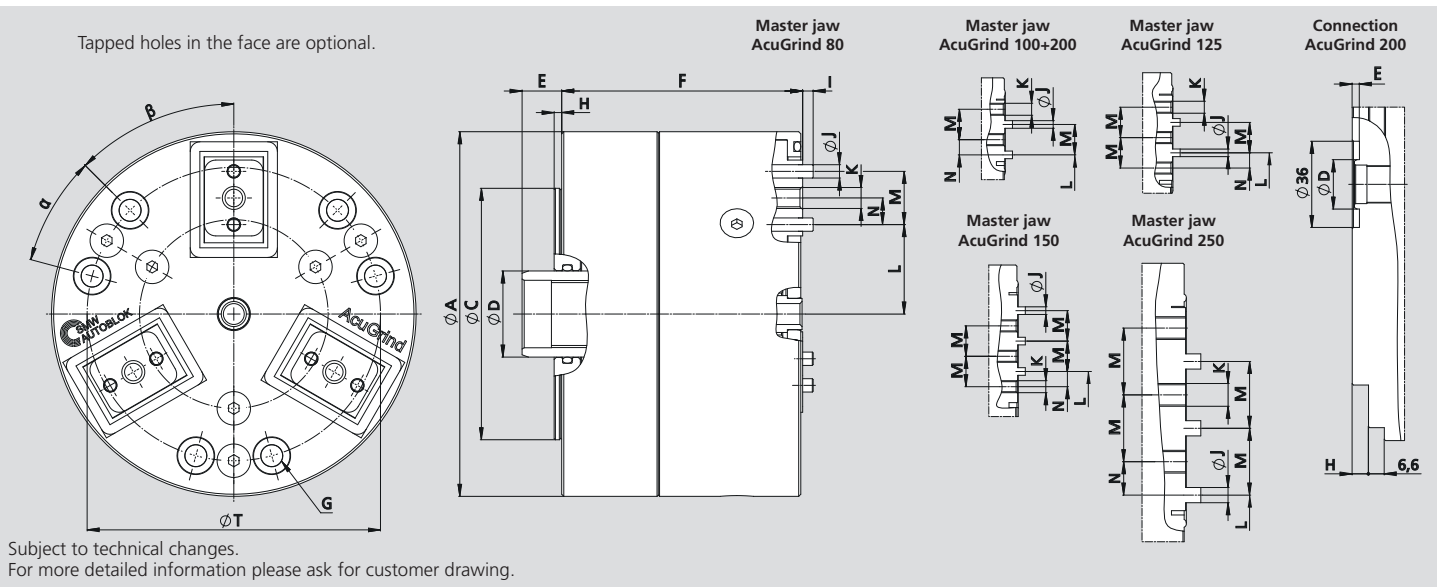
- Base jaws case hardened
- Repeatability < 0.002 mm
- **proofline® chucks** = fully sealed - low maintenance

Standard equipment

- Power chuck
- Boring ring for I.D. clamping
- Boring ring for O.D. clamping
- Lubricating oil

Ordering example

AcuGrind 150, Id.No. 5302503

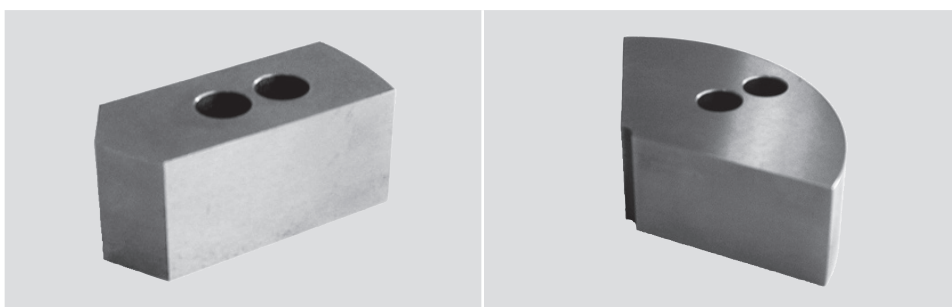


Technical data

SMW-AUTOBLOK Type		AcuGrind 80	AcuGrind 100	AcuGrind 125	AcuGrind 150	AcuGrind 200	AcuGrind 250
Order number	Id.No.	5302500	5302501	5302502	5302503	5302504	5302505
Outside Ø	A	87	107	135	157	214	265
Centering Ø	h7 C	60	82.55	101.6	125	167.6	215.8
Distributor Ø	D	20.55	20.55	20.6	20.6	20.6	20.6
min. / max.	E	9.5 / 17.0	10 / 17.5	8 / 15.5	10.5 / 18	-3 / 10.5	12.75 / 20.25
Height	F	57.5	56.5	60.3	56.2	81.5	74.6
Chuck mounting bolts	G	6 x M5	6 x M5	6 x M6	6 x M6	6 x M10	6 x M10
	H	1.8	2	2.2	2.2	6.8	7.2
	I	2.5	3.2	3.2	3.2	6.35	6.35
Pin Ø	J	3.18	3.18	3.18	3.18	6.35	6.35
Jaw mounting bolts	K	M5	M5	M5	M5	3/8" - 24 UNF	3/8" - 24 UNF
Distance to 1. pin max. / min.	L	21.34 / 20.09	21.34 / 20.09	34.05 / 32.8	34.05 / 32.8	38.05 / 36.8	35.7 / 34.45
	M	12.7	12.7	12.7	12.7	27.9	27.9
	N	6.35	6.35	6.35	6.35	13.95	13.95
Bolt circle Ø	T	70	88.9	110	135.75	183	233.7
	α	30°	30°	30°	30°	30°	30°
	β	45°	60°	60°	60°	60°	60°
Repeatability	mm	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Radial jaw stroke	mm	1.25	1.25	1.25	1.25	1.25	1.25
Speed max.	min ⁻¹	5000	5500	5500	5000	2500	2500
Clamping force at 6 bar	kN	2.65	4.85	9.5	10.5	28	31
Operating pressure	bar	1 - 6	1 - 6	1 - 6	1 - 6	1 - 6	1 - 6
Weight	kg	2.5	3.5	6.5	7.5	21	28

2-jaw and 4-jaw power chucks available on request.

Top jaws for AcuGrind



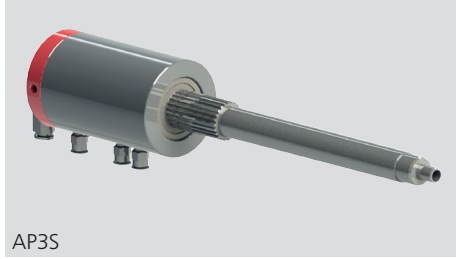
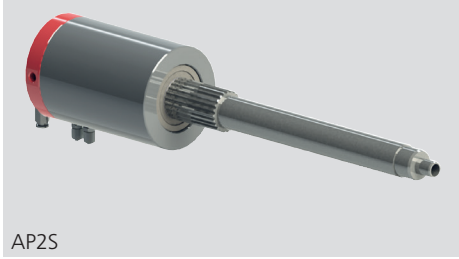
WAK Soft top jaws

SBK Segment jaws 120°

Chuck type	Material	Id.No.	Height	Id.No.	Height
AcuGrind 80	Aluminium	5302511	25	5302545	25
		5302512	38	5302546	38
	Steel	5302513	25	5302547	25
		5302514	38	5302548	38
AcuGrind 100	Aluminium	5302515	25	5302549	25
		5302516	38	5302550	50
		5302551	75	5302552	100
		5302552	100	5302552	100
	Steel	5302517	25	5302553	20
		5302518	38	5302554	38
5302519	50	5302555	50		
AcuGrind 125	Aluminium	5302520	25	5302556	25
		5302521	38	5302557	38
		5302522	50	5302558	50
		5302523	75	5302559	75
	Steel	5302524	25	5302560	20
		5302525	38	5302561	25
		5302526	50	5302562	38
		5302563	50	5302563	50
AcuGrind 150	Aluminium	5302527	25	5302564	25
		5302528	38	5302565	38
		5302529	50	5302566	50
		5302530	75	5302567	75
	5302568	100	5302568	100	
	Steel	5302531	25	5302569	25
		5302532	38	5302570	38
		5302533	50	5302571	50
5302534		75	5302572	75	
AcuGrind 200	Aluminium	5302535	50	5302573	38
		5302536	75	5302574	50
		5302537	100	5302575	75
	Steel	5302538	50	5302576	50
		5302539	75	5302577	75
		5302540	100		
AcuGrind 250	Aluminium	5302541	50	5302578	75
		5302542	75	5302579	100
	Steel	5302543	50	5302580	75
		5302544	75	5302581	100

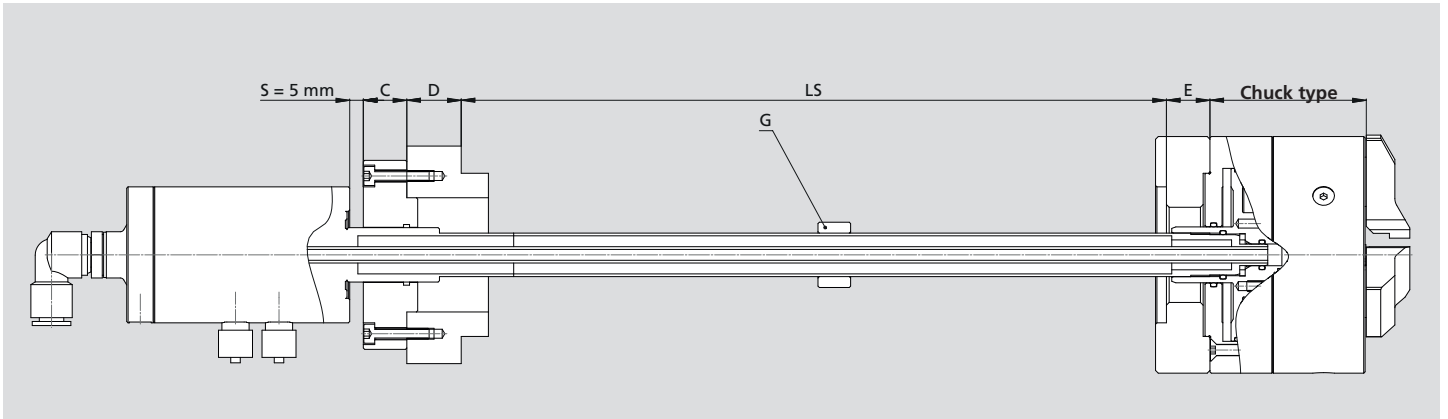
Top jaws in special version on request.

Air feed tubes fix (AP)



SMW-AUTOBLOK Type	Speed max. (min ⁻¹)	Version
AP2S	5.000	2 airways
AP3S	5.000	3 airways

AP2S/AP3S = with serration



LS	Spindle length
E	Chuck adaptor
C	Bushing (included in scope of delivery of the air feed tubes type AP)
D	Adaptor (mounting ring manufactured by the customer)
S	Safety distance
F	AcuGrind chuck
G	Support ring for tube bundle longer 600mm

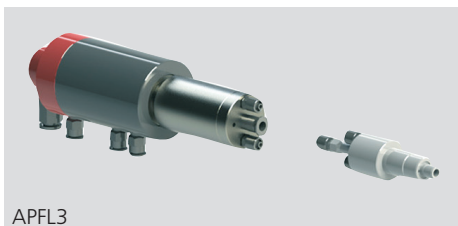
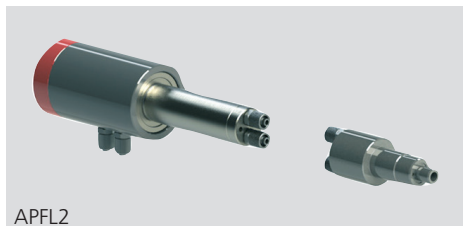
Ordering example

NOTE In case of an order of the air feed tubes type AP, the length of the air feed tube is necessary.

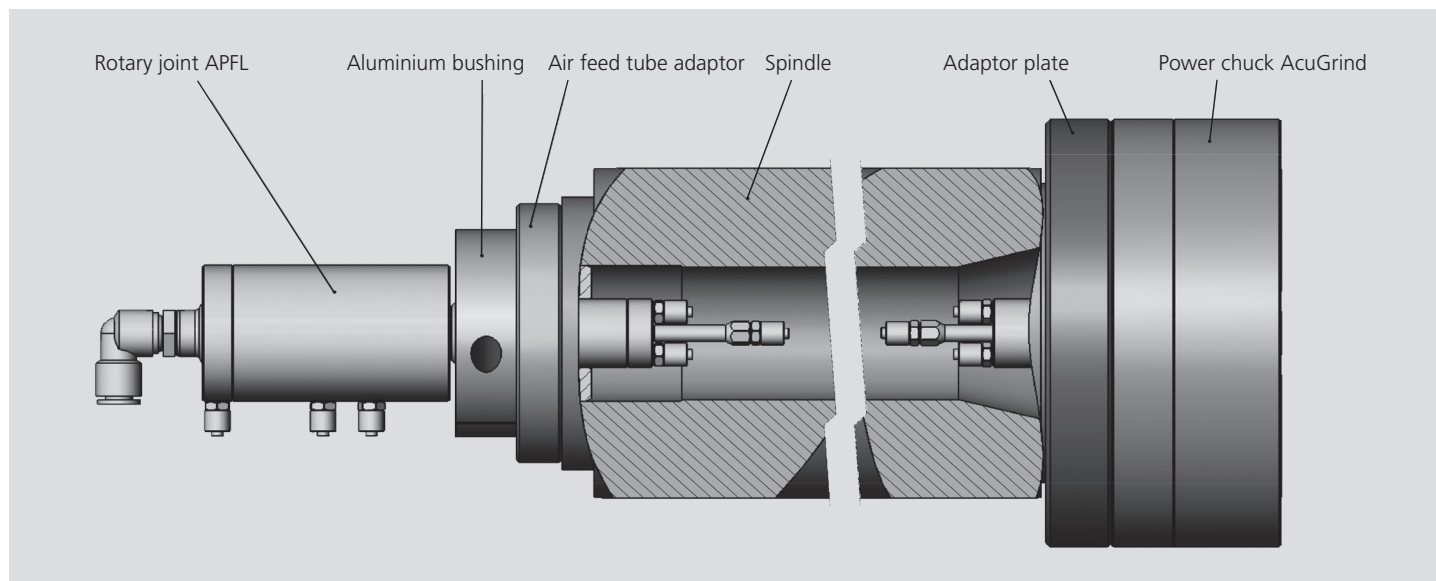
For calculating the correct length of the air feed tube (LR) are the following dimensions necessary: LS, E, C, D and the chuck type!

NOTE Use only with clean and oiled air.

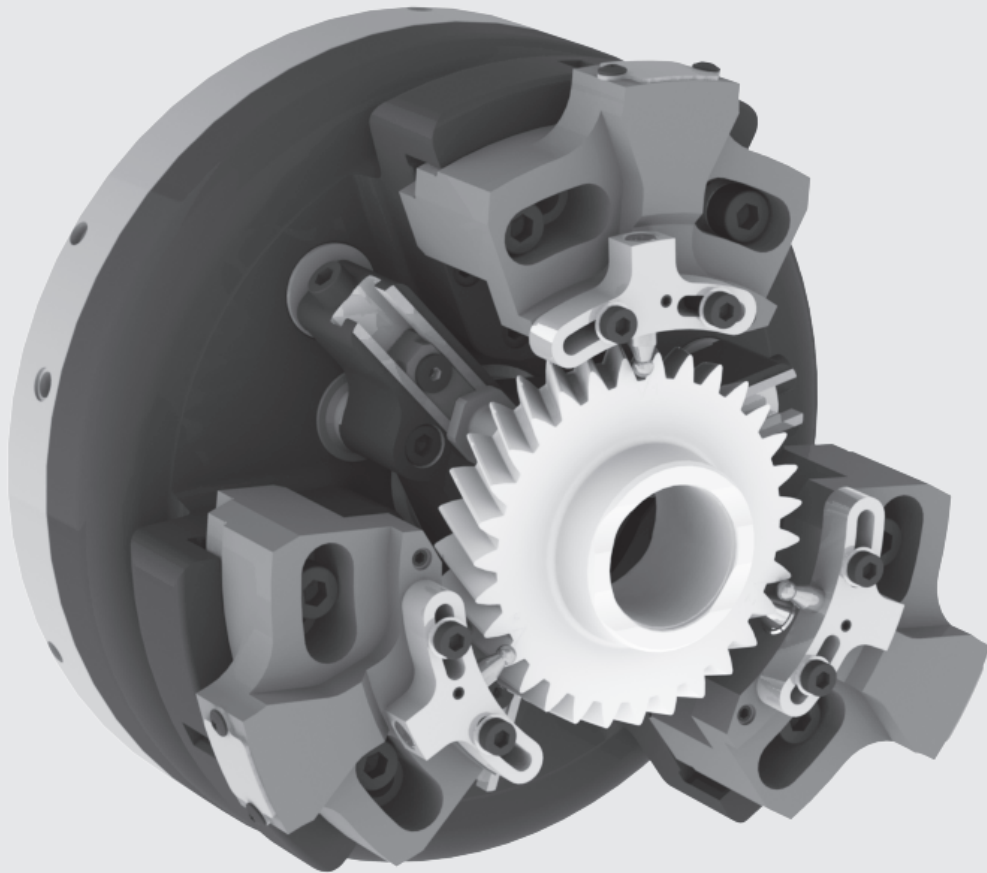
Air feed tubes flex (APFL)



SMW-AUTOBLOK		Speed	Version
Type	Id.No.	max. (min ⁻¹)	
APFL2	5302594	6.000	2 airways
APFL3	5302595	6.000	3 airways



SMW-AUTOBLOK Type	PH 6-2	PH 6-3
Id.No.	5302585	5302586
Number of airways	2	3
Airways outside Ø (mm)	6	6
Airways inside Ø (mm)	4	4
Medium	air	air
Max. operating pressure (MPa) at 20 °C	0.8	0.8
Operating temperature	-20 °C - +60 °C	-20 °C - +60 °C
Length (mm)	525	505
Max. working distance (mm)	1.500	1.000
Outside Ø coil (mm)	37	37
Material	Polyurethan	Polyurethan
Colour	black	black



Typ D

Diaphragm chuck

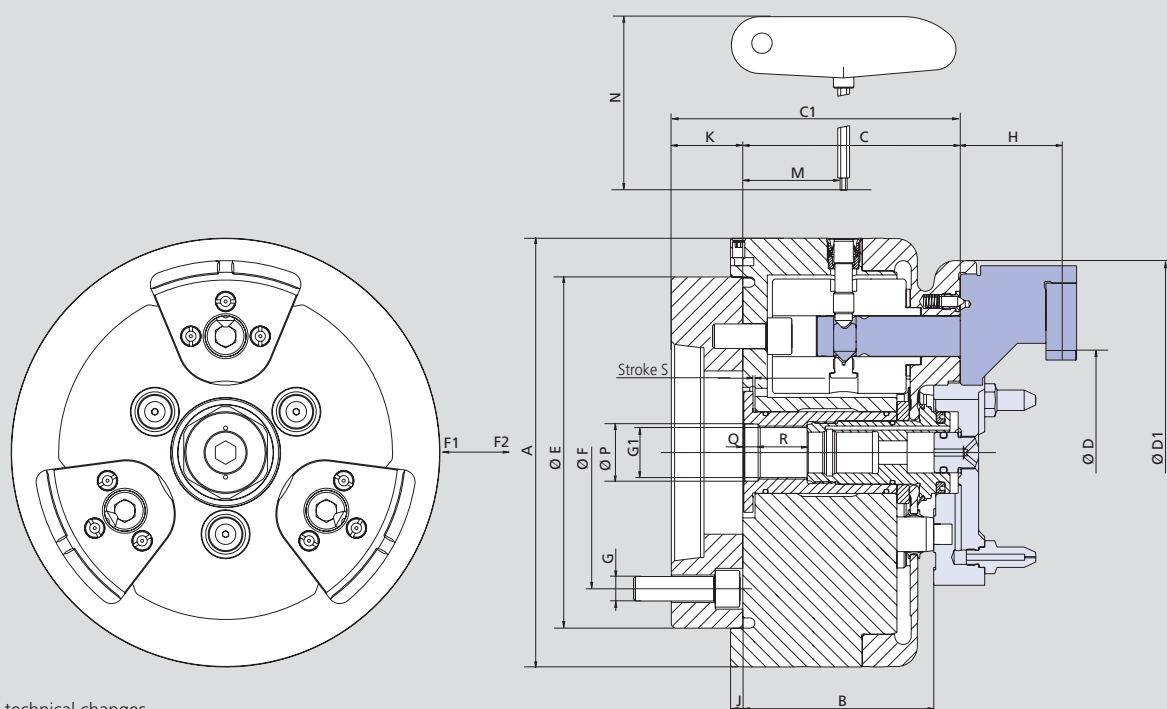
Chuck sizes Ø 210 - 400 mm

- Diaphragm technology for highest precision
- Pitch line clamping or O.D. clamping
- With or without open center

Type D

Diaphragm chuck
QUICK JAW CHANGE SYSTEMS

Main dimensions and technical data



Subject to technical changes
For more detailed information please ask for customer drawing

SMW-AUTOBLOK Type			D-210		D-260		D-315
Mounting	Size		A5	A6	A6	A8	A8
	A	mm	210		260		315
	B	mm	93.5		108		111
	C	mm	106.5		120		125
	C1	mm	146.5		156		173
Clamping range min./max.	D	mm	20-175		40-220		60-275
	D1	mm	188		227		275
	E	mm	172		225		275
	F	mm	104.8	133.4	133.4	171.4	171.4
	G		M10	M12	M12	M16	M16
	G1		M26 x 1.5		M26 x 1.5		M30 x 1.5
Jaw height	H	mm	52		62		64
	J	mm	6		6		6
	K	mm	40		48		48
	M	mm	49.4		53		57
	N	mm	185		185		185
	P H6	mm	28		28		32
	Q	mm	7		7		7
	R	mm	24		24		29.5
Piston stroke	S	mm	1.0		1.5		1.7
Jaw stroke at distance H			1.0		1.1		1.2
Draw pull min./max.*	F1	kN	0-25		0-25		0-25
Draw pull for chuck open	F2	kN	30		30		30
Moment of inertia		kg·m ²	0.16		0.45		0.75
Weight without top tooling		kg	30		44		60
Recommended actuating cylinders	Type		SIN-DFR		SIN-DFR		SIN-DFR

*Additional actuation force to the diaphragm spring clamping force applied by the clamping cylinder.

Advice: The max. allowed speed for the application is permanently marked on the corresponding top jaws and must not be exceeded.

Advice: Please note, that it is important, that the cylinder force for pushing and pulling can be set to different values independently!

Important: Never rotate the chuck without inserted jaws, otherwise the centrifugal force compensation mechanism will get damaged.

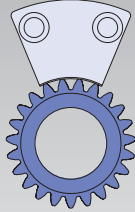
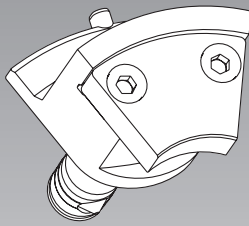
Type D

Diaphragm chuck
QUICK JAW CHANGE SYSTEMS

- Clamping jaws
- Closed center rotating cylinder
- Installation

Jaws

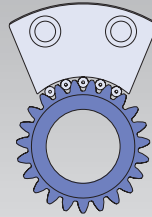
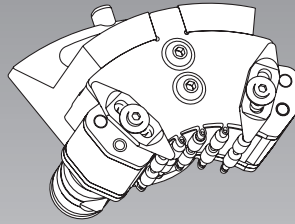
type A



External clamping

Jaws

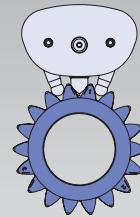
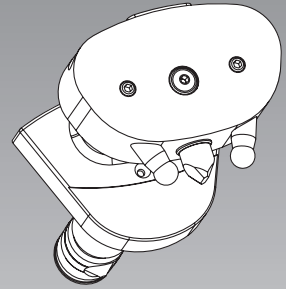
type B



Pitchline clamping with roller cage

Jaws

type C



Pitchline clamping with clamping pin

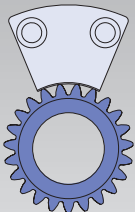
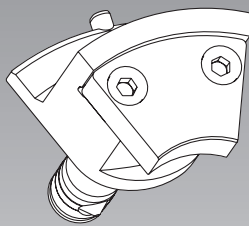
D-KOMBI®

Radial-axial clamping
QUICK JAW CHANGE SYSTEMS

- Clamping jaws
- Rotating double piston cylinder
- Installation

Jaws

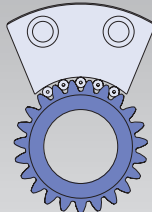
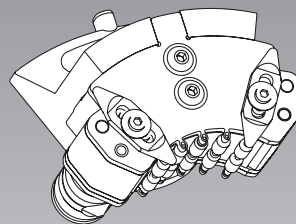
type A



External clamping

Jaws

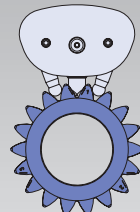
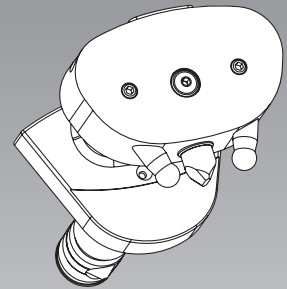
type B



Pitchline clamping with roller cage

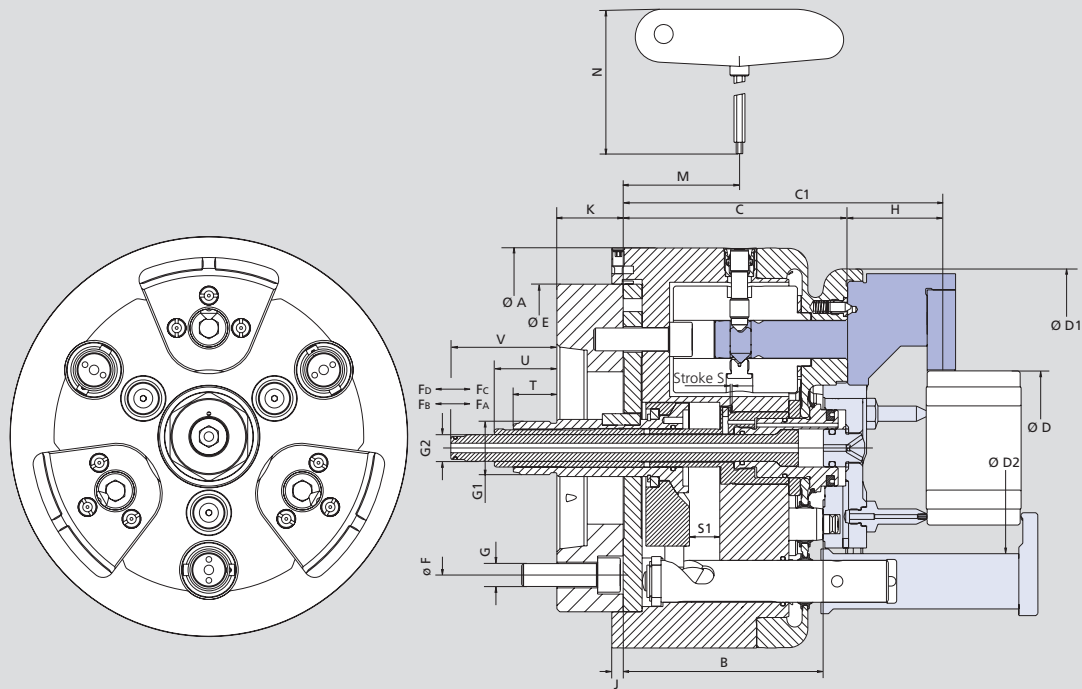
Jaws

type C



Pitchline clamping with pin

Main dimensions and technical data



Subject to technical changes
For more detailed information please ask for customer drawing

SMW-AUTOBLOK Type			D-210 KOMBI		D-260 KOMBI		D-315 KOMBI		D-400 KOMBI	
Mounting	Size		A5	A6	A6	A8	A8	A8	A8	A11
	A	mm	210		260		315		400	
	B	mm	105.5		111		116		123	
	C	mm	118.5		130		130		136	
	C1	mm	170.5		187		192		-	
Clamping range without fingers	D	mm	20-175		40-220		60-275		126-350	
	D1	mm	188		227		275		354	
Clamping range with fingers	D2	mm	111		153		203		268	
	E	mm	172		225		275		350	
	F	mm	104.8	133.4	133.4	171.4	171.4	171.4	171.4	235
	G		M10	M12	M12	M16	M16	M16	M16	M20
	G1		M28 x 1.5		M28 x 1.5		M28 x 1.5		M28 x 1.5	
	G2		M14 x 1.0		M14 x 1.0		M14 x 1.0		M14 x 1.0	
Jaw height	H	mm	52		62		64		-	
	J	mm	6		6		6		6	
	K	mm	40		48		48		50	
	M	mm	61.4		61.9		61.9		66.5	
	N	mm	185		185		185		185	
Piston stroke	S	mm	1.0		1.5		1.5		1.5	
Axial stroke swing clamps	S1	mm	16		16		16		16	
	T	mm	18		10		10		8	
	U	mm	28		20		20		18	
	V	mm	51		43		43		41	
Jaw stroke at distance H		mm	1.0		1.1		1.2		0.87	
Draw pull min./max.*	Fd	kN	0-25		0-25		0-25		0-25	
Draw pull for chuck open	Fc	kN	20		20		20		20	
Draw pull swing clamps max.	Fb	kN	6		9		9		18	
Draw pull swing clamps open	Fa	kN	2		2		2		2	
Moment of inertia		kg·m ²	0.16		0.45		0.75		2.26	
Weight without top tooling		kg	30		44		60		109	
Recommended actuating cylinder	Type		ZHVD-DFR		ZHVD-DFR		ZHVD-DFR		ZHVD-DFR	

* Additional draw pull to the diaphragme force actuated by the actuating cylinder

Advice: The max. allowed speed for the application is permanently marked on the corresponding top jaws and must not be exceeded.

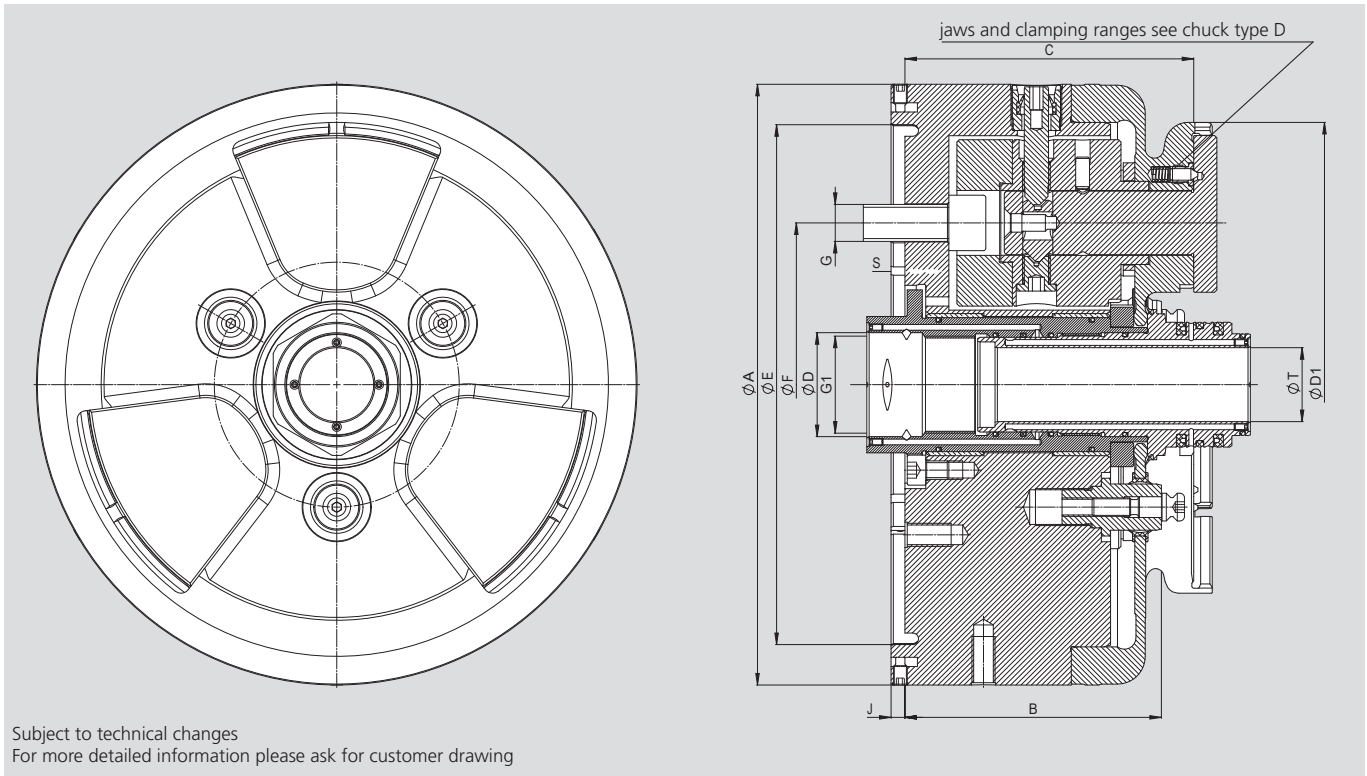
Important: Never rotate the chuck without inserted jaws, otherwise the centrifugal force compensation mechanism will get damaged.

Type D-PLUS

Diaphragm chuck
QUICK JAW CHANGE SYSTEMS

Open center diaphragm chuck

Main dimensions and technical data



Subject to technical changes
For more detailed information please ask for customer drawing

SMW-AUTOBLOK Type			D-PLUS-260	D-PLUS-315
Mounting	Size		225	275
	A	mm	260	315
	B	mm	111	111
	C	mm	125	125
	D1	mm	227	275
	E	mm	225	275
	F	mm	140	171.4
	G		M16	M16
	G1		M42x1.5	M60x1.5
	J	mm	6	6
	P H6	mm	45	63
Piston stroke	S	mm	1.5	1.5
Through hole	T	mm	32	50
Draw pull min./max.*	F1	kN	0-25	0-30
Draw pull for chuck open	F2	kN	25	30
Moment of inertia		kg·m ²	0.45	0.75
Weight without top tooling		kg	44	65
Recommended actuating cylinders	Type		SIN-DFR	SIN-DFR

*Additional actuation force to the diaphragm spring clamping force applied by the clamping cylinder.

Advice: The max. allowed speed for the application is permanently marked on the corresponding top jaws and must not be exceeded.

Advice: Please note, that it is important, that the cylinder force for pushing and pulling can be set to different values independently!

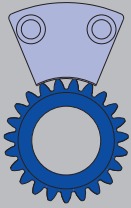
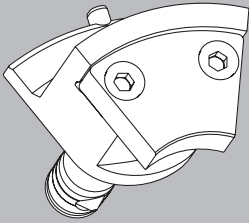
Important: Never rotate the chuck without inserted jaws, otherwise the centrifugal force compensation mechanism will get damaged.

Type D-PLUS

- Radial O.D. or pitch line clamping
- with central bore
- Centrifugal force compensation

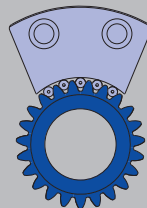
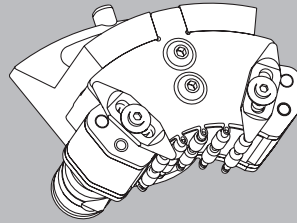
Diaphragm chuck
QUICK JAW CHANGE SYSTEMS

Jaws type A



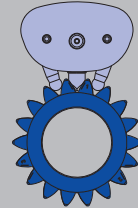
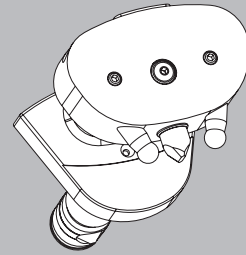
External clamping

Jaws type B



Pitchline clamping with roller cage

Jaws type C

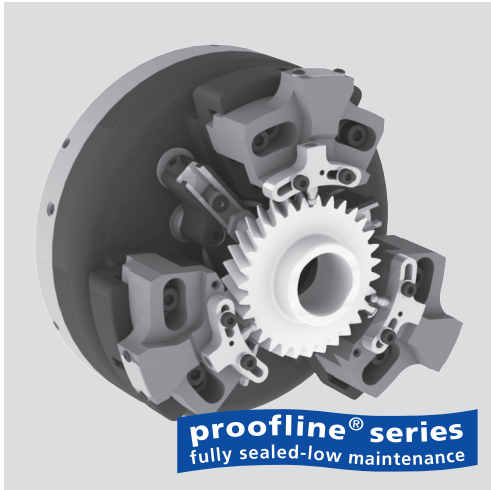


Pitchline clamping with clamping pin

Type D-VARIO

Diaphragm chuck
FLEXIBLE MODULAR SYSTEM

Main dimensions and technical data



Application/customer benefits

- Flexible solution for grinding with quick adjustment for short set up times

Technical features

- Adjustable, modular jaw system for clamping different work pieces with the same jaws
- Key Lock System for quick positioning of the pitch of different work pieces
- Micrometer fine adjustment of the center line
- For small, medium and large batch sizes
- Workstop with medium feed for air sensing and integrated coolant nozzles optional
- Jaws for O.D. clamping (Type A) optional
- D-Vario Configurator: free application to configure your set up (www.smw-autoblok.de/vario)

Standard equipment

Diaphragm chuck D-Vario (with mounting bolts)

Optional accessories in the modular system:

Pitch line clamping

- 6 different jaw sets for different outside diameters
- Key Lock System for different pitches of gears (see figure A, B and C)
- Clamping pins for different modules (Dia. of ball \varnothing 3,0 mm to 6,0 mm)
- Locators

O.D. clamping (Type A)

- 4 different jaw blanks for different outside diameters
- Factory finished jaws
- Locators



- Safe and quick configuration of all set-ups for different gears
- Web-APP: from anywhere with any device feasible (internet access needed)
- Availability for exporting all resolution of the results

With these free of charge D-VARIO Configurator you will be able to create individual configurations for different gears and set-ups. For input the data, there are only 3 steps needed.

Optional you could also make the interpretation of the work stop and the associated support bolts.

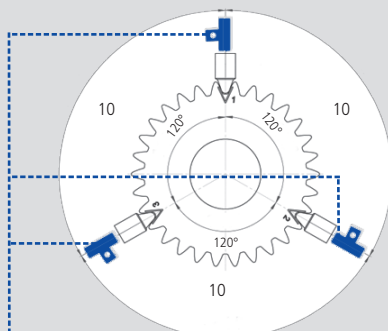
Through the integrated export function, the results can be saved at any time or transferred to a printer.

Start Web-App:

www.smw-autoblok.de/dvario

A: Number of teeth is divisible by 3

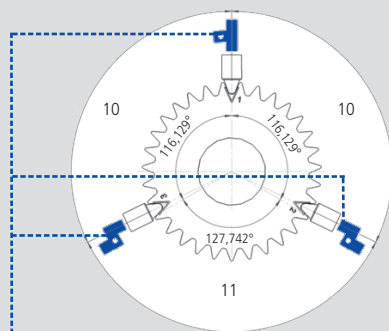
Example of application:
gear with number of teeth $[z] = 30$



► Specification of Key Lock System:
3x Key straight

B: Number of teeth is not divisible by 3

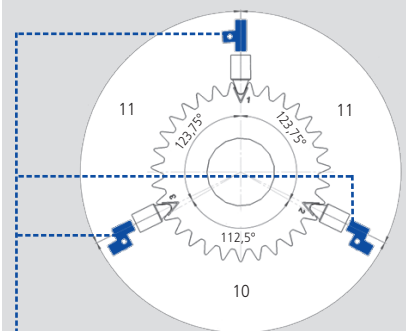
Example of application:
gear with number of teeth $[z] = 31$



► Specification of Key Lock System:
1x Key straight,
2x Key for number of teeth 31

C: Number of teeth is not divisible by 3

Example of application:
gear with number of teeth $[z] = 32$



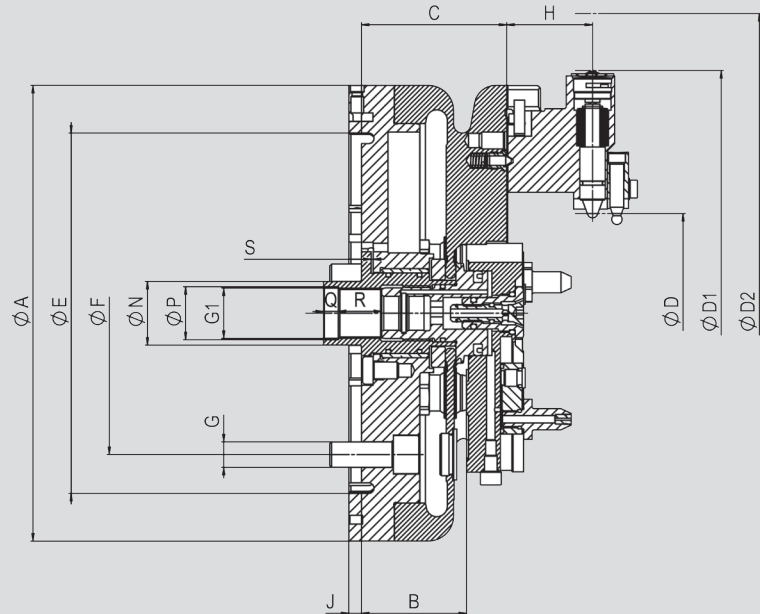
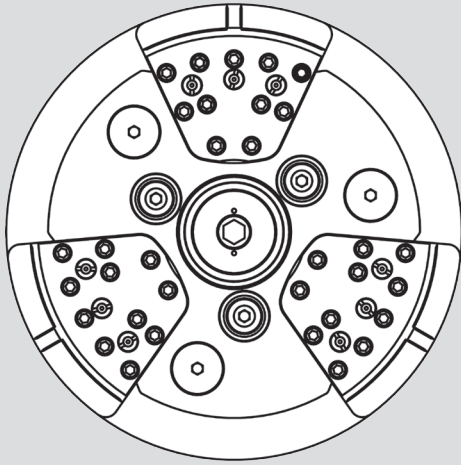
► Specification of Key Lock System:
1x Key straight,
2x Key for number of teeth 32

Type D-VARIO

Diaphragm chuck
FLEXIBLE MODULAR SYSTEM

Main dimensions and technical data

Top jaws and locator base are optional.



Subject to technical changes
For more detailed information please ask for customer drawing.

SMW-AUTOBLOK Type			D-VARIO 215
Mounting			Z170
Id. No.			069100
	A	mm	215
Locating Face for Locator	B	mm	49.5
	C	mm	68.5
Clamping range min./max.	D	mm	24 - 144
Swing min.	D1	mm	215
Swing max.	D2	mm	264
	E	mm	170
	F	mm	133.4
	G		M12
	G1		M24x1.5
Jaw height	H	mm	40.5
	J	mm	6
	P H8	mm	25
	Q	mm	7
	R	mm	20
Piston stroke	S	mm	1.0
Jaw stroke at distance H		mm	0.95
Draw pull min./max.*		kN	0-15
Draw pull for chuck open		kN	15
Moment of inertia		kg·m ²	0.082
Weight without top tooling		kg	12.2
Recommended actuating cylinders	Type		SIN-DFR

* Additional draw pull to the diaphragm force actuated by the actuating cylinder

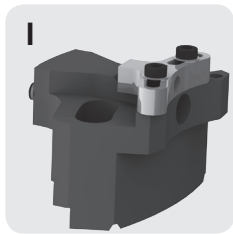
Advice: Please note: It is important, that the cylinder force for pushing and pulling can be set to different values independently!

Type D-VARIO

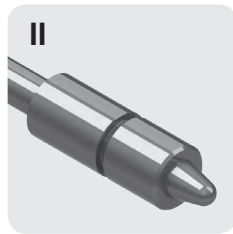
Diaphragm chuck
FLEXIBLE MODULAR SYSTEM

■ Overview clamping kit

Configuration of the set up for pitch line clamping within only 5 steps:



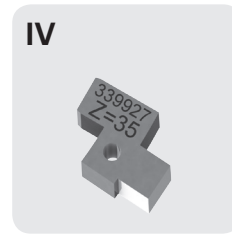
I
First you have to choose your matching top jaw (size 1 - 6) for the outside diameter [d_o] of the gear to be machined. Each size of top jaw can cover 20 mm outside diameter using two different types of clamping pins (Type A and B). One set of top jaw consists of 3 pieces including 1 straight Key Lock insert.



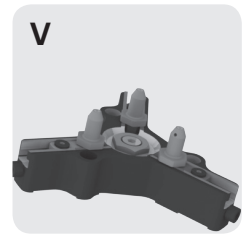
II
The determination of the spherical clamping pin is made according to the ball dimension of the gear. There are 2 types of clamping pins:
Type A for the first 10 mm of the clamping range of the top jaws.
Type B for the second 10 mm of the clamping range of the top jaws.



III
Optionally prelocator pins are available. Prelocator pins are used at automatic loading. The determination is made according to the clamping pins used.

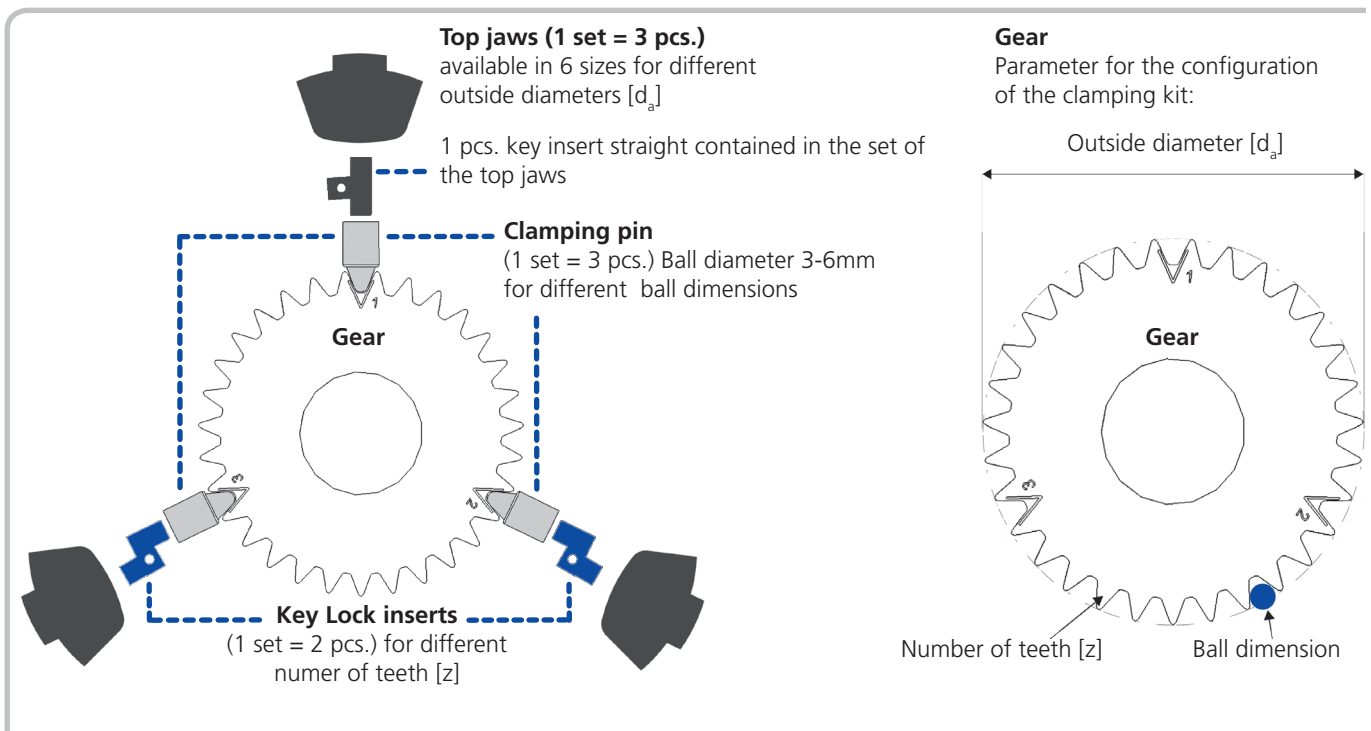


IV
One set of Key Lock insert consists of 2 keys. Gears, which number of teeth that is divisible by 3 can be machined with 3 of the same type Key Lock insert (straight). For all gears, which number of teeth is not divisible by 3, there are different key insert sets available according to the number of teeth. The Key Lock inserts are the same for all 6 sizes of top jaws.



V
The following types of locator bases are available:
Type A: without air sensing / without nozzle for coolant
Type B: without air sensing/with nozzle for coolant
Type C: with air sensing / with nozzle for coolant
The height of the locator posts is depending on the gear.

Overview of the clamping kit:



D-Vario Configurator

free application to configurate your set up

www.smw-autoblok.de



Type D-VARIO

Diaphragm chuck
FLEXIBLE MODULAR SYSTEM

■ Configuration of the clamping kit

I. Determination of the top jaws

Top Jaws		Size	1	2	3	4	5	6
Outside diameter of gear	d_a	mm	24-44	44-64	64-84	84-104	104-124	124-144
Number of teeth	z	number	16-37	14-44	13-86	13-86	13-86	13-86
Inside clearance diameter of jaws		mm	46	68	88	108	128	148
Swing diameter		mm	164	184	204	224	244	264
Weight / set		kg	2.9	3.0	3.0	3.1	3.1	3.1
Order number / set of 3 pieces	Id. No.		630741	630742	630743	630744	630745	630746


Clamping pin Type		A	B	A	B	A	B	A	B	A	B	A	B
Clamping range	mm	24-34	34-44	44-54	54-64	64-74	74-84	84-94	94-104	104-114	114-124	124-134	134-144

II. / III. Determination of the clamping pins (and optional prelocator pins)







Clamping pin type	Set	Type A	Available prelocator pins	Type B	Available prelocator pins
Ball diameter \varnothing 3,0	Id. No.	630851	339835	630844	339843
Ball diameter \varnothing 3,5	Id. No.	630852	339836	630845	339844
Ball diameter \varnothing 4,0	Id. No.	630853	339837	630846	339845
Ball diameter \varnothing 4,5	Id. No.	630854	339838	630847	339846
Ball diameter \varnothing 5,0	Id. No.	630855	339839	630848	339847
Ball diameter \varnothing 5,5	Id. No.	630856	339840	630849	339848
Ball diameter \varnothing 6,0	Id. No.	630857	339841	630850	339849

Clamping pins

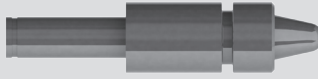
Clamping pin type A









Ball diameter
 \varnothing 3; 3,5; 4; 4,5; 5; 5,5; 6

	Top jaw 1	\varnothing 24-34 mm
	Top jaw 2	\varnothing 44-54 mm
	Top jaw 3	\varnothing 64-74 mm
	Top jaw 4	\varnothing 84-94 mm
	Top jaw 5	\varnothing 104-114 mm
	Top jaw 6	\varnothing 124-134 mm

Clamping pin type B



Ball diameter
 \varnothing 3; 3,5; 4; 4,5; 5; 5,5; 6

	Top jaw 1	\varnothing 34-44 mm
	Top jaw 2	\varnothing 54-64 mm
	Top jaw 3	\varnothing 74-84 mm
	Top jaw 4	\varnothing 94-104 mm
	Top jaw 5	\varnothing 114-124 mm
	Top jaw 6	\varnothing 134-144 mm

- ▶ **Clamping pin type A**
For the first 10 mm of the clamping range of the top jaws.

- ▶ **Clamping pin type B**
For the second 10 mm of the clamping range of the top jaws.

- ▶ **Compatibility**
All types and sizes of clamping bolts are compatible to all top jaws.

Type D-VARIO

Diaphragm chuck
FLEXIBLE MODULAR SYSTEM

■ Configuration of the clamping kit

IV. Key Lock inserts for different number of teeth of gears

Id. No. Key Lock insert for gears which number of teeth is not divisible by 3 (1 set = 2 pcs.)

z = 10	z = 11	z = 13	z = 14	z = 16	z = 17	z = 19	z = 20	z = 22	z = 23
339911	339912	339913	339914	339915	339916	339917	339918	339919	339920
z = 25	z = 26	z = 28	z = 29	z = 31	z = 32	z = 34	z = 35	z = 37	z = 38
339921	339922	339923	339924	338725	339925	339926	339927	339928	339929
z = 40	z = 41	z = 43	z = 44	z = 46	z = 47	z = 49	z = 50	z = 52	z = 53
339930	339931	339932	339933	339934	339935	339936	339937	339938	339939
z = 55	z = 56	z = 58	z = 59	z = 61	z = 62	z = 64	z = 65	z = 67	z = 68
339940	339941	339942	339943	339944	339945	339946	339947	339948	339949
z = 70	z = 71	z = 73	z = 74	z = 76	z = 77	z = 79	z = 80	z = 82	z = 83
339950	339951	339952	339953	339954	339955	339956	339957	339958	339959
z = 85	z = 86								
339960	339961								

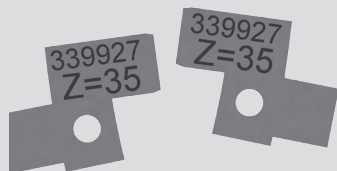
Id. No. Key Lock insert for gears which number of teeth is divisible by 3 (1 set = 2 pcs.)

straight	
338724	

Order Example:

- Gear with number of teeth 32 ▶ not divisible by 3 ▶ Id. No. 339925 (1 set = 2 pcs.)
 - Gear with number of teeth 33 ▶ divisible by 3 ▶ Id. No. 338724 (1 set = 2 pcs.)
- 1 straight Key Lock that comes with the chuck always remains in use.

Key Lock insert (1 set = 2 pcs.)



- ▶ **Compatibility**
All Key Lock inserts are compatible to all top jaws.

Type D-VARIO

Diaphragm chuck
FLEXIBLE MODULAR SYSTEM

■ Configuration of the clamping kit

V. Locator base

Locator base

Determination of height of locator posts:
 Δ = Distance between clamping position and locating face
 Height of locator posts [H] = 32,5 mm - Δ

Clamping position = 1/2 serration length / at longer serrations it is the requested clamping position.
 In case the lowest face is not the locating face, please ask our customer service.

Locator base			Type A	Type B	Type C
Medium feed for air sensing			-	-	X
Nozzle for coolant			-	X	X
Locating diameter min.	D	min.	22	47	47
Locating diameter max.	D1	max.	136	136	136
Width	B	mm	27	27	27
Order Number		Id. No.	339860	339859	339858

Locator posts with contact face diameter [E] 2,5 mm	
Height[H] = 12,5 mm	339861
Height[H] = 15,0 mm	339862
Height[H] = 17,5 mm	339863
Height[H] = 20,0 mm	339864
Height[H] = 22,5 mm	339865
Height[H] = 25,0 mm	339866
Height[H] = 27,5 mm	339867
Height[H] = 30,0 mm	339868
Height[H] = 32,5 mm	339869
Height[H] = 35,0 mm	339870
Height[H] = 37,5 mm	339871
Height[H] = 40,0 mm	339872
Height[H] = 42,5 mm	339873
Height[H] = 45,0 mm	339874
Height[H] = 47,5 mm	339875
Height[H] = 50,0 mm	339876

I.D. Number is for one set (=3 pieces)

Locator posts with contact face diameter [E] 4,5 mm	
Height[H] = 12,5 mm	339877
Height[H] = 15,0 mm	339878
Height[H] = 17,5 mm	339879
Height[H] = 20,0 mm	339880
Height[H] = 22,5 mm	339881
Height[H] = 25,0 mm	339882
Height[H] = 27,5 mm	339883
Height[H] = 30,0 mm	339884
Height[H] = 32,5 mm	339885
Height[H] = 35,0 mm	339886
Height[H] = 37,5 mm	339887
Height[H] = 40,0 mm	339888
Height[H] = 42,5 mm	339889
Height[H] = 45,0 mm	339890
Height[H] = 47,5 mm	339891
Height[H] = 50,0 mm	339892

I.D. Number is for one set (=3 pieces)

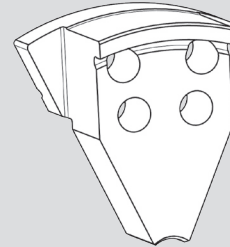
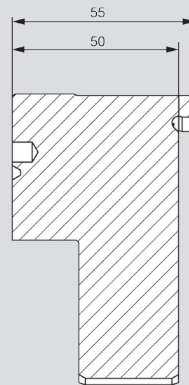
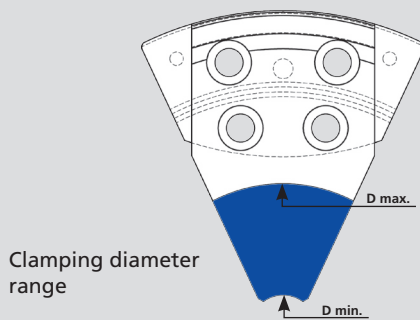
Type D-VARIO

Diaphragm chuck
FLEXIBLE MODULAR SYSTEM

■ Jaws type A for O.D. clamping

Jaws Type A

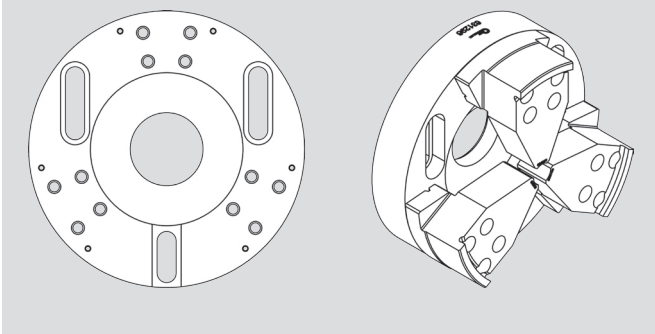
Jaws Type A (through hardened)



Jaws type A		1	2	3	4	5	6
Clamping Range \varnothing D min. - D max.	mm	20-40	40-60	60-80	80-100	100-120	120-140
Weight / set	kg	1,1	1,1	1,0	1,0	1,0	0,8
Blank jaws (set of 3 pcs.)	Id. No.	631484		631485		631486	631487
Jaws factory finished* (set of 3 pcs.)	Id. No.	631488	631489	631490	631491	631492	631493

* Jaws are factory finished according to the specified clamping diameter.
Note: The clamping diameter must be specified in case of order.

Device

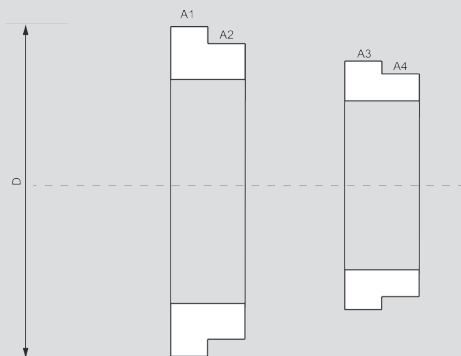


Device for machining of the blank jaws type A

Jaws type A sizes 1 - 6 631296

The device is needed to pre-machine the blank jaws type A. Then, the jaws must be finish ground to the clamping diameter on the D-Vario chuck. For this operation, the jaws have to be clamped with the grinding rings.

Grinding rings (1 Set = 2 pcs.)



Recommended grinding rings

Jaws type A sizes 1 - 6 631309

Grinding data

1. Grinding	A1	D = 177,0 mm	residual jaw stroke 0,25 mm
2. Grinding	A2	D = 176,9 mm	residual jaw stroke 0,20 mm
3. Grinding	A3	D = 176,8 mm	residual jaw stroke 0,15 mm
4. Grinding	A4	D = 176,7 mm	residual jaw stroke 0,10 mm

The clamping diameter A1 is used for the first finish grinding process. The smaller clamping diameter of the grinding rings (A2-A4) are used to regrind worn or damaged existing jaws.



FDG

High precision face drivers for machining between center pins

- Machining of the entire surface of the workpiece with one single operation
- Power operated on the side of the spindle
- Highest run-out accuracy

■ Power operated on the side of the spindle



Application/customer benefits

- Machining of the entire surface of the workpiece in one single operation
- For the machining of the surface of soft and hardened workpieces
- Center pin with carbide insert for highest running accuracy

Technische features

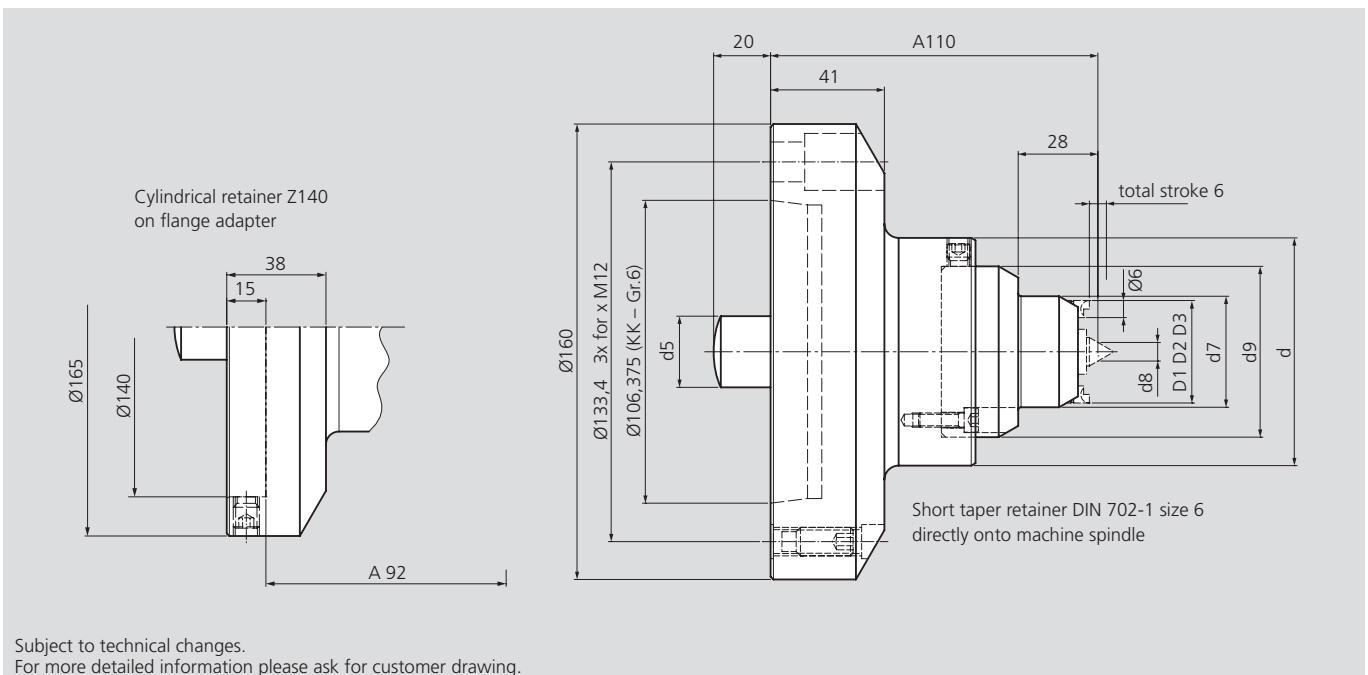
- Highest run-out accuracy < 0.003 mm
- Compensating drive elements
- Retractable drive pins in case of on- or off-loading
- Fine adjustment at face drivers for highest run-out requirements

Standard equipment

Face driver FDG
without changeable parts

Accessories

Pneumatic pancake cylinder CPG-FDG
Id.No. 045891



Technical Data

Id.-No. Z140	Id.-No. KK size 6	Type	d	Center Ø	d5	d7	d8	d9	Clamping dia Ø		
									D1	D2	D3
204869	204876	FDG 0	65	1 - 3	18	16	1,5	48	6	9	15
204870	204877	FDG 1	65	1 - 5	18	18	3	48	8	11	17
204871	204878	FDG 2	65	2 - 6,5	18	21	4,25	48	11	14	20
204872	204879	FDG 3	65	4 - 8,5	18	25	6,25	48	15	18	24
204873	204880	FDG 4	77	4 - 9	25	38	6,5	60	27	30	36
204874	204881	FDG 5	85	6 - 11	25	46	8,5	68	35	38	44
204875	204882	FDG 6	110	10 - 15	25	62	12,5	85	50	53	59

Face drivers with morse taper retainer according to DIN 228 available on request.

NOTE

Pancake cylinder CPG for the pneumatic actuation of face drivers FDG available.

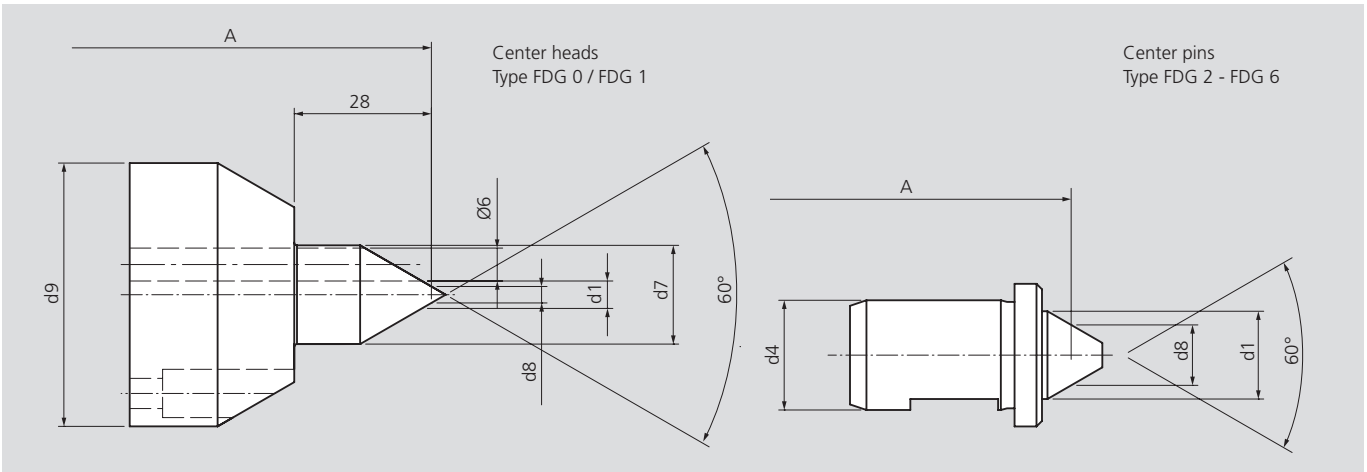
Center heads / Center pins



Application/customer benefits

- Center pin with carbide insert
- Maximum rigidity
- Highest change accuracy
- Fixed safely via set screw and plane surface inside the face driver

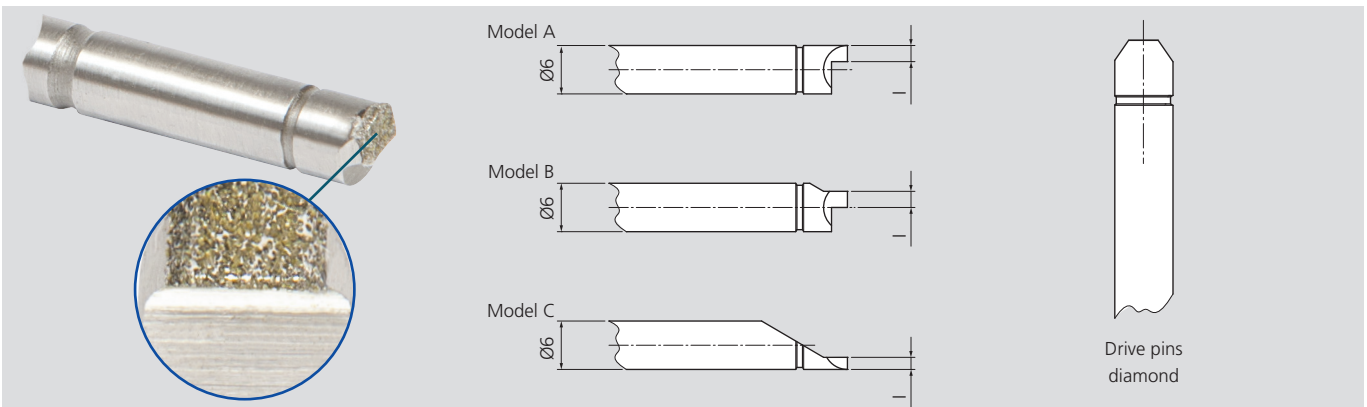
Center heads Type FDG 0 and FDG 1 60° center with carbide coating.
Center pins Type FDG 2 to FDG 6 carbide design.



Id.-No. Center pin	Type	d1	d4	Center Ø	d7	d8	d9
204883	FDG 0	3	-	1 - 3	18	1.5	48
204884	FDG 1	5	-	1 - 5	20	3	48
204885	FDG 2	7.8	6	2 - 6.5	-	4.25	-
204886	FDG 3	9.8	8	4 - 8.5	-	6.25	-
204887	FDG 4	10	14	4 - 9	-	6.5	-
204888	FDG 5	12	18	6 - 11	-	8.5	-
204889	FDG 6	16	20	10 - 15	-	12.5	-

Further dimensions on request.

Drive pins with diamond coating

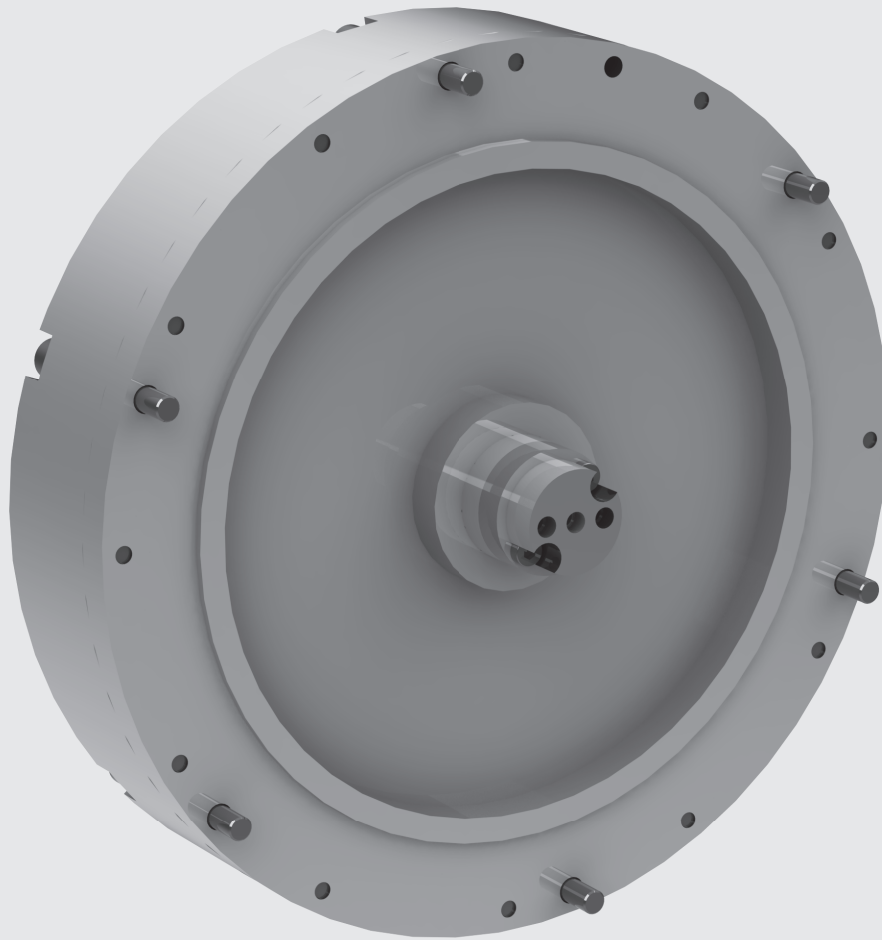


Id.-No. drive pin	Type	Clamping diameter	l	Model
204890	diamond	D1	1.5	C
204891	diamond	D2	3	B
204892	diamond	D3	3	A

- Drive pins for torque transmission onto the workpiece
- Drive pins with diamond coating
- High frictional coefficient

Clamping diameter D1/D2/D3 see page 1.

Further dimensions on request.

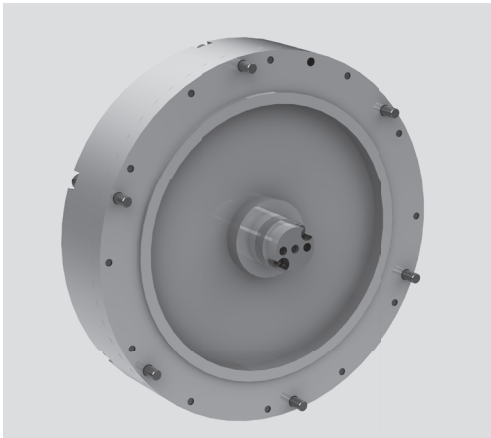


CPG

Pneumatic pancake cylinder for diaphragm chuck D-VARIO and face driver FDG

- Easy installation for grinding and turning machines without hydraulic unit
- Operating pressure 2-8 bar
- Medium feed for air / coolant

- Pneumatic actuation (2-8 bar)
- Easy installation for grinding and turning machines



Application/customer benefits

- For the actuation of diaphragm chuck D-VARIO and face driver FDG
- Easy installation for grinding and turning machines without hydraulic unit
- Compact design

Technical features

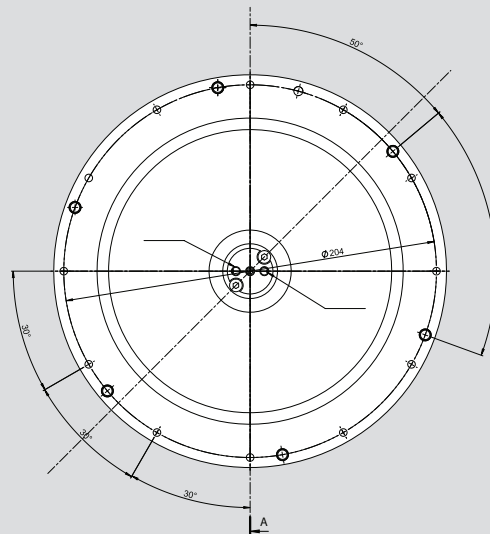
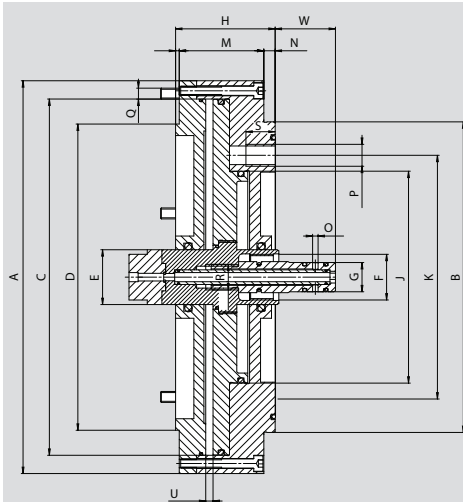
- Operating pressure 2-8 bar
- Maximum axial piston force push 21 kN and pull 7 kN
- 1 medium feed for air / coolant
- Air service unit with water separator and oil feed necessary
- Air feed tube necessary

Standard equipment

Pneumatic pancake cylinder
(without air feed tube)

Odering example

Version D-VARIO Id.No. 045863
Version FDG Id.No. 045891
APFL3 Id.No. 5302595



Accessory



APFL3 Air feed tube

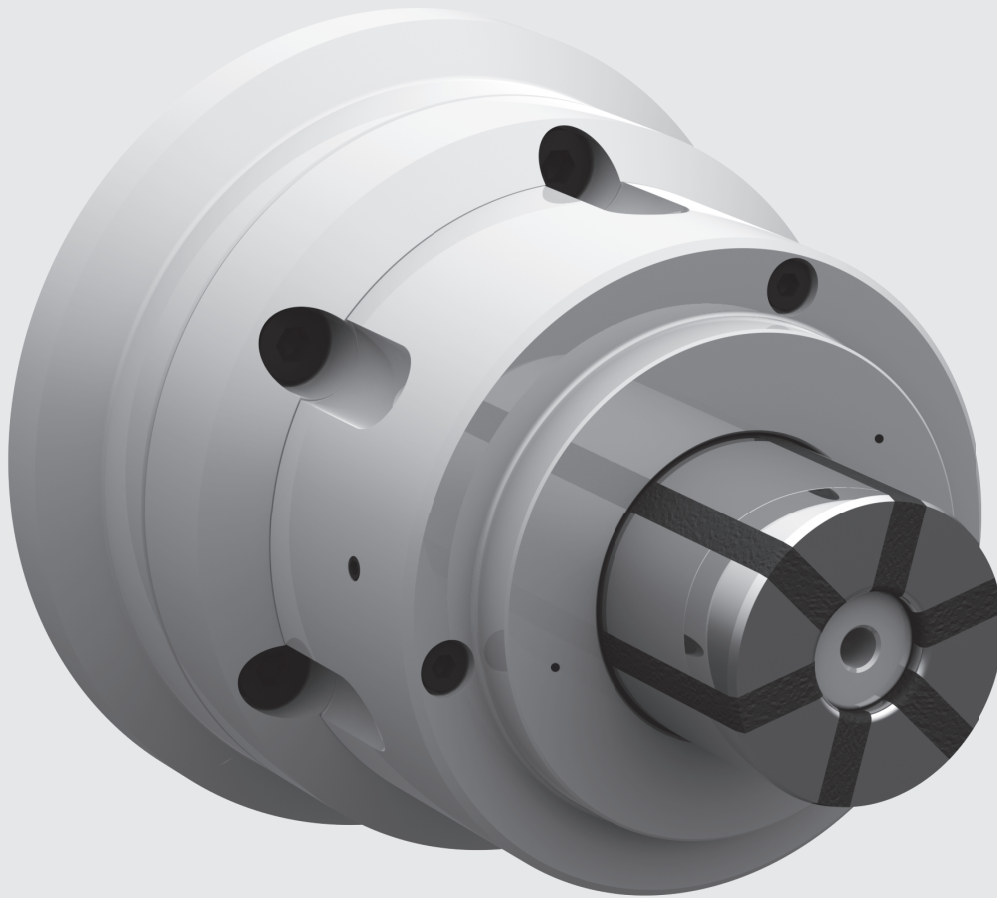
- 3 Connections:
1x Actuation "push"
1x Actuation "pull"
1x Additional medium channel for air/coolant

Subject to technical changes.
For more detailed information please ask for customer drawing.

Id. No. 5302595

Technical Data

SMW-AUTOBLOK Type			CPG 215
	A	mm	215
	B	mm	170
	C	mm	195
	D	mm	167.6
	E	mm	30
	F	mm	M25x1.5
	G	mm	16
	H	mm	54.5
	J	mm	116
	K	mm	133.4
	L	mm	2
	M	mm	46.3
	N	mm	6.2
	O	mm	3
	P	mm	3x M12x120°
	Q	mm	M6
	R	mm	M14
	S	mm	16
Piston stroke	U	mm	4
Axial force 6 bar (pull)		kN	5
Axial force at 6 bar (push)		kN	16
Moment of inertia		kg·m ²	0.09
Max. speed		U/min	2.500
Piston area (piston pull)		cm ²	291
Piston area (piston push)		cm ²	98
Operating pressure		bar	2-8
Weight		kg	11.1



EMS

Segment sleeve mandrels

Clamping diameter \varnothing 18 - 105 mm

- For ID clamping
- Rigid design

EM-S

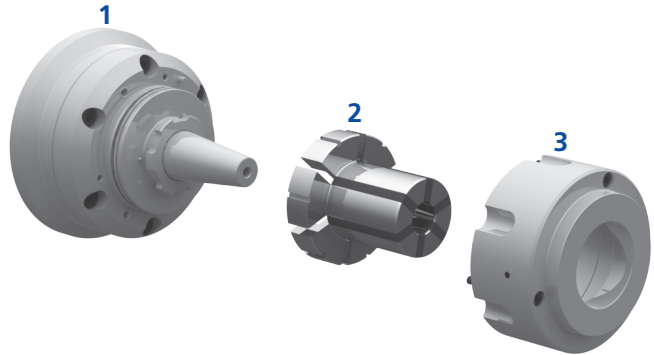
Segment sleeve mandrel
power operated

Segment sleeve mandrel \varnothing 18 - 105 mm

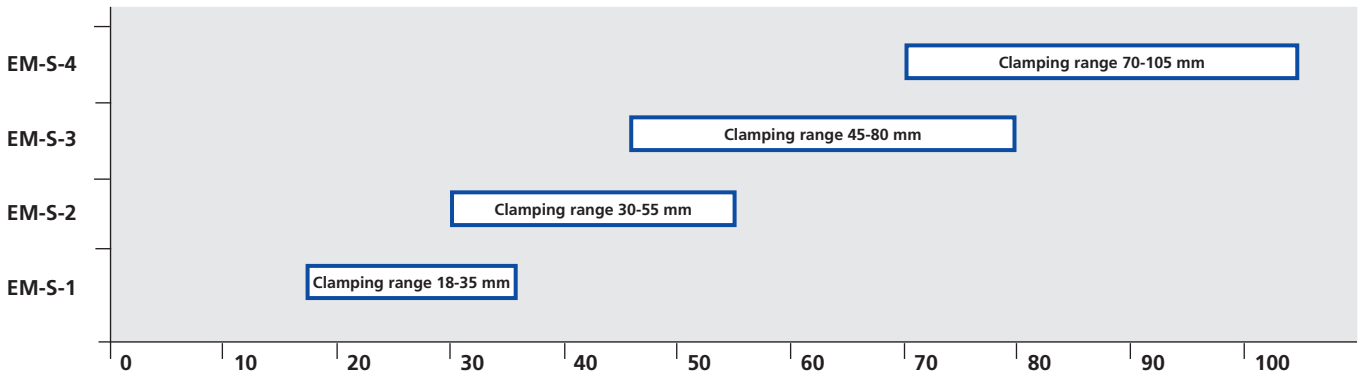
- Size 1 - 4
- Large expansibility

Technical design

1. Basic body EM-S with spindle adapter
2. Segment sleeve mandrel (vulcanized + case hardened) with bayonet quick change.
Clamping sleeves in size EM-S-1 with three segments, clamping sleeves from size EM-S-2 on with six segments for better gripping force distribution.
3. Workstop



Overview clamping ranges



Clamping sleeves

EM-S-1*

\varnothing	18	19	20	21	22	23	24	25	26	27	28	29	30
Id. No.	203025	203026	203027	203028	203029	203030	203031	203032	203033	203034	203035	203036	203037
\varnothing	31	32	33	34	35								
Id. No.	203038	203039	203040	203041	203042								

EM-S-2**

\varnothing	30	31	32	33	34	35	36	37	38	39	40	41	42
Id. No.	203043	203044	203045	203046	203047	203048	203049	203050	203051	203052	203053	203054	203055
\varnothing	43	44	45	46	47	48	49	50	51	52	53	54	55
Id. No.	203056	203057	203058	203059	203060	203061	203062	203063	203064	203065	203066	203067	203068

EM-S-3**

\varnothing	45	46	47	48	49	50	51	52	53	54	55	56	57
Id. No.	203069	203070	203071	203072	203073	203074	203075	203076	203077	203078	203079	203080	203081
\varnothing	58	59	60	61	62	63	64	65	66	67	68	69	70
Id. No.	203082	203083	203084	203085	203086	203087	203088	203089	203090	203091	203092	203093	203094
\varnothing	71	72	73	74	75	76	77	78	79	80			
Id. No.	203095	203096	203097	203098	203099	203100	203101	203102	203103	203104			

EM-S-4**

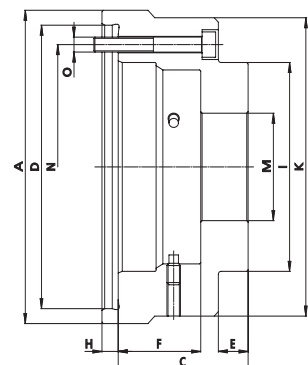
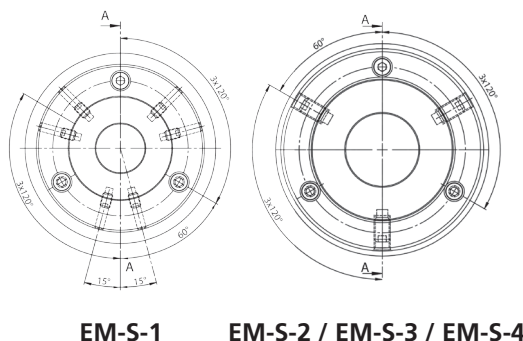
\varnothing	70	71	72	73	74	75	76	77	78	79	80	81	82
Id. No.	203434	203435	203436	203437	203438	203439	203440	203441	203442	203443	203444	203445	203446
\varnothing	83	84	85	86	87	88	89	90	91	92	93	94	95
Id. No.	203447	203448	203449	203450	203451	203452	203453	203454	203455	203456	203457	203458	203459
\varnothing	96	97	98	99	100	101	102	103	104	105			
Id. No.	203460	203461	203462	203463	203464	203465	203466	203467	203468	203469			

* The clamping sleeves have a max. radial expansibility in diameter of ± 0.4 mm from the nominal diameter.

** The clamping sleeves have a max. radial expansibility in diameter of ± 0.6 mm from the nominal diameter.

Soft work stop blank

Type	EM-S-1	EM-S-2	EM-S-3	EM-S-4
Id. No.	203106	203107	203108	203433
A	93	105	113	142
C	47	59	75	82.5
D	80	95	88	115
E	12.5	22	27	30
F	27.5	30.5	40.5	45
H	6	6	-	-
I	50	70	88	116
K	82	100	114	143
M	23.8	36	46	74
N	66	82	100	128
O	M5	M5	M5	M5

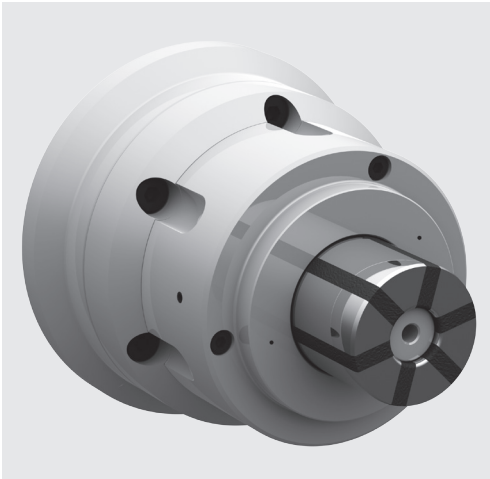


Segment sleeve mandrel Ø 18 - 105 mm

EM-S

- Size 1 - 4
- Large expansibility

Segment sleeve mandrel
power operated



Application/ customer benefit

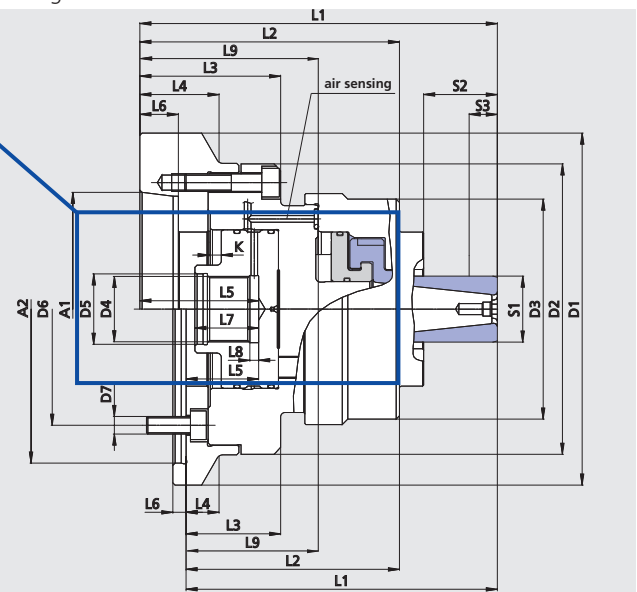
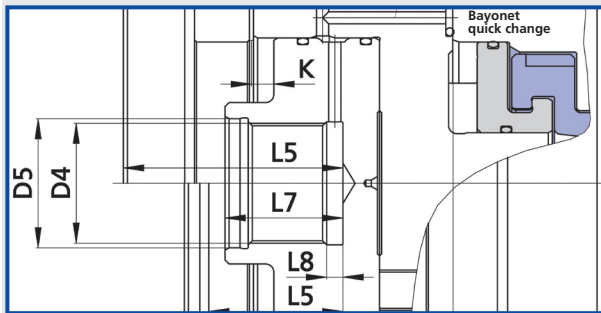
- Ideal for volume production and hard turning / grinding with wear resistant, case hardened and vulcanised clamping sleeves
- Highest accuracy and high torque transmission by means of fixed mandrel body
- Axial pull down by the axial clamping movement of the clamping sleeve = best face run out
- Clamping sleeve quick change for short setup times
- Preparation for air sensing

Technical details

- Large expansibility 0.8-1.2 mm depending on the size (The clamping sleeves have a max. radial expansibility in diameter of ± 0.4 mm or ± 0.6 mm from the nominal diameter.)
- Power operated
- Rigid design with flange mounting
- Tapped holes in the face for axial stops

Standard equipment

Base mandrel with mounting bolts



Attention:

Sleeve mandrel in open position = right end position!

Gap "L8" must remain open when using air sensing!

Subject to technical changes.

For more detailed information please ask for customer drawing.

SMW-AUTOBLOK Type		EM-S-1			EM-S-2			EM-S-3					EM-S-4				
Mounting		A5	A6	Z140	A5	A6	Z140	A5	A6	A08	Z140	Z170	A5	A6	A8	Z140	Z170
Id. No.		202734	202735	202736	202737	202738	202739	202740	202741	203132	202742	203133	203384	203385	203427	203383	203420
Short taper mounting DIN 55026	A1	A5	A6	-	A5	A6	-	A5	A6	A8	-	-	A5	A6	A8	-	-
Center mounting	A2 H5	-	-	140	-	-	140	-	-	-	140	170	-	-	-	140	170
	D1	132	160	150	132	160	150	132	160	202	150	180	157	157	202	157	180
	D2	132	132	132	132	132	132	132	132	132	132	132	157	157	157	157	157
	D3	82	82	82	100	100	100	114	114	114	114	114	143	143	143	143	143
	D4	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5	M30x1.5
	D5 H7	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
	D6	104.8	133.4	104.8	104.8	133.4	104.8	104.8	133.4	171.4	104.8	133.4	104.8	133.4	171.4	104.8	133.4
	D7	4 x M10	4 x M12	4 x M10	4 x M10	4 x M12	4 x M10	4 x M10	4 x M12	4 x M16	4 x M10	4 x M12	4 x M10	4 x M12	4 x M16	4 x M10	4 x M12
	L1	138.5	138.5	123.5	162.5	162.5	147.5	177.5	177.5	179.5	162.5	162.5	193	191	195	193	191
	L2	113.5	113.5	98.5	118	118	103	123	123	126	108	108	132.5	130.5	134.5	132.5	130.5
	L3	61	61	46	64	64	49	75	75	77	60	60	80	78	82	80	78
	L4	-	36	15	-	36	15	-	36	47	15	30	-	-	47	-	13
	L5	53	53	38	54	54	39	50	50	52	35	35	54	52	56	54	52
	L6	16.5	17.5	6	16.5	17.5	6	16.5	17.5	20	6	6	19	17.5	20	5	5
	L7	30	30	30	29	29	29	25	25	25	25	25	29	29	29	29	29
Gap	L8	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5
	L9	79	79	64	81	81	66	75	75	77	60	60	80	78	82	80	78

Technical data

Clamping range	S1	18-23	23-35	18-23	23-35	18-23	23-35	30-55	30-55	30-55	45-80	45-80	45-80	45-80	45-80	70-105	70-105	70-105	70-105	70-105
max. clamping length	S2	17.5	23	17.5	23	17.5	23	41.5	41.5	41.5	51.5	51.5	51.5	51.5	51.5	57.5	57.5	57.5	57.5	57.5
min. clamping length	S3	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	8	8
Axial stroke	K	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6
Expansibility in dia.		0.8	0.8	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
max. actuating force	kN	15	15	15	20	20	20	25	25	25	25	25	29	29	29	29	29	29	29	29
max. speed	min ⁻¹	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
max. transmittable torque	Nm	57	57	57	102	102	102	180	180	180	180	180	395-595	395-595	395-595	395-595	395-595	395-595	395-595	395-595
rec. actuating cylinders		SIN-S 70			SIN-S 85			SIN-S 85					SIN-S 85							