

## Face Drivers FSB / SB



### with drive pins and movable center pin

The entire surface of the workpiece can be tooled and finished by clamping with a maximum of torque transmission. NEIDLEIN face drivers are mechanical clamping systems which are suited **for turning as well as hard turning.**

Face drivers of type FSB / SB are power-operated by the thrust of the tailstock. Workpieces are clamped centrally using a movable center pin. This way different centerings can be adjusted, thus ensuring a constant datum-point at the end face of the workpieces.

#### Type FSB with flange retainer

Type FSB is mounted onto the machine spindle nose using a flange adapter.



#### Type SB with MK- or cylindrical retainer

Type SB with taper shank and extracting nut for fast mounting into the machine spindle.



#### NEIDLEIN face drivers FSB / SB with movable center pins ensure:

- a maximum of torque transmission, thus achieving high metal removing rates
- datum-point at the end face of the workpiece  
stable datum-point in case of different centerings
- extended tool-life of driving devices and cutting tools due to vibration-free running
- run-out deviation max.: 0.015 - 0.02 mm
- clamping force is triggered by tailstock
- fixed center pin/fixed datum-point in clamped state
- compensating driving devices/ideal clamping of the workpiece
- simple handling

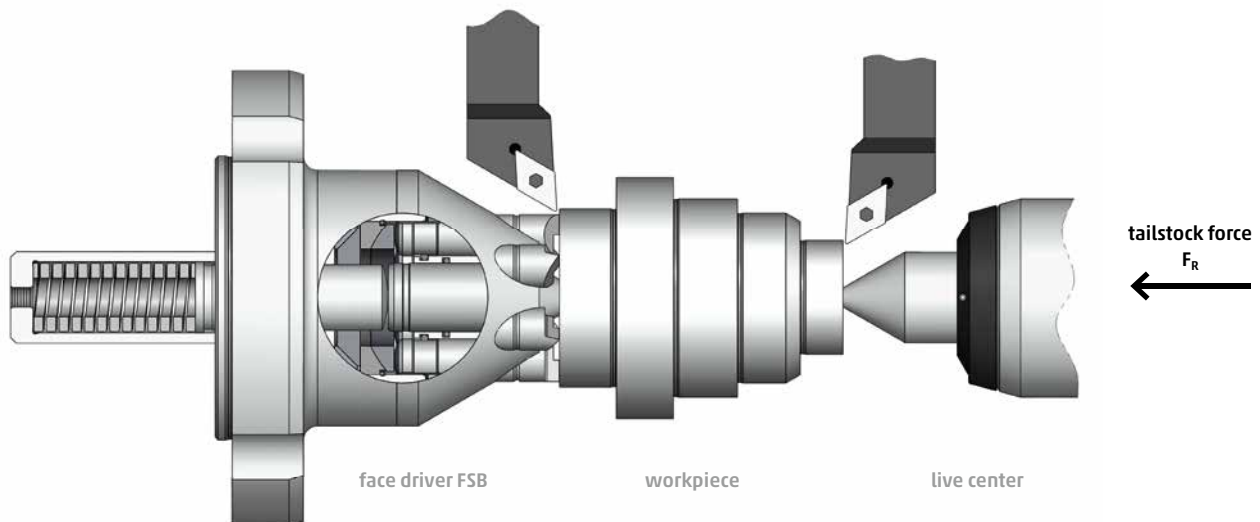
## Clamping principle

The center pin located on the side of the tailstock pushes the workpiece against the movable center pin of the face driver. The center pin will draw back until the surface of the workpiece bears against the drive pins. In this state the clamping bolt is clamped over the power flow in order to ensure a fixed datum-point during the entire tooling process.

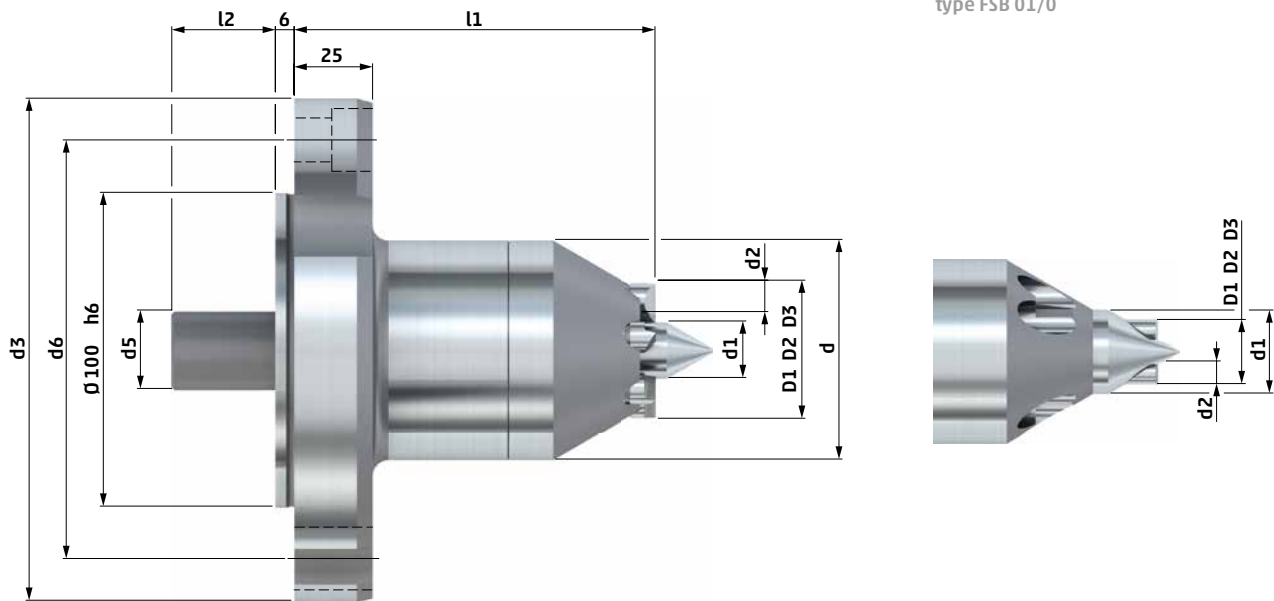
The drive pins are "floatingly", thus compensating for variations in workpiece, squareness and surface finish. The entire surface of the workpiece can now be finished in one single clamping. Please check page 14 - 15 for metal removing rates to be obtained as well as for the tailstock forces required. Compatible standard drive pins and center pins are listed on page 22 - 28.

We will be glad to design clamping devices suitable for your workpieces.

### Type FSB with flange retainer



## Technical data – type FSB face driver



type FSB	d	d1	center Ø	d2	d3	d5	d6	l1	l2	drive pin	fastening screw		clamping Ø			cat. no.
											type	pcs	D1	D2	D3	
<b>01</b>	48	22	0 - 5	6	160	25	133.4	115	28	3	M12	3	8	11	17	<b>730 12</b>
<b>0</b>	48	22	0 - 3	8	160	25	133.4	115	28	3	M12	3	6	11	19	<b>730 01</b>
<b>11</b>	42	6	0 - 6	6	160	25	133.4	115	28	3	M12	3	11	14	20	<b>730 11</b>
<b>1</b>	48	8	0 - 8	8	160	25	133.4	115	28	3	M12	3	13	18	26	<b>730 02</b>
<b>2</b>	70	14	2 - 14	10	160	25	133.4	115	23	6	M12	3	26	31	36	<b>730 03</b>
<b>3</b>	70	18	2 - 18	10	160	25	133.4	115	33	6	M12	3	34	39	44	<b>730 04</b>
<b>35</b>	80	14	2 - 14	15	160	25	133.4	115	33	6	M12	3	29	39	49	<b>730 09</b>
<b>4</b>	90	24	3 - 24	15	160	32	133.4	115	72	6	M12	3	39	49	59	<b>730 05</b>
<b>45</b>	100	28	3 - 28	15	160	32	133.4	115	72	6	M12	3	49	59	69	<b>730 10</b>
<b>5</b>	132	35	6 - 35	20	160	45	133.4	115	164	6	M12	3	69	84	99	<b>730 06</b>
<b>55</b>	182	35	6 - 35	20	220	45	171.4	115	165	6	M16	3	110	125	140	<b>730 08</b>
<b>6</b>	212	35	6 - 35	20	250	45	210	115	165	6	M20	3	140	155	170	<b>730 07</b>
<b>7</b>	255	50	25 - 48	20	290	50	250	132	165	6	M20	6	180	195	210	<b>730 13</b>
<b>75</b>	302	50	25 - 48	20	348	50	310	132	165	6	M20	6	230	245	260	<b>730 14</b>
<b>8</b>	360	80	30 - 76	30	440	78	394	190	262	6	M20	6	270	290	310	<b>730 16</b>
<b>85</b>	410	80	30 - 76	30	490	78	444	190	262	6	M20	6	320	340	360	<b>730 15</b>

- All face drivers are supplied without drive pins. (drive pins see page 22 - 27)
- Types FSB 01 / 0 are supplied with center body, all other types without center pin. (center pins see page 28)
- Mounting elements for face drivers see page 76 - 73.

It is the purpose of a flange-adapter to provide stable connection to the machine spindle. We supply these flange adapters for various sizes of spindle noses either in standard size (DIN ISO 702-1 / DIN 55028) or for spindle noses specific to manufacturer of machine-tools. Thus face drivers of type FSB can be used on different machines. Driving devices and center pins can be exchanged front view on the machine without any effort.

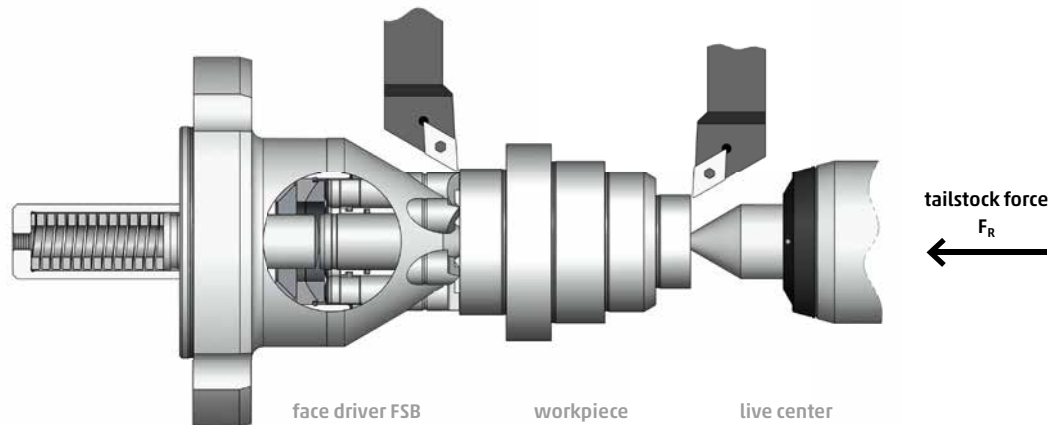
Upon request and depending on the tooling direction of the machine the face driver can be equipped optionally with drive pins for counter-clockwise tooling (SR / tooling direction M3), for clockwise tooling (SL / tooling direction M4) or for both tooling directions (NV = bi-directional).

Apart from the clamping diameters listed in the table under D1, D2, D3 we can also supply intermediate dimensions upon request. We can as well make extra-large center pins or mushroom centers appropriate to oversized centerings in workpieces. (see page 30)

## Face Drivers FSB / SB · Calculations

### tailstock force / maximum chip cross section of metal removing

**PRINCIPLE:** The tailstock force pushes the workpiece against the movable center pin of the face driver. The center pin will draw back until the surface of the workpiece bears against the drive pins.



#### ■ tailstock force $F_R$ :

The force onto the face driver required for metal removing is calculated on the basis of the empirical formula:

$$F_R = \left[ \left( q_{\max} \times 1000 \times \frac{D}{d} \right) + 1000 \right] \times m$$

$F_R$	[N]	tailstock force
$q_{\max}$	[mm <sup>2</sup> ]	maximum of chip cross section for metal removing
$D$	[mm]	cutting diameter
$d$	[mm]	clamping diameter
$m$	[-]	material factor (see adjustment-chart below)

#### ■ maximum chip cross section $q_{\max}$ :

At a given tailstock force, maximum chip cross section is calculated as follows:

$$q_{\max} = \frac{\frac{F_R}{m} - 1000}{1000 \times \frac{D}{d}}$$

**EXPLANATORY NOTES:** The calculations refer to tooling against the face driver. In case of tooling against tailstock the calculated chip cross section is reduced by approx. 40%. The first chip, however, should always be machined toward the face driver, in order to achieve an ideal penetration of the drive pins. The ratio  $D/d$  should not exceed 2, otherwise it would work inefficiently.

#### Material factor $m$ adjustment chart:

material factor $m$	1.4	1.2	1.1	1.0	0.8
<b>Rm [N / mm<sup>2</sup>]</b>	1000	800	700	600	400
<b>examples</b>	42CrMo4	16MnCr5 25CrMo4	C 15E (Ck 15) C 45E (Ck 45)	S355J0 35S20	S235J0

## Chisel load of drive pins

Keep the chisel load within the following range:  
250 - 350 N per mm chisel length

- the chisel load is calculated as follows:

$$BS = \frac{F_R}{n \times s}$$

$$BS = \frac{7200 \text{ N}}{6 \times 4 \text{ mm}} = 300 \frac{\text{N}}{\text{mm}}$$

BS	[N/mm]	chisel load
F <sub>R</sub>	[N]	tailstock force
n	[-]	number of drive pins
s	[mm]	chisel length

**EXEMPLIFICATION:** turning with FSB 3 face driver, 6 drive pins, respective length of chisel 4 mm, tailstock force 7200 N

### CALCULATION EXAMPLE for type FSB / SB

#### Specific data of machine and workpiece:

maximum tailstock force: 10000 N  
material of the workpiece: C15E  
diameter of the workpiece,  
side of face driver: Ø48 mm  
turning diameter: Ø90 mm

#### Selection of face driver:

face driver FSB 3 / clamping Ø 44 mm  
6 drive pins each 4 mm chisel length

- tailstock force F<sub>R</sub>:

In order to ensure sufficient entrainment (see chisel load of drive pins) a tailstock force of approx. 7200 N has to be supplied.

$$BS = \frac{F_R}{n \times s}$$

$$F_R = 300 \frac{\text{N}}{\text{mm}} \times 6 \times 4 \text{ mm} = 7200 \text{ N}$$

- maximum chip cross section q<sub>max</sub>:

The maximum chip cross section (at the ultimate turning-Ø) is calculated as follows:

$$q_{max} = \frac{\frac{7200 \text{ N}}{1,1} - 1000}{1000 \times \frac{90 \text{ mm}}{44 \text{ mm}}} = 2,71 \text{ mm}^2$$

#### Determination of material factor m:

as per adjustment chart material factor: m (C15E) = 1.1

**EXPLANATORY NOTES:** This calculation refers to tooling against the face driver. The calculated chip cross section refers to the ultimate turning diameter. In case of further tooling towards the axis of rotation of the workpiece, even larger chip cross sections can be achieved (» formula), commensurate with turning diameter.



## Drive Pins FSB / SB / FFB · Chisel SL / SR / NV

for torque transmission onto the workpiece  
for soft / green tooling

Type **FSB / SB / FFB** · chisel SL / SR / NV



SR

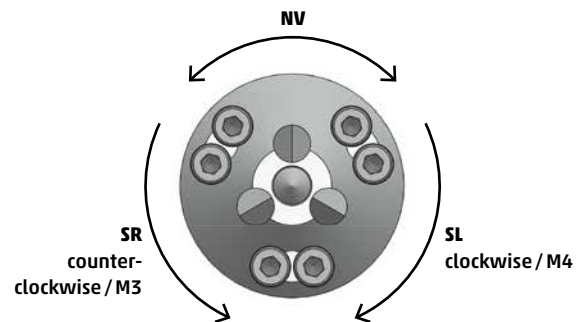


SL

SR

NV

view from tailstock onto the face driver



NV

SR

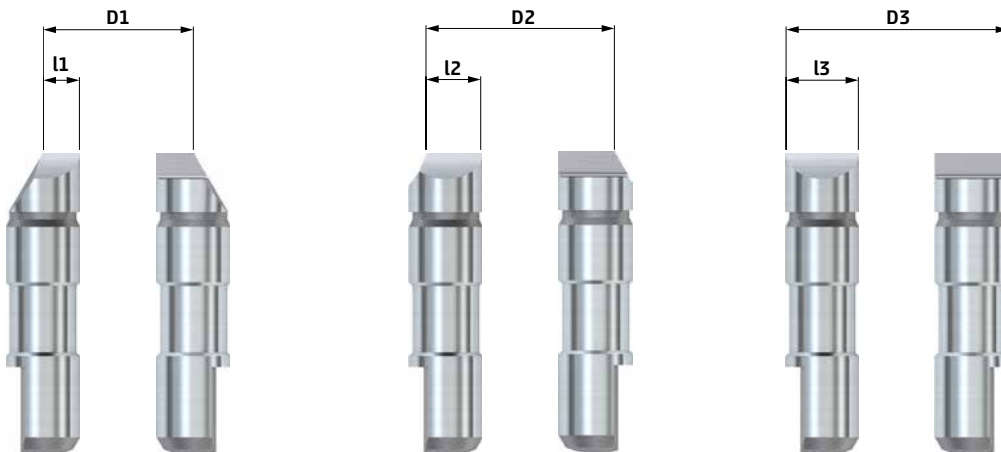
counter-  
clockwise / M3

SL

clockwise / M4

Technical data – type **FSB / SB / FFB** · chisel SL / SR / NV

types 01 and 11 with chisel SL and SR are double chiselled



D1

l1

D2

l2

D3

l3

**TYPE CHISEL SL**  
for tooling  
direction M4

**TYPE CHISEL SR**  
for tooling  
direction M3

**TYPE CHISEL NV**  
for tooling  
direction M4 and M3

for type FSB/SB/FFB	clamping Ø			chisel length			cat. no.	cat. no.	cat. no.
	D1	D2	D3	l1	l2	l3			
<b>01</b>	8			1.5			<b>736 104</b>	<b>736 101</b>	<b>736 107</b>
		11			3		<b>736 105</b>	<b>736 102</b>	<b>736 108</b>
			17			6	<b>736 106</b>	<b>736 103</b>	<b>736 109</b>
<b>0</b>	6			1.5			<b>736 04</b>	<b>736 01</b>	<b>736 07</b>
		11			4		<b>736 05</b>	<b>736 02</b>	<b>736 08</b>
			19			8	<b>736 06</b>	<b>736 03</b>	<b>736 09</b>
<b>1</b>	13			1.5			<b>736 13</b>	<b>736 10</b>	<b>736 16</b>
		18			4		<b>736 14</b>	<b>736 11</b>	<b>736 17</b>
			26			8	<b>736 15</b>	<b>736 12</b>	<b>736 18</b>
<b>11</b>	11			1.5			<b>736 76</b>	<b>736 73</b>	<b>736 79</b>
		14			3		<b>736 77</b>	<b>736 74</b>	<b>736 80</b>
			20			6	<b>736 78</b>	<b>736 75</b>	<b>736 81</b>
<b>2</b>	26			5			<b>736 22</b>	<b>736 19</b>	<b>736 25</b>
		31			7.5		<b>736 23</b>	<b>736 20</b>	<b>736 26</b>
			36			10	<b>736 24</b>	<b>736 21</b>	<b>736 27</b>
<b>3</b>	34			5			<b>736 31</b>	<b>736 28</b>	<b>736 34</b>
		39			7.5		<b>736 32</b>	<b>736 29</b>	<b>736 35</b>
			44			10	<b>736 33</b>	<b>736 30</b>	<b>736 36</b>
<b>35</b>	29			5			<b>736 85</b>	<b>736 82</b>	<b>736 88</b>
		39			5		<b>736 86</b>	<b>736 83</b>	<b>736 89</b>
			49			5	<b>736 87</b>	<b>736 84</b>	<b>736 90</b>
<b>4</b>	39			5			<b>736 40</b>	<b>736 37</b>	<b>736 43</b>
		49			7.5		<b>736 41</b>	<b>736 38</b>	<b>736 44</b>
			59			7.5	<b>736 42</b>	<b>736 39</b>	<b>736 45</b>
<b>45</b>	49			5			<b>736 94</b>	<b>736 91</b>	<b>736 97</b>
		59			7.5		<b>736 95</b>	<b>736 92</b>	<b>736 98</b>
			69			7.5	<b>736 96</b>	<b>736 93</b>	<b>736 99</b>
<b>5</b>	69			5			<b>73649</b>	<b>736 46</b>	<b>736 52</b>
		84			10		<b>73650</b>	<b>736 47</b>	<b>736 53</b>
			99			10	<b>73651</b>	<b>736 48</b>	<b>736 54</b>
<b>55</b>	110			5			<b>73658</b>	<b>736 55</b>	<b>736 61</b>
		125			10		<b>73659</b>	<b>736 56</b>	<b>736 62</b>
			140			10	<b>73660</b>	<b>736 57</b>	<b>736 63</b>
<b>6</b>	140			5			<b>73667</b>	<b>736 64</b>	<b>736 70</b>
		155			10		<b>73668</b>	<b>736 65</b>	<b>736 71</b>
			170			10	<b>73669</b>	<b>736 66</b>	<b>736 72</b>
<b>7</b>	180			5			<b>736 114</b>	<b>736 111</b>	<b>736 117</b>
		195			15		<b>736 115</b>	<b>736 112</b>	<b>736 118</b>
			210			20	<b>736 116</b>	<b>736 113</b>	<b>736 119</b>
<b>75</b>	230			5			<b>736 344</b>	<b>736 341</b>	<b>736 347</b>
		245			15		<b>736 345</b>	<b>736 342</b>	<b>736 348</b>
			260			20	<b>736 346</b>	<b>736 343</b>	<b>736 349</b>
<b>8</b>	270			10			<b>736 373</b>	<b>736 370</b>	<b>736 376</b>
		290			20		<b>736 374</b>	<b>736 371</b>	<b>736 377</b>
			310			30	<b>736 375</b>	<b>736 372</b>	<b>736 378</b>
<b>85</b>	320			10			<b>736 364</b>	<b>736 361</b>	<b>736 367</b>
		340			20		<b>736 365</b>	<b>736 362</b>	<b>736 368</b>
			360			30	<b>736 366</b>	<b>736 363</b>	<b>736 369</b>

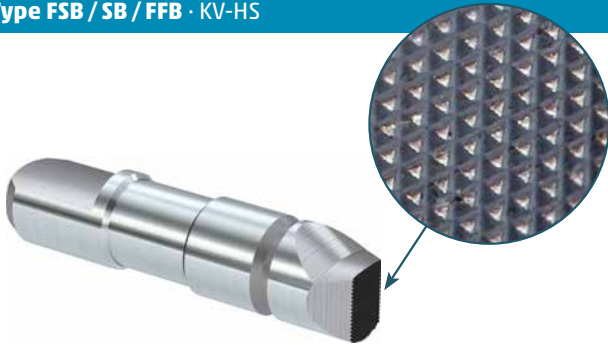
■ Further clamping Ø of drive pins upon request.



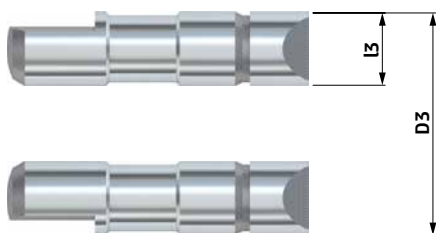
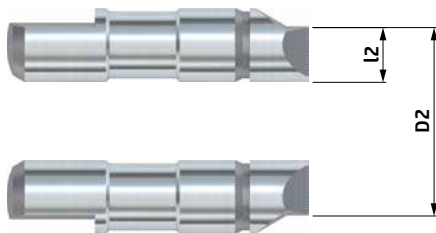
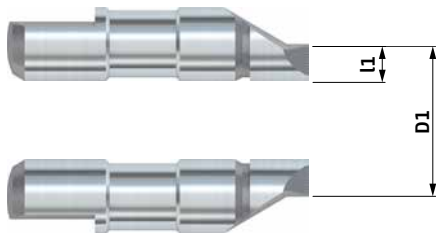
## Drive Pins FSB / SB / FFB · KV-HS

**cross serrated and coated for hard turning operation  
for torque transmission onto the workpiece  
for hard tooling**

### Type FSB / SB / FFB · KV-HS



### Technical data – type FSB / SB / FFB · KV-HS



for type FSB/SB/FFB	clamping Ø			chisel length			cat. no.
	D1	D2	D3	l1	l2	l3	
<b>01</b>	8			1.5			<b>736 200</b>
	11				3		<b>736 201</b>
			17			6	<b>736 202</b>
<b>0</b>	6			1.5			<b>736 203</b>
	11				4		<b>736 204</b>
			19			8	<b>736 205</b>
<b>1</b>	13			1.5			<b>736 209</b>
	18				4		<b>736 210</b>
			26			8	<b>736 211</b>
<b>11</b>	11			1.5			<b>736 206</b>
	14				3		<b>736 207</b>
			20			6	<b>736 208</b>
<b>2</b>	26			5			<b>736 212</b>
	31				7.5		<b>736 213</b>
			36			10	<b>736 214</b>
<b>3</b>	34			5			<b>736 215</b>
	39				7.5		<b>736 216</b>
			44			10	<b>736 217</b>
<b>35</b>	29			5			<b>736 218</b>
	39				10		<b>736 219</b>
			49			15	<b>736 220</b>
<b>4</b>	39			5			<b>736 221</b>
	49				10		<b>736 222</b>
			59			15	<b>736 223</b>
<b>45</b>	49			5			<b>736 224</b>
	59				10		<b>736 225</b>
			69			15	<b>736 226</b>
<b>5</b>	69			5			<b>736 227</b>
	84				12.5		<b>736 228</b>
			99			20	<b>736 229</b>
<b>55</b>	110			5			<b>736 230</b>
	125				12.5		<b>736 231</b>
			140			20	<b>736 232</b>
<b>6</b>	140			5			<b>736 233</b>
	155				12.5		<b>736 234</b>
			170			20	<b>736 235</b>

■ Further clamping Ø of drive pins upon request.



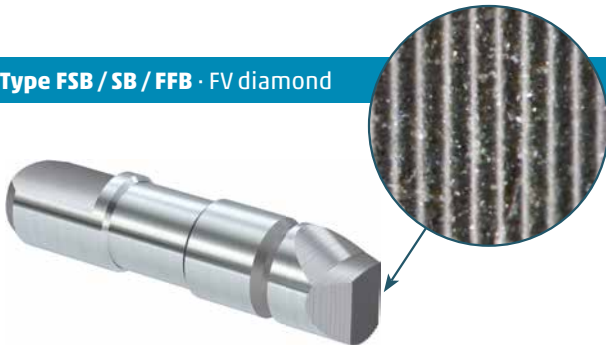


# Drive Pins FSB / SB / FFB · FV Diamond

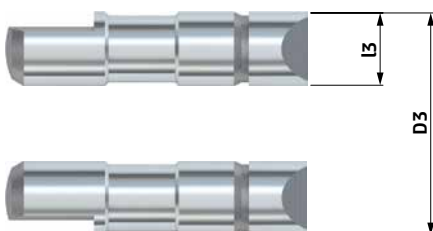
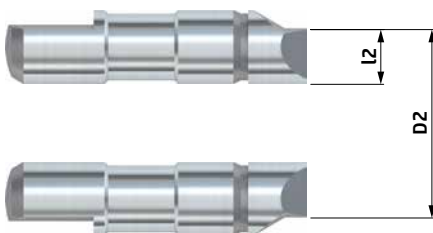
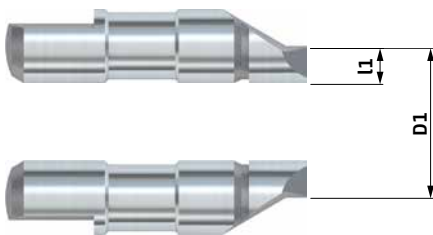
**serrated and diamond embedded  
for torque transmission onto the workpiece  
for hard tooling**

for higher friction coefficient and higher tool life of drive pin

## Type FSB / SB / FFB · FV diamond



## Technical data - type FSB / SB / FFB · FV diamond



for type FSB / SB / FFB	clamping Ø			chisel length			cat. no.
	D1	D2	D3	l1	l2	l3	
<b>01</b>	8			1.5			<b>736 400</b>
	11				3		<b>736 401</b>
			17			6	<b>736 402</b>
<b>0</b>	6			1.5			<b>736 403</b>
	11				4		<b>736 404</b>
			19			8	<b>736 405</b>
<b>1</b>	13			1.5			<b>736 409</b>
	18				4		<b>736 410</b>
			26			8	<b>736 411</b>
<b>11</b>	11			1.5			<b>736 406</b>
	14				3		<b>736 407</b>
			20			6	<b>736 408</b>
<b>2</b>	26			5			<b>736 412</b>
	31				7.5		<b>736 413</b>
			36			10	<b>736 414</b>
<b>3</b>	34			5			<b>736 415</b>
	39				7.5		<b>736 416</b>
			44			10	<b>736 417</b>
<b>35</b>	29			5			<b>736 418</b>
	39				10		<b>736 419</b>
			49			15	<b>736 420</b>
<b>4</b>	39			5			<b>736 421</b>
	49				10		<b>736 422</b>
			59			15	<b>736 423</b>
<b>45</b>	49			5			<b>736 424</b>
	59				10		<b>736 425</b>
			69			15	<b>736 426</b>
<b>5</b>	69			5			<b>736 427</b>
	84				12.5		<b>736 428</b>
			99			20	<b>736 429</b>
<b>55</b>	110			5			<b>736 430</b>
	125				12.5		<b>736 431</b>
			140			20	<b>736 432</b>
<b>6</b>	140			5			<b>736 433</b>
	155				12.5		<b>736 434</b>
			170			20	<b>736 435</b>

■ Further clamping Ø of drive pins upon request.



## Drive Pins FSB / SB / FFB · Chisel Carbide

**full carbide / carbide inserts**  
**for torque transmission onto the workpiece**  
**for tooling of high-tensile-strength materials**

**Type FSB / SB / FFB · chisel carbide**

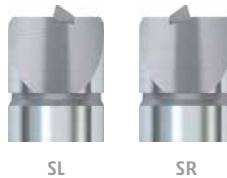
model B / SR



### MODEL A



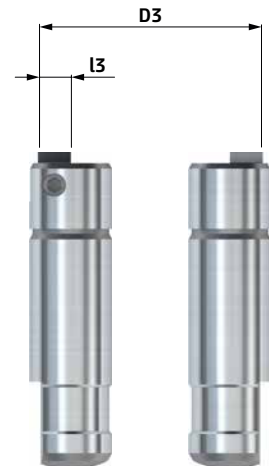
### MODEL B



**Technical data – type FSB / SB / FFB · chisel carbide**

type 01 - 3 made of full carbide, model A

type 35 - 6 with carbide inserts, model B



**MODEL A****TYPE CHISEL SL**for tooling  
direction M4**TYPE CHISEL SR**for tooling  
direction M3**TYPE CHISEL NV**for tooling  
direction M4 and M3

for type FSB / SB / FFB	clamping Ø D3	length l3	cat. no.	cat. no.	cat. no.
<b>01</b>	17	6	<b>736 500</b>	<b>736 518</b>	<b>736 536</b>
<b>0</b>	19	8	<b>736 501</b>	<b>736 519</b>	<b>736 537</b>
<b>1</b>	26	8	<b>736 502</b>	<b>736 520</b>	<b>736 538</b>
<b>11</b>	20	6	<b>736 503</b>	<b>736 521</b>	<b>736 539</b>
<b>2</b>	36	10	<b>736 504</b>	<b>736 522</b>	<b>736 540</b>
<b>3</b>	44	10	<b>736 505</b>	<b>736 523</b>	<b>736 541</b>

**MODEL B**

for type FSB / SB / FFB	clamping Ø		length l3	cat. no.	cat. no.
	D1	D3			
<b>35</b>	34		6	<b>736 506</b>	<b>736 524</b>
		46	6	<b>736 507</b>	<b>736 525</b>
<b>4</b>	44		6	<b>736 508</b>	<b>736 526</b>
		56	6	<b>736 509</b>	<b>736 527</b>
<b>45</b>	54		6	<b>736 510</b>	<b>736 528</b>
		66	6	<b>736 511</b>	<b>736 529</b>
<b>5</b>	75		6	<b>736 512</b>	<b>736 530</b>
		95	6	<b>736 513</b>	<b>736 531</b>
<b>55</b>	116		6	<b>736 514</b>	<b>736 532</b>
		136	6	<b>736 515</b>	<b>736 533</b>
<b>6</b>	146		6	<b>736 516</b>	<b>736 534</b>
		166	6	<b>736 517</b>	<b>736 535</b>

- Drive Pins are supplied with carbide insert.
- Further clamping-Ø of drive pins upon request.

**Changeable inserts for type 35 - 6, model B**

changeable parts	cat. no.
carbide insert	<b>736 550</b>
set screw for fastening of carbide insert	<b>736 551</b>



## Center Pins FSB / SB

for face drivers FSB / SB with movable center pin

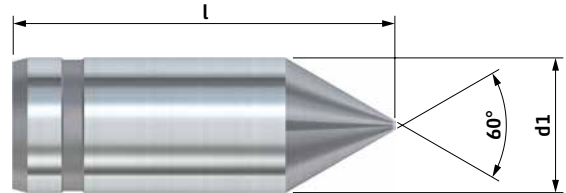
### Type FSB / SB · center pin



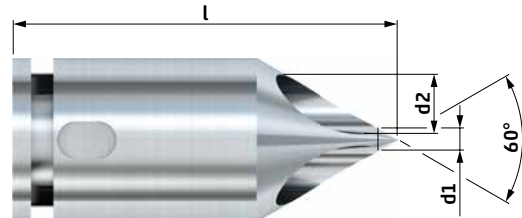
center body type FSB / SB 01 / 0



### Technical data - type FSB / SB · center pin



center body type FSB / SB 01 / 0



for type FSB / SB	d1	center Ø	d2	l	cat. no.
<b>01</b>	5	0 - 5	6	52	<b>735 101</b>
<b>0</b>	3	0 - 3	8	52	<b>735 01</b>
<b>11</b>	6	0 - 6	-	53	<b>735 11</b>
<b>1</b>	8	0 - 8	-	53	<b>735 02</b>
<b>2</b>	14	2 - 14	-	47	<b>735 03</b>
<b>3</b>	18	2 - 18	-	51	<b>735 04</b>
<b>35</b>	14	2 - 14	-	47	<b>735 09</b>
<b>4</b>	24	3 - 24	-	70	<b>735 05</b>
<b>45</b>	28	3 - 28	-	74	<b>735 10</b>
<b>5</b>	35	6 - 35	-	96	<b>735 06</b>
<b>55</b>	35	6 - 35	-	96	<b>735 08</b>
<b>6</b>	35	6 - 35	-	96	<b>735 07</b>
<b>7</b>	50	25 - 48	-	100	<b>735 301</b>
<b>75</b>	50	25 - 48	-	100	<b>735 401</b>
<b>8</b>	80	30 - 76	-	135	<b>735 601</b>
<b>85</b>	80	30 - 76	-	135	<b>735 501</b>

■ Further center pins for other center holes upon request.