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THE COMPANY

30 YEARS OF PRODUCTION

THE PARTNER FOR:
- Workholding technologies
- Magnetic-hydraulic-mechanical-vacuum
- Stationary and rotary workholding
- All technologies
- Heavy lifting systems
- Automation
- Standard parts
- Special applications

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Tel.: +86 - 751 - 8838228 ext SAV

THE COMPANY

30 YEARS OF PRODUCTION

THE PARTNER FOR:
- Workholding technologies
- Magnetic-hydraulic-mechanical-vacuum
- Stationary and rotary workholding
- All technologies
- Heavy lifting systems
- Automation
- Standard parts
- Special applications
Leading in technology – Not just a catch phrase for SAV

Research and development is the basis of our success. We develop magnetic, hydraulic, mechanical and vacuum technology solutions for our customers as well as tools and prototypes according to our customer’s specifications. We have a network of approximately 25 CAD workstations at several locations. All of them are equipped with 3D-systems and FEM programmes for magneto-static, thermal, static and dynamic analyses.

The engineering of standard and special solutions

Our engineering department is specialised in the development and engineering of rotary workholding solutions. Our high levels of expertise enable us to implement your specific requirements. Our many years of experience in the area of special-, workholding and lifting system solutions are integrated into the development of our standard products to ensure optimal results and the highest possible flexibility in their application.

Engineering, R&D

PRODUCTION

The production of standard and special solutions

Our products are manufactured in our state-of-the-art production facilities which are designed for various production processes. 5-Axis milling, circular and surface grinding, wire cutting and sinking operations are carried out in our own production facilities. In order that we are able to offer our customers excellent levels of product quality, our quality control management procedures are certified annually (ISO 9001/2010).

We manufacture globally. Our main production facilities are located in Nuremberg, Mittweida and Göppingen in Germany. Naturally, our standard products are employed in our own production processes. This enables our experienced development team to continually monitor and improve the product specifications which provides a practical benefit to our customers.

Our production facilities

- 55 CNC-machining centres up to 5000 mm machining length and 3000 mm in width
- 2 CNC Gantry milling machines
  - Gantry range 3 m, table length 5 m
- 4 HSC 5 axis milling machines
- 50 profile / surface / coordinate / circular (internal and outside) grinding machines up to 4000 mm machining length.
- Magnet test bench up to 50,000 kg
- 12 wire cutting and sinker EDM machines
- 4 CNC horizontal lathes
- 1 large horizontal lathe
  - Face plate diameter 3000 mm
- 4 coordinate measuring machines
  - Range: x = 600 mm, y = 1000 mm, z = 465 mm
- 1 injection moulding machine
SAV provides:

- Quality, operational safety and longevity
- Cost effectiveness
- Precision solutions
- Competence in problem solving
- High clamping forces appropriate to the workpiece characteristics
- Flexibility through R&D and our own production technologies
- Innovation – new technologies
- Applications “Made in Germany”

Workholding solutions for turning, grinding and milling:

- Universal and flexible
- Low wear and low maintenance
- Combined solutions
- Automation
- Adaptable for every spindle – specially for your machinery
- Comprehensive solutions
- On-site service and installation
- Workpiece and process orientated solutions
- Optimization of setup times

We develop and produce workholding technologies including individual solutions for your workpieces and operating requirements. Please request the SAV catalogues.

SAV catalogues workholding / special solutions

Download under www.group-sav.com

SAV catalogue “Magnetic workholding”
SAV catalogue “Special solutions”
SAV catalogue “Rotary workholding”
### MODULAR WORKHOLDING ELEMENTS

<table>
<thead>
<tr>
<th>SAV-ART.-NO.</th>
<th>DESCRIPTION</th>
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<th>PAGE</th>
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<td>14</td>
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<tr>
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<td>Grooved clamping face</td>
<td>15</td>
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<td>To extend the width of the clamping rail</td>
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<td>Positioning bushes</td>
<td>For 5-axis clamping block</td>
<td>24</td>
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<td>208.32</td>
<td>Clamping claws</td>
<td>For 5-axis clamping block</td>
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<td>For 5-axis clamping block</td>
<td>25</td>
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<td>208.41</td>
<td>Side stop, flexible</td>
<td>For 5-axis clamping block</td>
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<td>For horizontal and 5-Axis machines</td>
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MODULAR CLAMPING RAILS

Clamping rails of 50 and 80 mm widths. Lengths of 200 to 500 mm. Wedge clamps, fixed jaws, aluminium jaws and pallets in various dimensions. Adapter system to connect clamping rails. A comprehensive clamping system with which it is possible to achieve an optimal clamping solution for almost all workpieces on almost machining centers.

Flexible stop for positioning

Wedge clamps in various sizes

Clamping claws for table mounting

Positioning bushes for a quick setup

Adapter to connect two rails

Mill profiles into the jaws

T-nuts to mount the jaws

HOLDING FORCES OF THE SAV-WEDGE CLAMPS

Holding forces with cleaned clamping elements and lubricated bolts tighten with a torque wrench.

Holding force in daN

5000
4500
4000
3500
3000
2500
2000
1500
1000
500

5 10 15 20 25 30 35 40 45 50 55 60 65 70 80 90 100 110 120 140 160 180 185 190

Torque in Nm

M8
M12
M16
Fixed Clamping Jaw, with Tooothing

2mm pitch, toothed, clamping face

Application:
- The fixed stop is positioned on the clamping rail and fastened using the tensioning bolt and the jaw grips flush with the 2 mm toothing on the rail.

Execution:
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

Application:
- The fixed stop is positioned on the clamping rail and fastened using the tensioning bolt and the jaw grips flush with the 2 mm toothing on the rail.

Execution:
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

Clamping Wedge Element, with Tooothing

2mm pitch, toothed, clamping face

Application:
- Quick and secure clamping of workpieces
  - Tensioned via the cylinder bolt and the wedge element, which moves the clamping jaw and thereby presses the workpiece against the stop.

Execution:
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

Application:
- Quick and secure clamping of workpieces
  - Tensioned via the cylinder bolt and the wedge element, which moves the clamping jaw and thereby presses the workpiece against the stop.

Execution:
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

Clamping Wedge Element, Grooved

With grooved clamping face

Application:
- Quick and secure clamping of workpieces
  - Tensioned via the cylinder bolt and the wedge element, which moves the clamping jaw and thereby presses the workpiece against the stop.

Execution:
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

Application:
- Quick and secure clamping of workpieces
  - Tensioned via the cylinder bolt and the wedge element, which moves the clamping jaw and thereby presses the workpiece against the stop.

Execution:
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm
**Fixed Clamping Jaw, Smooth**

**Application:**
- The fixed stop is positioned on the clamping rail and fastened using the tensioning bolt and the jaw grips flush with the 2 mm toothing on the rail.

**Execution:**
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Thread D</th>
<th>Thread G</th>
<th>Weight in kg</th>
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<tbody>
<tr>
<td>A2</td>
<td>B</td>
<td>C</td>
<td>C1</td>
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<tr>
<td>30</td>
<td>36</td>
<td>42</td>
<td>29</td>
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</table>

**Ordering Example:**
- Fixed clamping jaw, smooth
- Designation: SAV 208.05 - 72

**Clamping Wedge Element, Oversized**

**Application:**
- With an extra 5 mm material on the clamping faces

**Execution:**
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm
- Clamping wedge with extra material to allow the inclusion of special profiles

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Thread D</th>
<th>Thread G</th>
<th>Holding force in kN</th>
<th>Weight in kg</th>
</tr>
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<tbody>
<tr>
<td>A1</td>
<td>A2</td>
<td>B</td>
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<td>72</td>
<td>84</td>
<td>57</td>
<td>67</td>
<td>29</td>
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*Clamping faces with extra 5 mm material for special profiles

**Ordering Example:**
- Clamping wedge element, oversized
- Designation: SAV 208.07 - 30

**Clamping Wedge Element, Smooth**

**Application:**
- With smooth clamping faces

**Execution:**
- Material: Case-hardened steel 21MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Holding force in kN</th>
<th>Weight in kg</th>
</tr>
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<tbody>
<tr>
<td>A1</td>
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<td>50</td>
<td>60</td>
<td>45</td>
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<tr>
<td>84</td>
<td>57</td>
<td>47</td>
</tr>
</tbody>
</table>

*Clamping faces with extra 5 mm material for special profiles

**Ordering Example:**
- Clamping wedge element, smooth
- Designation: SAV 208.06 - 30

**Clamping of Round Parts – Application Example**
APPLICATIONS

5-AXIS MOUNTING RAIL

- 5 Axis elements with improved access
- Raised jaws for swivel tables and rotary tables
- Off-set top jaws for improved tool access

Fixed jaw SAV-No. 208.12

Clamping wedge element SAV-No. 208.13

5-Axis clamping block SAV-No. 208.20

Clamping rail SAV-No. 208.21

Configuration with clamping rail and 5-axis wedge clamp elements

FIXED JAW, WITH TOOTHING

For 5-axis clamping block, 2mm pitch, toothed, clamping face

Application:
- The fixed stop is positioned on the clamping rail and fastened using the tensioning bolt and the jaw grips flush with the 2 mm toothing on the rail.

Execution:
- Material: Case-hardened steel 21 MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

Ordering example:
Fixed jaw with toothing SAV 208.10 - 40
Designation SAV-No. - A

<table>
<thead>
<tr>
<th>A</th>
<th>a1</th>
<th>a2</th>
<th>b</th>
<th>C</th>
<th>C1</th>
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<td>40</td>
<td>14.5</td>
<td>M6 30 1.12</td>
<td></td>
</tr>
</tbody>
</table>

SAV 208.10

CLAMPING WEDGE ELEMENT, WITH TOOTHING

For 5-axis clamping block, 2mm pitch, toothed, clamping face

Application:
- Quick and secure clamping of workpieces
- Tensioned via the cylinder bolt and the wedge element, which moves the clamping jaw and thereby presses the workpiece against the stop.

Execution:
- Material: Case-hardened steel 21 MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

Ordering example:
Kellspann-Element, mit Krallen SAV 208.11 - 40
Designation SAV-No. - A

<table>
<thead>
<tr>
<th>A</th>
<th>A1</th>
<th>A2</th>
<th>b</th>
<th>C</th>
<th>C1</th>
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<th>C3</th>
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<th>Holding force in kN</th>
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<tr>
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<td>40</td>
<td>14.5</td>
<td>M6 30 30</td>
<td>1.12</td>
<td></td>
</tr>
</tbody>
</table>

SAV 208.11
FIXED JAW, SMOOTH

For 5-axis clamping block

Application:
- The fixed stop is positioned on the clamping rail and fastened using the tensioning bolt and the jaw grips flush with the 2 mm toothing on the rail.

Execution:
- Material: Case-hardened steel 21 MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

### SAV 208.12

![SAV 208.12](image)

**Ordering example:**
Fixed jaw, smooth SAV 208.12 - 40

**Designation**
SAV-No. - A

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight (in kg)</th>
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<tbody>
<tr>
<td>A2</td>
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### SAV 208.13

![SAV 208.13](image)

**Ordering example:**
Clamping wedge element, smooth SAV 208.13 - 72

**Designation**
SAV-No. - A

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Holding face in mm</th>
<th>Weight (in kg)</th>
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<tbody>
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<td>22</td>
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</table>

### SAV 208.14

![SAV 208.14](image)

**Ordering example:**
Jaw facing shoe SAV 208.14 - 50

**Designation**
SAV-No. - A

<table>
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<tr>
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<td>21</td>
<td>25</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
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</tbody>
</table>

JAW FACING SHOES

For 5-axis clamping blocks

Application:
- Aluminium jaw facing inserts to allow the grinding of customer-specific profiles
- Suitable for clamping wedge elements SAV 208.01, 208.05, 208.07, 208.10, 208.11, 208.12, 208.13

Execution:
- Material: Aluminium

### SAV 208.15

**Ordering example:**
Jaw facing shoe SAV 208.15 - 50

**Designation**
SAV-No. - A

CLAMPING WEDGE ELEMENT, SMOOTH

For 5-axis clamping block

Application:
- Quick and secure clamping of workpieces
- Tensioned via the cylinder bolt and the wedge element, which moves the clamping jaw and thereby presses the workpiece against the stop.

Execution:
- Material: Case-hardened steel 21 MnCr5
- Tempered and case-hardened to 52 HRC
- Case depth 0.6 mm

### SAV 208.15

![SAV 208.15](image)

**Ordering example:**
Clamping wedge element, smooth SAV 208.15 - 72

**Designation**
SAV-No. - A

<table>
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<tr>
<th>Dimensions in mm</th>
<th>Weight (in kg)</th>
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<tr>
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</tr>
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<td>20</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

5-AXIS CLAMPING BLOCKS

Toothig top and bottom

Application:
- Mounting block for 5-face machining operations. It is installed on the clamping rail.
- Grips flush to the clamping rail and can, for example, be supplemented with a clamping wedge and fixed stop.
- Suitable to convert a multiple clamping system into a single assembly for 5-face machining operations.

Execution:
- Material: Case-hardened steel 21 MnCr5, plasma nitrided; hardness 58 HRC

### SAV 208.20

![SAV 208.20](image)

**Ordering example:**
5-axis clamping block SAV 208.20 - 80

**Designation**
SAV-No. - A

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight (in kg)</th>
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<tr>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>
**CLAMPING RAIL**

**SAV 208.21**

- **Application:**
  - Modular clamping system
  - Versatile range of applications
  - Designed for one or more workpieces
  - Quick clamping of workpieces for machining operations

- **Execution:**
  - Material: Case-hardened steel 21 MnCr5, plasma nitrided; hardness 58 HRC
  - Other mounting bore holes, for example, for clamping nipples K10 or K40, available on request
  - Positioning steps with a 2 mm interval are possible on the clamping rail
  - Max. holding force per clamping point 30 kN

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/B/C</td>
<td></td>
</tr>
<tr>
<td>80/100/80</td>
<td>6.2</td>
</tr>
<tr>
<td>80/14/14</td>
<td>6.7</td>
</tr>
<tr>
<td>80/14/14</td>
<td>7.2</td>
</tr>
<tr>
<td>80/14/14</td>
<td>10.0</td>
</tr>
<tr>
<td>80/14/14</td>
<td>11.6</td>
</tr>
<tr>
<td>80/14/14</td>
<td>16.7</td>
</tr>
<tr>
<td>80/14/14</td>
<td>21.0</td>
</tr>
<tr>
<td>80/16/16</td>
<td>25.2</td>
</tr>
</tbody>
</table>

**Ordering example:**
- Clamping rail: SAV 208.21 - 80 x 400
- Designation: SAV-No. - A x B

---

**MINI RAIL FOR CLAMPING ELEMENTS**

**SAV 208.23**

- **CLAMPING RAIL WIDTH REDUCER (1)**
  - **Application:**
    - Reduction from 2 T-Nuts to 1 T-Nut
    - Used with horizontal tombstones, in order to maintain accessibility in the multi-sided machining of small parts
    - Toothed top and bottom

- **CLAMPING RAIL WIDTH EXTENDER (2)**
  - **Application:**
    - To widen clamping rails
    - Positioning of the holding forces to the required points
    - Suitable for clamping large, round parts

**SAV 208.22**

- **Application:**
  - Can be transversely mounted at a 90 degree angle onto rails of 50 mm width
  - Toothed longitudinally on the underside
  - Only suitable for clamping wedge elements with an M8 thread
  - Clamping wedge elements with thread D (M8) available on request

**SAV 208.30**

- **Application:**
  - Using the adapter it is possible to directly connect two clamping rails without a gap

- **Execution:**
  - Material: Case-hardened steel, plasma nitrided

**For 5-axis clamping blocks**

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Thread D</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/B/C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40/200/40</td>
<td>M8</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Ordering example:**
- Transverse mounted rail: SAV 208.22 - 40 x 200
- Designation: SAV-No. - A x B

**Ordering example:**
- Adapter set: SAV 208.30
- Designation: SAV-No.
**POSITIONING BUSHES**

For 5-axis clamping blocks

Application:
- Positioning bush for simplified setup of the clamping rail on the machining table.
- All clamping rails are equipped with openings on the underside for the positioning bushes. This enables the quick and easy setup of the clamping rails on the machining table.

Execution:
- Material: Tempered steel, burnished

**SAV 208.31**

**APPLICATION:**
- Side stop to position workpieces.
- The stop is screwed to the fixed jaw and is movable.

**EXECUTION:**
- Material: Aluminium

**SCOPE OF DELIVERY:**
- Stop
- Fixing screw

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**CLAMPING CLAWS**

For 5-axis clamping blocks

Application:
- For mounting the clamping rail on to a slotted machine table

Execution:
- Material: Case-hardened steel, hardened

Scope of delivery:
- 4 clamping claws per packaging unit

**SAV 208.32**

**APPLICATION:**
- For mounting the clamping rail on to a slotted machine table

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

**Ordering example:**
Clamping claw  SAV 208.32 - 30 x 40
Designation    SAV-No.    -  A  x  B

**SIDE STOP, FIXED**

For 5-axis clamping blocks

**APPLICATION:**
- Positioning bush for simplified setup of the clamping rail on the machining table.
- All clamping rails are equipped with openings on the underside for the positioning bushes. This enables the quick and easy setup of the clamping rails on the machining table.

**EXECUTION:**
- Material: Tempered steel, burnished

**SCOPE OF DELIVERY:**
- Stop
- Fixing screw

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**SIDE STOP, FLEXIBLE**

For 5-axis clamping blocks

Application:
- Positioning bush for simplified setup of the clamping rail on the machining table.
- All clamping rails are equipped with openings on the underside for the positioning bushes. This enables the quick and easy setup of the clamping rails on the machining table.

Execution:
- Material: Tempered steel, burnished

Scope of delivery:
- 4 clamping claws per packaging unit

**SAV 208.32**

**APPLICATION:**
- Side stop to position workpieces.
- The stop is screwed to the fixed jaw and is movable.

**EXECUTION:**
- Material: Aluminium

**SCOPE OF DELIVERY:**
- Stop
- Fixing screw

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**SAV 208.32**

**APPLICATION:**
- For mounting the clamping rail on to a slotted machine table

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

**Ordering example:**
Clamping claw  SAV 208.32 - 30 x 40
Designation    SAV-No.    -  A  x  B

**SAV 208.40**

**APPLICATION:**
- Positioning bush for simplified setup of the clamping rail on the machining table.
- All clamping rails are equipped with openings on the underside for the positioning bushes. This enables the quick and easy setup of the clamping rails on the machining table.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**SAV 208.41**

**APPLICATION:**
- Positioning bush for simplified setup of the clamping rail on the machining table.
- All clamping rails are equipped with openings on the underside for the positioning bushes. This enables the quick and easy setup of the clamping rails on the machining table.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**SIDE STOP, FLEXIBLE**

For 5-axis clamping blocks

Application:
- Side stop to position workpieces.
- The stop is screwed to the fixed jaw and is movable.

Execution:
- Material: Aluminium

Scope of delivery:
- Stop
- Fixing screw

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**SAV 208.40**

**APPLICATION:**
- Side stop to position workpieces.
- The stop is screwed to the fixed jaw and is movable.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**SAV 208.41**

**APPLICATION:**
- Side stop to position workpieces.
- The stop is screwed to the fixed jaw and is movable.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**SAV 208.32**

**APPLICATION:**
- Side stop to position workpieces.
- The stop is screwed to the fixed jaw and is movable.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

**Ordering example:**
Clamping claw  SAV 208.32 - 30 x 40
Designation    SAV-No.    -  A  x  B

**SAV 208.41**

**APPLICATION:**
- Side stop to position workpieces.
- The stop is screwed to the fixed jaw and is movable.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

**Ordering example:**
Positioning bush  SAV 208.31 - 14 x 30
Designation    SAV-No.    -  A  x  B

**SAV 208.32**

**APPLICATION:**
- Side stop to position workpieces.
- The stop is screwed to the fixed jaw and is movable.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

**Ordering example:**
Clamping claw  SAV 208.32 - 30 x 40
Designation    SAV-No.    -  A  x  B
CHAPTER 2

CLAMPING PLATES AND TOMBSTONES

<table>
<thead>
<tr>
<th>SAV-ART.-NO.</th>
<th>DESCRIPTION</th>
<th>COMMENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Overview of tombstones</td>
<td>Tombstones for special applications</td>
<td>28-29</td>
</tr>
<tr>
<td>103.01</td>
<td>Grid plates</td>
<td>For matrix-related clamping operations</td>
<td>30-31</td>
</tr>
<tr>
<td>103.02</td>
<td>T-Slot plate</td>
<td>For flexible clamping</td>
<td>32</td>
</tr>
<tr>
<td>137.07</td>
<td>Single angle tombstone</td>
<td>For horizontal and vertical clamping</td>
<td>33</td>
</tr>
<tr>
<td>137.20</td>
<td>Single angle tombstone, bore matrix</td>
<td>For matrix-related horizontal and vertical clamping operations</td>
<td>34</td>
</tr>
<tr>
<td>183.06</td>
<td>Cube tombstone</td>
<td>Cube tombstone for customer-specific bore patterns</td>
<td>35</td>
</tr>
<tr>
<td>183.20</td>
<td>Cube tombstone, bore matrix</td>
<td>Matrix-related, four-sided clamping option</td>
<td>36</td>
</tr>
<tr>
<td>183.41</td>
<td>Double angle tombstone</td>
<td>For customer-specific, double-sided, bore patterns</td>
<td>37</td>
</tr>
<tr>
<td>183.60</td>
<td>Double angle tombstone, bore matrix</td>
<td>For double-sided, matrix-related clamping operations</td>
<td>38</td>
</tr>
</tbody>
</table>

TOMBSTONES

For horizontal and 5-Axis machines

Application:
- To increase the machine's operating time
- To increase the capacity at the highest levels of variability

Execution:
- Material: Aluminium body
- Steel clamping rails

Scope of delivery:
- Without clamping wedges

Dimensions in mm

<table>
<thead>
<tr>
<th>A</th>
<th>B1 - B2</th>
<th>B3</th>
<th>G (M12)</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>160</td>
<td>250</td>
<td>50</td>
<td>13</td>
<td>375</td>
<td>300</td>
<td>55</td>
<td>ca. 55</td>
</tr>
<tr>
<td>160</td>
<td>250</td>
<td>50</td>
<td>13</td>
<td>475</td>
<td>400</td>
<td>55</td>
<td>ca. 65</td>
</tr>
<tr>
<td>160</td>
<td>250</td>
<td>50</td>
<td>13</td>
<td>575</td>
<td>500</td>
<td>55</td>
<td>ca. 75</td>
</tr>
</tbody>
</table>

Base plate with bore holes G = Ø 13 mm for M 12.
Other bore intervals available on request

Application:
- To increase the machine's operating time
- To increase the capacity at the highest levels of variability

Execution:
- Material: Aluminium body
- Steel clamping rails

Scope of delivery:
- Without clamping wedges

Photo with clamping wedges (optional), Tombstone combined of 4 standard clamping rails

Ordering example:
Tombstone: SAV 183.01 - 160 x 250 x 375
Designation: SAV-No. - A x B1-B2 x H
APPLICATIONS

PERMANENT MAGNET TOMBSTONE
Special design with magnetic chuck plates for milling operations.

CUBE TOMBSTONE

CAST MINERAL TOMBSTONES
Polymer concrete tombstones for applications in which weight is a relevant factor (upon request).

DOUBLE ANGLE TOMBSTONE

ELECTRO-PERMANENT MAGNETIC FIXTURE
Clamping fixture for machining of cast iron parts on machining centers in first and second clamping on pallet systems.

TOMBSTONE WITH VACUUM MATRIX CHUCK MODULES
**Ordering example:**

**Grid plate**  
SAV 103.01 \( \times \) 450 \( \times \) 900 \( \times \) M12  
**Designation**  
SAV-No.  \( - \) A x B x T

**Execution:**  
- Cast iron 30, stress-free annealed  
- Hardened bushes 100Cr6  
- Bore matrix: ± 0.02 mm: 40 mm, M12 / 50 mm, M16  
- Other dimensions and tolerances available on request  
- Steel and aluminium grid plates available on request

---

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>T</th>
<th>Matrix</th>
<th>Boxes</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>600</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø12M12</td>
<td>40</td>
<td>126</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>600</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø12M12</td>
<td>40</td>
<td>154</td>
<td>112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>600</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø12M12</td>
<td>40</td>
<td>196</td>
<td>134</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>800</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø12M12</td>
<td>40</td>
<td>171</td>
<td>119</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>800</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø12M12</td>
<td>40</td>
<td>210</td>
<td>151</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>800</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø12M12</td>
<td>40</td>
<td>264</td>
<td>187</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>1000</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø16M16</td>
<td>50</td>
<td>96</td>
<td>87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>1000</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø16M16</td>
<td>50</td>
<td>120</td>
<td>108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>1000</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø16M16</td>
<td>50</td>
<td>144</td>
<td>129</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>600</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø16M16</td>
<td>50</td>
<td>128</td>
<td>115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>600</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø16M16</td>
<td>50</td>
<td>158</td>
<td>146</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>600</td>
<td>Ø18</td>
<td>Ø18</td>
<td>ø16M16</td>
<td>50</td>
<td>200</td>
<td>171</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ordering example:**

**Grid plate**  
SAV 103.02 \( \times \) 500 \( \times \) M16  
**Designation**  
SAV-No.  \( - \) A x T

**Execution:**  
- Cast iron 30, stress-free annealed  
- Hardened bushes 100Cr6  
- Bore matrix: ± 0.02 mm: 40 mm, M12 / 50 mm, M16  
- Other dimensions and tolerances available on request  
- Steel and aluminium grid plates available on request

---

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>T</th>
<th>Matrix</th>
<th>Boxes</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>320</td>
<td>55</td>
<td>25</td>
<td>ø12M12</td>
<td>40</td>
<td>81</td>
<td>4</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>400</td>
<td>75</td>
<td>25</td>
<td>ø12M12</td>
<td>40</td>
<td>121</td>
<td>8</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>500</td>
<td>100</td>
<td>40</td>
<td>ø12M12</td>
<td>40</td>
<td>196</td>
<td>8</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>320</td>
<td>55</td>
<td>25</td>
<td>ø16M16</td>
<td>50</td>
<td>59</td>
<td>4</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>400</td>
<td>75</td>
<td>25</td>
<td>ø16M16</td>
<td>50</td>
<td>93</td>
<td>8</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>500</td>
<td>100</td>
<td>40</td>
<td>ø16M16</td>
<td>50</td>
<td>139</td>
<td>8</td>
<td>130</td>
<td></td>
</tr>
</tbody>
</table>

**Customer-specific / surcharge applies**
**Application:**
- For use on various types of machining table
- To clamp large parts
- To clamp parts for horizontal and vertical machining

**Execution:**
- Cast iron 30, stress-free annealed
- Other dimensions available on request

**Note:**
Version V = Pre-machined clamping surfaces with excess material
Version F = Fully finished clamping surfaces machined to the exact size

In both versions, the machining for the connection of the base (positioning and fixing) to the corresponding machine pallet is included in the price.

When ordering always specify the pallet type and include a drawing.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F (±0.02)</th>
<th>G (±0.03)</th>
<th>Weight (in kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>320</td>
<td>14</td>
<td>55</td>
<td>ø18</td>
<td>160</td>
<td>80</td>
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</tr>
<tr>
<td>500</td>
<td>400</td>
<td>14</td>
<td>75</td>
<td>ø18</td>
<td>200</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>630</td>
<td>500</td>
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<td>160</td>
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<td>135</td>
<td>ø18</td>
<td>320</td>
<td>160</td>
<td>298</td>
</tr>
</tbody>
</table>

**Ordering example:**
T-Slot Plate  SAV 103.04 - 800 - 18
Designation  SAV-No.  - A - C

**Ordering example:**
Single angle tombstone  SAV 137.07 - 500 x 500
Designation  SAV-No.  - A x B
### Single Angle Tombstone, Bore Matrix

**Execution:**
- Bore matrix: ± 0.02 mm
  - M12 = 40 mm
  - M16 = 50 mm

**Note:**
- Version V = Pre-machined clamping surfaces with excess material
- Version F = Fully finished clamping surfaces machined to the exact size

In both versions, the machining for the connection of the base (positioning and fixing) to the corresponding machine pallet is included in the price.

When ordering always specify the pallet type and include a drawing.

#### Dimensions in mm

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J?</th>
<th>K [±0.06]</th>
<th>Matrix</th>
<th>Bore</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>300</td>
<td>220</td>
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<td>250</td>
<td>90</td>
<td>40</td>
<td>30</td>
<td>ø12/M12</td>
<td>75</td>
<td>40</td>
<td>ø12/M12</td>
<td>30</td>
<td>4</td>
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<td>400</td>
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<td>280</td>
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<td>90</td>
<td>50</td>
<td>35</td>
<td>ø12/M12</td>
<td>75</td>
<td>40</td>
<td>ø12/M12</td>
<td>90</td>
<td>4</td>
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<td>500</td>
<td>100</td>
<td>50</td>
<td>40</td>
<td>ø12/M12</td>
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<td>ø12/M12</td>
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<td>700</td>
<td>525</td>
<td>320</td>
<td>640</td>
<td>115</td>
<td>50</td>
<td>45</td>
<td>ø12/M12</td>
<td>75</td>
<td>40</td>
<td>ø12/M12</td>
<td>240</td>
<td>6</td>
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<td>800</td>
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<td>630</td>
<td>400</td>
<td>800</td>
<td>120</td>
<td>50</td>
<td>50</td>
<td>ø12/M12</td>
<td>75</td>
<td>50</td>
<td>ø12/M16</td>
<td>30</td>
<td>4</td>
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<td>900</td>
<td>900</td>
<td>735</td>
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<td>900</td>
<td>200</td>
<td>50</td>
<td>54</td>
<td>ø12/M16</td>
<td>75</td>
<td>50</td>
<td>ø12/M16</td>
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<td>75</td>
<td>50</td>
<td>ø12/M16</td>
<td>240</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Ordering example:
- Single angle tombstone, bore matrix
  - SAV 137.20 - 400 x 400 x M12
  - SAV-No.: A x B x J

### Cube Tombstone

**Execution:**
- Cast iron 30, stress-free annealed
- Including lid and transportation bolt
- Other dimensions and tolerances available on request

#### Dimensions in mm

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>Fixing holes</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>500</td>
<td>250</td>
<td>300</td>
<td>200</td>
<td>55</td>
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<td>640</td>
<td>400</td>
<td>135</td>
<td>50</td>
<td>8</td>
<td>215</td>
</tr>
</tbody>
</table>

#### Ordering example:
- Cube tombstone
  - SAV 183.06 - 600 x 500
  - SAV-No.: A x B
**Cube Tombstone, Bore Matrix**

**SAV 183.20**

Execution:
- Cast iron 30, stress-free annealed
- Including lid and transportation bolt
- Hardened bushes 100Cr6
- Bore matrix: ± 0.02 mm: 40 mm, M12 / 50 mm, M16
- Other dimensions and tolerances available on request

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>T</th>
<th>Matrix</th>
<th>Bore</th>
<th>Fixing holes</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>400</td>
<td>250</td>
<td>320</td>
<td>200</td>
<td>55</td>
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<td>ø12/M12</td>
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</table>

**Cube Tombstone, Bore Matrix**

**SAV 183.20 - 700 x 630 x M12**

**Ordering example:**
Cube tombstone, bore matrix
Designation: SAV 183.20 - A x B x T

---

**Double Angle Tombstone**

**SAV 183.41**

Execution:
- Cast iron 30, stress-free annealed
- Including lid and transportation bolt

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>Fixing holes</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
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<td>150</td>
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<td>315</td>
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<td>135</td>
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<td>6</td>
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</tbody>
</table>

**Double angle tombstone**

**SAV 183.41 - 600 x 500**

**Ordering example:**
Double angle tombstone
Designation: SAV 183.41 - A x B
Execution:
- Cast iron 30, stress-free annealed
- Including lid and transportation bolt
- Hardened bushes 100Cr6
- Bore matrix: ± 0.02 mm: 40 mm, M12 / 50 mm, M16

<table>
<thead>
<tr>
<th>SAV-ART.-NO.</th>
<th>DESCRIPTION</th>
<th>COMMENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.03</td>
<td>Tapered clamps</td>
<td>To mount in the T-slot for flexible clamping</td>
<td>40</td>
</tr>
<tr>
<td>203.55</td>
<td>Swivel hook clamps</td>
<td>Swivelling hook clamps for improved workpiece location and holding</td>
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</tr>
<tr>
<td>203.75</td>
<td>Eccenter clamps</td>
<td>For easy clamping with a high clamping force</td>
<td>41</td>
</tr>
<tr>
<td>203.76</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>204.01</td>
<td>Pull-down clamps</td>
<td>For flat workpieces in a limited working space</td>
<td>42</td>
</tr>
<tr>
<td>204.02</td>
<td></td>
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<tr>
<td>204.08</td>
<td>Eccenter clamp units</td>
<td>For thin parts which must be through-bored or through-milled</td>
<td>43</td>
</tr>
<tr>
<td>204.17</td>
<td>Universal clamping fixture</td>
<td>For specific clamping tasks</td>
<td>44</td>
</tr>
<tr>
<td>204.33</td>
<td>Step clamps</td>
<td>To clamp workpieces of various heights</td>
<td>45</td>
</tr>
<tr>
<td>204.39</td>
<td>Eccenter clamps</td>
<td>Knife-edge washer clamps</td>
<td>46</td>
</tr>
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<td>204.40</td>
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<td></td>
</tr>
<tr>
<td>204.67</td>
<td>Down-thrust clamps</td>
<td>Quick, manual clamping for various clamping positions</td>
<td>47-48</td>
</tr>
</tbody>
</table>

SAV 183.60

Ordering example:
Double angle tombstone, bore matrix  SAV 183.60 - 600 x 500 x M12
Designation  SAV-No.:  A x B x T

SAV Group
www.group-sav.com
TAPERED CLAMPS

Execution:
- Paint-coated clamp; other parts burnished

Note:
The swaged-on brass plate protects the workpiece.
The clamp can be used with a soft or hard clamping surface on both sides.

Form A: Clamp with adjusting screw and tensioning screw
Form B: Clamp with adjusting screw
Form C: Form A clamp without accessories

Ordering example:
Thread: SAV 203.03 - A - 12 x 125
Designation: SAV-No. - Form A1 x L4/B1 (with Form C)

SAV 203.03

SAV 203.55

SWIVEL HOOK CLAMP

Material:
- Steel; tempered steel clamping hook and tensioning screw, tempered

Execution:
Burnished

Swivel hook allows clamping angle adjustment

SAV 203.55

ECCENTER CLAMPS

SAV 203.75

Rear eccentric

Material:
Tempered steel eccentric and clamp

Execution:
Burnished

Scope of delivery:
Complete

SAV 203.76

Eccenter in the centre

Material:
Tempered steel eccentric and clamp

Execution:
Burnished

Scope of delivery:
Complete

Form A Dimensions in mm

<table>
<thead>
<tr>
<th>Form</th>
<th>Dimension A1</th>
<th>L4</th>
<th>Form A</th>
<th>Form B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8</td>
<td>8</td>
<td>15</td>
<td>0.200</td>
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<tr>
<td></td>
<td>10</td>
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<tr>
<td></td>
<td>16</td>
<td>10</td>
<td>30</td>
<td>1.740</td>
</tr>
</tbody>
</table>

SAV 203.03

SAV 203.55

SAV 203.75

SAV 203.76
Pull-down clamps

Also known as “flat clamps”

Material:
Tempered steel

Execution:
- Tempered, burnished/black
- Complete with screw and clamping piece

Application:
Suitable for lateral clamping of flat workpieces

Note:
In order to maintain a low clamping height, the depth of the clamp can be reduced by the dimension X.

<table>
<thead>
<tr>
<th>Set size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>H1(in mm)</th>
<th>H2(in mm)</th>
<th>H3(in mm)</th>
<th>X</th>
<th>F1 (in kN)</th>
<th>F2 (in kN)</th>
<th>Weight (in kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12x16x18</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>99</td>
<td>118</td>
<td>137</td>
<td>4</td>
<td>1.3</td>
<td>2.2</td>
<td>0.03</td>
</tr>
<tr>
<td>14x18x18</td>
<td>7</td>
<td>8</td>
<td>7</td>
<td>85</td>
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<td>120</td>
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<td>70</td>
<td>88</td>
<td>16</td>
<td>2.0</td>
<td>2.9</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Ordering example:
Pull-down clamp SAV 204.01 - 16
Designation SAV-No. - A

Pull-down clamps

Also known as “stable clamping jaws”

Material:
Body: Malleable cast iron
Jaws: Case hardened steel

Execution:
Reversible jaws, case hardened

Application:
High design, with precise V-guide.

<table>
<thead>
<tr>
<th>Set size</th>
<th>B</th>
<th>C</th>
<th>H1</th>
<th>H2(min)</th>
<th>H3(max)</th>
<th>L1</th>
<th>L2</th>
<th>P</th>
<th>S</th>
<th>F1 (in kN)</th>
<th>F2 (in kN)</th>
<th>Weight (in kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12x16x18</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>118</td>
<td>137</td>
<td>4</td>
<td>1</td>
<td>0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14x18x18</td>
<td>7</td>
<td>8</td>
<td>7</td>
<td>100</td>
<td>120</td>
<td>8</td>
<td>0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16x18x18</td>
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<td>10</td>
<td>9</td>
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<td>0.03</td>
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<td>20x20x20</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>55</td>
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<td>2.0</td>
<td>2.9</td>
<td>0.03</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ordering example:
Pull-down clamp SAV 204.02 - 19
Designation SAV-No. - B1

Eccenter clamp units

With workpiece locating edge

Material:
Tempered steel

Execution:
Tempered steel and burnished body and clamping plate. Brass coated clamping plate.
The workpiece locating edge is hardened and precisely ground to ±0.006 mm.

Note:
The workpiece is held in a level position and can be machined at right angles. Ideal for parts which must be through-bored or through-milled. Eccenter clamping screw M12 for a clamping force of 18 kN.

The clamping plate has a toothed edge for rough parts and a smooth edge for machined parts.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>T-Slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>63,5</td>
</tr>
<tr>
<td>16</td>
<td>28,5</td>
</tr>
<tr>
<td>18</td>
<td>16</td>
</tr>
</tbody>
</table>

Ordering example:
Eccenter clamp unit SAV 204.08 - 12
Designation SAV-No. - T-Nut

Ordering example:
Eccenter clamp unit SAV 204.08 - 12 Satz
Designation SAV-No. - T-Nut (Set)

When ordering a set with a storage case please specify “Set” in the designation.

Storage case

4 Pc. Clamp units
2 Pc. Allen keys
UNIVERSAL CLAMPING FIXTURE

With workpiece locating edge, storage case

The clamping elements, with workpiece locating edge, (see SAV 204.08) together with the corresponding support bar, make up a universal clamping fixture. Various workpiece dimensions are accommodated by adjustment of the clamping elements and the corresponding end or centre stops.

- Economical, time-saving production of a special clamping fixture using standard elements
- Due to the interface to the table top, the workpieces can be through-bored and through-milled
- Short workpiece replacement times, low build height
- Holding for up to 27 kN (2.7 tons)
- The locating edges are hardened and precision ground to a uniform height to a tolerance of ±0.006 mm

When ordering a set with a storage case please specify “K” in the designation.

Form E
Universal clamping system – Single

Form D
Universal clamping system – Double

Material:
- Special cast iron,
- Screw and bushing 8.8

Note:
Clamping unit for quick application. The fine spiral serration allows fast adjusting to any workpiece height up to 320 mm. Low space requirement on machine table due to compact design.

Ordering example:
Universal clamping fixture  
Designation  SAV 204.17 - E - 12 - K  
SAV-No. - Form - T-Slot - Storage case

<table>
<thead>
<tr>
<th>Content</th>
<th>T-Slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pc. Support bar</td>
<td>10</td>
</tr>
<tr>
<td>2 Pc. Clamping units</td>
<td>12</td>
</tr>
<tr>
<td>1 Pc. Workpiece stop</td>
<td>14</td>
</tr>
<tr>
<td>3 Pc. Allen keys</td>
<td>16</td>
</tr>
</tbody>
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<tbody>
<tr>
<td>1 Pc. Support bar</td>
<td>10</td>
</tr>
<tr>
<td>4 Pc. Clamping units</td>
<td>12</td>
</tr>
<tr>
<td>1 Pc. Workpiece stop</td>
<td>14</td>
</tr>
<tr>
<td>3 Pc. Allen keys</td>
<td>16</td>
</tr>
</tbody>
</table>

Ordering example:
Step clamp  
Designation  SAV 203.33 - A x 1  
SAV-No. - A - Size

Material:
- Special cast iron,
- Screw and bushing 8.8

Note:
Clamping unit for quick application. The fine spiral serration allows fast adjusting to any workpiece height up to 320 mm. Low space requirement on machine table due to compact design.

<table>
<thead>
<tr>
<th>Dim in</th>
<th>Dimension in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>H</td>
<td>E</td>
</tr>
<tr>
<td>0</td>
<td>0.45</td>
<td>0.75</td>
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<tr>
<td>1</td>
<td>15-45</td>
<td>1.25</td>
</tr>
<tr>
<td>2</td>
<td>30-75</td>
<td>1.25</td>
</tr>
<tr>
<td>3</td>
<td>60-135</td>
<td>2.50</td>
</tr>
<tr>
<td>4</td>
<td>120-195</td>
<td>2.50</td>
</tr>
<tr>
<td>5</td>
<td>180-255</td>
<td>19</td>
</tr>
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<tr>
<td>A</td>
<td>H</td>
<td>E</td>
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<tr>
<td>0</td>
<td>0.70</td>
<td>1.25</td>
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<tr>
<td>1</td>
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<td>2.50</td>
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<tr>
<td>2</td>
<td>50-120</td>
<td>2.50</td>
</tr>
<tr>
<td>3</td>
<td>100-220</td>
<td>3.75</td>
</tr>
<tr>
<td>4</td>
<td>200-320</td>
<td>3.75</td>
</tr>
</tbody>
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<td>3.75</td>
</tr>
<tr>
<td>4</td>
<td>200-320</td>
<td>3.75</td>
</tr>
</tbody>
</table>

Ordering example:
Universal clamping fixture  
Designation  SAV 204.17 - E - 12 - K  
SAV-No. - Form - T-Slot - Storage case

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<tr>
<td>3 Pc. Allen keys</td>
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</tr>
</tbody>
</table>
**HEXAGON ECCENTER CLAMPS**

Also known as “flat clamps”

**Material:**
Case hardened clamping bolt
Brass hexagon clamping washer

**Execution:**
Clamp case hardened to 10.9 and burnished

**Note:**
A whole range of clamping problems in fixture and apparatus construction can be solved due to the very low design of the clamp. The brass clamping washer provides a very strong and secure clamping of the workpiece whilst avoiding damage to the material. Even whole pallets can be equipped by the use of a number of eccentric clamps.

**Ordering example:**
Hexagon eccentric clamp  SAV 204.39 - M4
Designation SAV-No. - A

---

**SAV 204.39**

---

**DOWN-THRUST CLAMPS**

With eccentric and screw tensioner

**Material:**
Steel

**Execution:**
Case hardened, burnished and ground.

**Application:**
The down-thrust clamps can be used, for example, on tooling machines, on pallets for NC-machines and as standardised parts for fixtures.

The clamps offer the following advantages:
- Rapid manual clamping, by means of clamping screw or eccentric lever
- Easy and quick changing of the workpiece by swinging the clamping head to the left or right
- Reduced space requirements due to compact design

The clamps can be secured in four ways:
- In a T-slot
- Directly to a fixture using the set screw
- By using a support SAV 204.68
- Together with securing bars SAV 204.14

The clamping height can be increased by using height adjusting cylinders SAV 204.70 or other fixture elements.

---

**SAV 204.67**

---

**KNIFE-EDGE ECCENTER CLAMPS**

**Material:**
Tempered steel knife-edge washer. Steel alloy eccentric bolt.

**Execution:**
Hardened and anodised knife-edge washer.

**Note:**
The hardened knife-edge washer is suited for the clamping of unfinished parts (sawn cut-offs, cast and forged parts). A pack contains knife-edge washers and eccentric bolts.

**Ordering example:**
Knife-edge eccentric clamp  SAV 204.40 - M12
Designation SAV-No. - A

---

**SAV 204.40**

---

**SAV 204.40**

---

**Material:**
Case hardened clamping bolt
Brass hexagon clamping washer

**Execution:**
Clamp case hardened to 10.9 and burnished

**Note:**
A whole range of clamping problems in fixture and apparatus construction can be solved due to the very low design of the clamp. The brass clamping washer provides a very strong and secure clamping of the workpiece whilst avoiding damage to the material. Even whole pallets can be equipped by the use of a number of eccentric clamps.

**Ordering example:**
Hexagon eccentric clamp  SAV 204.39 - M4
Designation SAV-No. - A

---

**SAV 204.39**

---

**SAV 204.40**

---

**Material:**
Tempered steel knife-edge washer. Steel alloy eccentric bolt.

**Execution:**
Hardened and anodised knife-edge washer.

**Note:**
The hardened knife-edge washer is suited for the clamping of unfinished parts (sawn cut-offs, cast and forged parts). A pack contains knife-edge washers and eccentric bolts.

**Ordering example:**
Knife-edge eccentric clamp  SAV 204.40 - M12
Designation SAV-No. - A

---

**SAV 204.40**

---

**SAV 204.40**

---

**Material:**
Tempered steel knife-edge washer. Steel alloy eccentric bolt.

**Execution:**
Hardened and anodised knife-edge washer.

**Note:**
The hardened knife-edge washer is suited for the clamping of unfinished parts (sawn cut-offs, cast and forged parts). A pack contains knife-edge washers and eccentric bolts.

**Ordering example:**
Knife-edge eccentric clamp  SAV 204.40 - M12
Designation SAV-No. - A

---

**SAV 204.40**

---

**With eccentric and screw tensioner**

**Material:**
Steel

**Execution:**
Case hardened, burnished and ground.

**Application:**
The down-thrust clamps can be used, for example, on tooling machines, on pallets for NC-machines and as standardised parts for fixtures.

The clamps offer the following advantages:
- Rapid manual clamping, by means of clamping screw or eccentric lever
- Easy and quick changing of the workpiece by swinging the clamping head to the left or right
- Reduced space requirements due to compact design

The clamps can be secured in four ways:
- In a T-slot
- Directly to a fixture using the set screw
- By using a support SAV 204.68
- Together with securing bars SAV 204.14

The clamping height can be increased by using height adjusting cylinders SAV 204.70 or other fixture elements.

---

**SAV 204.67**

---

**Form B**

With clamping screw

---

**Diagram 1**

---

**Diagram 2**

---

**Diagram 3**

---

**Thread**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>SW</th>
<th>SW1</th>
<th>SW2</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4</td>
<td>9.6</td>
<td>2.8</td>
<td>0.76</td>
<td>8</td>
<td>3</td>
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<td>9.52</td>
<td>2.03</td>
<td>25</td>
<td>8</td>
<td>8</td>
<td>18</td>
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<tr>
<td>M16</td>
<td>28.5</td>
<td>17.69</td>
<td>2.54</td>
<td>30</td>
<td>12</td>
<td>4</td>
<td>27</td>
</tr>
</tbody>
</table>

Dimensions in mm

1) Only Form B
2) If A is not specified, it will be supplied with Nut A = column 2
3) Applies to Form B
DOWN-THRUST CLAMPS

SAV 204.67

With clamping lever / positioning ring

Material: Steel

Execution: Case hardened, burnished and ground.

Application: The down-thrust clamps can be used, for example, on tooling machines, on pallets for NC-machines and as standardised parts for fixtures.

The clamps offer the following advantages:
- Rapid manual clamping, by means of clamping screw or eccentric lever
- Easy and quick changing of the workpiece by swinging the clamping head to the left or right
- Reduced space requirements due to compact design

The clamps can be secured in four ways:
- In a T-slot
- Directly to a fixture using the set screw
- By using a support SAV 204.68
- Together with securing bars SAV 204.14

The clamping height can be increased by using height adjusting cylinders SAV 204.70 or other fixture elements.

**Positioning Ring**

Material: Steel, burnished

If the positioning ring is used, the dimension H2 is increased by 7 mm (stroke S minus 7 mm). Positioning ring is rotating by 360° on down-thrust clamps. After mounting, the clamp can swing 110° to the left or right.

### ORDERING EXAMPLE

Positioning ring  SAV 204.67 - 40
Designation  SAV-No. - Size

### Form C

With clamping lever

<table>
<thead>
<tr>
<th>Form</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>A5</th>
<th>S Stroke</th>
<th>Fmax in kN</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>40</td>
<td>70</td>
<td>50</td>
<td>15</td>
<td>73</td>
<td>93</td>
<td>14</td>
<td>20</td>
<td>1,120</td>
</tr>
</tbody>
</table>

### Dimensions in mm

<table>
<thead>
<tr>
<th>Form</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>A5</th>
<th>S Stroke</th>
<th>Fmax in kN</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>48</td>
<td>88</td>
<td>68</td>
<td>15</td>
<td>73</td>
<td>93</td>
<td>14</td>
<td>20</td>
<td>1,285</td>
</tr>
</tbody>
</table>

### Dimensions in kg

<table>
<thead>
<tr>
<th>Form</th>
<th>D1</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>A5</th>
<th>S Stroke</th>
<th>Fmax in kN</th>
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</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>40</td>
<td>70</td>
<td>50</td>
<td>15</td>
<td>73</td>
<td>93</td>
<td>14</td>
<td>20</td>
<td>1,120</td>
</tr>
</tbody>
</table>

Ordering example:

Down-thrust clamp  SAV 204.67 - C - 40 x 135 x 16
Designation  SAV-No. - Form - D1 x H1max x A5

**Material:**

- Steel, burnished

**Application:**

- Stainless tool steel
- For precise clamping
- Mechanical-hydraulic
- Mechanical-hydraulic
- Optimal workpiece clamping
- Setup time optimisation
- Mechanical-hydraulic
- Drive, crank handle, clamping claws etc.
- Mechanical, for multiple clamping, jaws, plates, clamping claws
- Clamping jaws, angle drive etc.
- For flexible clamping
- Manually via spindle drive, self-centring
- Self-centring, hydraulically actuated, manually actuated
- Hydraulically actuated
- Hydraulically or pneumatically actuated
- Pneumatically actuated

**Positioning Ring**

Material: Steel, burnished

If the positioning ring is used, the dimension H2 is increased by 7 mm (stroke S minus 7 mm). Positioning ring is rotating by 360° on down-thrust clamps. After mounting, the clamp can swing 110° to the left or right.

### ORDERING EXAMPLE

Positioning ring  SAV 204.67 - 40
Designation  SAV-No. - Size
**PRECISION PULL DOWN VICE**

**SAV 231.01**

For precise clamping

Execution:
- Precision ground
- For precise clamping
- Precision ground
- Hardness: HRC 55

Material:
Tool steel, hardened

Optional:
- Wooden storage case available at a surcharge

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
<th>Wooden case order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>60</td>
<td>172</td>
<td>95</td>
</tr>
<tr>
<td>80</td>
<td>210</td>
<td>125</td>
</tr>
<tr>
<td>100</td>
<td>300</td>
<td>160</td>
</tr>
<tr>
<td>150</td>
<td>350</td>
<td>210</td>
</tr>
</tbody>
</table>

Ordering example:
- Precision pull down vice SAV 231.01 - 48
- Designation SAV-No. - A

**PRECISION MACHINE VICE**

**SAV 233.07**

For precise clamping

Execution:
- Produced from tool steel
- Hardened to HRC 58 and precision ground
- For precise clamping
- Hardness: HRC 58

Application:
Grinding, drilling, measuring, milling

Optional:
- Wooden storage case available at a surcharge (SAV 539.03)
- Available with horizontally ground prism in moveable jaw (PR) at a surcharge
- Hardness: HRC 58

<table>
<thead>
<tr>
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<th>Wooden case order no.</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>50</td>
<td>155</td>
<td>65</td>
</tr>
<tr>
<td>60</td>
<td>175</td>
<td>70</td>
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<tr>
<td>70</td>
<td>215</td>
<td>110</td>
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<tr>
<td>100</td>
<td>285</td>
<td>140</td>
</tr>
<tr>
<td>125</td>
<td>285</td>
<td>140</td>
</tr>
<tr>
<td>150</td>
<td>320</td>
<td>170</td>
</tr>
</tbody>
</table>

Ordering example:
- Precision machine vice SAV 233.07 - 150 - PR
- Designation SAV-No. - A - Prism

**PRECISION MINI PULL DOWN VICE**

**SAV 231.02**

For precise clamping of small workpieces

Application:
For precision grinding and EDM applications on small workpieces. Can also be used as electrode holding device for spark erosion machinery, such as SAV 581.05, Type EH 25.

Technical data:
- Rectangularity: 0.005 / 100 mm
- Parallelism: 0.003 / 100 mm

Execution:
- Tool steel, through-hardened HRC 55 and ground on all sides
- Pull-down-system
- Mounting threads on the sides
- Stainless execution on request, with extension (RF)

Scope of delivery:
- Hexagon socket wrench
- Wooden storage case optional

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<td>C</td>
</tr>
<tr>
<td>25</td>
<td>65</td>
<td>20</td>
</tr>
</tbody>
</table>

Ordering example:
- Precision mini pull down vice SAV 231.02 - RF
- Designation SAV-No. - A - Execution

**SAV 233.07**

For precise clamping

Execution:
- Produced from tool steel
- Hardened to HRC 58 and precision ground
- For precise clamping
- Hardness: HRC 58

Application:
Grinding, drilling, measuring, milling

Optional:
- Wooden storage case available at a surcharge (SAV 539.03)
- Available with horizontally ground prism in moveable jaw (PR) at a surcharge
- Hardness: HRC 58

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<tr>
<td>60</td>
<td>175</td>
<td>70</td>
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<td>285</td>
<td>140</td>
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<td>285</td>
<td>140</td>
</tr>
<tr>
<td>150</td>
<td>320</td>
<td>170</td>
</tr>
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</table>

Ordering example:
- Precision machine vice SAV 233.07 - 150 - PR
- Designation SAV-No. - A - Prism

**SAV 231.02**

For precise clamping of small workpieces

Application:
For precision grinding and EDM applications on small workpieces. Can also be used as electrode holding device for spark erosion machinery, such as SAV 581.05, Type EH 25.

Technical data:
- Rectangularity: 0.005 / 100 mm
- Parallelism: 0.003 / 100 mm

Execution:
- Tool steel, through-hardened HRC 55 and ground on all sides
- Pull-down-system
- Mounting threads on the sides
- Stainless execution on request, with extension (RF)

Scope of delivery:
- Hexagon socket wrench
- Wooden storage case optional

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<td>C</td>
</tr>
<tr>
<td>25</td>
<td>65</td>
<td>20</td>
</tr>
</tbody>
</table>

Ordering example:
- Precision mini pull down vice SAV 231.02 - RF
- Designation SAV-No. - A - Execution
**MACINE VICE SAV 233.70**

**Application:**
An economical clamping alternative for moulds, tools and fixturing and production. Especially suitable for conventional machines.

**Execution:**
- Slide carriage and base made from steel with hardened and ground guides
- Compact design
- Stepless adjustment of the clamping force due to the mechanical-hydraulic system
- High precision
- Quick setup using socket bolts
- Threaded bores in the fixed jaw for workpiece stops (accessories)
- Angle drive (accessories) available

**Scope of delivery:**
- Standard reversible jaws smooth / grooved
- Crank handle
- Instructions for use

**Accessories:**
- Large selection Standard jaws SAV 233.80
- G.I.S. quick insert jaws SAV 233.81
- Angle drive SAV 233.84
- Precision workpiece stop SAV 233.86
- Set of clamping claws SAV 233.88-A

---

**MACINE VICE SAV 233.72**

**Application:**
For stable and exact clamping operations. Especially suitable for use on vertical machining centers. Especially advantageous through exact positioning on all slotted tables due to the side slots. The very large clamping range, which is achieved by the use of top stepped jaws, guarantees an optimal use of travel range of the machines.

**Execution:**
- Quick and exact positioning via longitudinal and transverse slots
- Stepless adjustment of the clamping force due to the mechanical-hydraulic system
- High precision
- Hardened and ground guide rails
- Optimal protection against dirt and chippings as the spindle and power transmission are integrated into the slide body
- Quick setup using socket bolts
- Threaded bores in the fixed jaw for precision workpiece stops
- Slots and threaded bores on the slide carriage and fixed jaw enable the extension of the clamping range
- Quick and secure fixing using clamping claws
- Comprehensive range of accessories
- Hydraulic-hydraulic execution with hydraulic aggregate and accessories on request

**Scope of delivery:**
- Standard reversible jaws smooth / grooved
- Crank handle
- Instructions for use

**Accessories:**
- Large selection Standard jaws SAV 233.80
- G.I.S. quick insert jaws SAV 233.81
- Angle drive SAV 233.84
- Precision workpiece stop SAV 233.86

---

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B*</th>
<th>C</th>
<th>D</th>
<th>E*</th>
<th>F*</th>
<th>G</th>
<th>H*</th>
<th>K</th>
<th>SW</th>
<th>max. holding force in kN</th>
<th>max. clamping range in kN</th>
<th>max. total length in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>380</td>
<td>205</td>
<td>464</td>
<td>34</td>
<td>13</td>
<td>80</td>
<td>70</td>
<td>24</td>
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<td>45</td>
<td>225</td>
<td>526</td>
<td>18,5</td>
</tr>
<tr>
<td>125</td>
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<td>562</td>
<td>45</td>
<td>15</td>
<td>100</td>
<td>82</td>
<td>27</td>
<td>17</td>
<td>60</td>
<td>280</td>
<td>664</td>
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<tr>
<td>160</td>
<td>450</td>
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<td>27</td>
<td>19</td>
<td>75</td>
<td>509</td>
<td>884</td>
<td>58,5</td>
</tr>
</tbody>
</table>

* Tolerance ± 0,01

**Dimensions for use with top stepped jaws in mm**

| A | B* | C1 | C2 | D | E1 | E2 | F1 | F2 | G | H* | K | L | M** | V | W | X | Z | SW | Weight in kg |
| 130 | 360 | 386 | 28 | 56 | 40 | 45 | 45 | 225 | 350 | 100 | 45 | 27 | 115 | 15 | 36 | 125 | 18 | 68 | 22 |
| 150 | 450 | 431 | 35 | 69 | 53 | 58 | 56 | 320 | 526 | 125 | 45 | 32 | 130 | 30 | 36 | 150 | 18 | 82 | 35 |
| 160 | 500 | 503 | 573 | 37 | 72 | 55 | 70 | 73 | 171 | 784 | 150 | 45 | 78 | 180 | 40 | 45 | 180 | 18 | 110 | 50 |

* Tolerance = ± 0,01
** Tolerance = ± 0,02

**Ordering example:**
Machine vice SAV 233.70 - 125
Designation SAV-No. - A
STANDARD JAWS

Enables optimal workpiece clamping

Application:
Exchangeable jaws for diverse clamping operations on hydraulic machining vices of type HMS.

Standard jaws
Both sides can be used: 1st side serrated; 2nd side smooth
Relevante dimensions: ± 0,01 mm

Prismatic jaws
Clamping of round workpieces in a horizontal or vertical position.
Relevante dimensions: ± 0,01 mm

Precision stepped jaws
Preferred for the clamping of parallel, cubic workpieces without parallel edges.

Extra tall flat jaws
Clamping of high workpieces. Use singly or in pairs.

Pendulum jaws
Clamping of non-parallel workpieces or two workpieces of different tolerances.

Top stepped jaws
Only for use with hydraulic machining vice Type HMS SAV 233.72. To extend the clamping range.

Ordering example:
Prismatic jaw SAV 233.80 - PR - 125
Designation SAV-No. - Type - A

SAV 233.80 - Q.I.S. Quick insert jaw system

For use with hydraulic machining vices SAV 233.70 und 233.72

Application:
The quick insert jaws, which are held by 2 permanent magnets and secured from lateral displacement, can be changed in a minimum of time. The thrust-down effect of the exchangeable jaws as well as the constant zero-point in the clamping position allows a very high workpiece accuracy level.

Q.I.S. Prismatic jaw insert
Horizontal or vertical clamping of cylindrical workpieces. The crossover to the lower guide profile enables exact positioning in the centre. Used singly for 3-point clamping.

Q.I.S. Jaw insert, serrated
Serrated jaw insert for workpieces with unmachined clamping surfaces.

Q.I.S. Jaw insert, stepped
For clamping right-angled workpieces without parallel pieces. The production of rimless bores is possible due to the narrow seat.

SAV 233.81 - Q.I.S. Jaw insert, soft
For the self-preparation of special jaws, with a crossover to the lower guide profile for an exact repeat tension.

SAV 233.81 - Q.I.S. Jaw insert, serrated or -F*
Serrad jaw insert for workpieces with unmachined clamping surfaces.

SAV 233.81 - Q.I.S. Jaw insert, smooth
For clamping right-angled workpieces when using parallel pieces.

SAV 233.81 - Q.I.S. Jaw insert, soft
For clamping right-angled workpieces without parallel pieces. The production of rimless bores is possible due to the narrow seat.

Ordering example:
Prismatic jaw SAV 233.81 - GB - 125
Designation SAV-No. - Type - A
**HYDRAULIC MACHINING VICE KNC**

**SAV 233.75**

**Mechanical-hydraulic**

- **Compact • precise • reliable**
- The hydraulic power transmission and the spindle drive are both completely enclosed and integrated in to the slide bed.
- Clamping range up to 350 mm with stepped reversible jaws.
- Reversible block jaws, 1st side smooth, 2nd side coated for a high friction coefficient.
- Mountable on all sides (Type Universal).
- For use with workpiece-specific special jaws.
- Locking mechanism for purely mechanical clamping of sensitive workpieces.
- Execution for vertical use with face plate and slide brake on request.

**Scope of delivery:**
- Vice.
- Block jaw set SAV 233.75-BBF+BBM.
- Crank handle.

**Accessories:**
- Large selection.
- Standard jaws SAV 233.80 and Q.I.S. quick insert jaws SAV 233.81.
- Block jaws and stepped reversible jaws SAV 233.75.
- Angle drive SAV 233.84.
- Precision workpiece stop SAV 233.86.

**Suppliable executions:**
- Standard SAV 233.75-A-S.
- Universal SAV 233.75-A-U.

**Scope of delivery:**
- Vice.
- Block jaw set SAV 233.75-BBF+BBM.
- Crank handle.

**Accessories:**
- Standard jaws SAV 233.80.
- Q.I.S. quick insert jaws SAV 233.81.
- Block jaws and stepped reversible jaws SAV 233.75.
- Angle drive SAV 233.84.
- Precision workpiece stop SAV 233.86.

**Accessories for hydraulic machining vice KNC**

**SAV 233.75**

**Stepped reversible jaw, fixed**

For fixed jaws. Suitable for various clamping ranges.

Complete with fixing bolts and cylinder pin.

Relevante dimensions ± 0.01 mm

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
</tr>
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<tbody>
<tr>
<td>100</td>
<td>80</td>
<td>22</td>
<td>4</td>
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<td>160</td>
<td>120</td>
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<td>36</td>
<td>89</td>
<td>12</td>
<td>38</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

Ordering example:
- Stepped reversible jaw, fixed SAV 233.75 - SWF - 100
- Designation: SAV-No. - Type - A

**Stepped reversible jaw, mobile**

For moveable jaws. Suitable for various clamping ranges.

Complete with fixing bolts and cylinder pin.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
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<th>K</th>
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<td></td>
</tr>
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<td>36</td>
<td>83</td>
<td>9</td>
<td>24</td>
<td>38</td>
<td></td>
</tr>
</tbody>
</table>

Ordering example:
- Stepped reversible jaw, mobile SAV 233.75 - SWM - 100
- Designation: SAV-No. - Type - A

**Block jaw, fixed**

Usable on both sides as a standard jaw.
1st side smooth. 2nd side hard metal coated.

Complete with fixing bolts and cylinder pin.

Relevante dimensions ± 0.01 mm

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
</tr>
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<tr>
<td>125</td>
<td>44</td>
<td>100</td>
<td>96</td>
<td>60</td>
<td>70.5</td>
<td>10</td>
<td>30</td>
<td>12</td>
<td>16</td>
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</tr>
<tr>
<td>160</td>
<td>53</td>
<td>120</td>
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<td>70</td>
<td>89</td>
<td>12</td>
<td>36</td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ordering example:
- Block jaw, fixed SAV 233.75 - BBF - 100
- Designation: SAV-No. - Type - A

**Accessories:**
- Hydraulic machining vice SAV 233.75 - 125 - S
- Designation: SAV-No. - Type - A

**Suppliable executions:**
- Standard SAV 233.75-A-S.
- Universal SAV 233.75-A-U.

For vertical use on horizontal machining equipment, surcharge applies.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>33.5</td>
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<td>78</td>
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<td>125</td>
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<td>160</td>
<td>53</td>
<td>120</td>
<td>120</td>
<td>70</td>
<td>89</td>
<td>12</td>
<td>36</td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ordering example:
- Hydraulic machining vice SAV 233.75 - 125 - S
- Designation: SAV-No. - Type - A

**Tolerance ± 0.01**

**Tolerance ± 0.02**
**Block jaw, mobile**

Usable on both sides as a standard jaw.

1st side smooth, 2nd side hard metal coated. Complete with fixing bolts.

Relevant dimensions ± 0.01 mm

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>H</th>
<th>KM</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>33,5</td>
<td>60</td>
<td>43</td>
<td>32</td>
<td>57</td>
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<td>125</td>
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<td>20,5</td>
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<tr>
<td>160</td>
<td>53</td>
<td>100</td>
<td>60</td>
<td>54</td>
<td>83</td>
<td>9</td>
<td>24,5</td>
</tr>
</tbody>
</table>

Ordering example: **Block jaw, mobile** SAV 233.75 - BBM - 100

**Angle drive**

For clamping points which are difficult to access.

* For jaw width A

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
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<td>76</td>
<td>80</td>
<td>22,5</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>125</td>
<td>62</td>
<td>82</td>
<td>90</td>
<td>24</td>
<td>17</td>
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<td>160</td>
<td>62</td>
<td>82</td>
<td>90</td>
<td>24</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

Ordering example: **Angle drive** SAV 233.75 - WA - 100

**Face plate**

(only for the execution Universal - U)

To fix 2 machining vices back to back. For use with horizontal-BAZ.

* For jaw width A

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>A*</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Depth ± 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>256</td>
<td>200</td>
<td>32</td>
<td>100</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>125</td>
<td>256</td>
<td>200</td>
<td>32</td>
<td>100</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>160</td>
<td>340</td>
<td>300</td>
<td>50</td>
<td>150</td>
<td>16</td>
<td>50</td>
</tr>
</tbody>
</table>

Ordering example: **Face plate** SAV 233.75 - KP - 100

Do you have a special task and weren't able to find the right workholding device? Ask us! We've got the answer.
The double clamping system provides efficient and flexible workpiece clamping through multiple clamping.

Very economical in the production of small, medium and large batches but also for single production tasks.

Easy to operate due to the 3rd hand function. Mechanically or hydraulically actuated.

**Execution:**
- Maximum use of the working space, high workpiece density and minimal travel distances
- Used for vertical and horizontal machining operations
- Clamping of up to 4 workpieces, even if they are of different sizes
- Spindle well protected as the device is sealed from chipping ingress

**Scope of delivery:**
- Vice without jaws
- Instructions for use

Up to 4 workpieces, with the same or different dimensions, can be clamped using standard jaws.

Details of the clamping ranges possible and the corresponding jaws can be found in the table.

Accessories e.g.
- SAV 233.76-SWB-A / SAV 233.76-SMB-A
- Hydraulic aggregates and accessories on request.

---

**Available clamping ranges:**

<table>
<thead>
<tr>
<th>A</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>206</td>
<td>81-156</td>
<td>40-120</td>
<td>60-126</td>
<td>10-90</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>186</td>
<td>350</td>
<td>80-164</td>
<td>40-164</td>
<td>50-134</td>
<td>10-134</td>
<td>75-97</td>
<td>75-97</td>
<td>50-62</td>
<td>50-62</td>
<td>34 / 37</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Tolerance ± 0.02

**Scope of delivery:**
- Vice without jaws
- Instructions for use

Up to 4 workpieces, with the same or different dimensions, can be clamped using standard jaws.

Details of the clamping ranges possible and the corresponding jaws can be found in the table.

Accessories e.g.
- SAV 233.76-SWB-A / SAV 233.76-SMB-A
- Hydraulic aggregates and accessories on request.

---

**Accessories for double clamping system DS**

**SAV 233.76**

**Available clamping ranges:**

<table>
<thead>
<tr>
<th>A</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>206</td>
<td>81-156</td>
<td>40-120</td>
<td>60-126</td>
<td>10-90</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Tolerance ± 0.02

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
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<td>206</td>
<td>81-156</td>
<td>40-120</td>
<td>60-126</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Clamping force in kN**

<table>
<thead>
<tr>
<th>A</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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<td>81-156</td>
<td>40-120</td>
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<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Only for execution H (hydraulic)

Only for execution M (mechanical)

Hexagon drive

**Accessories for double clamping system DS**

**SAV 233.76**

**Accessories e.g.**
- SAV 233.76-SWB-A / SAV 233.76-SMB-A
- Hydraulic aggregates and accessories on request.

**Ordering example:**
- Double clamping system: SAV 233.76 - 125 - M
- Designation: SAV-No. - A - Execution
- www.group-sav.com
### Accessories for double clamping system DS

**SAV 233.76**

**Stepped centre jaw**

Complete with fixing screws and cylinder pin.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>C1</th>
<th>C2</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>40,1</td>
<td>25</td>
<td>15,1</td>
<td>17</td>
<td>96</td>
<td>26</td>
<td>5</td>
<td>5</td>
<td>18</td>
<td>62,5</td>
<td>78</td>
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<tr>
<td>125</td>
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<td>92</td>
<td>22</td>
<td>5</td>
<td>5</td>
<td>20</td>
<td>78,5</td>
<td>98</td>
</tr>
</tbody>
</table>

Ordering example:
Designation: Stepped centre jaw
SAV-No. - Type - A

**SAV 233.76-SMK-A**

**Stepped centre jaw**

Complete with fixing screws.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>C1</th>
<th>C2</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>40,1</td>
<td>25</td>
<td>15,1</td>
<td>96</td>
<td>86</td>
<td>5</td>
<td>5</td>
<td>18</td>
<td>62,5</td>
<td>78</td>
<td>60</td>
</tr>
<tr>
<td>125</td>
<td>43,1</td>
<td>28</td>
<td>15,1</td>
<td>92</td>
<td>82</td>
<td>5</td>
<td>5</td>
<td>20</td>
<td>78,5</td>
<td>98</td>
<td>52</td>
</tr>
</tbody>
</table>

Ordering example:
Designation: Stepped centre jaw
SAV-No. - Type - A

**SAV 233.76-SMG-A**

**Reversible stepped jaw**

Als Standardbacke beidseitig verwendbar.

Complete with fixing screws and cylinder pin.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>40,1</td>
<td>25</td>
<td>15,1</td>
<td>17</td>
<td>72</td>
<td>26</td>
<td>5</td>
<td>27</td>
<td>4,5</td>
<td>18</td>
<td>57,5</td>
<td>40</td>
</tr>
<tr>
<td>125</td>
<td>43,1</td>
<td>28</td>
<td>15,1</td>
<td>20</td>
<td>78</td>
<td>28</td>
<td>5</td>
<td>29</td>
<td>5</td>
<td>20</td>
<td>73,5</td>
<td>54</td>
</tr>
</tbody>
</table>

Ordering example:
Designation: Reversible stepped jaw
SAV-No. - Type - A

**SAV 233.76-SWB-A**

**Guide plate**

Required when clamping one workpiece to cover and support the carriage.

Complete with fixing screws.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>16</td>
<td>96</td>
<td>4,5</td>
<td>18</td>
<td>62,5</td>
<td>78</td>
<td>60</td>
</tr>
<tr>
<td>125</td>
<td>19</td>
<td>92</td>
<td>5</td>
<td>20</td>
<td>78,5</td>
<td>98</td>
<td>52</td>
</tr>
</tbody>
</table>

Ordering example:
Designation: Guide plate
SAV-No. - Type - A

---

**SAV 233.76-SFG-A**

**Stepped jaw, fixed**

For a large clamping range and the clamping of one workpiece.

Complete with fixing screws.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>C1</th>
<th>C2</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>40,1</td>
<td>25</td>
<td>15,1</td>
<td>88</td>
<td>76</td>
<td>4,5</td>
<td>5</td>
<td>18</td>
<td>78</td>
<td>54</td>
<td>20</td>
</tr>
<tr>
<td>125</td>
<td>43,1</td>
<td>28</td>
<td>15,1</td>
<td>96</td>
<td>84</td>
<td>5</td>
<td>5</td>
<td>20</td>
<td>98</td>
<td>54</td>
<td>20</td>
</tr>
</tbody>
</table>

Ordering example:
Designation: Stepped jaw, fixed
SAV-No. - Type - A

**SAV 233.76-SFK-A**

**Stepped jaw, fixed**

For a large clamping range and the clamping of one workpiece.

Complete with fixing screws.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>C1</th>
<th>C2</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>40,1</td>
<td>25</td>
<td>15,1</td>
<td>72</td>
<td>26</td>
<td>5</td>
<td>27</td>
<td>4,5</td>
<td>18</td>
<td>57,5</td>
<td>40</td>
</tr>
<tr>
<td>125</td>
<td>43,1</td>
<td>28</td>
<td>15,1</td>
<td>78</td>
<td>28</td>
<td>5</td>
<td>29</td>
<td>5</td>
<td>20</td>
<td>73,5</td>
<td>54</td>
</tr>
</tbody>
</table>

Ordering example:
Designation: Stepped jaw, fixed
SAV-No. - Type - A

**SAV 233.76-FP-A**

**Guide plate**

Required when clamping one workpiece to cover and support the carriage.

Complete with fixing screws.
Floating centre jaw

For multiple clamping.
Complete with fixing screws and cylinder pin.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B1 (0.03)</th>
<th>B2 (0.03)</th>
<th>C</th>
<th>C1 (0.03)</th>
<th>C2</th>
<th>C3</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>43.1</td>
<td>28</td>
<td>15.1</td>
<td>35</td>
<td>10</td>
<td>5</td>
<td>56</td>
<td>54</td>
<td>40</td>
</tr>
<tr>
<td>125</td>
<td>43.1</td>
<td>28</td>
<td>15.1</td>
<td>35</td>
<td>10</td>
<td>5</td>
<td>80</td>
<td>54</td>
<td>40</td>
</tr>
</tbody>
</table>

Ordering example:
Floating centre jaw, soft
Designation SAV 233.76 - SMB - 100

Centre jaw, soft

Soft jaw for the machining-in of profiles, steps or stops.
Material C45
Complete with fixing screws.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>D</th>
<th>E7</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>40</td>
<td>30</td>
<td>22</td>
<td>96</td>
<td>4.5</td>
<td>18</td>
<td>62.5</td>
<td>78</td>
<td>60</td>
</tr>
<tr>
<td>125</td>
<td>43</td>
<td>36</td>
<td>24</td>
<td>100</td>
<td>5</td>
<td>20</td>
<td>78.5</td>
<td>98</td>
<td>52</td>
</tr>
</tbody>
</table>

Ordering example:
Centre jaw, soft
Designation SAV 233.76 - MBW - 100

Reversible jaw, soft

Soft jaw for the machining-in of profiles, steps or stops.
Material C45
Complete with fixing screws.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>D</th>
<th>E7</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>40</td>
<td>30</td>
<td>22</td>
<td>84</td>
<td>4.5</td>
<td>18</td>
<td>57.5</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>125</td>
<td>43</td>
<td>36</td>
<td>24</td>
<td>100</td>
<td>5</td>
<td>20</td>
<td>73.5</td>
<td>54</td>
<td>40</td>
</tr>
</tbody>
</table>

Ordering example:
Reversible jaw, soft
Designation SAV 233.76 - WBW - 125

**Torque wrench 20-100 Nm**

To apply defined clamping forces

**Set of clamping claws with screws**

(1 Set = 4 Pieces)

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A*</th>
<th>M</th>
<th>Nut</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>125</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>125</td>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>

* width of vice

Ordering example:
Floating centre jaw, soft
Designation SAV 233.76 - SMB - 100

Centre jaw, soft
Designation SAV 233.76 - MBW - 100

Floating centre jaw, soft
Designation SAV 233.76 - SMB-A

Set of clamping claws with screws
Designation SAV 233.76 - SPP - 125 - 16

Reversible jaw, soft
Designation SAV 233.76 - WBW - A

Application using special jaws

Clamping fixture with dual clamping system SAV 233.76
Accessories for hydraulic and machine vices

**Angle drive SAV 233.84-A**
For use with hydraulic machining vices Type HMS, SAV 233.70 and SAV 233.72
For use with vice spindles that are difficult to access or if the vice is mounted in the longitudinal direction of the machine table.

Ordering example:
- **Angle drive**: SAV 233.84 - A 100
- **Designation**: SAV-No. - Type - Jaw width

**Crank handle SAV 233.85-HK-A**
For use with hydraulic machining vices Type HMS, SAV 233.70 and SAV 233.72

Ordering example:
- **Crank handle**: SAV 233.85 - HK - A 100
- **Designation**: SAV-No. - Type - Jaw width

**Holding force pre-selector SAV 233.85-SKV-A**
For use with hydraulic machining vices Type HMS, SAV 233.70 and SAV 233.72

Ordering example:
- **Holding force pre-selector**: SAV 233.85 - SKV - A 100
- **Designation**: SAV-No. - Type - Jaw width

**Precision workpiece stop SAV 233.86-PWA-A**
For use with hydraulic machining vices Type HMS, SAV 233.70 and SAV 233.72

Ordering example:
- **Precision workpiece stop**: SAV 233.86 - PWA - A 100
- **Designation**: SAV-No. - Type - Jaw width

---

**Set of clamping claws**
For use with hydraulic machining vices Type HMS, SAV 233.70 and SAV 233.72
Comprised of 4 clamping claws with screws

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>A</th>
<th>M</th>
<th>Nut</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>M12</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>M12</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>M16</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>M12</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>M16</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

Ordering example:
- **Clamping claw set**: SAV 233.88 - 100 - A 120 - M12
- **Designation**: SAV-No. - Type - Jaw width

**Force gauge**
For use with all machine vices and all jaw widths.

Ordering example:
- **Force gauge**: SAV 233.91 - A 100
- **Designation**: SAV-No. - Type - Jaw width

**Set of ground T-Nuts**
DIN 6325
(1 Set = 2 Pieces) (1 Satz = 2 Stück)
For use with hydraulic machining vices Type HMS, SAV 233.72 for exact positioning via longitudinal and transverse slots.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form A</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>0,0</td>
</tr>
</tbody>
</table>

Ordering example:
- **T-Nut set**: SAV 320.21 - G 10 x M12
- **Designation**: SAV-No. - Type - Jaw width

**Set of nuts for T-slots**
DIN 508
(1 Set = 4 Pieces)

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form A</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>0,0</td>
</tr>
</tbody>
</table>

Ordering example:
- **T-Nut set**: SAV 320.21 - G 10 x M12
- **Designation**: SAV-No. - Type - Jaw width

---

**Do you have a special task and weren't able to find the right workholding device?**
**Ask us! We've got the answer.**
### SLIMFLEX JAW SYSTEM

For hydraulic machining vices SAV 233.70 and 233.72

**Application:**

Allows 3-side machining of small workpieces in a single clamping step. The workpiece is kept away from the edge of the jaw through transversally movable, stepped inserts or soft inserts.

**Illustration with jaws**

SAV 233.89

**Designation**

SAV-No. - Type - A

With reversible, hardened stepped inserts and a scale to preset the inserts.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F1*</th>
<th>F2*</th>
<th>G1</th>
<th>G2</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>34</td>
<td>18</td>
<td>78</td>
<td>23</td>
<td>30</td>
<td>33</td>
<td>30</td>
<td>24</td>
<td>91</td>
</tr>
<tr>
<td>150</td>
<td>45</td>
<td>20</td>
<td>98</td>
<td>29</td>
<td>32</td>
<td>35</td>
<td>30</td>
<td>42</td>
<td>120</td>
</tr>
<tr>
<td>200</td>
<td>54</td>
<td>22</td>
<td>125</td>
<td>38</td>
<td>34</td>
<td>37</td>
<td>39</td>
<td>51</td>
<td>150</td>
</tr>
</tbody>
</table>

*Tolerance: ± 0.02

**Ordering example:** SlimFlex Standard jaw SAV 233.89-SFS-A

**SlimFlex-QIS Quick change jaw**

SAV 233.89-SFQ-A

With reversible, hardened stepped inserts and a scale to preset the inserts.

**Ordering example:** SlimFlex-QIS Quick change jaw SAV 233.89-SFQ-A

**SlimFlex Retaining Insert, C 45 soft**

SAV 233.89-EW-A

For the preparation of workpiece-specific supports.

**Ordering example:**

SlimFlex Retaining insert SAV 233.89 : EW - A

**SAV 751.31**

### 2-JAW CHUCK

**Hand actuated**

**Execution:**

- Centered manually over the spindle drive
- Also possible in compensating execution

**Scope of delivery:**

- Without jaws
- If required, on request

**Illustration with jaws**

**Dimensions in mm**

<table>
<thead>
<tr>
<th>Stroke / Jaw</th>
<th>Max. tightening torque</th>
<th>Maximum holding torque</th>
<th>Maximum release torque</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>Nm</td>
<td>daN</td>
<td>daN</td>
<td>kg</td>
</tr>
<tr>
<td>150 x 45</td>
<td>36</td>
<td>15</td>
<td>22.5</td>
<td>1.40</td>
</tr>
<tr>
<td>220 x 60</td>
<td>56</td>
<td>15</td>
<td>22.5</td>
<td>1.40</td>
</tr>
<tr>
<td>320 x 80</td>
<td>76</td>
<td>20</td>
<td>22.5</td>
<td>1.40</td>
</tr>
</tbody>
</table>

**Ordering example:**

2-Jaw chuck SAV 751.31 - 220 x 60

**Designation**

SAV-No. - A x B

See table above
Self centring

Execution:
- Hydraulically actuated, with integrated clamping cylinder
- High clamping repeat-accuracy (0.01 mm)

Application:
- As a single centering clamping element
- Used in groups on fixtures
- Can be combined with other SAV clamping elements

Material:
- Hardened steel
- Wear protected

Scope of delivery:
- Without jaws
- If required, on request

Ordering example:
2-jaw chuck  SAV 751.25 - 100 x 100 - 80
Designation  SAV - No.  A x B - max. working pressure

Dimensions in mm
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>75</td>
<td>55.5</td>
<td>30</td>
<td>35.5</td>
<td>25.05</td>
<td>26.25</td>
<td>24</td>
<td>M6</td>
<td>1.5</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>74</td>
<td>40</td>
<td>75.6</td>
<td>33.4</td>
<td>35</td>
<td>32</td>
<td>M8</td>
<td>2</td>
</tr>
<tr>
<td>150</td>
<td>150</td>
<td>111</td>
<td>60</td>
<td>112.5</td>
<td>50.1</td>
<td>52.5</td>
<td>48</td>
<td>M12</td>
<td>3</td>
</tr>
<tr>
<td>200</td>
<td>200</td>
<td>148</td>
<td>80</td>
<td>150</td>
<td>66.8</td>
<td>70</td>
<td>64</td>
<td>M16</td>
<td>4</td>
</tr>
</tbody>
</table>

Execution:
- Hydraulically actuated, with integrated clamping cylinder
- High clamping repeat-accuracy (0.01 mm)
- High holding forces
- Stable jaw guidance over long jaw strokes

Application:
- As a single centering clamping element
- Used in groups on fixtures
- Can be combined with other SAV clamping elements

Material:
- Hardened steel
- Wear protected

Scope of delivery:
- Without jaws
- If required, on request

Ordering example:
2-jaw chuck  SAV 751.25 - 150 x 150 - 130
Designation  SAV - No.  A x B - max. working pressure

Dimensions in mm
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>75</td>
<td>55.5</td>
<td>30</td>
<td>35.5</td>
<td>25.05</td>
<td>26.25</td>
<td>24</td>
<td>M6</td>
<td>1.5</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>74</td>
<td>40</td>
<td>75.6</td>
<td>33.4</td>
<td>35</td>
<td>32</td>
<td>M8</td>
<td>2</td>
</tr>
<tr>
<td>150</td>
<td>150</td>
<td>111</td>
<td>60</td>
<td>112.5</td>
<td>50.1</td>
<td>52.5</td>
<td>48</td>
<td>M12</td>
<td>3</td>
</tr>
<tr>
<td>200</td>
<td>200</td>
<td>148</td>
<td>80</td>
<td>150</td>
<td>66.8</td>
<td>70</td>
<td>64</td>
<td>M16</td>
<td>4</td>
</tr>
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<td>250</td>
<td>250</td>
<td>126</td>
<td>65</td>
<td>160</td>
<td>336</td>
<td>48</td>
<td>M12</td>
<td>9.3</td>
<td>130</td>
</tr>
</tbody>
</table>

2-JAW CHUCK

SAV 751.25

SAV 751.25

SAV-Group

www.group-sav.com
**HYDRAULIC CLAMPING BLOCK**

**SAV 751.26**

**Self centring**

- Operating pressure: max. 45 bar
- Accuracy: 20-40: 0.01 mm, 50-120: 0.02 mm
- Operating temperature range: 0°C - 60°C
- Operating principle: Wedge hook system
- Actuation: Hydraulically via filtered oil
- Lubrication interval: 500 h
- Protection classification: IP 40
- Compressed air connections on the sides
- M5 Purging air connection is possible
- Execution 1: Low force / long stroke
- Execution 2: Large force / small stroke

**Application:**
Hydraulic centering clamp for use in jig manufacture and automation. Robust and reliable.

**Material:**
Housing and functional parts made from hardened steel

**Scope of delivery:**
- Without jaws
- If required, on request

**Maximum permitted forces and torque at the finger**

<table>
<thead>
<tr>
<th>A in mm</th>
<th>CA in N</th>
<th>MR in Nm</th>
<th>MF in Nm</th>
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**Maximum permitted forces and torque at the finger**

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**Type:**
- Pneumatic (P)
- Hydraulic (H)

* Execution 1 / 2 with different wedge hook angles for different strokes and holding forces.
When ordering please specify.

**Ordering example:**
- Hydraulic clamping block
- SAV 751.26 - 250 x 120 - 2

---

**HYDRAULIC / PNEUMATIC CLAMPING BLOCK**

**SAV 751.27**

**Self centring**

- Operating pressure: max. 9 bar (pneumatic) (P) / max. 120 bar (hydraulic) (H)
- Accuracy: 66-100: 0.02 mm
- Operating temperature range: 5°C - 60°C
- Operating principle: Wedge hook system
- Actuation: Pneumatic via filtered compressed air or hydraulically via filtered oil
- Lubrication interval: 500 h
- Protection classification: IP 40
- Compressed air connections on the sides
- M5 Purging air connection is possible
- Execution 1: Low force / long stroke
- Execution 2: Large force / small stroke

**Application:**
Clamping block for stationary use in machining equipment and as a mounting fixture.

**Material:**
Housing and functional parts made from hardened steel

**Accessories:**
Proximity switch, finger blanks

**Maximum permitted forces and torque at the finger**

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**Type:**
- Pneumatic (P)
- Hydraulic (H)

* Execution 1 / 2 with different wedge hook angles for different strokes and holding forces.
When ordering please specify.

**Ordering example:**
- Hydraulic / Pneumatic clamping block
- SAV 751.27 - 200 x 200 - 1 - P

---

*www.group-sav.com*
### 3-FINGER GRIPPER

**SAV 751.30**

**Self centring**

- **Execution:**
  - Operating pressure: 2 - 8 bar
  - Accuracy: 0.02 mm
  - Operating temperature range: -10°C - 90°C
  - Operating principle: Wedge hook system
  - Actuation: Pneumatic via filtered compressed air 10 mm, dry or lubricated
  - Pressurized
  - Maintenance-free: up to 1.5 million cycles
  - Compressed air connections on the sides and base
  - MS Purging air connection is possible
  - Protection classification: IP 40
  - With spring package
  - With pressure plate
  - Stabilized clamping force
  - Stroke control
  - Execution 1: Low force
  - Execution 2: Large force

**Application:**

Pneumatic centering clamp for use in jig manufacture and automation. Robust and reliable.

**Material:**

Housing and functional parts made from hardened steel.

**Scope of delivery:**

- Without jaws
- If required, on request

**Maximum permitted forces and torque at the finger**

<table>
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<tr>
<th>A (in mm)</th>
<th>CA (in N)</th>
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**Execution:**

- Operating pressure: 2 - 8 bar
- Accuracy: 0.02 mm
- Operating temperature range: -10°C - 90°C
- Operating principle: Wedge hook system
- Actuation: Pneumatic via filtered compressed air 10 mm, dry or lubricated
- Pressurized
- Maintenance-free: up to 1.5 million cycles
- Compressed air connections on the sides and base
- MS Purging air connection is possible
- Protection classification: IP 40
- With spring package
- With pressure plate
- Stabilized clamping force
- Stroke control
- Execution 1: Low force
- Execution 2: Large force

**Application:**

Pneumatic centering clamp for use in jig manufacture and automation. Robust and reliable.

**Material:**

Housing and functional parts made from hardened steel.

**Scope of delivery:**

- Without jaws
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**Maximum permitted forces and torque at the finger**

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**Ordering example:**

3 Finger Gripper SAV 751.30 - 100 x 69 - 1

Designation: SAV - No. - A x B - Execution

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### CHAPTER OVERVIEW

**CHAPTER 5**

MAGNETIC PALLETS

<table>
<thead>
<tr>
<th>SAV-ART.-NO.</th>
<th>DESCRIPTION</th>
<th>COMMENTS</th>
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<td>220.25</td>
<td>Screw-threaded pallet</td>
<td>With bore hole matrix</td>
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<tr>
<td>220.30</td>
<td>Permanent magnet pallet</td>
<td>With fine pole pitch, for zero-point clamping systems</td>
<td>77</td>
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<tr>
<td>220.31</td>
<td>Power magnet pallet</td>
<td>With high clamping force, for zero-point clamping systems</td>
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<tr>
<td>220.32</td>
<td>Permanent magnet pallet</td>
<td>With wide pole pitch, for zero-point clamping systems</td>
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</table>

**Adaptable to all available reference systems for the applications**
**Screw-threaded pallet SAV 220.10**

*Material:* Aluminium base with screwed-on, hardened, stainless steel, top plate with threaded screw holes M8 / ø 8H7 and M12 / ø 12H7.

*Technical specifications:*
- Parallelism: 0.01 mm
- Top plate: hardened

*Dimension C is a guideline value and can be determined exactly using the reference system.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Matrix bore hole in mm</th>
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<th>Weight in kg</th>
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**Permanent magnet pallet SAV 220.30**

*Transverse pole pitch P = 2 mm*

*Application:*
For use with zero point clamping systems. Adaptable to the majority of systems.

*Material:*
Aluminium base with pole plate St 37/V4A

*Technical specifications:*
- Can be executed with threaded bores for stop rails and angled stops
- Magnet field height: 4 mm
- Pole plate wear limit: 3 mm
- Nominal holding force: 80 N/cm²
- Pole pitch: 2 mm

Parallelism in the executions.

Standard (D): D.03 / fine milled
Precision (F): D.01 / ground

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*Dimension C is a guideline value and can be determined exactly using the reference system.*

Screw-threaded pallet SAV 220.10 on a reference system

Ordering example:
Screw-threaded pallet SAV 220.10 - 320 x 320 - Reference system - Adaptation
Designation SAV - No. - A x B - Reference system - Adaptation

Example
Execution: Magnet pallet
SAV 220.30 - 320 x 320
Reference system

Example
Execution: Magnet pallet
SAV 220.30 - 240 x 240
Reference system

Ordering example:
Magnet Pallet SAV 220.30 - 320 x 160 - 1 - Reference system - Adaptation - P
Designation SAV - No. - A x B - Switchable sections - Reference system - Adaptation - Accuracy
### Power Magnet Pallet

**SAV 220.31**

- **True transverse pole pitch** $P = 6\, \text{mm}$
- **Application**: For use with zero point clamping systems. Adaptable to the majority of systems.
- **Material**: Aluminium base with pole plate St 37/V4A
- **Technical specifications**:
  - Low weight with high holding force
  - Pole plate wear limit: $2\, \text{mm}$
  - Nominal holding force: $140\, \text{N/cm}^2$
  - Can be executed with threaded bores for stop rails and angled stops
  - Low magnetic field height
  - Can be executed with clamping bore holes on the top plate if required
- **Parallelism in the executions**: Standard ($C^*$): 0.03 / fine milled

### Permanent Magnet Pallet

**SAV 220.32**

- **Transverse pole pitch** $P = 15\, \text{mm}$
- **Application**: To clamp medium-size and large parts in grinding, milling, and EDM operations. Adaptable to the majority of zero point clamping systems.
- **Technical specifications**:
  - Aluminium housing, for attachment or installation
  - Stoppers on 3 sides
  - 2 Switchable sections
  - Hexagon key
  - Operating instructions
  - Finely milled execution
- **Pole pitch steel/brass**: $11 / 4\, \text{mm}$
- **Nominal holding force**: $130\, \text{N/cm}^2$
- **Magnetic field height**: $6\, \text{mm}$
- **Pole plate wear limit**: $6\, \text{mm}$
- **Re-machining of the bottom face**: up to $12\, \text{mm}$
- **Parallelism**: $0.03\, \text{mm}$

### Permanent Magnet Pallet

**SAV 220.33**

- **Transverse pole pitch** $P = 19\, \text{mm}$
- **Application**: 5-face machining operations possible through the use of pole beams.
- **Technical specifications**:
  - Steel body, for attachment or installation
  - Stops on 3 sides
  - 2 Switchable sections
  - Threaded bores on all sides
  - Hexagon key and instructions
  - Finely milled execution
- **Pole pitch steel/brass**: $15 / 4\, \text{mm}$
- **Nominal holding force**: $140\, \text{N/cm}^2$
- **Magnetic field height**: $8\, \text{mm}$
- **Pole plate wear limit**: $6\, \text{mm}$
- **Re-machining of the bottom face**: up to $4\, \text{mm}$
- **Parallelism**: $0.03\, \text{mm}$

*Exact dimension is determined using the reference system.*

### Ordering example:

- **Power Magnet Pallet**
  - SAV 220.31 - 320 x 320 - Adaptation
  - Designation: SAV - No. - A x B - Adaptation - Precision

- **Permanent Magnet Pallet**
  - SAV 220.32 - 320 x 320 - Adaptation
  - Designation: SAV - No. - A x B - Adaptation - Precision

---

*Dimensions in mm*

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C*</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
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<tbody>
<tr>
<td>240</td>
<td>240</td>
<td>60</td>
<td>126,0</td>
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<tr>
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<td>2</td>
<td>21,5</td>
</tr>
<tr>
<td>320</td>
<td>320</td>
<td>65</td>
<td>206,0</td>
<td>3</td>
<td>25,0/36,0</td>
</tr>
</tbody>
</table>

*Dimension C is a guideline value and can be determined exactly using the reference system.*

*Stability: $\pm 0.001\, \text{mm}$*

**Example**

- Execution: Power magnet pallet
- SAV 220.31 - 320 x 320
- Reference system*

---

*Ordering example:

- **Power Magnet Pallet**
  - SAV 220.31 - 320 x 320 - Adaptation
  - Designation: SAV - No. - A x B - Adaptation - Precision

- **Permanent Magnet Pallet**
  - SAV 220.32 - 320 x 320 - Adaptation
  - Designation: SAV - No. - A x B - Adaptation - Precision

---

*Dimensions in mm*

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C*</th>
<th>D</th>
<th>E</th>
<th>F</th>
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</thead>
<tbody>
<tr>
<td>240</td>
<td>240</td>
<td>63</td>
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<td>200</td>
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<tr>
<td>280</td>
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<td>240</td>
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<td>320</td>
<td>320</td>
<td>63</td>
<td>280</td>
<td>290</td>
<td>38</td>
</tr>
</tbody>
</table>

*Exact dimension is determined using the reference system.*

**Example**

- Execution: Power magnet pallet
  - for HSC-milling
  - SAV 220.31 - 320 x 320
  - Reference system*

---

*Ordering example:

- **Power Magnet Pallet**
  - SAV 220.31 - 320 x 320 - Adaptation
  - Designation: SAV - No. - A x B - Adaptation - Precision

- **Permanent Magnet Pallet**
  - SAV 220.32 - 320 x 320 - Adaptation
  - Designation: SAV - No. - A x B - Adaptation - Precision

---

*Dimensions in mm*

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C*</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>240</td>
<td>240</td>
<td>63</td>
<td>200</td>
<td>200</td>
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<td>280</td>
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<td>63</td>
<td>280</td>
<td>320</td>
<td>50</td>
</tr>
</tbody>
</table>

*Exact dimension is determined using the reference system.*

Size 320 can be supplied with bevelled edges 320-45.
CHAPTER 6

APPLICATIONS

SINE TABLES

<table>
<thead>
<tr>
<th>SAV-ART.-NO.</th>
<th>DESCRIPTION</th>
<th>COMMENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>235.71</td>
<td>Precision sine table</td>
<td>Tilts on the longitudinal axis</td>
<td>82</td>
</tr>
<tr>
<td>235.72</td>
<td>Precision sine table</td>
<td>Tilts on the longitudinal and transversal axes, without magnet plate</td>
<td>83</td>
</tr>
<tr>
<td>245.40</td>
<td>Precision sine table</td>
<td>Also in tool-steel execution</td>
<td>Tilts on the longitudinal axis, with switchable permanent magnet block SAV 242.1</td>
</tr>
<tr>
<td>245.41</td>
<td>Precision sine table</td>
<td>Also in tool-steel execution</td>
<td>Tilts on the transversal axis, with switchable permanent magnet block SAV 242.11</td>
</tr>
</tbody>
</table>

For further sine tables with magnets see SAV-Catalogue I – Magnetic workholding and SAV-Catalogue VII – Special solutions
Tilts on the longitudinal axis

**Execution:**
Tilts on the longitudinal axis. The base plate of the sine table is made of hardened steel (HRC 60), burnished and precision ground. The tilt-plate is executed with threaded bores M8 (G).

Sizes from 400 x 200 can be supplied with T-slots (T) at a surcharge. An alternative mechanical adjustment drive can be supplied at a surcharge. The height at 0° tilt angle then increases by 40 mm per axis.

Tables up to size 400 x 150 are delivered in a wooden storage case. Sine conversion table in degrees / minutes in mm.

**Angle precision:** ± 5 sec.

**Planar parallelism:** ± 0.005 / 100 mm

**Shimming dimension at 0°:** 3 mm

**Application:** The angles are set using the end gauge according to the sine principle. Depending on the workpiece, a choice of precision grinding vices or switchable permanent magnets can be installed on the tilt-plate.

Fixation is achieved by means of the side-mounted retaining shears and tightening the upper bearing clamps.

### Dimensions in mm and Weight in kg

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
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<td>100</td>
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<td>47</td>
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<td>12.5</td>
<td>25</td>
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<td>-</td>
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<td>20</td>
<td>20</td>
<td>-</td>
<td>-</td>
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<td></td>
</tr>
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<td>25</td>
<td>25</td>
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<tr>
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<td>25</td>
<td>25</td>
<td>50</td>
<td>100</td>
<td>2</td>
<td>33.5</td>
</tr>
<tr>
<td>500</td>
<td>200</td>
<td>500</td>
<td>245</td>
<td>60</td>
<td>215</td>
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<td>25</td>
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<td>25</td>
<td>50</td>
<td>100</td>
<td>2</td>
<td>48.5</td>
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<tr>
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<td>300</td>
<td>600</td>
<td>345</td>
<td>70</td>
<td>315</td>
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<td>25</td>
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<td>25</td>
<td>50</td>
<td>100</td>
<td>2</td>
<td>80.0</td>
</tr>
</tbody>
</table>

**Ordering example:**
**Precision Sine Table** SAV 235.71 - 600 - G
**Designation** SAV - No. - A - Execution

---

Tilts on the longitudinal and transversal axes

**Execution:**
Tilts on the longitudinal and transversal axes. The base plate of the sine table is made of hardened steel (HRC 60), burnished and precision ground. The tilt-plate is executed with threaded bores M8 (G). Sizes from 400 x 200 can be supplied with T-slots (T) at a surcharge. An alternative mechanical adjustment drive can be supplied at a surcharge. The height at 0° tilt angle then increases by 40 mm per axis.

Tables up to size 400 x 200 are delivered in a wooden storage case. Sine conversion table in degrees / minutes in mm.

**Angle precision:** ± 5 sec.

**Planar parallelism:** ± 0.005 / 100 mm

**Shimming dimension at 0°:** 3 mm

**Application:** The angles are set using the end gauge according to the sine principle. Suitable for workpieces with two working planes.

Fixation is achieved by means of the side-mounted retaining shears and tightening the upper bearing clamps.

### Dimensions in mm and Weight in kg

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>150</td>
<td>250</td>
<td>195</td>
<td>52</td>
<td>165</td>
<td>25</td>
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<td>25</td>
<td>25</td>
<td>50</td>
<td>100</td>
<td>2</td>
<td>14.0</td>
</tr>
<tr>
<td>350</td>
<td>150</td>
<td>350</td>
<td>195</td>
<td>56</td>
<td>165</td>
<td>25</td>
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<td>25</td>
<td>50</td>
<td>100</td>
<td>2</td>
<td>84.0</td>
</tr>
</tbody>
</table>

**Ordering example:**
**Precision Sine Table** SAV 235.72 - 450 - G
**Designation** SAV - No. - A - Execution
**CHAPTER 7**

**5-AXIS ATTACHMENT MODULES**

<table>
<thead>
<tr>
<th>SAV-ART.NO.</th>
<th>DESCRIPTION</th>
<th>COMMENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAV 220.80</td>
<td>5-axis Basic module</td>
<td>For direct mounting on the machining table</td>
<td>86</td>
</tr>
<tr>
<td>SAV 220.81</td>
<td>5-axis extension module</td>
<td>To increase the height of the basic module</td>
<td>87</td>
</tr>
<tr>
<td>SAV 220.xx</td>
<td>5-axis Reduction adapter</td>
<td>To compensate for different workplace heights</td>
<td>87</td>
</tr>
<tr>
<td>SAV 220.82</td>
<td>5-axis collet adapter</td>
<td>For the clamping round workpieces</td>
<td>88</td>
</tr>
<tr>
<td>SAV 220.83</td>
<td>5-axis clamping bolts</td>
<td>For the fixing of workpieces or pallets</td>
<td>89</td>
</tr>
<tr>
<td>SAV 220.84</td>
<td>5-axis accessories</td>
<td>Tools for the application of the exact clamping force</td>
<td>90</td>
</tr>
</tbody>
</table>

**PRECISION SINE TABLE**

*Also in tool-steel execution*

**Tilts on the longitudinal axis, with switchable permanent magnet block SAV 242.11**

**Execution:**

Tilts on the longitudinal axis. The base plate of the sine table is made of hardened steel (HRC 60), burnished and precision ground. Delivery in wooden storage case. Sine conversion table in degrees / minutes in mm, Tool steel execution (RF) can be supplied.

- Angle precision: ± 5 sec.
- Planar parallelism: ≤ 0.005 / 100 mm
- Shimming dimension at 0°: 3 mm
- Angle tilt range: 0° to 45°
- Nominal holding force: 50 N/cm²
- Nom. holding force tool steel: 30 N/cm²

**Application:**

The angles are set using the end gauge according the sine principle. The switchable magnet block is detachable and can be used without the sine table. All four clamping surfaces of the magnet block are magnetically active.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight (in kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>140</td>
<td>118.5</td>
</tr>
</tbody>
</table>

**Ordering example:**

Precision Sine Table  SAV 245.40 - RF
Designation SAV - No. - Execution

**PRECISION SINE TABLE**

*Also in tool-steel execution*

**Tilts on the transversal axis, with switchable permanent magnet block SAV 242.11**

**Execution:**

Tilts on the transversal axis. The base plate of the sine table is made of hardened steel (HRC 60), burnished and precision ground. Delivery in wooden storage case. Sine conversion table in degrees / minutes in mm, Tool steel execution (RF) can be supplied.

- Angle precision: ± 5 sec.
- Planar parallelism: ≤ 0.005 / 100 mm
- Shimming dimension at 0°: 3 mm
- Angle tilt range: 0° to 45°
- Nominal holding force: 50 N/cm²
- Nom. holding force tool steel: 30 N/cm²

**Application:**

The angles are set using the end gauge according the sine principle. The switchable magnet block is detachable and can be used without the sine table. All four clamping surfaces of the magnet block are magnetically active.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight (in kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>140</td>
<td>118.5</td>
</tr>
</tbody>
</table>

**Ordering example:**

Precision Sine Table  SAV 245.41 - RF
Designation SAV - No. - Execution
### 5-Axis Basic Module

**SAV 220.80**

**Application:**
- For mounting on machining tables using clamping bolts
- Can be supplied in the basic heights of 75 mm, 100 mm and 125 mm
- Reduction adapter with the dimensions 25 mm and 50 mm

**Scope of delivery:**
- 5-Axis basic module incl. fixing bolts

---

### 5-Axis Extension Module

**SAV 220.81**

**Application:**
- Used to extend the height of the basic module
- Difficult to access workpieces and workpieces of different heights can be clamped by stacking various module types

**Scope of delivery:**
- 5-Axis extension module incl. 1x SBA 40-25-5-16 centering clamping bolts

---

### 5-Axis Reduction Adapter

**SAV 220.82**

**Application:**
- Hard and soft reduction adapters are used to clamp workpieces with small locating surfaces
- Soft adapters can be machined enabling an improved level of workpiece accessibility

**Scope of delivery:**
- 5-Axis reduction adapter incl. fixing bolt and centering clamping bolts

---

### Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D'Tff</th>
<th>Repeat accuracy</th>
<th>Thread</th>
<th>Holding force in N</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>100</td>
<td>17.0</td>
<td>12.0</td>
<td>&lt; 0.005</td>
<td>M10 / M12</td>
<td>35'000</td>
<td>3.65</td>
</tr>
<tr>
<td>80</td>
<td>125</td>
<td>17.0</td>
<td>12.0</td>
<td>&lt; 0.005</td>
<td>M14</td>
<td>35'000</td>
<td>4.45</td>
</tr>
</tbody>
</table>

Ordering example:
- 5-Axis extension module **SAV 220.81** - 80 x 100
- Designation **SAV** - No. - A x B

---

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D'Tff</th>
<th>Repeat accuracy</th>
<th>Thread</th>
<th>Holding force in N</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>75</td>
<td>12.0</td>
<td>5.5</td>
<td>&lt; 0.005</td>
<td>M10 / M12</td>
<td>35'000</td>
<td>2.85</td>
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<tr>
<td>80</td>
<td>100</td>
<td>12.0</td>
<td>5.5</td>
<td>&lt; 0.005</td>
<td>M10 / M12</td>
<td>35'000</td>
<td>3.65</td>
</tr>
</tbody>
</table>

Ordering example:
- 5-Axis Basic module **SAV 220.80** - 80 x 125
- Designation **SAV** - No. - A x B

---

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D'Tff</th>
<th>Fixing bolt</th>
<th>Thread</th>
<th>Holding force in N</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>50</td>
<td>50</td>
<td>25</td>
<td>5 M10 x 75</td>
<td>M10 / M12</td>
<td>35'000</td>
<td>2.85</td>
</tr>
<tr>
<td>80</td>
<td>100</td>
<td>50</td>
<td>25</td>
<td>5 M10 x 100</td>
<td>M10 / M12</td>
<td>35'000</td>
<td>3.65</td>
</tr>
</tbody>
</table>

Ordering example:
- 5-Axis reduction adapter **SAV 220.82** - 80 x 50
- Designation **SAV** - No. - A x B
**5-AXIS COLLET ADAPTER**

Application:
- To clamp axles and other round parts
- Designed for ER 40 collets up to a diameter of 25 mm

Scope of delivery:
- 5-Axis collet adapter incl. length-adjustable centering clamping bolts, without collet
- Supplied without the basic module

**SAV 220.83**

**SAV 220.84**

Application:
- Fixing sets for the optimal use of the 5-axis clamping elements
- The fixings guarantee efficient operating conditions

Scope of delivery for 5-axis fixings:
- 5-axis clamping bolts for workpiece fixing M10/M12, incl. 1x Fixing bolt M10x45
- 5-axis clamping bolts for workpiece fixing M16/M12, incl. 1x Fixing bolt M12x45
- 5-axis clamping bolts for workpiece fixing with centre bore 16F6 without fixing bolt
- 5-axis clamping bolts for workpiece fixing with centre bore 12F7 without fixing bolt

**STANDARD CLAMPING BOLTS FOR M10, M12, M16**

Scope of delivery:
- Also available in the sizes M16 and M20
- The complete clamping bolt range is available in tool steel execution

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A (øA)</th>
<th>B (øA)</th>
<th>C (D)</th>
<th>D (øA)</th>
<th>Repeat accuracy</th>
<th>Holding force in N</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>100</td>
<td>150</td>
<td>25</td>
<td>&lt; 0.005</td>
<td>35 000</td>
<td>50 000</td>
</tr>
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</table>

**Ordering example:**
5-Axis collet adapter  SAV 220.83 - 80 x 100
Designation  SAV - No.  - A x B

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions in mm</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Centering clamping bolts Typ A</td>
<td>40</td>
</tr>
<tr>
<td>Compensating clamping bolts Typ B</td>
<td>40</td>
</tr>
<tr>
<td>Non-centering (play) clamping bolts Typ C</td>
<td>39.90</td>
</tr>
</tbody>
</table>

**Ordering example:**
5-Axis clamping bolt  SAV 220.84 - B
Designation  SAV - No.  - Type
5-AXIS ACCESSORIES

Application:
- A 15 Nm torque wrench is recommended to tauten the initial manual tightening of the 5-axis modules

Accessories:
- 5-Axis body-fit shoulder screw M12/12h6, Length 55 mm
- 5-Axis torque wrench to tauten the initial manual tightening (15 Nm), wrench size 6 mm
- 5-Axis fitting bush, diameter 25h7x16 mm, Hardened, ground steel

CHAPTER OVERVIEW

CHAPTER 8

SPECIAL SOLUTIONS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>COMMENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic quadruple fixture on dual axis indexer</td>
<td>For complex, multiple clamping operations</td>
<td>92</td>
</tr>
<tr>
<td>Dual hydraulic fixture</td>
<td>Dual clamping fixture for magnesium parts</td>
<td>92</td>
</tr>
<tr>
<td>Hydraulic quadruple fixture</td>
<td>Clamping fixture for forged parts</td>
<td>93</td>
</tr>
<tr>
<td>Hextriple fixture</td>
<td>Swing-clamp fixture for aluminium castings</td>
<td>93</td>
</tr>
<tr>
<td>2+2 symmetric fixture</td>
<td>Fixture for automatic loading</td>
<td>94</td>
</tr>
<tr>
<td>Hydraulic quadruple fixture for truck steering parts</td>
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</tr>
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ORDERING EXAMPLE:

5-Axis accessory SAV 220.85

DESIGNATION: SAV - No.

COMPLETE RANGE OF 5-AXIS ATTACHMENT MODULES

Magnetic special solutions can be found in SAV-Catalogue VII "Special Solutions"
SPECIAL SOLUTIONS

HYDRAULIC AND MECHANICAL SOLUTIONS, RECTANGULAR

Dimensions:
800 x 650 x 420 mm

Workpieces:
Aluminium housings

Application:
Milling, drilling, line boring

Description:
- 2-Axis indexer with 4 NC axes
- 3 special swing clamps per fixture
- Workpiece positioning check via air sensoring
- Main body from high density aluminium, hard coated

Dimensions:
2400 x 1150 x 720 mm

Werkstücke:
Magnesium automotive chassis parts

Application:
Milling, drilling, line boring

Description:
- NC indexer (NC axis 360°)
- Tail stock with hydraulic clamping & multiple rotary feed for hydraulics and pneumatics
- Workpiece positioning check via air sensoring
- Fixture base made from welded square profiles

EFFICIENT MANUFACTURING - CUSTOM WORKHOLDING SOLUTIONS

Dimensions:
620 x 400 x 350 mm

Workpieces:
Forged steel parts, automotive parts

Application:
Milling, drilling

Description:
- Integrated positioning and clamping control for automatic loading

Dimensions:
950 x 450 x 450 mm

Workpieces:
Aluminium castings

Application:
Milling, drilling, line boring

Description:
- Workpiece positioning with swing clamps and pendular claws
- Pressure control on opened clamp cylinders
- Lateral “floating” clamping of the workpieces, self impeding

Hydraulic quadruple fixture

Hydraulic quadruple fixture on dual axis indexer

Dual hydraulic fixture

Hextruple fixture

Hydraulic quadruple fixture
**SPECIAL SOLUTIONS**

**HYDRAULIC AND MECHANICAL SOLUTIONS, RECTANGULAR**

- **Dimensions:** 580 x 350 x 430 mm
- **Workpieces:** Aluminium castings
- **Application:** Milling, drilling, line boring
- **Description:**
  - Holding with block clamping cylinders, hydraulic
  - Pressure control on workpieces
  - Double clamping position per fixture side
  - Fixture for automatic loading
  - Control of opened block cylinders, pneumatic

---

**EFFICIENT MANUFACTURING - CUSTOM WORKHOLDING SOLUTIONS**

- **Dimensions:** 1200 x 800 x 420 mm
- **Workpieces:** Forged steel parts, automotive parts
- **Application:** Milling, drilling, line boring
- **Description:**
  - 2 swing clamps against fixed references
  - 2 compensating, mechanically-coupled references, hydraulically clamping
  - Clamping with 2 swing clamps against 2 compensating references
  - Integrated valve control and pressure converter

---

**HYDRAULIC AND MECHANICAL SOLUTIONS, RECTANGULAR**

- **Dimensions:** 650 x 480 mm
- **Werkstücke:** Steering parts
- **Application:** Milling, drilling
- **Description:** Hydraulic clamping

---

**EFFICIENT MANUFACTURING - CUSTOM WORKHOLDING SOLUTIONS**

- **Dimensions:**
  - Jaw width: 140 mm
  - Clamping range: 199.9 - 219 mm
  - Holding force: 20,000 daN at 80 bar
  - Weight: 180 kg
- **Workpieces:** Pipes for the oil industry
- **Application:**
  - Machining of pipe-ends on machinery with rotating tools (Facing, chamfering and tapping)
- **Description:**
  - Hydraulically centering chuck, exchangeable jaws

---

**HYDRAULIC AND MECHANICAL SOLUTIONS, RECTANGULAR**

- **Dimensions:** 580 x 350 x 430 mm
- **Workpieces:** Aluminium castings
- **Application:** Milling, drilling, line boring
- **Description:**
  - Holding with block clamping cylinders, hydraulic
  - Pressure control on workpieces
  - Double clamping position per fixture side
  - Fixture for automatic loading
  - Control of opened block cylinders, pneumatic

---

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- **Application:**
  - Machining of pipe-ends on machinery with rotating tools (Facing, chamfering and tapping)
- **Description:**
  - Hydraulically centering chuck, exchangeable jaws
APPLICATIONS

ADAPTER PLATE WITH ZERO-POINT CLAMPING BOLTS

Dimensions:
400 x 400 mm

Workpieces:
Cast iron parts

Application:
Milling, drilling

Description:
- Media transfer via couplings
- Hydraulic clamping
- Zero point reference system

FOUR-FACE MACHINING

Dimensions:
600 x 600 mm

Workpieces:
Aluminium die-cast body

Application:
Drilling, thread milling

Description:
- Overhead clamping
- Internal hydraulics
- Hardened base

APPLICATIONS

BASE PLATE WITH 2 CLAMPING AREAS

Dimensions:
1200 x 800 mm

Workpieces:
Cast iron parts (Man-hole covers)

Application:
First machining of casting blanks

Description:
- Mounting via zero-point clamping
- Media transfer via couplings
- Hardened materials

CONSOLE CLAMPING

Dimensions:
600 x 600 mm to 1500 x 1500 mm

Workpieces:
Piston rod heads

Application:
Drilling, thread milling

Description:
- Mounted on a row on beams
- Multi-side machining possible
- Piston rod eyes
HYDRAULIC CLAMPING FIXTURE

Dimensions: 800 x 280 x 200 mm
Workpieces: Slide valve plates
Application: Face milling
Description: - Milling, thickness - according to the valve boxes

HYDRAULIC CLAMPING FIXTURE

Dimensions: Ø 450 mm
Workpieces: Motor housings
Application: Turning, drilling, thread milling
Description: - Centric clamping - Radial fixed alignment - Radial compensating clamps

## APPLICATIONS

### CHAPTER OVERVIEW

**CHAPTER 9 VACUUM WORKHOLDING**

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Dimensions: 800 x 600 x 800
Workpieces: Camshafts
Application: Milling, drilling
Description: - End faces - Oil channels, radial

Dimensions: Ø 450 mm
Workpieces: Motor housings
Application: Turning, drilling, thread milling
Description: - Centric clamping - Radial fixed alignment - Radial compensating clamps

Dimensions: 800 x 600 x 800
Workpieces: Camshafts
Application: Milling, drilling
Description: - End faces - Oil channels, radial
**Application examples**

Vacuum workholding systems to clamp precision workpieces or workpieces with large surface areas for the airline industry.

**Application criteria and holding forces**

**Design of vacuum workholding systems:**

Criteria for the application of vacuum workholding:

Due to the increasing use of light-metal alloys and composite, fibre materials – which are not clamping magnetically – a large increase in the demand for vacuum clamping systems has been observed. Despite the limitations in holding forces compared to magnetic workholding (ca. factor 0.1), vacuum clamping is a competitive alternative – especially when residual magnetism is undesired – or may even be combined with magnetic systems. As is the case for magnetic workholding, a further advantage is the full-surface application of the holding forces, which makes it especially suitable for parts which are susceptible to distortion or vibrational effects. As the atmospheric air pressure is subject to variations between ca. 930 hPa and 1013 hPa, the maximum available vacuum also varies within this range. This then clearly prescribes the maximum holding force per effective contact surface area. As the maximum possible vacuum is dependent on the leakage losses of the system and thereby the evenness of the contact surface and its roughness, the maximum holding force of 9.3 N/cm² is subject to further reductions, whereby the sealing characteristics of the workpiece contact surface play a special role. The leakage losses also increase as the size of the workpiece increases. In order to keep the vacuum pressure loss through the sealing gap as small as possible, it is therefore necessary to select the correct vacuum power unit appropriate to size of the workpiece or plate.

**Various vacuum generation systems are available, according upon the application:**

**Vacuum compressor pumps:**

Standard solutions. Almost all pumps can be used together with our liquid separator units, if fluids are drawn in during the machining operations.

SAV 249.72 – VP

Modular vacuum compressors:

Modular compressors are especially recommended if large amounts of fluid are drawn in during machining operations.

SAV 249.72 – VW

**Modular vacuum compressor aggregates:**

These aggregate units contain an integral vacuum storage unit and a fluid separator.

SAV 249.72 – VM

**Vacuum aggregates:**

These aggregates provide an additional vacuum storage unit.

SAV 249.72 – VA

Available upon request.

<table>
<thead>
<tr>
<th>Area</th>
<th>Throughput</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100 cm²</td>
<td>5 m³/h</td>
<td>Vacuum compressor pump VP</td>
</tr>
<tr>
<td>&lt; 1,000 cm²</td>
<td>10 m³/h</td>
<td>Vacuum aggregate WM</td>
</tr>
<tr>
<td>&lt; 5,000 cm²</td>
<td>16 m³/h</td>
<td>Modular aggregate VM</td>
</tr>
<tr>
<td>&lt; 1 m²</td>
<td>21 m³/h</td>
<td>Vacuum compressor pump VP</td>
</tr>
<tr>
<td></td>
<td>21 m³/h</td>
<td>Vacuum aggregate WM</td>
</tr>
<tr>
<td></td>
<td>22 m³/h</td>
<td>Modular compressor VM</td>
</tr>
<tr>
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<td>63 m³/h</td>
<td>Vacuum compressor pump VP</td>
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<tr>
<td></td>
<td>63 m³/h</td>
<td>Vacuum aggregate WM</td>
</tr>
<tr>
<td></td>
<td>65 m³/h</td>
<td>Modular compressor VM</td>
</tr>
<tr>
<td>&lt; 3 m²</td>
<td>100 m³/h</td>
<td>Vacuum compressor pump VP</td>
</tr>
<tr>
<td></td>
<td>100 m³/h</td>
<td>Vacuum aggregate WM</td>
</tr>
<tr>
<td></td>
<td>100 m³/h</td>
<td>Modular aggregate, mobile VM</td>
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<tr>
<td>&lt; 4.5 m²</td>
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<td>Vacuum compressor pump VP</td>
</tr>
<tr>
<td></td>
<td>160 m³/h</td>
<td>Vacuum aggregate, mobile WM</td>
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<tr>
<td></td>
<td>235 m³/h</td>
<td>Modular compressor WM</td>
</tr>
<tr>
<td></td>
<td>250 m³/h</td>
<td>Vacuum compressor pump VP</td>
</tr>
<tr>
<td></td>
<td>250 m³/h</td>
<td>Vacuum aggregate, mobile WM</td>
</tr>
</tbody>
</table>

**Application criteria and holding forces**

**Due to the increasing use of light-metal alloys and composite, fibre materials – which are not clamping magnetically – a large increase in the demand for vacuum clamping systems has been observed. Despite the limitations in holding forces compared to magnetic workholding (ca. factor 0.1), vacuum clamping is a competitive alternative – especially when residual magnetism is undesired – or may even be combined with magnetic systems. As is the case for magnetic workholding, a further advantage is the full-surface application of the holding forces, which makes it especially suitable for parts which are susceptible to distortion or vibrational effects. As the atmospheric air pressure is subject to variations between ca. 930 hPa and 1013 hPa, the maximum available vacuum also varies within this range. This then clearly prescribes the maximum holding force per effective contact surface area. As the maximum possible vacuum is dependent on the leakage losses of the system and thereby the evenness of the contact surface and its roughness, the maximum holding force of 9.3 N/cm² is subject to further reductions, whereby the sealing characteristics of the workpiece contact surface play a special role. The leakage losses also increase as the size of the workpiece increases. In order to keep the vacuum pressure loss through the sealing gap as small as possible, it is therefore necessary to select the correct vacuum power unit appropriate to size of the workpiece or plate.**

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**Vacuum aggregates:**

These aggregates provide an additional vacuum storage unit.

SAV 249.72 – VA

Available upon request.

Weiterhin erfolgt eine Reduzierung der Spannzeiten auf Bruchteile von Sekunden.

For safety reasons, it is recommended that a vacuum auxiliary storage unit in combination with a machine tool interlock is used. In the case of a power failure, the vacuum auxiliary storage unit also ensures that the vacuum force is available for a longer period. In addition it prevents the permanent operation of the aggregate, which can lead to excessive heat generation and wear through the ingress of dirt or chipings or shavings. It also enables the reduction of clamping times to a fraction of a second.

Machine table 3.3 x 11m. Equipped with VAC-MAT vacuum system. Used for pocket-milling, on 468 mats, to reduce the weight of aircraft fuselage panels.
VACUUM WORKHOLDING

Information and application examples

Vacuum workholding systems:

Vacuum workholding systems are used in a range of applications when non-magnetic materials such as light, heavy, carbide and non-ferrous metals, plastics, glass, wood, steel, iron etc are to be machined. The workpieces to be clamped must have a smooth clamping surface and must not be porous. In vacuum clamping, a vacuum is generated between the vacuum clamping plate and the workpiece contact surface.

Various vacuum workholding systems are available for a range of machining operations. The size of the workpiece and its shape as well as the evenness of the contact surface are decisive factors influencing the holding forces that can be achieved. In addition, under certain circumstances, the rigidity of the workpiece may also play a decisive role.

All slot vacuum chucks have integrated slots in their surface area. To clamp parts that do not cover the full surface area rubber adapter mats or foils are used to cover the area not needed.

Use:

- For light machining work such as:
  - Milling
  - Drilling (e.g. circuit boards, electronic parts)
  - Engraving and for complicated workpieces e.g. cut-outs

Special advantages:

- Very flat
- Large range of applications through the use of (normally reusable) rubber adapter mats
- Can be used in high speed cutting for precision milling of contours with the aid of the plane parallel black mat that can be machined down to achieve optimum accuracy
- Clamping very small workpieces possible

Handling:

- Makes workpiece positioning easier with the aid of height adjustable end stops
- Limiting of vacuum area can be achieved by the moveable hose connection, masking foil or rubber adapter mats.

Scope of delivery:

- 1 x Vacuum chuck
- 1 x Vacuum stopper
- 1 x Rubber adapter mat
- 2 x Height adjustable end stops
- 1 m Vacuum tubing with a quick attachment coupling

Electro-permanent milling magnet with integrated vacuum clamping plate and matrix indexing system. In special executions a hydraulic supply for hydro-clamps is available.

Slot vacuum chuck with rubber adapter mat and workpiece.

Accessories:

- Masking foil and adapter mats SAV 249.82

Execution:

Vacuum chucks with 38 / 48 mm build height

Execution A = Aluminium (Standard)

Execution S = Steel

Chucks with a build height of 28 mm available on request

Dimensions in mm

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Width of suction slit</th>
<th>Interspace</th>
<th>Height Al in kg</th>
<th>Height Steel in kg</th>
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<tbody>
<tr>
<td>100</td>
<td>100</td>
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<td>5</td>
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<td>13.0</td>
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<td>48</td>
<td>1</td>
<td>5</td>
<td>5.0</td>
<td>15.0</td>
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<tr>
<td>250</td>
<td>250</td>
<td>48</td>
<td>2</td>
<td>10</td>
<td>8.0</td>
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<td>650</td>
<td>48</td>
<td>2</td>
<td>10</td>
<td>65.0</td>
<td>188.0</td>
</tr>
</tbody>
</table>

Ordering example:

Slot vacuum chuck SAV 249.01 - 800 x 400 - A

Designation SAV-No. - A x B - Execution
Use:
- Suitable for simple shaped workpieces with rough surfaces. For heavy machining such as:
  - Grinding
  - Milling
  - Drilling

Special advantages:
- High holding forces
- Universal application
- Secure clamping of unmachined workpiece surfaces due to high friction coefficient of clamping surface
- Sealing cord events out any irregularities between workpiece and chuck surface

Handling:
- Special shapes and sizes of all dimensions available on request
- The most suitable grid dimensions are determined by workpiece outline and size
- Clamping area is defined by neoprene sealing cords
- Vacuum chuck with fine grid for small workpieces with different shapes
- Forms the basis for many different special solutions in combination with special vacuum adapter chucks

Scope of delivery:
- 1 x Tubing nozzle
- 7 x blind plugs
- 10 x O-rings
- 1 x Connector LW12
- 10 m sealing cord Ø 4 mm
- 1 m vacuum tubing 18 / 12, spiral reinforced
- Height-adjustable, eccentric side stops with discs
- 2 clamps

For almost all material types
Depending upon the application, the chuck surface is made of air-permeable sinter bronze, ceramic or porous aluminium. The special properties of METAPOR open up a wide range of application opportunities and novel problem-solving solutions.

Use:
- Preferred for the following workpieces:
  - Thin-walled (e.g. Paper, foils, circuit boards, metal tapes)
  - Fine (e.g. Optics)
  - Soft (e.g. Rubber) or for
  - Measurement and test procedures in micrometer or nanometer ranges, for
  - Precision machining and for
  - Silicon wafer production

Special advantages:
- Workpiece distortions are ruled out as there are no slots or bore holes
- Through-milling is possible with the use of a Friction Booster
- Various qualities of METAPOR-p plates are available (e.g. clean room, Class 10)

Handling:
- Modular execution for large clamping surfaces
- Workpiece-specific special executions available on request

Scope of delivery:
- 1 x Tubing nozzle
- 7 x blind plugs
- 10 x O-rings
- 1 x Connector LW12
- 10 m sealing cord Ø 4 mm
- 1 m vacuum tubing 18 / 12, spiral reinforced
- Height-adjustable, eccentric side stops with discs
- 2 clamps

The Vacuum Grid Chucks are manufactured from high density aluminium. Steel execution manufactured on request.
Standard vacuum grid chucks with the same dimensions as SAV 249.01 are available on request in either steel or aluminium.

Ordering example:
Vacuum Grid Chuck - modular, Al
Designation: SAV 249.03 - 600 x 400 - 12,5
SAV-No. - A x B - Grid pitch
**SINTERMETAL VACUUM CHUCKS – MODULAR**

**SAV 249.04**

For almost all material types

Sintermetal vacuum chuck
- Execution **Si**
- Plate inlay made from tested, wear-resistant sinter bronze

Metapor vacuum chuck
- Execution **BF**
- Plate inlay made from air-permeable material
- Metapor **BF 100 AL**
- Medium-sized pores ø ca. 15 μm

Metapor vacuum chuck
- Execution **MC**
- Plate inlay made from air-permeable material
- Metapor **MC 100 AL** with a greater porosity in comparison to **BF 100 AL**
- Medium-sized pores ø ca. 40 μm

Metapor vacuum chuck
- Execution **CE**
- Plate inlay made from very fine porous material with a small pore diameter and very high, homogeneous, overall porosity.
- Metapor **CE 100 White**.
- Particularly suited for silicon wafer production
- Medium-sized pores ø ca. 10 - 12 μm

With rubber vacuum mats

**VACUUM MAT CHUCKS - MODULAR**

**SAV 249.05 / SAV 249.85**

Use:
For the machine-finishing of workpieces, in particular for through-milling of pockets, cutouts and bore holes without any vacuum loss.

Execution:
The vacuum mats have fine suction holes and sucker points which are spaced out across the mat. Each mat has six lugs on the underside which locate in the chuck. To increase the size of the working area, the modular chucks can simply be connected to one another using plug-in couplings. After through cutting or milling the mats can easily be replaced after machining.

Black vacuum mats are used to seal the areas not required on the chuck plate during machining.

Vacuum mats
- Thickness tolerance: ± 0.04 mm
- Concave to: 0.1 mm

Scope of delivery:
- 1 x Vacuum chuck
- 1 x Hose connector
- 1 x Coupling
- 7 x Blind plugs
- 10 x O-rings
- 10 x Vacuum mats blue
- 1 m Vacuum tubing 18 / 12 spiral reinforced
- 2 x Clamps

**Vacuum chucks SAV 249.05**

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Execution</th>
<th>Weight for Sinter in kg</th>
<th>Weight for BF 100 AL in kg</th>
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<tbody>
<tr>
<td>300 x 200</td>
<td>Single</td>
<td>7.1</td>
<td>6.3</td>
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<tr>
<td>300 x 400</td>
<td>Double</td>
<td>14.2</td>
<td>12.2</td>
</tr>
<tr>
<td>600 x 400</td>
<td>Quadruple</td>
<td>28.4</td>
<td>24.4</td>
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</table>

**Vacuum mats SAV 249.85**

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Colour</th>
<th>Weight in kg</th>
<th>Dimension in mm</th>
<th>Execution</th>
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<tbody>
<tr>
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<td>blue</td>
<td>300 200 2.42</td>
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<tr>
<td>300 x 400</td>
<td>green</td>
<td>300 200 2.42</td>
<td>–</td>
<td>Standard</td>
</tr>
<tr>
<td>600 x 400</td>
<td>red</td>
<td>300 200 2.42</td>
<td>–</td>
<td>Standard</td>
</tr>
</tbody>
</table>

With rubber vacuum mats

**SAV 249.05 - 600 x 400**

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Execution</th>
<th>Weight in kg</th>
<th>Dimension in mm</th>
<th>Execution</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 x 200</td>
<td>Single</td>
<td>5.0</td>
<td>300 200 2.42</td>
<td>Standard</td>
</tr>
<tr>
<td>300 x 400</td>
<td>Double</td>
<td>10.0</td>
<td>300 200 2.42</td>
<td>Hard</td>
</tr>
<tr>
<td>600 x 400</td>
<td>Quadruple</td>
<td>20.0</td>
<td>300 200 2.42</td>
<td>Soft</td>
</tr>
</tbody>
</table>

**SAV 249.05 - 300 x 200**

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Colour</th>
<th>Weight in kg</th>
<th>Dimension in mm</th>
<th>Execution</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 x 200</td>
<td>blue</td>
<td>300 200 2.42</td>
<td>–</td>
<td>Standard</td>
</tr>
<tr>
<td>300 x 400</td>
<td>green</td>
<td>300 200 2.42</td>
<td>–</td>
<td>Standard</td>
</tr>
<tr>
<td>600 x 400</td>
<td>red</td>
<td>300 200 2.42</td>
<td>–</td>
<td>Standard</td>
</tr>
</tbody>
</table>

Required suction capacity:
- 1 Mat 3 - 6 m³/h
- ≥ 8 Mats 16 - 21 m³/h
- ≥ 20 Mats 40 - 63 m³/h
- ≥ 50 Mats 100 - 160 m³/h

Ordering example:
- Vacuum mat chuck - modular SAV 249.05 - 600 x 400
- Designation SAV-No. - A x B - Execution

Ordering example:
- Vacuum Mat SAV 249.85 - red
- Designation SAV-No. - Colour
**Use:**

**METAPOR** is a unique, porous aluminium compound material for vacuum and compressed air applications. Supplied as plates, it can be used for moulds and tool manufacture as well as conveying and workholding systems. METAPOR’s special properties open up a wide range of application opportunities and novel problem-solving solutions:

- **Evacuation:** With vacuum-moulded clamps made of METAPOR
- **Lifting:** With air-film glide handling equipment made of METAPOR
- **Through flow:** With fluidizer beds and conveyor channels made of METAPOR
- **Moulding/demoulding:** With deep-drawn and die moulds made of METAPOR
- **Vacuum clamping technology:** The main feature of METAPOR vacuum clamping systems is suction over the complete surface area without suction bores. Foils are held absolutely flat. The pressure drop, which takes place within the structure, means that it is not necessary to cover areas which are not in use. METAPOR is ideally suited for holding foils and electronic parts as well as for mould forms and soft workpieces.
- **Air-film glide technology:** The pressure distribution in the METAPOR structure allows even surface airflow capacity, even if only part of the surface is covered. Air consumption and noise emission are considerably reduced. Trouble-free machining offers cost reduction on air-flow components and a new perspective for rotation bearings, conveying and extrusion beds.
- **Through-flow technology:** The microporous METAPOR structure allows an even fluidisation of granulates and powders without the formation of bubbles. Low air consumption reduces friction and mechanical load. METAPOR is ideal for mixing processes, coating, conveyance troughs and dismantling of silo bridges.
- **Molding technology:** Deep-drawn moulds made of METAPOR do not require any bores. Bore imprints on the moulded workpiece are avoided. Suction over the complete area allows the production of complex structures without air pockets and distortions. The complete flow-through of air prevents high-temperature areas developing. The rational production process and immediate usability offer a valuable technological advantage.

**Ordering example:**

**Vacuum circular grid chuck**

- **SAV 249.42**

**With radial grid**

**Use:**

With this circular vacuum chuck, disc and ring shaped workpieces can be clamped, for instance on lathes. Particularly suited for glass and plastic processing.

**Scope of delivery:**

- 10 m seal for 38 mm plate height
- 20 m seal for plate heights from 48 mm

Available in high-tensile aluminium (Al) or steel (St).

Circular vacuum grid chucks are available in custom-made formats for workpiece-specific clamping operations.

**Dimensions in mm**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Grid size</th>
<th>Weight Al in kg</th>
<th>Weight Steel in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>38</td>
<td>70</td>
<td>3</td>
<td>83</td>
<td>M8</td>
<td>10.0</td>
<td>1.0</td>
<td>2.0</td>
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<tr>
<td>125</td>
<td>38</td>
<td>95</td>
<td>4</td>
<td>108</td>
<td>M8</td>
<td>10.0</td>
<td>1.0</td>
<td>3.0</td>
</tr>
<tr>
<td>160</td>
<td>38</td>
<td>125</td>
<td>4</td>
<td>140</td>
<td>M10</td>
<td>10.0</td>
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<td>6.0</td>
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<tr>
<td>200</td>
<td>38</td>
<td>160</td>
<td>4</td>
<td>176</td>
<td>M10</td>
<td>10.0</td>
<td>3.0</td>
<td>9.0</td>
</tr>
<tr>
<td>250</td>
<td>38</td>
<td>200</td>
<td>5</td>
<td>224</td>
<td>M12</td>
<td>10.0</td>
<td>5.0</td>
<td>14.0</td>
</tr>
<tr>
<td>315</td>
<td>48</td>
<td>260</td>
<td>5</td>
<td>286</td>
<td>M16</td>
<td>12.5</td>
<td>5.0</td>
<td>14.0</td>
</tr>
<tr>
<td>400</td>
<td>48</td>
<td>330</td>
<td>5</td>
<td>362</td>
<td>M16</td>
<td>12.5</td>
<td>16.0</td>
<td>47.0</td>
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<tr>
<td>500</td>
<td>58</td>
<td>420</td>
<td>5</td>
<td>458</td>
<td>M16</td>
<td>12.5</td>
<td>31.0</td>
<td>89.0</td>
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<tr>
<td>630</td>
<td>58</td>
<td>545</td>
<td>7</td>
<td>586</td>
<td>M16</td>
<td>12.5</td>
<td>49.0</td>
<td>142.0</td>
</tr>
</tbody>
</table>

**Ordering example:**

**Vacuum circular grid chuck**

- **SAV 249.42 - 630 - S**

**Designation**

<table>
<thead>
<tr>
<th>SAV-No.</th>
<th>A</th>
<th>Execution</th>
</tr>
</thead>
</table>

www.group-sav.com
Use:
For mechanical machining – milling (face and contour milling), drilling and thread tapping – of large-surface workpieces made of
- wood
- plastic, glass
- metal, sand castings including those with sawn surfaces and rough, non-machined surfaces.

Special advantages:
Strong hold down forces enable use on large machines. Chamfers, undercuts and radii can be machined on the outer upper and lower workpiece surfaces. Clamping dimensions can be changed within seconds to adapt to new workpiece sizes. Can be used on most machine tables.

Handling:
The pods serve as the contact surfaces for the workpiece. Simply activate or deactivate the pods by turning them around.
To clamp a workpiece effectively 6-8 pods are advised.
This modular system can be extended for larger clamping surfaces.

Function:
The round polymer pods (1) protrude out of the pod plate when in use.
The pods not required lie in a recess cavity (2) of the pod plate. Simply flipping them over activates or deactivates the pods. The valve ball which stops the vacuum supply when the pod is resting, opens the valve and the vacuum system is activated.
All active pods stand 27mm above the pod plate surface, allowing contour milling and recess cutting on the outer contours.

The sketches show a range of possible pod panel designs.
The pod voids can be arranged in almost any design and combination. This means the best panel design can be selected for every application.

Required execution upon request.

Pods in the active position with an “apparent” workpiece.
The cross-section shows the design of the FLIP-POD with:
- Sucker
- Unit
- Polymer valve ball
and
- Filter
Located in the pod plate are the
- Large gasket
- Centre hole gasket

Alu Flip-Pod

Height adjustable ALU Flip-Pod

Flip-Pod

ALU FLIP-POD™-clamping system for a CNC deburring machine, used on aircraft parts

FLIP-POD™ clamping system to clamp large aluminium workpieces with cut-outs

SAV 249.06

FLIP-POD VACUUM SYSTEM
VACUUM ROTATION JOINTS

Vacuum rotation joints

For use with:
- Circular vacuum chucks on lathes with a hollow spindle
- Vacuum chucks on a rotating machine table with a hollow spindle

The vacuum rotation joint allows the rotary movement of the vacuum plates / circular vacuum chucks connected to a stationary vacuum supply without any vacuum loss.

Standard rotation joints are available for three rotation ranges: up to 1500, 3000 and 6000 1/min.

The rotation joints are supplied with a plastic tube. The plastic tube connects the chuck with the rotation joint through the hollow spindle. The tube transmits the torque forces.

Scope of delivery:
- 1.5 m tube
- Connection parts

VACUUM FLUID SEPARATOR SAV

Fluid separators are essential in systems which employ coolants and lubricants.

Application:
Installed between the vacuum plate and the vacuum compressor. Draining performed manually.

- For the retention of swarf, shavings, fluids and operational residues
- Easy use due to its light weight
- Easily observable fluid level

Scope of delivery:
- With 2 hoses of 0.5 m each
- Hose couplings

Automatic fluid separator available upon request

<table>
<thead>
<tr>
<th>Volume</th>
<th>Dimensions in mm</th>
<th>Connection diameter</th>
<th>Weight</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>500</td>
<td>400</td>
<td>LW 12</td>
<td>4.0</td>
</tr>
<tr>
<td>21</td>
<td>300</td>
<td>500</td>
<td>LW 32</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Ordering example:
Vacuum rotation joint  SAV 249.70 - 3000
Designation  SAV-No. - max. RPM

Ordering example:
Vakuum-Flüssigkeitsabscheider  SAV 249.71 - 5
Designation  SAV-No. - Volumen

Ordering example:
SAV-249.70
Catalogue II

Vakuum-Flüssigkeitsabscheider SAV 249.71 - 5
Designation  SAV-No. - Volumen

Ordering example:
Catalogue II

For use with:
- Circular vacuum chucks on lathes with a hollow spindle
- Vacuum chucks on a rotating machine table with a hollow spindle

The vacuum rotation joint allows the rotary movement of the vacuum plates / circular vacuum chucks connected to a stationary vacuum supply without any vacuum loss.

Standard rotation joints are available for three rotation ranges: up to 1500, 3000 and 6000 1/min.

The rotation joints are supplied with a plastic tube. The plastic tube connects the chuck with the rotation joint through the hollow spindle. The tube transmits the torque forces.

Scope of delivery:
- 1.5 m tube
- Connection parts
**SAV 249.72**

**MODULAR VACUUM COMPRESSOR**

For coolant and lubricants

- vacuum storage with integrated liquid separator – additional liquid separator is not required
- very compact design
- transparent combined container for liquid separation and vacuum storage offer quick visible safety
- different storage capacity can be achieved by exchanging the acryl glass container
- integrated air filter, liquid separator, relays, motor protection and differential pressure switch
- available with different vacuum pumps from 6 m³ to 63 m³. Request also available with dry running pumps.
- all pumps for the modular compressors are equipped with oil lubrication.

Also available with dry running vacuum pump for module compressor on request.

**Scope of delivery:**
- 1 interface unit, with:
  - 2 m vacuum tubing
  - 3/2 manual valve with air vent
  - 1 vacuummeter
  - 1 electric connector with 3 m cable

**SAV 249.72**

**VACUUM COMPRESSOR PUMP**

Generates vacuum pressure

**Use:**
Economical alternative for small vacuum chucks.

**Oil lubricated vacuum pumps** offer the following advantages:
- Air-cooled
- High reliability
- Low operating costs
- Good resistance to condensation
- Equipped with an integrated oil mist separator, oil filter, check valve on suction side with sieve as standard.

**Scope of delivery:**
1 Pc. Connection unit, consisting of:
- 2m wire spiral hose
- 3/2-way aerated handvalve
- 1 x Vacuum meter

**Modular Vacuum Compressor**

**Designation**

<table>
<thead>
<tr>
<th>Size</th>
<th>Design</th>
<th>Suction capacity in m³/h</th>
<th>Motor drive in V/kW</th>
<th>max. mbar</th>
<th>max. dB (A)</th>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM 10 - 230</td>
<td>Modular compressor</td>
<td>10</td>
<td>230 / 0,37</td>
<td>50</td>
<td>59</td>
<td>Ø 500</td>
<td>630</td>
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<tr>
<td>VM 10 - 400</td>
<td>Modular compressor</td>
<td>10</td>
<td>400 / 0,37</td>
<td>50</td>
<td>61</td>
<td>Ø 500</td>
<td>630</td>
</tr>
<tr>
<td>VM 16 - 230</td>
<td>Modular compressor</td>
<td>16</td>
<td>230 / 0,55</td>
<td>20</td>
<td>60</td>
<td>Ø 500</td>
<td>630</td>
</tr>
<tr>
<td>VM 16 - 400</td>
<td>Modular compressor</td>
<td>16</td>
<td>400 / 0,55</td>
<td>20</td>
<td>60</td>
<td>Ø 500</td>
<td>630</td>
</tr>
<tr>
<td>VM 21 - 230</td>
<td>Modular compressor</td>
<td>21</td>
<td>230 / 0,75</td>
<td>20</td>
<td>62</td>
<td>Ø 500</td>
<td>630</td>
</tr>
<tr>
<td>VM 21 - 400</td>
<td>Modular compressor</td>
<td>21</td>
<td>400 / 0,75</td>
<td>20</td>
<td>62</td>
<td>Ø 500</td>
<td>630</td>
</tr>
<tr>
<td>VM 63 - 400</td>
<td>Modular compressor</td>
<td>63</td>
<td>400 / 1,50</td>
<td>20</td>
<td>65</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>VM100 - 400</td>
<td>Modular compressor</td>
<td>100</td>
<td>400 / 3,00</td>
<td>50</td>
<td>67</td>
<td>700</td>
<td>700</td>
</tr>
</tbody>
</table>

**Ordering example:**

- Modular Vacuum Compressor SAV 249.72 - VM 16 - 400
- Designation SAV-No. - Dimension

**Vacuum compressor pump**

**Designation**

<table>
<thead>
<tr>
<th>Size</th>
<th>Suction capacity in m³/h</th>
<th>Motor drive in V/kW</th>
<th>Lubricant</th>
<th>max. mbar</th>
<th>max. dB (A)</th>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP 3 - 230</td>
<td>3</td>
<td>230 / 0,12</td>
<td>Dry</td>
<td>150</td>
<td>57</td>
<td>209</td>
<td>120</td>
</tr>
<tr>
<td>VP 5 - 230</td>
<td>5</td>
<td>230 / 0,25</td>
<td>Dry</td>
<td>150</td>
<td>63</td>
<td>172</td>
<td>143</td>
</tr>
<tr>
<td>VP 10 - 230</td>
<td>10</td>
<td>230 / 0,40</td>
<td>Oil</td>
<td>20</td>
<td>60</td>
<td>271</td>
<td>258</td>
</tr>
<tr>
<td>VP 16 - 230</td>
<td>16</td>
<td>230 / 0,55</td>
<td>Oil</td>
<td>20</td>
<td>60</td>
<td>306</td>
<td>226</td>
</tr>
<tr>
<td>VP 16 - 400</td>
<td>16</td>
<td>400 / 0,55</td>
<td>Oil</td>
<td>20</td>
<td>60</td>
<td>306</td>
<td>226</td>
</tr>
<tr>
<td>VP 21 - 230</td>
<td>21</td>
<td>230 / 0,75</td>
<td>Oil</td>
<td>20</td>
<td>62</td>
<td>410</td>
<td>230</td>
</tr>
<tr>
<td>VP 21 - 400</td>
<td>21</td>
<td>400 / 0,75</td>
<td>Oil</td>
<td>20</td>
<td>62</td>
<td>410</td>
<td>230</td>
</tr>
<tr>
<td>VP 63 - 400</td>
<td>63</td>
<td>400 / 1,5</td>
<td>Oil</td>
<td>20</td>
<td>65</td>
<td>602</td>
<td>406</td>
</tr>
<tr>
<td>VP100 - 400</td>
<td>100</td>
<td>400 / 3,0</td>
<td>Oil</td>
<td>20</td>
<td>67</td>
<td>692</td>
<td>406</td>
</tr>
<tr>
<td>VP160 - 400</td>
<td>160</td>
<td>400 / 5,1</td>
<td>Oil</td>
<td>20</td>
<td>70</td>
<td>834</td>
<td>473</td>
</tr>
</tbody>
</table>

**Ordering example:**

- Vacuum compressor pump SAV 249.72 - VP 10 - 230
- Designation SAV-No. - Size
MODULAR VACUUM COMPRESSOR

Generates vacuum pressure for coolant and lubricant feeds

Features:
These robust, low wear and low maintenance pumps produce an operating vacuum of up to 50 mbar and do not require an additional liquid separation.
In operation, the water contained in the pump is swirled in to a ring form by a fast rotating impeller and serves to seal the contactless running impeller. A re-cleanable polyester filter and a patented condenser are installed to clean the incoming air supply before it enters the pump.
The discharged lubricant is re-introduced into the operating fluid circulation system and a valve enables the removal and return of excess fluid to the machinery during operation.

Air cooling protects the compressor from overheating.

Scope of delivery:
- 1 connection unit comprised of:
  - 2 m Vacuum tubing
  - 3/2-way manual valve with air vent
  - 1 Vacuum gauge

VACUUM SEALANT MATERIALS AND ACCESSORIES

Accessories for use with vacuum grid chucks

Vacuum seal SAV 249.76
The neoprene seal is placed into the suction slot of the vacuum grid type chuck to restrict the clamping area. The seal diameter is dependent upon the cross section of the slot. If a plate is re-machined, then a seal with a smaller diameter should be selected.
Minimum seal length: 50 m
When ordering please state the length in m.
Ordering example: Vacuum seal SAV 249.76 - 100 - 50

Vacugrease SAV 249.79
For the occasional greasing of suction tubing and strain relievers. Brush-on sealant for workpieces with rough and scored surfaces.
Container, contents 250 g
Ordering example: Vacugrease SAV 249.79

Vacuum hoses SAV 249.83
Wire spiral hose Type A: 13/8 diameter
Wire spiral hose Type B: 18/12 diameter
Wire spiral hose Type C: 25/18 diameter
Wire spiral hose Type D: 34/25 diameter
Wire spiral hose Type E: 40/32 diameter
Wire spiral hose Type F: 60/50 diameter
When ordering please state the length in m.
Ordering example: Schlauch SAV 249.83 - A - 10

Vacuum dial gauges

Connection thread Type Scale range
A 1/8" axial 0 bis -1 bar
B 1/8" radial 0 bis -1 bar

Manually operated lever valve with air vent

Scope of delivery:
- Hose connector for vacuum pumps - Inlet
- Hose connector for 3/2-way manually operated vacuum lever valve with air vent for each outlet
- Vacuum gauge

Outlets and connections according to your specifications upon request.
### MASKING FOIL, ADAPTER MATS

**Accessories for vacuum chucks**

**Masking foil**

**Application:**

This foil is vapour-coated with aluminium and is recommended as an aid for every slotted vacuum chuck.

It is applied directly to the slotted vacuum plate. By drawing around the workpiece shape and cutting slits in the foil beneath it, a wide range of diverse workpieces can be clamped without any vacuum losses. The thickness tolerance of the foil is ca. ± 0.02 mm.

After using, the foil can easily be peeled off. The vacuum plate remains free of adhesive residues.

**Ordering example:**

`SAV 249.74 - 210`  
Vacuum switch, electronic  
For use as a safety switch in wet and explosion-protected environments. The upper and lower threshold limits of the vacuum gauge can be preset.

**Dimensions:** 33 x 92 – 24 Volt

---

**Adapter mat, rubber, red**

**Application:**

The workpiece contours can be simply drawn on to the rubber adapter mat using an ordinary pen.

Remove the mat and punch holes into the area corresponding to the actual clamping surface of the work piece. Replace the mat and the workpiece onto the slotted vacuum plate and they will both be sucked down together. The excellent friction values offer especially good resistance to displacement forces during machining. The rubber adapter mat allows milling into the mat to a depth of 1.5mm without a loss of vacuum pressure. As the mat suffers hardly any wear and tear it can be repeatedly used for workpieces with the same contours.

The height tolerance range of the rubber adapter mat is up to ± 0.3 mm (DIN 7715, Part 5 class P2).

**Adapter mat, elastomer, black**

**Application:**

These mats can be face-milled and therefore offer a significantly higher planar parallelism.

---

**Ordering example:**

<table>
<thead>
<tr>
<th>Designation</th>
<th>SAV-No.</th>
<th>Length x Width - Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-slip mat blue</td>
<td>SAV 249.82 - 150 x 100 - B</td>
<td></td>
</tr>
<tr>
<td>Anti-slip mat red</td>
<td>SAV 249.82 - 150 x 100 - R</td>
<td></td>
</tr>
<tr>
<td>Anti-slip mat black</td>
<td>SAV 249.82 - 150 x 100 - S</td>
<td></td>
</tr>
<tr>
<td>Anti-slip mat black</td>
<td>SAV 249.82 - 150 x 100 - S</td>
<td></td>
</tr>
</tbody>
</table>

---

**ACCESSORIES – VACUUM WORKHOLDING**

A comprehensive range of accessories is available for our vacuum workholding systems.

**Examples:**

**SAV 249.74 - 210**

Vacuum switch, electronic  
For use as a safety switch in wet and explosion-protected environments. The upper and lower threshold limits of the vacuum gauge can be preset.

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<table>
<thead>
<tr>
<th>Designation</th>
<th>SAV-No.</th>
<th>Length x Width - Colour</th>
</tr>
</thead>
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**Vacuum valve with manual slide connector**

**Quick-release coupling with external thread**

**Connector for the quick-release coupling**

**Hose connectors, hose couplings, reducing adaptors, double nipples etc, available upon request**
1. General and contract conclusion
   a) All agreements and offers are based on the conditions, they apply as accepted through placement of order or acceptance of the supply. Deviating conditions of the customer which we do not explicitly express in writing, are non-binding for us, even if we do not contradict explicitly.
   b) For the scope of supply our confirmation of order is deciding. Verbal, telephonic, telegraphic and all other formal agreements and additional outward modifications have no binding force.
   c) Our offers are without obligation and are to be understood as firm exclusively with the message that goods are ready for dispatch within delivery time.
   d) The date of delivery is decided, unless special agreements concerning this can be made, to appropriate extent.

2. Place of delivery
   a) At delivery of the supplies by us or one of our assigned transporters, however latest at acceptance and/or if necessary validate claims for damages in accordance with the conditions of the previous paragraph.

3. Payment
   a) The prices are in Euro. The prices apply, if not explicitly differently agreed, purely net ex works including loading, excluding packing, freight, insurance, assembly and other additional expenses. All increase of freight and toll, value added tax, material- and wages for the account of the customer. With supplementary orders the prices are newly agreed upon.

4. Delivery time
   a) The delivery time is specified after best discretion and is therefore to be understood as approximately, excluding explicitly for designated agreements. The time for delivery starts only from the time in which written agreement exists over the final supply and all questions necessary for the trouble-free execution of the order are decided. The time for delivery is calculated without Sundays, public holidays, the Christmas holiday period, March to April, and May to July.
   b) The customer has the obligation to keep the commodities in proper condition during the guarantee period. As far as this is economically not justifiable, a right of resignation is entitled to us. If we want to use the right of resignation, we will communicate this to the customer immediately in writing.
   c) The order acceptance by us takes place in writing. If we should deviate slightly in our order confirmation from the order data, the customer can immediately set off the deviation, unless we do not correspond to the agreed payments and other obligations.
   d) The customer is just as inadmissible as the set-off with such counterclaims.

5. Repair
   a) Repair works are to be executed by us or one of our recognized repair workshops at our own cost.

6. Receipt
   a) The customer is the delivery is insured by the supplier against breakage, transportation- and fire risk.
   b) The customer has the obligation to keep the commodities in proper condition during the guarantee period. As far as this is economically not justifiable, a right of resignation is entitled to us. If we want to use the right of resignation, we will communicate this to the customer immediately in writing.
   c) The order acceptance by us takes place in writing. If we should deviate slightly in our order confirmation from the order data, the customer can immediately set off the deviation, unless we do not correspond to the agreed payments and other obligations.

7. Guarantee
   a) If the customer is the delivery is considered as firm with the message that goods are ready for dispatch within delivery time.

8. Right of setoff
   a) Any written or oral offers are, unless no other agreements are made or confirmed by us, not binding.

9. Repair
   a) All claims for damages because of delay, poor quality, delay of receipt of the order, defects interfering with the use and proper handling of the delivered commodity, as well as all arising additional fees or other costs can be charged.

10. Transfer of the contract
   a) Claims for damages because of delay, poor quality, delay of receipt of the order, defects interfering with the use and proper handling of the delivered commodity, as well as all arising additional fees or other costs can be charged.
   b) The guarantees offered by us to the customer from this or another contract.
   c) All written or oral offers are, unless no other agreements are made or confirmed by us, not binding.

11. Guarantee
   a) The customer is the delivery is insured by the supplier against breakage, transportation- and fire risk.
   b) The customer has the obligation to keep the commodities in proper condition during the guarantee period. As far as this is economically not justifiable, a right of resignation is entitled to us. If we want to use the right of resignation, we will communicate this to the customer immediately in writing.
SAV – CATALOGUES

THE SAV PRODUCT RANGE

CATALOGUE I: SAV–MAGNETIC WORKHOLDING
Permanent, electro and ep-magnetic, mechanical, hydraulic, vacuum, multi-technique. Demagnetisers, sine tables, magnetic tools

CATALOGUE II: SAV–STATIONARY WORKHOLDING
Vices and clamping equipment, vacuum clamping, angle plates and tombstone fixtures, stationary chucks and attachments

CATALOGUE III: SAV–ROTARY WORKHOLDING
Manually and power operated chucks, lever compensating, finger, console and column chucks

CATALOGUE IV: SAV–PRODUCTION AUTOMATION
Pallet changers, transfer lines, deburring cells, tool changers, loading/unloading robots

CATALOGUE V: SAV–STANDARD PARTS
Semi-finished parts, spanners, positioning elements, actuating, guiding and driving components

CATALOGUE VI: SAV–MAGNETIC LIFTING
Heavy duty magnetic lifting equipment, Permanent lifting magnets, battery lifting magnets, handling tools

CATALOGUE VII: SAV–SPECIAL SOLUTIONS
Customized magnetic, mechanical, hydraulic, vacuum, stationary and rotary workholding

CATALOGUE VIII: SAV–SMALL MAGNETS
Flat and holding magnets, pot magnets, magnet cores and office magnets

CATALOGUE IX: SAV–DRESSING AND CIRCULAR GRINDING
Dressing, circular grinding, indexing tables

CATALOGUE X: SAV–QMC
Mould holding and changing systems for injection moulding and presses
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