WORKHOLDING FOR ROTARY OPERATIONS
25 YEARS SUPERIOR TECHNOLOGY IN ROTARY WORKHOLDING

FOR highest performance AND QUALITY

MAGNETIC HYDRAULIC MECHANIC VACUUM
The requirements of our customers determine our products and the company philosophy.

Own production with:

- Large magnets from one piece
- Quality, reliability and longevity
- Efficiency
- Precision solutions
- Problem solving competence
- From Workpiece to Process – Handling and Automation
- The right principle: magnetic, hydraulic, mechanic, vacuum
- Flexibility of design manufactured in SAV factory
- Innovation – new technologies

SAV GUARANTEES

12 wire- and spark erosion machines
4 CNC-lathes and 1 facing-lathe with table diameter Ø 3000 mm
4 Coordinate measuring machines

According ISO 9001:2000

TOP QUALITY WORKHOLDING

Protopin production with:

- 55 machine centers up to 5000 x 3000 machining surface
- 50 profile-/ surface-/ coordinate-/ external- and internal circular grinding machines up to 4000 mm machining length

SAV ELECTROMAGNETIC AND ELECTRO-PERMANENT MAGNETIC CHUCKS WITH DEMAGNETIZING CYCLE

- Manufacturing magnet body Ø 4100 mm

PRECISION MADE IN GERMANY

- Grinding of large bearing rings Ø 2800 mm
- Minimum clamping and setting times
- 3-side machining
- Universal and flexible
- Wear resistant solid state construction
- Reliable in process and clamping
- High efficiency
- Stable mono block construction
- Extreme holding forces
- Optimum workpiece damping
- Use of complete machine table surface
- High accuracy due to full surface force distribution
- Good automation possibility

SAV Spann-Automations-Normteiltechnik GmbH • www.sav-spanntechnik.de
SAV Workholding and Automation • www.sav-workholding.com
SAV MAGNETS FOR TURNING / HARD TURNING

Production advantages with magnetic clamping:
- Precision chip removal from 3 sides in one set-up
- Down pulling of the reference surfaces
- Full surface holding force with big damping for superior machining surface quality
- Most economic clamping tool with effortless machine integration
- Flexibility through large workpiece clamping range
- Removal of internal workpiece stresses during production

Test results with hard turning of a ring Ø 600 mm

<table>
<thead>
<tr>
<th>Form, resp. surface quality</th>
<th>Reproducible quality</th>
<th>Potential improvement *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arithmetic inside roughness</td>
<td>0.3 µm</td>
<td>0% to 25%</td>
</tr>
<tr>
<td>Circular form difference</td>
<td>0.5 µm</td>
<td>75% to 90%</td>
</tr>
<tr>
<td>Cylindrical form failure</td>
<td>10 µm</td>
<td>80% to 85%</td>
</tr>
<tr>
<td>Wall thickness variation</td>
<td>25 µm</td>
<td>60% to 80%</td>
</tr>
</tbody>
</table>

* potential improvement in comparison with conventional methods

SAV MECHANIC AND HYDRAULIC CHUCKS

Powered solutions for
- Extreme chip removal
- Precision clamping with point supports / point clamping, no pull-down of uneven parts
- Shaft clamping with centre offset
- Clamping of rings without deformation
- Fine turning operations

SAV MAGNETS FOR CIRCULAR AND CENTERLESS GRINDING

The proven SAV precision products offer:
- Highest accuracies in first and second clamping set-up
- Internal coolant supply
- Combined grinding of 3 sides
- Large workpiece clamping range
- Also small, difficult workpieces can be clamped through shoe-centerless grinding
- Simple automation
- Workpiece eccentric to spindle
- Magnet for rotary movement
- Precision through sliding shoes

SAV COMBINED SOLUTIONS

The combination of magnetic, hydraulic, mechanic and electrical power offer:
- Delicate and deformation-less clamping
- Simple automation
- Measuring of movement and force during operation process
- Reproducible centering
- Combination of first and second clamping radial and/or axial
- Oversize optimized centering

Electro-Permanent Magnetic Chuck manufactured from one piece. Ø 3200 mm

Electromagnetic circular chuck Ø 500 mm for shoe centerless grinding applications
### Magnetic Workholding – Selection Criteria

<table>
<thead>
<tr>
<th>Operation</th>
<th>Workpieces</th>
<th>Selection Criteria</th>
<th>Products</th>
</tr>
</thead>
</table>
| Turning / Hard turning – Vertical spindle | For ring shaped workpieces  | • High holding forces  
• High rotation speed range  
• Even pole division at perimeter  
• Flexible modification of diameter range  
• Safety and independence of electrical supply  
• High stiffness for machining of large parts | SAV 244.70 / .71 Upto ø 5000 mm and bigger                                      |
|                             | For disc shaped workpieces  | • High forces at low magnetic field height  
• Safety and independence of electrical supply  
• High rotation speed range | SAV 244.72 Upto ø 1600 mm                                                                       |
|                             |                             | • High holding forces  
• High rotation speed range  
• Flexible modification of diameter range  
• Safety and independence of electrical supply  
• Simple energy supply  
• Holding force regulation of EP magnets for centering of workpieces possible | SAV 244.73 Upto ø 800 mm                                                                   |
| Turning / Hard turning – Horizontal spindle | For ring shaped workpieces  | • High forces at low magnetic field height  
• Safety and independence of electrical supply  
• High rotation speed range  
• Simple energy supply  
• Holding force regulation of EP magnets for centering of workpieces possible | SAV 244.06 Upto ø 500 mm                                                                       |
|                             |                             | • High holding forces  
• High rotation speed range  
• Flexible modification of diameter range  
• Safety and independence of electrical supply  
• Holding force regulation of EP magnets for centering of workpieces possible | SAV 244.70 / .71 Upto ø 800 mm                                                               |
|                             | For disc shaped workpieces  | • High forces at low magnetic field height  
• Safety and independence of electrical supply  
• High rotation speed range  
• Simple energy supply  
• Holding force regulation of EP magnets for centering of workpieces possible | SAV 244.02 Upto ø 500 mm                                                                       |
|                             |                             | • High forces at low magnetic field height  
• Safety and independence of electrical supply  
• High rotation speed range  
• Simple energy supply  
• Holding force regulation of EP magnets for centering of workpieces possible | SAV 244.72 Upto ø 800 mm                                                                       |
|                             |                             | • High forces at low magnetic field height  
• Safety and independence of electrical supply  
• High rotation speed range  
• Simple energy supply  
• Holding force regulation of EP magnets for centering of workpieces possible | SAV 244.73 Upto ø 800 mm                                                                       |
|                             |                             | • High precision  
• Even pole division  
• Flexible modification of diameter range  
• High stiffness  
• Good holding force regulation for Electro  
• Permanent Circular Magnets | SAV 244.06 Upto ø 500 mm                                                                       |
|                             |                             | • High precision  
• Low magnetic field height supply  
• Good holding force regulation for Electro  
• Permanent Circular Magnets  
• For multiple loading with small workpieces  
• Also for thin workpieces | SAV 244.41 / .72 Upto ø 1600 mm                                                                |
|                             |                             | • High precision  
• Bigger, flexible clamping range  
• Extreme air gap behavior | SAV 244.45 Upto ø 500 mm                                                                       |
|                             |                             | • Extreme holding forces  
• High precision  
• High stiffness  
• Low magnetic field height  
• Fine, real pole pitch | SAV 244.08 Upto ø 200 mm                                                                       |

For instance ø 6 x 5 mm

For instance ø 40 x 0.8 mm

Grinding vertical / horizontal

Grinding small parts
## ELECTRO-PERMANENT CIRCULAR MAGNETS

**SAV 244.70**

*With radial poles and strong magnetic field*

### Execution:
- Solid constructed pole plate
- Switching off through demagnetizing cycle
- Electro-permanent system, guaranteeing safe operation during power failure
- Pole separation with brass in-lays for optimal wear behavior
- 8 mm consumption of pole plate
- Heat treated tension free body
- Available with flange on request
- Internal water cooling possible
- T-slots for pole raisers optional

### Application:
Mainly for precision grinding operations of small and big workpieces on rotary tables and circular grinding machines.

### Dimensions in mm

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Height</th>
<th>Magnetic active range from Ø upto Ø (mm)</th>
<th>Pole pairs</th>
<th>Weight (kg)</th>
<th>Control unit max. current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>90</td>
<td>60 - 280</td>
<td>6</td>
<td>42</td>
<td>30</td>
</tr>
<tr>
<td>400</td>
<td>90</td>
<td>70 - 360</td>
<td>6</td>
<td>76</td>
<td>30</td>
</tr>
<tr>
<td>500</td>
<td>90</td>
<td>100 - 460</td>
<td>8</td>
<td>120</td>
<td>30</td>
</tr>
<tr>
<td>600</td>
<td>100</td>
<td>100 - 560</td>
<td>8</td>
<td>195</td>
<td>30</td>
</tr>
<tr>
<td>800</td>
<td>100</td>
<td>150 - 764</td>
<td>12</td>
<td>365</td>
<td>30</td>
</tr>
<tr>
<td>1000</td>
<td>100</td>
<td>200 - 964</td>
<td>12</td>
<td>590</td>
<td>60</td>
</tr>
<tr>
<td>1200</td>
<td>110</td>
<td>300 - 1150</td>
<td>18</td>
<td>990</td>
<td>60 x 2</td>
</tr>
<tr>
<td>1500</td>
<td>120</td>
<td>300 - 1450</td>
<td>18</td>
<td>1350</td>
<td>60 x 2</td>
</tr>
</tbody>
</table>

*Bigger diameters on request*

*for execution with T-slots the height increases with 10 mm Adaption to spindle according requirements*

---

**SAV 244.71**

*With radial poles, enhanced magnetic system and extra high holding force*

### Execution:
- Even, strong magnetic field
- Solid designed pole plate
- Switching off through demagnetizing cycle
- Electro-permanent system, guaranteeing safe operation during power failure
- Pole separation with brass in-lays for optimal wear behavior
- Also available with T-slots 10H10 for optional pole raisers for 3-side machining
- 8 mm consumption of pole plate
- Heat treated tension free body

### Application:
- Hard turning operations and extreme chip removal with turning of small and large workpieces
- Grinding operations with highest accuracy

### Dimensions in mm

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Height</th>
<th>Magnetic active range from Ø upto Ø (mm)</th>
<th>Pole pairs</th>
<th>Weight (kg)</th>
<th>Control unit max. current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>100</td>
<td>60 - 280</td>
<td>6</td>
<td>54</td>
<td>30</td>
</tr>
<tr>
<td>400</td>
<td>100</td>
<td>70 - 360</td>
<td>6</td>
<td>85</td>
<td>30</td>
</tr>
<tr>
<td>500</td>
<td>110</td>
<td>100 - 460</td>
<td>8</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>600</td>
<td>110</td>
<td>100 - 560</td>
<td>8</td>
<td>210</td>
<td>30</td>
</tr>
<tr>
<td>800</td>
<td>110</td>
<td>150 - 764</td>
<td>12</td>
<td>380</td>
<td>30</td>
</tr>
<tr>
<td>1000</td>
<td>110</td>
<td>200 - 964</td>
<td>12</td>
<td>680</td>
<td>60</td>
</tr>
<tr>
<td>1200</td>
<td>125</td>
<td>300 - 1150</td>
<td>18</td>
<td>975</td>
<td>60 x 2</td>
</tr>
<tr>
<td>1500</td>
<td>135</td>
<td>300 - 1450</td>
<td>18</td>
<td>1350</td>
<td>60 x 2</td>
</tr>
<tr>
<td>1600</td>
<td>135</td>
<td>300 - 1550</td>
<td>18</td>
<td>2105</td>
<td>60 x 2</td>
</tr>
</tbody>
</table>

*Bigger diameters on request*

*for execution with T-slots the height increases with 10 mm Adaption to spindle according requirements*
**ELECTRO-PERMANENT CIRCULAR MAGNETS**

**SAV 244.72**

**With concentric poles**

- Uniform holding force distribution due to concentric pole arrangement
- Suitable for thin and flat workpieces (e.g., saw blades)

**Application:**
- Mainly for precision grinding operations of small and big workpieces on rotary tables and circular grinding machines. Because of cylindrical pole arrangement it is also suitable for holding groups of randomly placed mass-production pieces.

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>Height in mm</th>
<th>Magnetic active range from Ø up to Ø in mm²</th>
<th>Weight in kg</th>
<th>Control unit max. current in A</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>105</td>
<td>60 - 280</td>
<td>52</td>
<td>30</td>
</tr>
<tr>
<td>400</td>
<td>105</td>
<td>70 - 350</td>
<td>82</td>
<td>30</td>
</tr>
<tr>
<td>500</td>
<td>105</td>
<td>100 - 460</td>
<td>141</td>
<td>30</td>
</tr>
<tr>
<td>600</td>
<td>105</td>
<td>100 - 560</td>
<td>204</td>
<td>60</td>
</tr>
<tr>
<td>800</td>
<td>105</td>
<td>150 - 764</td>
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<tr>
<td>1000</td>
<td>105</td>
<td>200 - 964</td>
<td>578</td>
<td>60</td>
</tr>
<tr>
<td>1200</td>
<td>125</td>
<td>300 - 1150</td>
<td>990</td>
<td>60 x 2</td>
</tr>
<tr>
<td>1500</td>
<td>125</td>
<td>300 - 1450</td>
<td>1760</td>
<td>60 x 2</td>
</tr>
<tr>
<td>1600</td>
<td>125</td>
<td>300 - 1550</td>
<td>1760</td>
<td>60 x 2</td>
</tr>
</tbody>
</table>

Available with pole pitch 4.5 mm, 9 mm and 18 mm.

**SAV 244.73**

**With fine pole pitch P = 4 mm**

- Multiple workpiece clamping possible on pitch circle diameter
- For workpieces with minimum thickness X:
  - 2 mm at pole pitch = 4.5 mm
  - 4 mm at pole pitch = 9 mm
  - 8 mm at pole pitch = 18 mm
- Uniform holding force distribution due to concentric pole arrangement
- Suitable for thin and flat workpieces (e.g., saw blades)

**Application:**
- For grinding of thin, plate shaped workpieces. Suitable for clamping of multiple small parts.

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>Height in mm</th>
<th>Magnetic active range from Ø up to Ø in mm²</th>
<th>Weight in kg</th>
<th>Control unit max. current in A</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>100</td>
<td>213</td>
<td>55</td>
<td>30</td>
</tr>
<tr>
<td>400</td>
<td>100</td>
<td>301</td>
<td>98</td>
<td>30</td>
</tr>
<tr>
<td>500</td>
<td>100</td>
<td>401</td>
<td>153</td>
<td>30</td>
</tr>
<tr>
<td>600</td>
<td>100</td>
<td>481</td>
<td>220</td>
<td>60</td>
</tr>
<tr>
<td>700</td>
<td>100</td>
<td>581</td>
<td>300</td>
<td>60</td>
</tr>
<tr>
<td>800</td>
<td>100</td>
<td>681</td>
<td>390</td>
<td>60</td>
</tr>
</tbody>
</table>

**Nominal holding force:**
- For grinding of thin plates, wide rings with low thickness and minimum width 40 mm
- For workpieces with minimum thickness 2 mm
- For flat workpieces, minimum 40x40 mm²

**Nominal operating voltage:**
- 100 V DC
- 360 V DC

**Multiple clamping - high precision**

**Execution:**
- Gap free construction of pole plate
- Evenly distributed, strong magnetic field
- Solid constructed pole plate
- Switching off through demagnetizing cycle
- Electro-permanent system, guaranteeing safe operation during power failure
- Pole separation with brass in-lays for optimal wear behavior
- 8 mm consumption of pole plate

**Nominal holding force:**
- P = 4.5 mm: 80 N/cm²
- P = 9 mm: 100 N/cm²
- P = 18 mm: 110 N/cm²

**Adjustable by control unit through coded switch**

**Thin parts clamped accurately!**

**Execution:**
- Pole plate with very small, parallel pole division, 3 mm steel and 1 mm brass
- Low height
- Laminations glued and reinforced with tie bars
- Low magnetic field height, 4 mm
- Switching-off through demagnetizing cycle
- Heat treated tension free body
- Threaded mounting holes in back-side. Through holes on request
- Electro-permanent system, guaranteeing safe operation during power failure
- 8 mm consumption of pole plate

**Nominal operating voltage:**
- 360 V DC

**Nominal holding force:**
- 100 N/cm²

**Adjustable through control unit through coded switch**

**Nominal operating voltage:**
- 360 V DC
**SAV 244.40**

**SAV 244.41**

**Electro Circular Magnets**

**Strong and Reproducible**

**Execution:**
- Evenly distributed, strong magnetic field
- Solidly constructed pole plate
- Switching off through demagnetizing cycle
- Pole separation with brass in-lays for optimal wear behavior
- Also available with T-slots 10H10 for optional pole raisers for 3-side machining
- 8 mm consumption of pole plate
- Duty cycle 100%
- Internal water cooling possible

**Application:**
For circular grinding of cylindrical and ring shaped workpieces on vertical internal and external grinding machines. Also suitable for turning operations with form and position tolerances of 0.01 mm to 0.02 mm.

**Nominal operating voltage:**
- 24 V DC up to Ø 300 mm diameter
- 110 V DC for all other sizes

**Nominal holding force:**
- 120 N/cm²
- Adjustable by control unit

**Nominal operating voltage:**
- For thin workpieces with minimum size

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**Electro Circular Magnets**

**Strong and Low Magnetic Field Though Concentric Poles**

**Execution:**
- Pole separation with brass in-lays for optimal wear behavior
- Switching off through demagnetizing cycle
- Gap free construction of pole plate
- 8 mm consumption of plate
- Duty cycle 100%

**Application:**
Mainly for precision grinding operations of disc shaped workpieces on rotary tables, internal and external circular grinding machines. Not suitable for thin rings. Because of cylindrical pole arrangement it is also suitable for holding groups of randomly placed mass-production pieces. Also for turning operations with form and position tolerances of 0.01 mm to 0.02 mm.

**Nominal holding force:**
- P = 4.5 mm: 80 N/cm²
- P = 9 mm: 100 N/cm²
- P = 18 mm: 110 N/cm²
- Adjustable by control unit

**Nominal operating voltage:**
- 24 V DC up to Ø 300 mm diameter
- 110 V DC for all other sizes

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**ELECTRO CIRCULAR MAGNETS**

**SAV 244.43**

With fine pole pitch, for machining of thin parts

**SLIDING SHOE GRINDING MAGNETS**

**SAV 244.45**

With pot-magnetic system for large workpiece range

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**For universal use!**

### Execution:
- Pole plate with very small, parallel pole division, 3 mm steel and 1 mm brass
- Low height
- Laminations glued and reinforced with tie bars
- Low magnetic field height; 4 mm
- Switching-off through demagnetizing cycle
- Heat treated tension free body
- Threaded mounting holes in backside. Through holes on request
- 8 mm consumption of pole plate
- Robust and watertight!
- Duty cycle 100%

### Nominal holding force:
- 100 N/cm²
- Adjustable through control unit

### Nominal operating voltage:
- 110 V DC

---

**Application:**
- For grinding of small rings with limited workpiece contact surface
- Extreme low wall thickness variation through centerless workpiece clamping and positioning over static sliding shoes
- Simple changing through universal workpiece driver
- Universal use for large diameter range
- Workpiece out of spindle center
- Magnet for turning movement, precision through sliding shoes

### Dimensions:

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Height</th>
<th>Magnetic active range from Ø up to Ø in mm</th>
<th>Weight in kg</th>
<th>Power in W</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>100</td>
<td>213</td>
<td>55</td>
<td>110</td>
</tr>
<tr>
<td>400</td>
<td>100</td>
<td>301</td>
<td>98</td>
<td>180</td>
</tr>
<tr>
<td>500</td>
<td>100</td>
<td>401</td>
<td>153</td>
<td>230</td>
</tr>
<tr>
<td>600</td>
<td>100</td>
<td>481</td>
<td>220</td>
<td>410</td>
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<tr>
<td>700</td>
<td>100</td>
<td>581</td>
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<td>430</td>
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<tr>
<td>800</td>
<td>100</td>
<td>681</td>
<td>392</td>
<td>540</td>
</tr>
<tr>
<td>900</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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**Execution:**
- Extreme magnetic field for grinding of large workpiece range
- Delivery with driver according requirements
- Adaption to spindle on request
- On request with changeable pole plates for large clamping range
- For simple workpiece handling, easy automation
- Internal coolant supply possible

### Nominal operating voltage, advised:
- 24 V DC upto diameter 250 mm
- 110 V DC above diameter 250 mm

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For grinding of thin plates, wide rings with low thickness. Suitable for clamping of multiple small parts.

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For grinding of thin plates, wide rings with low thickness. Suitable for clamping of multiple small parts.

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Circular magnet

Driver

Workpiece

Sliding shoe
**SAV SPECIAL MAGNETIC SOLUTIONS**

**Special electromagnetic chuck**
- for automatic grinding of ferrite cores
- 16 individual switchable magnetic segments

**Changing pole plate in special execution**
- rotating pole plate, static magnetic system
- for automatic grinding of bearing parts
- 24 individual magnetic segments

**Special clamping tool for coordinate grinding**
- for Maltese cross drives

**SAV LARGE MAGNET PRODUCTION**

SAV magnets for machining of large parts offer:
- Accuracy and high stiffness of magnet body and pole plates, also at overhang to machine table
- Long time stability through stress-free heat treated components
- Large magnetic active ranges
- High rotation speeds
- Large magnets also in one piece
- Very small magnetic “dead” zones
- High quality on evenness and parallelism according requirements
- Individual spindle adaption
- Extreme large diameters, for instance Ø 12 m, in segment construction

*Electro-permanent circular magnet, combined pole division for grinding of sleeves and plates
*Electro-permanent ring magnet for turbine parts
*Electro circular magnet in segments, Ø5400 mm, for machining of slewing bearings*
SAV MECHATRONIC CHUCK  

SAV 244.75

SPECIAL COMBINED CHUCK  

SAV 244.99

Combined solutions can be applied usefully when:
- Full surface and/or selective power introduction is required for the same workpiece
- Changing devices are applied
- High accurate centering possibilities are required
- Extreme chip removal at small workpiece dimensions must be realized
- Combined clamping axial / vertical is required

Application:
- For automation
- Precise centering, reproducible with high accuracy
- High power chip removal and finishing
- Combination first and second set-up
- Clamping radial and/or axial
- Clamping of eccentric parts

Variant A
- 3 Axis centric
- 3 Axis internal or external engaging

Variant B
- 6 Axis centric
- internal or external engaging

Variant C
- Clamping of oval parts

Variant D
- Manual workpiece positioning with dial gauge
- Magnetic pre-clamping
- 6 axis individual engaging and clamping

Variant E
- Centric per 2 facing axis

Variant F
- Clamping external parts at changing positioning to spindle

The clever combination!

Combination circular magnet – electric linear axis:
- Servo drive with integrated brakes
- 300 daN clamping force per actuator at Ø1000 mm
- Direct measuring system with resolution 0.001 mm
- 50 mm clamping stroke with quick change jaws
- Electronic centrifugal force compensation
- Enhanced magnetic system with optimized pole division
- Magnetic material under each pole for minimum field heights
- Ø350 mm minimum magnetic area
- Smallest chuck diameter Ø800 mm at 100 daN clamping force per jaw
- With 165 mm minimum height
- Available end 2010

PATENT PENDING

Electro-permanent magnet with mechanic centering system on pole raisers

Combined chuck from high energy magnet and precision lamination-centering

Special clamping device Ø1400 mm on electro-permanent magnet, radial and axial grinding of rings

Application:
- For automation
- Precise centering, reproducible with high accuracy
- High power chip removal and finishing
- Combination first and second set-up
- Clamping radial and/or axial
- Clamping of eccentric parts

Combined solutions can be applied usefully when:
- Full surface and/or selective power introduction is required for the same workpiece
- Changing devices are applied
- High accurate centering possibilities are required
- Extreme chip removal at small workpiece dimensions must be realized
- Combined clamping axial / vertical is required

Variant A
- 3 Axis centric
- 3 Axis internal or external engaging

Variant B
- 6 Axis centric
- internal or external engaging

Variant C
- Clamping of oval parts

Variant D
- Manual workpiece positioning with dial gauge
- Magnetic pre-clamping
- 6 axis individual engaging and clamping

Variant E
- Centric per 2 facing axis

Variant F
- Clamping external parts at changing positioning to spindle

The clever combination!

Combination circular magnet – electric linear axis:
- Servo drive with integrated brakes
- 300 daN clamping force per actuator at Ø1000 mm
- Direct measuring system with resolution 0.001 mm
- 50 mm clamping stroke with quick change jaws
- Electronic centrifugal force compensation
- Enhanced magnetic system with optimized pole division
- Magnetic material under each pole for minimum field heights
- Ø350 mm minimum magnetic area
- Smallest chuck diameter Ø800 mm at 100 daN clamping force per jaw
- With 165 mm minimum height
- Available end 2010

Some images are not visible in this text representation.
**SAV POLE RAISERS**

**Application:** Hard turning of thin roller bearing rings on 3 sides with fixed and movable pole raisers

**Execution:**
- Pole raisers in segmented execution ensure an undisturbed tool path for 3 side machining of thin rings
- Through the radial adjustment a larger diameter range can be covered
- Cut-outs for uneven workpieces or for through holes possible
- Depending on workpiece stiffness also flexible pole raisers for uneven clamping surfaces
- The pole raisers for circular magnets must be adjusted individually
- We design and produce pole raisers for special solutions on request.

**POLE BEAMS**
- As protection against wearing of magnet top plate
- Easy cleaning
- On request also with T-slots
- Toothed racks for positioning of heavy rings possible

**ADAPTER POLE PLATES**
- No loss of workpiece contact surface
- Good holding forces also with smaller diameters
- Easily changeable
- Good chip removal, easy to clean
- Pre-setting of pole raisers outside the machine
- Pole plate changing can be automated
- Also with T-slots for pole raisers

**ADAPTER POLE RINGS**
- Upto diameter Ø650 mm
- No loss of workpiece contact surfaces
- Profiling possible
- Good holding forces, also at smaller diameters
- Easily changeable
- Economic
SAV CONTROL TECHNOLOGY

SAV 876.12

Advantages:
- Short circuit proof
- Fully electronic
- Extended diagnostics
- Monitoring of short circuit to ground
- Very compact design
- Pre-programmed settings
- Individual programmability
- Automatic mains-frequency recognition
- Functional design and operation guide

SAV 876.10

Use:
For electro-permanent magnetic clamping systems. Also suitable for retrofitting.
Operation through remote control unit or PLC signals.

Function:
Electronic polarity reversing control units are used as impulse-control for electro-permanent magnetic chucks.
For your safety, the unit permanently monitors the current source, its own power components and all connection cables including magnet coil.
Machine release through safety contact
Holding force regulation through coded switch.

SAV 876.10 for electro magnets

<table>
<thead>
<tr>
<th>Ordering no.</th>
<th>Dimensions in mm</th>
<th>Length</th>
<th>Width</th>
<th>Depth</th>
<th>Weight in kg</th>
<th>Magnet voltage DC in V</th>
<th>Magnet current in A</th>
<th>Mains voltage AC in V</th>
</tr>
</thead>
<tbody>
<tr>
<td>876.10-E-24/ 230</td>
<td>220 x 120 x 95</td>
<td>2</td>
<td>24</td>
<td>7</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>876.10-E-15/230</td>
<td>260 x 120 x 95</td>
<td>3</td>
<td>24</td>
<td>15</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>876.10-E-6/230</td>
<td>220 x 120 x 95</td>
<td>2</td>
<td>110</td>
<td>6</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>876.10-E-16/230</td>
<td>260 x 120 x 95</td>
<td>3</td>
<td>110</td>
<td>16</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CE-conformity according Machine, Low-Voltage and EMC Directives.

SAV 876.12 for electro-permanent magnets

<table>
<thead>
<tr>
<th>Ordering no.</th>
<th>Dimensions in mm</th>
<th>Length</th>
<th>Width</th>
<th>Depth</th>
<th>Weight in kg</th>
<th>Magnet voltage DC in V</th>
<th>Magnet current in A</th>
<th>Mains voltage AC in V</th>
</tr>
</thead>
<tbody>
<tr>
<td>876.12-E-O-210/30/230</td>
<td>220 x 120 x 95</td>
<td>2</td>
<td>210</td>
<td>30</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>876.12-E-O-30/400</td>
<td>260 x 120 x 95</td>
<td>3</td>
<td>210</td>
<td>30</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>876.12-E-O-30/400</td>
<td>320 x 120 x 95</td>
<td>3</td>
<td>360</td>
<td>30</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>876.12-E-O-360/60/400</td>
<td>360 x 120 x 95</td>
<td>5</td>
<td>360</td>
<td>60</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>876.12-E-O-360/60x2/400</td>
<td>360 x 120 x 95</td>
<td>6</td>
<td>360</td>
<td>60x2</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SAV 876.02-SE3

Remote control unit
Panel suitable for integration in machine console
Clear text
German / English
for operation status and fault messages
SAV ELECTRIC SUPPLY FOR CIRCULAR MAGNETS

**Separated slip ring body SAV 248.81**

Power supply for electro circular magnets

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Diameter</th>
<th>Length</th>
<th>Magnet voltage in V</th>
<th>Number of contacts</th>
<th>Max r.p.m.</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>bis 300</td>
<td>40</td>
<td>24</td>
<td>2</td>
<td>3600</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>bis 900</td>
<td>110</td>
<td>3</td>
<td>3</td>
<td>3000</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>bis 1600</td>
<td>24</td>
<td>3</td>
<td>3</td>
<td>2500</td>
<td>3.5</td>
<td></td>
</tr>
</tbody>
</table>

**Separated slip ring body SAV 248.85**

Power supply for electro-permanent circular magnets

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Diameter</th>
<th>Length</th>
<th>Magnet voltage in V</th>
<th>Number of contacts</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>bis 800</td>
<td>61.5</td>
<td>210/360</td>
<td>3</td>
<td>4100</td>
<td>1.1</td>
</tr>
<tr>
<td>bis 1000</td>
<td>65.5</td>
<td>360</td>
<td>3</td>
<td>3000</td>
<td>2.5</td>
</tr>
<tr>
<td>bis 1600</td>
<td>79.0</td>
<td>360</td>
<td>4</td>
<td>3000</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Carbon brush holder SAV 248.83**

Power supply for electro circular magnets

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Diameter</th>
<th>Length</th>
<th>Width</th>
<th>Magnet voltage in V</th>
<th>Number of contacts</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>bis 300</td>
<td>140</td>
<td>40</td>
<td>24</td>
<td>2</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>bis 900</td>
<td>140</td>
<td>40</td>
<td>110</td>
<td>3</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>bis 1600</td>
<td>140</td>
<td>60</td>
<td>110</td>
<td>3</td>
<td>0.20</td>
<td></td>
</tr>
</tbody>
</table>

**Carbon brush holder SAV 248.84**

Power supply for electro-permanent circular magnets

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Diameter</th>
<th>Length</th>
<th>Width</th>
<th>Magnet voltage in V</th>
<th>Number of contacts</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>bis 800</td>
<td>140</td>
<td>40</td>
<td>210/360</td>
<td>3</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>bis 1000</td>
<td>140</td>
<td>40</td>
<td>360</td>
<td>3</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>bis 1600</td>
<td>140</td>
<td>60</td>
<td>360</td>
<td>4</td>
<td>0.23</td>
<td></td>
</tr>
</tbody>
</table>

**Power supply for electro-permanent circular magnets**

With industrial watertight connector; for magnetizing and demagnetizing, removed during machining (only for electro-permanent magnets)

**Application:**

- Slip ring bodies are used in combination with carbon brush holders for power supply.
- For separate mounting to the hollow machine spindle. Suitable protection must be provided to prevent contact with live components.

**Execution:**

The slip ring body is supplied with a small through-hole only. This can be machined (for instance with thread) on request to suit the machine spindle.

**Application:**

For power supply on the slip ring body. The carbon brush holders are supplied in 3 sizes including mounting bar.

**Execution:**

Carbon brushes, spring loaded. Mounting over spacer bolts.

**Application:**

- Protection IP65
- with quick locking for simple handling

**Application:**

- For circular magnets with diameter bigger than Ø1000 mm.

**Execution:**

Completely integrated in the magnet. Adaption to spindle on request.

**Electro-permanent circular magnet**

Changeable at spindle, for hard turning operation and extreme rotation speeds up to 3000 r.p.m. Electric connection through spring loaded contacts.

**Application:**

- Protection IP65
- with quick locking for simple handling

**Application:**

- For combined circular grinding / turning machine
- Changeable magnet / 3-jaw chuck
- Combined drawing bar / power supply and internal coolant supply

**Application:**

- Electro-permanent circular magnet with radial poles, changeable.
SAV LAMINATED TOP PLATES

Application:
For use on circular magnets with parallel pole arrangement.

Execution:
- Can be machined to any required shape, or custom machined during manufacture.
- Mounting on magnetic chuck to be agreed upon.
- Lamination must be parallel to magnetic chuck.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
<th>Pole pitch in mm</th>
<th>Switching position</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter 100</td>
<td>62</td>
<td>4/1.5 2/1.5</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Diameter 130</td>
<td>62</td>
<td>4/1.5 2/1.5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Diameter 160</td>
<td>75</td>
<td>6/5</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Diameter 200</td>
<td>80</td>
<td>8/5</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Diameter 250</td>
<td>80</td>
<td>8/5</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Diameter 300</td>
<td>85</td>
<td>8/5</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>Diameter 350</td>
<td>85</td>
<td>8/5</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Diameter 400</td>
<td>100</td>
<td>8/5</td>
<td>1</td>
<td>59</td>
</tr>
<tr>
<td>Diameter 450</td>
<td>100</td>
<td>8/5</td>
<td>2</td>
<td>70</td>
</tr>
<tr>
<td>Diameter 500</td>
<td>100</td>
<td>8/5</td>
<td>2</td>
<td>90</td>
</tr>
</tbody>
</table>

Magnetic field height : 10 mm
Pole plate wearing limit : 8 mm

SAV PERMANENT CIRCULAR MAGNETS

Application:
- For grinding Sizes A = 100 to 160 mm
- For turning and grinding Sizes A = 200 to 500 mm

Execution:
- Exceptional strong magnetic field
- Concentric grooves simplify centering of the workpiece
- Also available with flange

Nominal holding force:
- 70 N/cm² for diameter Ø100 – 160 mm
- 140 N/cm² for diameter Ø200 – 500 mm

SAV PERMANENT CIRCULAR MAGNETS

Application:
For use on circular magnets with parallel pole arrangement

Execution:
- High magnetic force
- Concentric grooves simplify centering of the workpiece
- Standard execution without center through hole. Possible on request.
- Bigger diameters available with T-slots
- Also available with flange on request

Nominal holding force:
- 100 N/cm²

SAV LAMINATED TOP PLATES

Application:
For clamping of profiled workpieces on magnets with parallel pole arrangement.

<table>
<thead>
<tr>
<th>Dimensions in mm</th>
<th>Weight in kg</th>
<th>Pole pitch in mm</th>
<th>Switching position</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter 100</td>
<td>350</td>
<td>25</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>Diameter 200</td>
<td>300</td>
<td>350</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Diameter 200</td>
<td>300</td>
<td>450</td>
<td>25</td>
<td>38</td>
</tr>
<tr>
<td>Diameter 300</td>
<td>350</td>
<td>500</td>
<td>30</td>
<td>47</td>
</tr>
</tbody>
</table>

*Available on request

SAV PERMANENT CIRCULAR MAGNETS

Application:
For cylindrical and ring shaped workpieces, for grinding and hard turning.

Pole plate wearing limit:
- 5 mm for A = 100 to 300 mm
- 10 mm for A = 350 to 400 mm

SAV 248.03

SAV 248.05

Execution:
- For clamping of profiled workpieces
- Mounting on magnetic chuck to be agreed upon
- Profile depth: max. 8 mm

Dimensions in mm

<table>
<thead>
<tr>
<th>Diameter 100</th>
<th>Height</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>150</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>200</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>250</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>300</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>350</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>400</td>
<td>20</td>
<td>24.5</td>
</tr>
</tbody>
</table>

Pole pitch:
Steel 3 mm
Brass 1 mm

Machining depth: 8 mm

SAV 244.06

SAV 248.06

Execution:
- For clamping on circular magnet SAV 244.06 with radial poles.

Dimensions in mm

<table>
<thead>
<tr>
<th>Diameter 100</th>
<th>Height</th>
<th>Number of poles</th>
<th>Weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>10</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>150</td>
<td>16</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>200</td>
<td>16</td>
<td>12</td>
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</tr>
<tr>
<td>250</td>
<td>16</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>300</td>
<td>20</td>
<td>20</td>
<td>24.5</td>
</tr>
<tr>
<td>350</td>
<td>20</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>20</td>
<td>24.5</td>
<td></td>
</tr>
</tbody>
</table>
SAV FLANGES

Short taper adapter flanges without mounting bolts

SAV 248.90

Application:
Mounting of circular magnets or other clamping tools. For spindle noses according DIN 55026 (55021) Form A and B, ISO 702/I A1 and A2, ASA B5.9 A1 and A2.

Execution:
- Soft steel flanges according:
  - DIN,
  - ISO and
  - ASA standard

Machined on spindle side. The adaption to magnet or chuck according requirements (please indicate diameter and hole pattern when ordering)

We supply our circular magnets completely mounted to flanges on request.

Short taper adapter flanges with bayonet ring fixing with studs and collar nuts

SAV 248.91

Application:
Mounting of circular magnets or other clamping tools. For spindle noses according DIN 55022 and ISO 702/III.

Short taper adapter flanges with camlock fixing

SAV 248.92

Application:
Mounting of circular magnets or other clamping tools. For spindle noses according DIN 55029 and ISO 702/II, ASA B5.9 D1.

Morse taper adapter

SAV 248.94

Application:
Mounting of circular magnets or other clamping tools. For morse taper sockets according DIN 228.

Pulling thread possible according requirements.

SAV NEODYMIUM CIRCULAR MAGNETS

SAV 244.07

With parallel pole arrangement P = 6 mm,
Neodymium magnets with extreme high holding force

Application:
For workpieces that are particularly difficult to clamp, such as ferromagnetic and hard metals with cobalt content.

For very small and smallest workpieces.

Nominal holding force:
180 N/mm² on inductive steel surface

Also suitable for parts with 0.8 mm thickness

Also suitable for parts with 0.8 mm thickness

Execution:
- Housing from aluminum, pole plate made from stainless steel.
- Extreme high holding force through a specially developed construction using Neodymium-Iron-Boron magnets.
- Also available with flange on request
- Magnetic field height : 4 mm
- Pole plate wearing limit : 3 mm

Nominal holding force: 180 N/mm² on inductive steel surface

SAV Workholding and Automation • www.sav-workholding.com

SAV Spann-Automations-Normteiletechnik GmbH • www.sav-spanntechnik.de
SAV HYDRAULIC-MECHANIC CLAMPING SYSTEMS

2+2 jaw chucks
- Ø165 upto Ø500 mm
- 2x centric operation
- axial pressing and radial positioning device

6 jaw lever compensating chuck
- Ø200 upto Ø1480 mm
- for clamping of rings without deformation
- base jaw sealed
- pendular compensation can be blocked

Rear chuck
- Ø820 mm
- for machining of pipe

Front chuck
- Ø1140 mm
- system with quick change jaws

Rotary finger chuck
- Ø 165 upto 400 mm
- Precise centering in tooth system
- Supporting and clamping in bore with miniature clamping fingers for highest precision

Special clamping fixture
in special execution for face machining

Column chuck
- Ø165 upto Ø400 mm
- for heavy chip removal

Centering and face clamping chuck
- Ø165 upto Ø5000 mm
- for fine turning applications

Compensating chucks
- Ø165 upto Ø4000 mm
- 2 jaws with spring loaded centering pin for clamping with offset

ø 165 upto 400 mm
- Precise centering in tooth system
- Supporting and clamping in bore with miniature clamping fingers for highest precision

Face plate
- Ø500 – Ø2000 mm
- with torque amplifier

Pipe
- for machining of pipe

LATHE

OTHER DIAMETERS FOR HYDRAULIC-MECHANIC CHUCKS ON REQUEST