MAGNETIC WORKHOLDING TOOLS
HOW MAGNETS SERVE IN THE INDUSTRY

Magnetism has been known since ancient times. The word magnet comes from the Greek word μαγνήτης λίθος (magnētēs lithos) (magnētēs lithos) which means literally “magnesium stone”. Magnesia was an area in Antique Greece (today Manisa in Turkey) where magnetite was found in the Antique period. The ancient Chinese navigators were the first known users of magnetic compasses. Today ships and planes are navigated mainly by modern electronic systems; however magnets and magnetism continue to serve. They are used in many fields; for example in the electronic and automobile industries, engineering and metallurgy.

One particular area of use of magnetism is found in workholding and clamping. Magnetic chucks present a modern technology which can substitute vices, mechanic clamps and jigs in the machining of ferromagnetic materials. The main benefit is speed because the clamping and unclamping of machined workpieces can be carried out in minutes. This results in minimizing the non-productive time.

For example, for machining operations the component can be clamped on the magnet in seconds and be accessed from all five sides. One great advantage in comparison with mechanical clamps is the fact that the component’s surface is in no way deformed by a magnetic chuck.

A complete list of real-world uses of magnets would be indeed long. The clamping of components in milling, surface and circular grinding, turning and EDM; the clamping of moulds in plastics production and fixation and positioning when welding are just a few of the primary examples.

Why choose WALMAG MAGNETICS chucks?

Till March 2011 WALMAG MAGNETICS has been a member of the Walker Magnetics Group for about 20 years. The Walker Company was founded in 1897 by Oakley S. Walker. The end of the 19th century was the period of the industrial revolution and the Walker concept was likewise revolutionary – to use magnetism in steel grinding. The company became the pioneer in the development of magnetic clamping systems which have been taken up all over the world since that early beginning.

The mission of WALMAG MAGNETICS is to research, develop and offer the solution for your needs and requests. If you want to make your production more efficient, we are here for you.

It is thanks to our long tradition of production and to our experience and expertise that we can reliably offer quality products to exactly fit your needs. This guarantee and after sales service are a matter of course as far as we are concerned.

WALMAG MAGNETICS is fully continuing based on experiences made over more than 40 years in own Czech facilities. We offer a full range of magnetic technologies (Permanent, Electro, Electro-Permanent) mainly from own production.

In this new era of an independent WALMAG company we intend to concentrate on improving of our products and the development of new precision high quality magnetic tools for our clients.
The catalog is divided into application areas like grinding, milling etc. indicated by a pictogram and the name. For each application the available magnetic chucks are listed in the order Permanent Magnetic (PM, blue), Electro-magnetic (EM, orange) and Electro-Permanent (EP, green).

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- 5 FIXAR
- 6 NEODYMAX

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- 8 UNIGRIP
- 9 ELECTROFINE
- 10 BJP
- 11 Control units

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- 16 PERMAGRIP
- 17 NEOSTAR
- 18 ALUSTAR VARIABLE FORCE

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- 21 EPERING
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Walmag Neomicro\textsuperscript{2} chucks combine a high quality and a low price. They are particularly suited for precision grinding of both small and thin as well as large and thick components.

**READ ALL ABOUT THE EXTRAORDINARY QUALITIES OF NEOMICRO\textsuperscript{2} CHUCKS:**

**HIGH PRECISION GRINDING** – The solid and very sturdy assembly together with the exceptional holding power enable workholding without deformation.

**EXTREME STABILITY** – Neomicro\textsuperscript{2} chucks are designed to form a solid assembly, top plate, frame and body are connected mechanically and magnetically to offer the highest stability and accuracy.

**HIGH HOLDING POWER** – The dual Neodymium magnetic system generates up to 130 N/cm\textsuperscript{2} of holding force which is 60\% higher than traditional micropitch chucks.

**HIGH SECURITY** – The exceptionally high holding force ensures that components are held in place securely even in difficult working conditions such as a fully loaded clamping surface. Furthermore the holding performance stays on a high level even after 100,000 switching operations.

**TRULY UNIVERSAL** – The unique micro pole division allows to hold the widest range of workpiece sizes and thicknesses.

**LONG LIFE** – The solid top plate allows a high number of redressing operations whereas all moving parts are sealed against water ingress.

**CONSTRUCTION**

- Solid top plate with transverse poles, pole division 1.4 mm steel and 0.5 mm brass
- Life span (regrinding limit): 7 mm
- Dual\* Neodymium magnetic system; nominal\* holding force: 100 N/cm\textsuperscript{2}
- Solid steel base with robust actuating mechanism
- Waterproof assembly

**APPLICATION**

- Precision grinding of very small and thin up to large components
- Recommended minimum workpiece size: 4 x 4 x 1 mm
- EDM, possible to submerge in dielectric liquid

**SCOPE OF SUPPLY**

- Back and end stop
- Set of clamps
- Allen key
- User manual

* See Technology pages

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**NEOMICRO\textsuperscript{3} NEW**

The Neomicro\textsuperscript{3} has the same outstanding properties as the Neomicro\textsuperscript{2}.

The difference is found in the top plate which has **STAINLESS STEEL** instead of brass separators.

**ADVANTAGES**

- higher resistance against wear
- higher precision

**NEW**

Walmag Neomicro\textsuperscript{2} chucks combine a high quality and a low price. They are particularly suited for precision grinding of both small and thin as well as large and thick components.

**READ ALL ABOUT THE EXTRAORDINARY QUALITIES OF NEOMICRO\textsuperscript{2} CHUCKS:**

**HIGH PRECISION GRINDING** – The solid and very sturdy assembly together with the exceptional holding power enable workholding without deformation.

**EXTREME STABILITY** – Neomicro\textsuperscript{2} chucks are designed to form a solid assembly, top plate, frame and body are connected mechanically and magnetically to offer the highest stability and accuracy.

**HIGH HOLDING POWER** – The dual Neodymium magnetic system generates up to 130 N/cm\textsuperscript{2} of holding force which is 60\% higher than traditional micropitch chucks.

**HIGH SECURITY** – The exceptionally high holding force ensures that components are held in place securely even in difficult working conditions such as a fully loaded clamping surface. Furthermore the holding performance stays on a high level even after 100,000 switching operations.

**TRULY UNIVERSAL** – The unique micro pole division allows to hold the widest range of workpiece sizes and thicknesses.

**LONG LIFE** – The solid top plate allows a high number of redressing operations whereas all moving parts are sealed against water ingress.

**CONSTRUCTION**

- Solid top plate with transverse poles, pole division 1.4 mm steel and 0.5 mm brass
- Life span (regrinding limit): 7 mm
- Dual\* Neodymium magnetic system; nominal\* holding force: 100 N/cm\textsuperscript{2}
- Solid steel base with robust actuating mechanism
- Waterproof assembly

**APPLICATION**

- Precision grinding of very small and thin up to large components
- Recommended minimum workpiece size: 4 x 4 x 1 mm
- EDM, possible to submerge in dielectric liquid

**SCOPE OF SUPPLY**

- Back and end stop
- Set of clamps
- Allen key
- User manual

* See Technology pages
FIXAR sine tables are equipped with a Neomicro² magnetic chuck. They are high precision instruments designed for *highly accurate angle grinding* and measuring purposes. The angle setting is done by slip gauges according to the sine principle. The unique bearing design together with the hardened base plate and side support allow for extreme precision over an extended period of use.

Fixar sine tables come in 2 standard versions:
- simple, magnetic chuck tilting over the long side (short lift)
- compound, magnetic chuck tilting over both long and short side

Fixar sine tables offer an unparalleled precision and stability for precision grinding, EDM and measuring jobs.

**CONSTRUCTION**
- Hardened, single piece and precision ground base plate
- Unique bearing design with distortion free locking and stainless steel rollers
- Zero slip gauge of 3 mm
- Stable side support of magnetic chuck
- Neomicro², waterproof permanent magnetic chuck

**BENEFITS**
- Extreme precision, maximum angle accuracy: +/- 5 seconds of arc
- Parallelism: +/- 5 microns/100 mm
- Accuracy is maintained over a long period of use
- Easy setting of very small angles
- Effective clamping of a large range of workpiece sizes

**APPLICATIONS**
- Precision angle grinding or EDM
- Measuring

**SCOPE OF SUPPLY**
- Wooden storage box
- Set of Allen keys
- Test certificate
- Manual and sine chart

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CONSTRUCTION
- Magnetic system with high energy Neodymium magnets; nominal** holding force 120 N/cm²
- Rigid top plate with transverse poles, pole division 5/1/5/1/2/1 mm, steel/stainless steel;
- Life span (regrinding limit): 6 mm
- Solid steel body with robust actuating mechanism;
- Waterproof assembly

SCOPE OF SUPPLY
- Back and end stop;
- Set of clamps;
- Allen key
- User manual

APPLICATIONS
- Precision grinding of small and thin up to large components;
- Spark erosion, possible to submerge in dielectric liquid.
- Light and medium duty surface and pocket milling;
- Recommended minimum workpiece size: 10x10x5 mm

* According to JIS standard
** Standard measuring method

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POWERFUL WORKHOLDING
Neodymax chucks dispose of a double magnetic circuit with Neodymium magnets to generate a very powerful clamping force. This makes them suitable for demanding machining operations, e.g. heavy grinding, medium duty milling.

LOW MAGNETIC FIELD
Apart from powerful, the magnetic field is low, thanks to the close pole distance which avoids the magnetization of the cutting tool.

RIGID AND STURDY
The solid steel base and sturdy pole plate with robust back and end stops ensure a high rigidity and stability of the chuck to withstand the higher machining forces associated with chip removal.

EASY WORKPIECE REMOVAL
Another advantage of the double magnetic system is the perfect neutralization of the magnetic field when switching the chuck off. This facilitates the removal of the workpieces from the chuck.

TRULY UNIVERSAL
The unique close pole division allows to hold a wide range of workpiece sizes and thicknesses in grinding, milling and spark erosion applications.

EXTENDED WORKHOLDING POSSIBILITIES
The top plate can be machined to accommodate workholding and positioning aids. On request, auxiliary top plates and pole parallels can be supplied to raise the workpiece and enable through drilling operations. This will protect the top plate from any damage.
**CONSTRUCTION**
- Flame cut top plate with epoxy resin gaps
- Life span (regrinding limit): 7 mm
- Pole pitch: 14, 18 and 25 mm depending on chuck size
- Solid body with firmly embedded coils
- Watertight assembly
- Optimized holding force – power consumption ratio
- Standard input voltage: 110 VDC

**BENEFITS**
- High holding force on uneven and rough components
- Clamping face can be fully loaded while maintaining sufficient holding force for pieces on the edge
- Nominal holding force: 120 N/cm²
- Good precision thanks to low temperature rise

**APPLICATIONS**
- Rough and finish grinding of medium to large size components
- Recommended minimum component size: 28 x 8, 36 x 10 and 50 x 15 mm respectively

**SCOPE OF SUPPLY**
- Back and end stop
- Set of clamps
- Power cord of 3 m
- Sizes 300 x 600 mm and bigger have studs for handling
- User manual with test certificate
- Other sizes and voltages can be supplied on request

**SUITABLE CONTROL UNIT**
- Available models M and MT
- See section Chuck Control Units for more information

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**ELMAX**

ELMAX electromagnetic chucks have a unique top plate with a shifting pole pattern. The polarity changes both in longitudinal and transverse direction which enables effective holding of many different workpiece shapes. Furthermore, this pole pattern generates a much higher holding force than a traditional transverse pole configuration.

ELMAX chucks are therefore particularly well suited for heavy duty grinding operations in mass and series production and can be fully loaded with components without a significant drop in clamping force.

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**SURFACE GRINDING**

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Unigrip chucks feature a low, single piece body together with a transverse fine pole top plate design. The magnetic field is quite homogeneous over the entire chuck surface. This allows effective holding of a wide range of steel components for precision grinding operations. They are designed for a power supply of 110 VDC through our M(T) control units which offer variable holding force and automatic demagnetization.

**CONSTRUCTION**
- Robust top plate with transverse poles, pole distance 19 mm
- Fine pole division steel/brass: 5/0.5/5/0.5/5/3 mm
- Life span (regrinding limit): 6 mm
- Solid piece body with firmly embedded coils
- Standard input voltage: 110 VDC
- Waterproof assembly

**BENEFITS**
- Low temperature rise: medium to high precision work
- Relatively low weight, more wheel head clearance
- Nominal holding force: 80 N/cm²

**APPLICATIONS**
- General purpose grinding of medium size up to large components
- Recommended minimum workpiece size: 25 x 25 x 5 mm
  - workpieces must be nested together to allow maximum flow of magnetic force lines
  - do not load full width of chuck if workpieces are small

**SCOPE OF SUPPLY**
- Back and end stop
- Set of clamps
- Power cord of 3 m
- Sizes 300 x 600 mm and bigger have studs for handling
- User manual with test certificate
- Other sizes and voltages can be supplied on request

**SUITABLE CONTROL UNIT**
- Available models M and MT
- See section Chuck Control Units for more information
ELECTROFINE

ELECTROMAGNETIC CHUCK

The multi coil system in our Electrofine chucks together with the fine pole spacings is designed to generate a strong and homogeneous magnetic field and to distribute the heat evenly over the whole chuck surface. The result is very effective holding of small and thin steel components for precision grinding operations. Electrofine chucks come in 2 versions – with a “fine” or “micro pitch” pole division. They are designed for a power supply of 110 VDC through our M(T) control units which offer variable holding force and automatic demagnetization.

CONSTRUCTION
- Solid top plate with transverse poles
- Fine pole division: 3 mm steel and 1 mm brass
- Life span (regrinding limit): 6 mm
- Micro pitch pole division: 1.4 mm steel and 0.5 mm brass
- Multi core magnetic system
- Solid piece body with firmly embedded coils
- Standard input voltage: 110 VDC
- Waterproof assembly

BENEFITS
- Low temperature rise: medium to high precision work
- Relatively low weight, more wheel head clearance
- Nominal holding force: 100 N/cm²

APPLICATIONS
- Surface grinding of small size up to large components
- Recommended minimum workpiece size:
  - fine pole: 25 x 25 x 3 mm, micro pitch: 15 x 15 x 1 mm
  - workpieces must be nested together to bridge the major pole distance

SCOPE OF SUPPLY
- Back and end stop
- Set of clamps
- Power cord of 3 m
- User manual with test certificate
- Other sizes and voltages can be supplied on request
- Electrofine chucks with longitudinal poles can also be supplied

SUITABLE CONTROL UNIT
- Available models M and MT
- See section Chuck Control Units for more information
BJP chucks also have a multi coil system together with a transverse fine pole top plate. They have a higher body to generate an even stronger and homogeneous magnetic field over the whole chuck surface. The result is very strong holding of small to large steel components for demanding grinding operations. They are designed for a power supply of 110 VDC through our M(T) control units which offer variable holding force and automatic demagnetization.

**CONSTRUCTION**
- Heavy duty top plate with transverse poles
- Fine pole division: 4 mm steel and 1 mm brass
- Life span (regrinding limit): 7 mm
- Major pole distance: approx. 42 mm
- Multi core magnetic system
- Solid piece body with firmly embedded coils
- Standard input voltage: 110 VDC
- Waterproof assembly

**BENEFITS**
- Nominal holding force: 120 N/cm²
- High material removing rate, faster production

**APPLICATIONS**
- Heavy duty surface grinding of medium size up to large components;
- Recommended minimum workpiece size: 35x35x3 mm
  - workpieces must be nested together to bridge the major pole distance

**SCOPE OF SUPPLY**
- Back and end stop
- Set of clamps
- Power cord of 3 m
- Sizes 300 x 600 mm and bigger have studs for handling
- User manual with test certificate

Other sizes and voltages can be supplied on request.

**SUITABLE CONTROL UNIT**
- Available models M and MT
- See section Chuck Control Units for more information
CHUCK CONTROL UNIT

ELECTROMAGNETIC CHUCK

Electromagnets need direct current to generate their magnetic field. With the help of a suitable power supply and a controller, in short a control unit, electromagnets can be energized and operated efficiently. Control units ensure the right voltage supply for the given type of chuck which also prolongs its life time.

DESCRIPTION AND FUNCTION
Chuck control units get their power from the AC line and convert the AC (alternating current) into DC (direct current) to "feed" the coils of the chuck. A microprocessor based control board in the unit allows adjusting the clamping force of the magnet and also automatic demagnetization. Basically, a chuck control has 2 distinct functions:
1. Convert AC input into DC output voltage, this is the power section.
2. Control the power, i.e. variable output voltage and polarity reversal, this is the control board with microprocessor.

A further important function lies in operator safety: The chuck control prevents the machine from running if the holding force of the chuck is too low.

VARIABLE HOLDING FORCE
A rotary button on the remote control station allows output voltage adjustment resulting in variable holding force. This prevents any deformations that would result from too strong a clamping force. A lower output voltage also helps to reduce the warming up of the coils inside the chuck and to work cooler with a higher accuracy.

AUTOMATIC DEMAGNETIZATION
Demagnetization of the chuck is accomplished by reversing the polarity and gradually reducing the output voltage of the control unit. The primary advantage is that both the magnetic chuck and the workpieces can be completely demagnetized. Thus workpieces can be easily removed from the chuck.
Depending on the type of steel, different demagnetizing programs can be selected.

SAFETY
Apart from the fact that our control units comply with the IEC electrical standards they also comply with the provisions of the European Machinery Directive 2006/42/EC. A safety contact inside the unit blocks the starting of the machine if the magnet is not switched on or if the holding force is too low. The minimum holding force can be set on the control board.

CONTROL UNITS AVAILABLE
For electromagnetic chucks we offer 2 types of control units M and MT (with transformer) and in 2 versions:
- without enclosure, protection class IP00 for integration in the machine’s control cabinet
- built into steel enclosure, protection class IP54, for wall mounting
Standard output voltage: 110 VDC
Input voltage: 230 VAC
Choosing the correct control unit depends upon the magnet wattage or the total wattage of multiple magnets.

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Uniperm and Epefine electropermanent magnetic chucks have very similar magnetic properties. They are both designed to hold a wide range of workpiece sizes for high precision grinding operations. Being electropermanent magnetic (EP), they offer a high level of safety because the holding force is generated by permanent magnets and a high precision because of the absence of a continuous current causing a temperature rise. Uniperm chucks are manufactured up to a size of 1200 x 400 mm. For larger sizes, we offer the Epefine design.

**CONSTRUCTION**
- Electro-permanent multi-core magnetic system
- Uniperm top plate with fine division transverse poles, 19 mm major pole distance
- Epefine top plate with 3 mm steel transverse poles and 1 mm brass separators, 36 mm major pole distance
- Rigid, solid body
- Watertight assembly

**BENEFITS**
- Increased safety, magnetic force is permanent
- High accuracy, homogeneous holding force over entire clamping surface and high mechanical stability
- Both small and large components can be clamped effectively
- Life span (regrinding limit): 7 mm
- Nominal holding force: 100 N/cm²

**APPLICATION**
- Medium to high precision grinding operations of a wide range of workpiece sizes
- Recommended minimum component size: 36 x 10 mm and 50 x 15 mm respectively
- Minimum height: 2 mm
- Minimum length: 30 mm

**SCOPE OF SUPPLY**
- Back and end stop
- Set of clamps
- Power cord of 3 m
- Sizes 300 x 600 mm and bigger have studs for handling
- Control unit model BUR with variable holding force and demagnetization
- User manual with test certificate
Powerfine and Epegrip electropermanent magnetic chucks have very similar magnetic properties. They are designed for general purpose grinding operations and characterized by the fact that they do not have a separate top plate like the Uniperm and Epefine chucks. This kind of design offers the best cost/quality ratio. The top surface can be reground up to a maximum of 6 mm.

Other benefits are a lower height and weight which allow a bigger workpiece load.

**POWERFINE**, featuring a close transverse pole division, steel/epoxy resin 7/6/7/4 mm. It is the most universal magnetic chuck of the two and also offers the best cost/performance ratio. Nominal holding force 110 N/cm².

**WORKPIECE**
- Minimum height: 4 mm
- Minimum length: 30 mm

**EPEGRIP**, featuring a transverse pole division, steel/epoxy resin 14/8 mm. The Epegrip chuck is quite similar to the Powerfine chuck. The difference is the somewhat coarser pole division which offers a higher holding force. Nominal holding force 120 N/cm².

**WORKPIECE**
- Minimum height: 6 mm
- Minimum length: 40 mm

**OPTION:**
- Brass separators

**SCOPE OF SUPPLY**
- Back and end stop;
- Set of clamps;
- Power cord of 3 m;
- Sizes 300 x 600 mm and bigger have studs for handling;
- Control unit model BUR with variable holding force and demagnetization;
- Standard control input voltage: 400 VAC;
- User manual with test certificate.

Other sizes and control voltages can be supplied on request.
ELECTRO-PERMANENT MAGNETIC CHUCKS

Electro-permanent magnets need direct current surges to activate or deactivate their magnetic field. With the help of a suitable power supply and a controller, in short a control unit, electro-permanent magnets can be (de-)energized and operated efficiently.

Model BUR control units ensure the right voltage supply for the given type of chuck which also prolongs its life time.

DESCRIPTION AND FUNCTION
Chuck control units get their power from the AC line and convert the AC (alternating current) into DC (direct current) to “feed” the coils of the chuck. A microprocessor based control board in the unit allows adjusting the clamping force of the magnet and also automatic demagnetization. Basically, a chuck control has 2 distinct functions:

1. Convert AC input into DC output voltage, this is the power section.
2. Control the power, i.e. variable output voltage, current surge duration and polarity reversal, this is the control board with microprocessor.

A further important function lies in operator safety: The chuck control prevents the machine from running if the holding force of the chuck is too low.

VARIABLE HOLDING FORCE
A rotary button on the remote control station allows output voltage adjustment resulting in variable holding force. This prevents any deformations that would result from too strong a clamping force.

AUTOMATIC DEMAGNETIZATION
Demagnetization of the chuck is accomplished by reversing the polarity and gradually reducing the output voltage of the control unit. The primary advantage is that both the magnetic chuck and the workpieces can be completely demagnetized. Thus workpieces can be easily removed from the chuck. Depending on the type of steel, different demagnetizing programs can be selected.

SAFETY
Apart from the fact that our control units comply with the IEC electrical standards they also comply with the provisions of the European Machinery Directive 2006/42/EC. A safety contact inside the unit blocks the starting of the machine if the magnet is not switched on or if the holding force is too low. The minimum holding force can be set on the control board.
NEOGRIp

Circular permanent magnetic chuck with a Neodymium magnetic system and parallel pole division for grinding operations. Neogrip chucks feature a low construction height and a very low magnetic field.

Holes can be drilled into the steel poles up to a depth of 15 mm to accommodate pins, pegs or other workholding aids. The hole diameter must not exceed the pole width. A pilot or centering hole can be drilled according to dimension D₁ x F.

CONSTRUCTION
- Silver brazed top plate, parallel pole division 8 mm steel + 3 mm brass
- Life span (regrinding limit): 7 mm
- Solid steel body with robust actuating mechanism
- Neodymium magnetic system; nominal holding force 80 N/cm²
- Waterproof design

APPLICATION
- Finish (circular) grinding

SCOPE OF SUPPLY
- Actuating key
- Operator’s manual

PERMAGRIP

Permagrip circular magnetic chucks are designed for quick clamping of ferromagnetic workpieces during grinding operations. The top plate with parallel poles is provided with concentric grooves for easy centering of workpieces. Like the Neogrip, holes can be drilled into the steel poles up to a depth of 15 mm to accommodate pins, pegs or other workholding aids.

CONSTRUCTION
- Robust top plate, parallel pole division 8 mm steel + 3 mm epoxy resin
- Life span (regrinding limit): 7 mm
- Solid steel body with robust actuating mechanism
- Neodymium magnetic system; nominal holding force 80 N/cm²
- Waterproof design

APPLICATIONS
- Finish (circular) grinding

SCOPE OF SUPPLY
- Switching key
- Operator’s manual
Ferromax chucks feature a very solid, silver brazed top plate with a double ferrite magnetic system. This type of chuck is designed for clamping thin to thick workpieces for turning and grinding operations. The top plate with parallel poles is provided with concentric grooves for easy centering of workpieces. It can be machined and drilled to accommodate driving or positioning pins and pegs or be provided with a pilot hole in the center (size $D_1 \times F$) for accurate centering of the workpiece.

**CONSTRUCTION**
- Solid, silver brazed top plate with parallel poles; life span 7 mm
- Pole division: 8 mm steel + 5 mm brass or 12 mm steel + 5 mm brass
- Double ferrite magnetic system
- Light weight aluminium body
- Diameters 200 up to 450 mm have variable holding force
- Diameters 600 to 800 mm have 4 switches
- Waterproof design

**BENEFITS**
- Very low magnetic field, 10 and 12 mm respectively
- No magnetization of the cutting tool
- Effective holding of thin plates
- High nominal clamping force of 120 N/cm²

**APPLICATION**
- Turning and grinding
- Minimum workpiece thickness to absorb all flux: 8 and 12 mm respectively
- Suitable to clamp steel plates from 2 mm and up

**SCOPE OF SUPPLY**
- Switching key
- Operator’s manual

---

### MOUNTING OF CHUCK TO MACHINE
The underside of the body has a recess and 3 or 4 threaded holes for mounting a suitable flange.

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Neostar chucks have a top plate with a radial pole configuration. This type of chuck is designed to clamp ring shaped workpieces more efficiently than a parallel pole chuck. The symmetrical design of a radial pole chuck provides a good initial mechanical balance which enables higher turning speeds. With the help of pole shoes or an auxiliary top plate, rings can be raised to allow inside (ID) and outside diameter (OD) grinding or turning. Neostar chucks can also be supplied with T-slots in the top plate which allow the use of adjustable pole shoes. All Neostar chucks are designed for drilling a through going center bore to allow the supply or drain of cooling liquid and to provide for tool clearance. Furthermore, the top plate can be drilled and tapped to accommodate driving or positioning pins. Dimension D1 indicates the diameter of the non-magnetic center piece. It is best to drill a center hole 1 or 2 mm bigger or smaller than D1 to avoid an irregular surface finish.

CONSTRUCTION
- Robust, one piece top plate with radial poles and epoxy resin gaps
- Remachining limit of top plate: 5 mm
- Double, high energy Neodymium magnetic system
- Solid steel body with robust actuating mechanism

APPLICATION
- Turning and grinding of ring shaped components; Optimal thickness and height of ring depends on number of poles
- ID, OD and face machining separately or in a single set up.

SCOPE OF SUPPLY
- Supplied without center bore
- Switching key
- Operator’s manual

OPTIONS
- Through going center bore
- Accurate centering hole
- Auxiliary top plate
- Top plate with threaded holes
- Top plate with T-slots
- Set of pole shoes
- Dynamic balancing

MOUNTING OF CHUCK TO MACHINE
The underside of the body has a recess and 3 or 4 threaded holes for mounting a suitable flange. See dimensions W, E and M.
New range of NEOSTAR chucks with aluminium body and patented switching mechanism **ALUSTAR** allowing variable holding force.

Unique, very safe, self-locking mechanism, preventing switching-off during machining.

**Typical set up procedure:**
1) Switch ON up to 10–20% power
2) Workpiece centring
3) Switch ON up to 100% power
4) Workpiece machining

No competitor offers such a solution! Furthermore, the aluminium body has significantly reduced the weight of the chuck.

### CONSTRUCTION
- Robust, welded top plate with radial poles and epoxy resin gaps
- Double, high energy Neodymium magnetic system;
- Solid aluminium body with worm gear actuating mechanism;

### APPLICATION, SCOPE OF SUPPLY, OPTIONS
- Same as standard Neostar

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**EM - FINE**

**CIRCULAR ELECTROMAGNETIC CHUCK**

EM-FINE chucks come with a fine division, parallel pole configuration designed for the finish grinding of small and thin workpieces in mass grinding. The parallel pole configuration requires the nesting of a multitude of workpieces for maximum magnetic efficiency. (See also the Technology pages.)

Standard pole pitch 5 mm (4 mm steel + 1 mm brass or epoxy).

**CONSTRUCTION**
- Solid machined top plate with brass gaps
- Solid machined body with firmly embedded coils
- Centering recess and mounting holes according to customer’s request
- Standard electrical connection from center bottom
- Waterproof assembly
- Standard input voltage: 110 VDC

**WORKPIECE**
- Minimum thickness and length 2 x 15 mm

**APPLICATION**
- Mass grinding of small and thin workpieces

---

**EM - RING**

**CIRCULAR GRINDING**

EM-RING chucks have a concentric pole configuration. It is designed for the clamping of medium to large workpieces away from the center of the chuck in series and mass production. For maximum magnetic efficiency, many workpieces must be nested together.

Standard pole pitch 16 mm (11 mm steel + 5 mm brass).

**CONSTRUCTION**
- Solid machined top plate with brass gaps
- Solid machined body with firmly embedded coils
- Centering recess and mounting holes according to customer’s request
- Standard electrical connection from center bottom
- Waterproof assembly
- Standard input voltage: 110 VDC

**WORKPIECE**
- Minimum thickness and length 5 x 55 mm

**APPLICATION**
- Series and mass grinding of medium up to large workpieces
EM - STAR

Circular electromagnetic chucks are made on order only. Standard dimensions range from Ø 250 mm up to Ø 3500 mm. Bigger diameters can be supplied on request. The chuck heights typically range from 90 mm to 120 mm. Standard input voltage is 110 VDC. Walmag EM chucks are operated from the control and power supply unit BUE (T), ranging from 120 W to 4 kW. Standard input voltage 230 or 400 VAC. Other input voltages are available on request.

EM-STAR is an electromagnetic chuck with radial pole configuration which is specifically designed for ring-shaped workpieces. The radial poles provide for a homogeneous clamping force over the diameter of the workpiece and enable maximum magnetic flux concentration. The electromagnetic principle allows infinite regulation of the clamping force.

The chuck’s center can be drilled through for the supply of cooling liquid or for tool clearance. Or a pilot hole can be provided for the centering of the workpiece. Other possibilities are a top plate with T-slots to suit adjustable pole shoes. Pole shoes raise the workpiece and allow inside and outside diameter machining.

CONSTRUCTION
- Solid machined top plate with epoxy resin gaps
- Solid machined body with firmly embedded coils
- Centering recess and mounting holes according to customer’s request
- Standard electrical connection from center bottom
- Waterproof assembly
- Standard input voltage: 110 VDC

BENEFITS
- Solid, waterproof design guarantees a long life
- High turning speeds thanks to symmetrical construction
- Continuous, accurate adjustment of clamping force

APPLICATION
- Grinding of ring shaped components
- ID, OD and face grinding separately or in a single set up

OPTIONS
- Centering hole in top plate
- Top plate with threaded holes or T-slots
- Set of pole shoes
- Auxiliary top plate
- Slip ring assembly and carbon brushes

BearinG RING GRINDING

Circular grinding + turning
EPEFINE

ELECTROPERMANENT CIRCULAR CHUCK

EPEFINE chucks come with a fine division, parallel pole arrangement designed for the finish grinding of small and thin workpieces. Standard pole pitch 5 mm (4 mm steel + 1 mm brass or epoxy). For maximum magnetic efficiency multiple workpieces must be nested together. (See also the Technical pages).

WORKPIECE
- Minimum thickness: 2 mm
- Minimum length: 15 mm

APPLICATION
- Grinding of small and thin workpieces.

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EPERING

This chuck presents a high-quality electropermanent circular chuck with the pole plate in the shape of a concentric circular pole. The poling permits a multiple workpiece arrangement Standard pole pitch 16 mm (11 mm steel + 5 mm brass).

It is especially suitable for clamping of medium to large workpieces.

WORKPIECE
- Minimal height 5 mm
- minimal length 55 mm

APPLICATION
- Grinding of medium and large workpieces

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POWERFINE

The most universal electropermanent magnetic chuck in its range. Attractive price/performance ratio. Technology FULL DEMAG EP. (See Technology pages). Standard pole pitch 11 mm (7 mm steel + 4 mm brass or epoxy).

WORKPIECE
- Minimal height 4 mm
- minimal length 30 mm

APPLICATION
- Universal for grinding

Note: Consult Us for suitable powersupply and control units.
Like the EM-STAR, the EPESTAR chucks have a radial pole configuration, specifically designed for ring-shaped workpieces. The radial poles create a homogeneous field over the full diameter of the workpiece and provide for a maximum magnetic flux concentration in the contact area between chuck and workpiece. EPESTAR chucks are permanent magnetic chucks, activated and deactivated by short current impulses. They do not need a continuous power supply which eliminates any thermal expansion due to electrical heating. These magnets are supplied in two types: COMPENSATED EP and FULL DEMAG EP. (See Technology pages).

**CONSTRUCTION**
- Solid machined top plate with epoxy resin gaps
- Solid machined body with firmly embedded coils and permanent magnets
- Centering recess and mounting holes according to customer's request
- Standard electrical connection from center bottom
- Waterproof assembly
- Standard input voltage: 340 VDC

**APPLICATION COMPENSATED EP**
- Turning of ring parts and annulus
- Machining of the front and sides in the same time

**APPLICATION FULL DEMAG EP**
- Grinding of ring parts and annulus
- Light turning of ring parts and annulus
- Machining of the front and sides in the same time

**ACCESSORIES**
- Suitable control unit due to the chuck
- Slip rings
- Standard pole plate without adjustments

Available NEOSTAR sizes: Ø 250-3500 mm
Number of poles depends on diameter and application

**Typical heights:**
Mounting recess and threaded holes in the back according to customer requirements.
They are suitable even for the most difficult machining operations.

**NEOMILL**

The **NEOMILL** has the same outstanding properties as the original Neomill. The difference is found in the top plate which has stainless steel instead of brass separators.

**ADVANTAGES**
- higher resistance against wear
- higher precision

**CONSTRUCTION**
- Magnetic system with high energy Neodymium magnets; nominal holding force 130 N/cm²
- Rigid top plate with transverse poles, pole division 11 mm steel + 4 mm brass
- Solid steel body with robust actuating mechanism
- Waterproof assembly

**APPLICATIONS**
- Milling
- Drilling
- Planing
- Heavy grinding
- Recommended minimum workpiece size: 15x15x6 mm

**SCOPE OF SUPPLY**
- Back and end stop
- Set of clamps
- Allen key
- User manual

---

**NEOMILL 2**

The **NEOMILL 2** has the same outstanding properties as the original Neomill. The difference is found in the top plate which has stainless steel instead of brass separators.

**ADVANTAGES**
- higher resistance against wear
- higher precision

**CONSTRUCTION**
- Magnetic system with high energy Neodymium magnets; nominal holding force 130 N/cm²
- Rigid top plate with transverse poles, pole division 11 mm steel + 4 mm brass
- Solid steel body with robust actuating mechanism
- Waterproof assembly

**APPLICATIONS**
- Milling
- Drilling
- Planing
- Heavy grinding
- Recommended minimum workpiece size: 15x15x6 mm

**SCOPE OF SUPPLY**
- Back and end stop
- Set of clamps
- Allen key
- User manual

---

**PERMANENT CHUCK**

Powerful magnetic chuck, suitable for demanding chip removal operations.

**POWERFUL WORKHOLDING**
Neomill chucks dispose of a double magnetic circuit with Neodymium magnets to generate a very powerful clamping force. This makes them suitable for very demanding machining operations, e.g. milling, planing or drilling.

**LOW MAGNETIC FIELD**
Apart from powerful, the magnetic field is low, thanks to the close pole distance which avoids the magnetization of the cutting tool.

**RIGID AND STURDY**
The solid steel base and sturdy pole plate construction ensures a high rigidity and stability of the chuck to withstand the higher machining forces associated with chip removal.

**EASY WORKPIECE REMOVAL**
Another advantage of the double magnetic system is the perfect neutralization of the magnetic field when switching the chuck off. This facilitates the removal of the workpieces from the chuck.

**EXTENDED WORKHOLDING POSSIBILITIES**
The top plate can be machined to accommodate workholding and positioning aids. On request, auxiliary top plates and pole parallels can be supplied to raise the workpiece and enable through drilling operations. This will protect the top plate from any damage.

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**SURFACE MILLING**

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SURFACE MILLING

THE MOST POWERFUL PERMANENT MAGNETIC CHUCK, SUITABLE FOR 5-SIDED MACHINING OPERATIONS

EXTREMELY POWERFUL WORKHOLDING

Like the Neomill chuck, the **NEOPOWER** disposes of a double Neodymium magnetic system, however with a wider pole distance and a deeper magnetic field to overcome airgaps and other resistances in the magnetic circuit more effectively. Workpieces with an uneven surface or which are hard to magnetize are held with 10 to even 50% more power depending on the conditions.

CONTROLLED DEPTH OF FIELD

The powerful magnetic field merely penetrates up to 8 mm into the workpiece whereas the chuck does not generate stray fields. The benefit is the absence of undesired magnetization of the cutting tool and steel chips are evacuated easily.

ROBUST CHUCK DESIGN

Like all permanent magnetic chucks of Walmag Magnetics, the body is made of a solid piece of steel and firmly connected to the top plate to create a rigid, sturdy assembly, capable to cope with high machining forces.

5-SIDED MACHINING POSSIBILITIES

A wide range of accessories is available for Neopower chucks. For instance a set of pole raiser parallels or a special steel shim to raise the workpiece. Thus, the vertical sides can be machined and through holes can be drilled.

AUTOMATION

Neopower chucks are supplied with an Allen key for manual switching as standard. Pneumatic switching (from 280 mm size) is available on request which will allow remote, simultaneous and automatic switching.

CONSTRUCTION

- Magnetic system with high energy Neodymium magnets; nominal holding force 140 N/cm²
- Top plate with transverse poles, pole division 15 mm steel + 4 mm epoxy resin, optional brass
- Solid steel body with robust actuating mechanism
- Waterproof assembly

APPLICATIONS

- Surface milling; contour and pocket milling, slotting
- High speed cutting
- Drilling, tapping

SCOPE OF SUPPLY

- Back and end stop
- Set of clamps
- Allen key
- User manual

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ACCESSORIES

Set of pole raiser parallels
This set consists of 2 slotted side rails and a suitable number of steel bars to cover the chuck completely. The steel bars having a section 15 × 10 mm act like pole raisers. Their ends simply fit into the slots of the rails which ensure a correct position. Once worn, the user could simply make a new set of bars as they are made of mild steel.

Steel grate
Instead of separate bars, a complete grate with a height of 15 mm to cover the chuck can be supplied.

Slotted steel shim
A slotted steel shim typically has a thickness of 3 mm and covers the chuck completely. It is an economical and effective way to raise the workpiece for 5-sided machining and through drilling.

End stops with T-slots
T-slots of 8 mm allow to use mechanical clamps to support the workpiece more positively in case of critical operations.
APPLICATION EXAMPLES NEOPOWER

SURFACE MILLING
Unilateral cutting forces, the component is supported by back and end stop.

SURFACE AND POCKET MILLING:
Multi directional forces, component is raised.

CHAMFERING, CONTOURING, DRILLING, BORING:
Special steel shim to raise the workpiece and provide tool clearance.

CLAMPING OF IRREGULAR COMPONENTS:
T-slot end stop with adjustable ruler.
TURBOMILL 18

TurboMill 18 chucks come with 18 mm transverse pole and a single magnetic system. Thanks to its full demagnetization capability, this chuck allows to reach the lowest possible residual magnetism level in the workpiece.

FEATURES
- Pole division: 18 mm of steel, 10 mm of epoxy resin
- Recommended minimum workpiece thickness and length: 9 and 60 mm
- Nominal holding force: 120 N/cm²
- Input voltage: 360 Vdc.

APPLICATIONS
- Surface milling and drilling of medium to large sized plates, starting at 200 x 200 mm and heavy duty grinding operations.

SCOPE OF SUPPLY
- Stops on 2 sides
- Cable junction box on long side
- 3m long armoured cable
- 4 chuck clamps

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## TURBOMILL 40 B

Double, “compensated” magnetic system to achieve the highest holding performance, suitable for the most arduous chip removal operations.

### FEATURES:
- Transverse poles, pole division 40 mm of steel, 16 mm of epoxy resin
- Recommended minimum workpiece thickness - 20 mm.
- Chuck height: 40 mm
- Nominal holding force: 170 N/cm²
- Input voltage: 360 Vdc

### APPLICATIONS
- Five sided machining
- Milling
- Drilling
- Boring of large moulds, ingots, blocks, frames, etc.

### SCOPE OF SUPPLY
- Stoppers on 2 sides
- Cable junction box on long side
- 3 m long armoured cable
- 4 chuck clamps

#### Turbomill 40NS (On request only)

In the „NS“ design every chuck pole is active. With this technology, we managed to decrease the height of the magnetic field and still increase the clamping force. The magnetic flux is „controlled“ and stays within the workpieces. Neither the tool nor the machine can get magnetized.

On request Turbomill 25B

Suitable for medium components, frames etc. The pole width is 25 mm.

See Technology pages for comparison and selection of Turbomill chucks.
TURBOMILL 50SQ-1 NEW

New, very low 50 mm square pole design, "compensated" high power magnetic system. Suitable for rough and uneven components. Controlled depth of magnetic field resulting in a low field height.

FEATURES
- Pole division 50 mm of steel, 10 mm of epoxy
- Recommended minimum workpiece thickness 12 mm
- Extremely low height 50 mm
- Nominal holding force 160 N/cm²

APPLICATIONS
- Five sided machining
- Milling
- Drilling
- Boring of large moulds, ingots, blocks, frames, etc.

SCOPE OF SUPPLY:
- Quick Push-pull connector
- Stoppers on 2 sides
- Cable junction box on long side
- 3 m long armoured cable
- 4 chuck clamps
- Input voltage 360 Vdc

OPTIONS FOR TURBOMILL CHUCKS
- Different cable junction box location
- Quick acting bayonet connector
- Holes for pole extensions
- Through-going holes
- Other input voltages

See Technology pages for comparison and selection of Turbomill chucks.

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ACCESSORIES
WALMAG MAGNETICS offers a comprehensive range of accessories to suit your application best.

POLE RAISER PARALLELS & ADAPTER PLATES
Pole raiser parallels are extremely useful in small production runs. They are an inexpensive means to raise the workpieces to carry out drilling and boring operations without damaging the surface of the magnetic chuck. For larger batches, dedicated adapter plates are very effective to raise the workpieces enabling drilling and contour milling operations.

FIXED & SLIDING POLE EXTENSIONS
Available for both TURBOMILL 40 and TURBOMILL 50SQ, sliding poles can adapt themselves to the shape of the workpiece, eliminate clamping stress and raise the workpiece above the clamping surface of the chuck to allow five sided machining in one single set up. They allow to equalize an unevenness of up to 5 mm. Sliding poles enable the operator to achieve a flat workpiece without having to use cumbersome shimming. Sliding pole extensions must be combined with 3 fixed pole extensions in order to create the supporting plane of the workpiece. Setting up and rearranging the pole extensions is easy and quick thanks to positioning pins or integrated screws.

AIR BLOWING SYSTEM
The clamping surface of the chuck can be provided with air blowing holes to create an air cushion under large and heavy plates. The air facilitates the release of large plates after machining enormously and also allows to position such plates easily and accurately.
NEOSPARK chucks are primarily designed for workholding on spark erosion machines (EDM), more specific die sinking. Particularly important is the low magnetic field height, allowing operations close to the chuck’s surface. The switching mechanism is conveniently located at the top of the chuck. Thanks to the low profile, Neospark chucks can be mounted on a pallet without creating height and/or weight problems.

**CONSTRUCTION**
- Solid top plate with transverse poles, pole division 1.4 mm steel and 0.5 mm brass
- Life span (regrinding limit): 7 mm
- Dual* Neodymium magnetic system; nominal holding force: 100 N/cm²
- Solid steel base with integrated actuating mechanism
- Waterproof assembly

**USAGE**
- EDM, possible to submerge in dielectric liquid
- Precision grinding of very small and thin up to large components

**SCOPE OF SUPPLY**
- Set of clamps
- Allen key
- User manual

* See Technology pages

### Code L/mm W/mm C/mm H/mm Weight/kg

<table>
<thead>
<tr>
<th>Code</th>
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<th>C/mm</th>
<th>H/mm</th>
<th>Weight/kg</th>
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</table>
Walmag Magnetics range of magnetic pallet chucks are designed for use in conjunction with zero-reference systems, like System 3R, Erowa, Hirschmann and others. The magnetic pallets are typically square with sharp or cut-off corners and can be either mounted on top of a pallet or fitted with zero reference elements. The advantage of the latter version being the lower height and weight of the clamping tool.

**FEATURES**
- Micropitch pole division, 1.4 mm of steel, 0.5 mm of brass
- Life span of top plate: 6 mm
- Neodymium magnetic system, nominal holding force 100 N/cm²
- Magnetic field height: 4 mm
- Solid aluminium body
- Actuating mechanism with variable holding power
- Suitable for mounting or adaptation
- Base can be machined up to 12 mm deep

**APPLICATIONS**
- Holding of very small to large components
- Precision grinding
- Spark erosion (die sinking)
- Light milling

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>L x W /mm/</th>
<th>H /mm/</th>
<th>Switch</th>
<th>Weight /kg/</th>
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<tr>
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<tr>
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**INTRODUCTION**

**NEOMICRO PALLET**

**PERMANENT CHUCK**

**NEOMILL PALLET**

**SCOPE OF SUPPLY**
- Back and end stops;
- Allen key
- User manual

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>L x W /mm/</th>
<th>H /mm/</th>
<th>Switch</th>
<th>Weight /kg/</th>
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<tr>
<td>320 x 320-45</td>
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<td>1</td>
<td>34</td>
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</table>

**FEATURES**
- Transverse pole division, 11 mm of steel, 4 mm of brass
- Life span of top plate: 6 mm
- Neodymium magnetic system, nominal holding force 130 N/cm²
- Magnetic field height: 6 mm
- Solid aluminium body
- Actuating mechanism with variable holding power
- Suitable for mounting or adaptation
- Base can be machined up to 12 mm deep

**APPLICATIONS**
- Holding of small to large components
- Medium duty and high speed milling
- Heavy grinding

**SCOPE OF SUPPLY**
- Back and end stops;
- Allen key
- User manual
APPLICATION EXAMPLES

PERMANENT CHUCK

FEATURES
- Transverse pole division, 15 mm of steel, 4 mm of brass
- Life span of top plate: 6 mm
- Neodymium magnetic system, nominal holding force 140 N/cm²
- Magnetic field height: 8 mm
- Solid steel body
- Actuating mechanism with variable holding power
- Suitable for mounting or adaptation
- Base can be machined up to 4 mm deep

APPLICATIONS
- Holding of medium size to large components
- Heavy duty and high speed milling
- 5-Sided machining
- Drilling, tapping
- Heavy grinding

SCOPE OF SUPPLY
- Back and end stops;
- Allen key
- User manual

ACCESSORIES AND OPTIONS
Set of pole raiser parallels
This set consists of 2 slotted side rails and a suitable number of steel bars to cover the chuck completely. The steel bars having a section 15 × 10 mm act like pole raisers. Their ends simply fit into the slots of the rails ensuring a correct position. Once worn, the user could simply make a new set of mild steel bars himself.

Steel grate
Instead of separate bars, a complete grate with a height of 15 mm to cover the chuck can be supplied.

Slotted steel shim
A slotted steel shim typically has a thickness of 3 mm and covers the chuck completely. It is an economical and effective way to raise the workpiece for 5-sided machining and through drilling.

End stops with T-slots
T-slots of 8 mm allow the use mechanical clamps to support the workpiece more positively in case of critical operations.

Automation
Neopower chucks are supplied with an Allen key for manual switching as standard. Pneumatic switching (from 280 mm size) is available on request which will enable remote, simultaneous and automatic switching.

TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>L x W (mm)</th>
<th>H (mm)</th>
<th>Switch</th>
<th>Weight (kg)</th>
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<td>320 x 320 – 45</td>
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</tbody>
</table>

NEOPOWER PALLETS

MAGNETIC PALLET CHUCKS
FEATURES
- Square pole division, 50 mm with 10 mm epoxy resin gap
- Life span of top plate: 5 mm
- Neodymium magnetic system, nominal holding force 160 N/cm²
- Magnetic field height: 10 mm
- Solid steel body
- Push-pull connector
- Suitable for mounting on pallet
- Base can be machined up to 4 mm deep

APPLICATIONS
- Holding of medium size to large components
- Heavy duty and high speed milling
- 5-Sided machining
- Drilling, tapping

SCOPE OF SUPPLY
- Back and end stops;
- User manual

ACCESSORIES AND OPTIONS
- Fixed and moving pole extensions (see page 29)
- Extra connector acting as safety contact and parking station

Consult us for further information!
Table or platen demagnetizers are designed for use in tool rooms, workshops and production lines. They are particularly effective for flat parts like small punches and dies, bearing races and other machinery parts.

Walmag DM series demagnetizers have a unique electric design. Two coils ensure a homogeneous magnetic field and work together with a resonance circuit. The result is an automatic adjustment of the demagnetizing field to the volume to the part. The bigger the part, the stronger the field. Without a part, the table draws only little current and stays cool.

### CONSTRUCTION
- Lightweight aluminium body
- Stainless steel top plate
- Double pole switch with signal light
- Power cord 3 m with plug
- Input voltage: 230V/50Hz

### FEATURES
- Large effective area
- Automatic increase of demagnetizing field with workpiece volume
- Field penetration up to 40 mm
- Low stand-by power consumption
- Model DM4-Easy Logic specially designed for use in tool rooms

### APPLICATION
- Manual demagnetization of tools, dies, bearings and other flat parts.
- Under a conveyor belt of a production line
- Several tables can be mounted side by side to create a larger working area.

### ACCESSORIES

<table>
<thead>
<tr>
<th>Code</th>
<th>Type</th>
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<td>15</td>
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</tbody>
</table>

Other voltages upon request.
Walmag hand demagnetizers series HD feature a lightweight plastic body with a large handle with push button for easy manipulation. They are typically used in situations where the component is too big or difficult to get access to.

**FEATURES**
- Sturdy plastic body with large handle
- Incorporated push button
- Protection against overheating
- Field penetration up to 30 mm
- Duty cycle: 20%
- Power cord 3 m with plug
- Input voltage: 230V/50-60Hz

**APPLICATION**
- Demagnetizing of small to large components up to 30 mm deep
- Maximum operating time: 10 minutes

### HAND DEMAGNETIZER HD

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>HD-1</td>
<td>Code 51.57.212 Active demagnetizing surface 105 x 75 mm, Voltage 230 - 240 V / 50 Hz, Supply 300 VA, Demagnetizing field max. 2000 A/m, Active depth of demag. field max. 20 mm, Weight 1,9 kg</td>
</tr>
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<td>HD-2</td>
<td>Code 51.57.213 Active demagnetizing surface 105 x 95 mm, Voltage 230 - 240 V / 50 Hz, Supply 350 VA, Demagnetizing field max. 2000 A/m, Active depth of demag. field max. 40 mm, Weight 2,2 kg</td>
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</tbody>
</table>

### TUNNEL DEMAGNETIZER

Tunnel or aperture type demagnetizers are designed for large cylindrical or box shaped components. The size of the component should preferably match the aperture dimensions. They are designed for continuous duty and suitable for use in a production line.

**CONSTRUCTION**
- Epoxy resin casing
- Solid aluminium base with circuit breaker, switch and signal light
- Power cord 3 m
- Input voltage: 230V/50-60Hz

**APPLICATION**
- Demagnetizing of small to large components up to 30 mm deep
- Maximum operating time: 10 minutes

Other sizes and voltages on request.
**DIGITAL GAUSS METER**

**DESCRIPTION**
- Measuring range from 0 up to 999 Gauss;
- indication of magnetic polarity;
- display light;
- dimension 76 x 61 x 24 mm;
- battery: 9 VDC;
- battery life, 72 hours of uninterrupted working, several months of intermittent usage.
FEATURES AND APPLICATIONS

- Walmag Magnetics laminated blocks and plates are silver brazed products with 3 mm of steel and 1 mm of brass laminations.
- Being solid pieces without bolts or tie-bars, they can be machined to practically any desired shape to suit one or multiple components.
- Also, our laminated bars with longitudinal poles (laminations) can be cut into thin spacers or small adapter plates.
- Rectangular and circular laminated plates are typically used as adapter plates.
- Also, these plates can be used to reduce the pole pitch of the chuck and enable the holding of small and thin components.

PRODUCT RANGE

- Plates and bars with transverse poles
- Bars with longitudinal poles
- Rectangular and circular adapter plates
- V-blocks with 90 degree prism
- Standard thickness: 25 and 40 mm
LAMINATED BLOCKS
MAGNETIC V-BLOCKS

PRODUCTS BRAZED WITH SILVER

PAIR OF V-BLOCKS

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
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</table>

AUXILIARY, LAMINATED CIRCULAR TOP PLATES

<table>
<thead>
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<td>70.00.025</td>
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<td>25</td>
</tr>
<tr>
<td>70.00.030</td>
<td>300</td>
<td>25</td>
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</tbody>
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Magnetic V-blocks are useful for holding cylindrical and flat components for measuring and light machining operations. These products can be used under coolant or submerged in dielectric liquid.

SWITCHABLE PERMANENT MAGNETIC BLOCKS

BLOCK MB100
- Robust block with 4 magnetic clamping faces
- Provided with 5 V’s (prisms)
- Sturdy ON/OFF switch

V 68-53-65
V 120-80-98
W 120-80-98
- Provided with 3 magnetic faces:
  - top, bottom and opposite to switch
- Large V holds big diameters
- “W” is a matched pair with height ground to 5 microns tolerance

V 100-70-95
W 100-70-95
- Provided with 3 magnetic faces:
  - top, bottom and opposite to switch
- Top face hardened to 55 RC
- “W” is a matched pair with height ground to 5 microns tolerance.

<table>
<thead>
<tr>
<th>Code</th>
<th>Hardened</th>
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<th>Width /mm/</th>
<th>Height /mm/</th>
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<td>8</td>
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<tr>
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<td>x</td>
<td>120</td>
<td>2</td>
<td>98</td>
<td>70</td>
<td>0,01</td>
<td>11,8</td>
</tr>
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**MAGNETIC CLAMPING TECHNOLOGY**

**CHOOSING THE RIGHT MAGNETIC CHUCK IN 3 STEPS**
1. What kind of machining? E.g. only certain chucks are suitable for milling.
2. Most common workpiece size(s), in particular the smallest, thinnest, determine the pole division.
3. Size of magnetic chuck. Permanent magnetic chucks are available up to (only) 600 x 300 mm.

**OTHER, ESSENTIAL SELECTION CRITERIA**
- Variable holding required? Permanent magnetic chucks mostly do not offer variable holding.
- Demagnetization required? Only EM and certain EP chucks offer demagnetization.

**PERMANENT MAGNETIC CHUCKS**
In permanent magnetic chucks, we find the utilization of high energy magnets and ferromagnetic materials which, in a particular arrangement, facilitate the clamping of magnetic steel. Under normal conditions, the magnets do not lose their magnetic force. Activation and deactivation (switching On and Off) is performed mechanically by moving the internal permanent magnetic system. This is usually done manually by means of a handle.

**Benefits of permanent magnetic chucks**
- Independence from electrical power: safety and no ongoing costs.
- Easy installation and quick transfer of the chuck onto another machine.
- No heat development and no thermal deformations of the pole plate which allows highly accurate machining.
- Usually with a close pole distance: very effective holding of small and thin workpieces.

**Electro-permanent magnetic chucks**
- A robust design, virtually maintenance free with a very long life.
- Relatively low investment cost.

**Restrictions of permanent magnetic chucks**
- Chuck dimensions are generally limited to 600x300 mm.
- Mostly no variable holding force or demagnetization.
- The mechanical switching system is not suitable for automation.
- Mechanical wear

**ELECTROMAGNETIC CHUCKS**
The magnetic field in this type of chuck is generated by coils supplied with direct current. Inside the coils cores of ferromagnetic material are located. These cores are magnetized by the electromagnetic field. Electromagnets are activated by a control unit which allows variable holding force and demagnetization of the workpiece.

**Benefits of electromagnetic chucks**
- Easy operation thanks to the control unit, simply push a button or turn a switch.
- The magnetic force can be easily adjusted to create optimal workholding conditions.
- The control unit enables to demagnetize the workpieces for easy removal from the chuck.
- Operation can be semi or entirely automatic through interfacing with the machine.

**Restrictions of electromagnetic chucks**
- The chuck needs a continuous supply of current, interruption of the supply leads to loss of holding power.
- Depending on the operation a back-up power supply may be required.
- The current through the coils generates heat which limits the level of accuracy.

**ELECTRO - PERMANENT MAGNETIC CHUCKS**
Electro-permanent magnetic chucks are in fact permanent magnetic chucks. The permanent magnets inside the chuck are activated and deactivated by the magnetic field of coils in which they are placed. Electric current is just needed for a few seconds to generate the magnetic filed and magnetize or demagnetize the permanent magnets. A control unit supplies the current and enables to adjust the holding force and to demagnetize the workpieces.

**Benefits of electro-permanent magnetic chucks**
- Greater safety as the force is generated by permanent magnets; when the power supply is cut off, nothing can happen and the workpieces stay clamped.
- Very high machining accuracy as there is no temperature rise of the coils inside the chuck and consequently no risk of deformations.
- Minimal electricity consumption.
- Operation from a control unit enabling variable holding force, demagnetization and automatic machining.

**Restrictions of electro-permanent magnetic chucks**
- Higher cost and higher weight than other types of chucks.
- EP chucks for grinding have a somewhat lower holding force under unfavorable conditions than EM chucks.
ELECTROPERMANENT CHUCK GRINDING

The electropermanent magnetic system presents the perfect solution. It marries safety with high performance and economy.

As shown in the sketches on the left, a short current rush is all that is needed to activate (magnetize) the permanent magnet. Chuck is ON.

To switch the chuck OFF, the permanent magnet must be demagnetized. At the same time, workpieces on the chuck are also completely demagnetized. This is accomplished by a smart control unit.

In particular tool steels need to be demagnetized to eliminate residual magnetism, causing the workpieces to remain stuck on the chuck clamping surface.

TOTAL DEMAGNETIZATION is a typical feature of EP chucks for grinding purposes.

![Diagram showing the comparison of different grinding machines and workpieces](image)

**Technologies**

- Small / thin
- Big / thick
- High-quality finishing
- Final finishing

**Types of Grinding Machines**

- UNIPERM
- EPEFINE
- POWERFINE
- EPEGRIP

**Workpiece Solutions**

- Small / thin
- Big / thick
- Workpiece
EP chucks for milling, or chip removal operations dispose of a double magnetic circuit with Neodymium magnets in order to generate a much stronger magnetic field than that of chucks for grinding. This double, or also called compensated magnetic system, is shown in the following sketches.

The magnets are always active (magnetized). Switching is accomplished by reversing the polarity of the switchable magnet by means of the field of the coil. The current runs for merely a second. With a double magnetic circuit, the external magnetic field cannot be reversed for demagnetizing.

**HOW TO CHOOSE THE RIGHT MAGNETIC CHUCK FOR YOUR MILLING JOB?**

The diagram shows the application range for each chuck model.
THE BASICS OF MAGNETIC CLAMPING

- Only ferromagnetic materials can be clamped magnetically. Most steels are ferromagnetic and have good magnetic properties. Wood, glass, aluminium and brass are non-magnetic.
- The component is part of the magnetic circuit, the circuit between the North and the South pole(s) of the magnet. The component must close the circuit as best as possible.
- Magnetic chucks have different kinds of pole configurations, see figures with correct workpiece positions below.

RECTANGULAR CHUCKS

- TRANSVERSE POLES
- LONGITUDINAL POLES
- SQUARE POLES

CIRCULAR CHUCKS

- CONCENTRIC POLES
- PARALLEL POLES
- ADIALPOLES

HOLDING FORCE

- \( F_p = \text{Pulling force} \)
- \( F_s = \text{Sliding force} \)
- \( f = \text{Friction factor} \)
- \( F_s = f \times F_p \)
- \( f = 0.15 - 0.35 \)

**FACTORS AFFECTING THE HOLDING FORCE**

1. **Contact area and surface condition – airgap**
   The more intimate the contact between component and clamping face, the higher the force. Poor contact, roughness, unevenness, burrs, dirt etc. create an “airgap” which reduces the magnetic flux.

2. **Workpiece thickness**
   Only if the workpiece is able to conduct all the available magnetic flux from the poles of the magnet, the maximum holding force is attained. If the workpiece thickness is less than 50% of the pole width, the holding force will be lower.

3. **Material composition and condition**
   Low carbon mild steel like S 235JR has very good magnetic properties and is our reference material. Alloys and heat treatment reduce the magnetic properties and the maximum possible holding force. See table below.

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<thead>
<tr>
<th>Kurzname DIN</th>
<th>Werkstoff-Nr.</th>
<th>max. unmagnetischer Legierungsanteil</th>
<th>Wärmebehandlung</th>
<th>Haftkraft Magnetic force</th>
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<td>S50-2</td>
<td>1.0050</td>
<td>-</td>
<td>weich mild</td>
<td>79%</td>
</tr>
</tbody>
</table>
# The Basics of Magnetic Clamping

## Kurzname DIN

<table>
<thead>
<tr>
<th>DIN designation</th>
<th>Werkstoff-Nr.</th>
<th>max. unmagnetischer Legierungsanteil</th>
<th>Wärmebehandlung</th>
<th>Haftkraft</th>
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<tbody>
<tr>
<td>Einsatzstähle</td>
<td>C10</td>
<td>1.0301</td>
<td>weich mild</td>
<td>98%</td>
</tr>
<tr>
<td></td>
<td>C15</td>
<td>1.0401</td>
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<td>98%</td>
</tr>
<tr>
<td></td>
<td>17CrNiMo6</td>
<td>1.87</td>
<td>weich mild</td>
<td>76%</td>
</tr>
<tr>
<td></td>
<td>16MnCr5</td>
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<td>87%</td>
</tr>
<tr>
<td></td>
<td>20MnCr5</td>
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</tr>
<tr>
<td>Nitrierstähle</td>
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<td>81%</td>
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<tr>
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<tr>
<td></td>
<td>34CrAlNi7</td>
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<tr>
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<td>9SMn28</td>
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<td>45S20</td>
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<tr>
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<td>C45</td>
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<td>Walzlagerstähle</td>
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<tr>
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<td>77%</td>
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<td>X102CrMo17</td>
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<tr>
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<td></td>
<td>51MnV7</td>
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<tr>
<td>Kaltfließpressstähle</td>
<td>G15</td>
<td>1.1132</td>
<td>weich mil</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td>41C4</td>
<td>1.35</td>
<td>weich mild</td>
<td>85%</td>
</tr>
</tbody>
</table>

## 4. Temperature

The nominal holding force is measured at room temperature, 20 to 25 °C. High temperatures, like 60, 80 °C or more will affect the holding force due to the increase of resistance in the magnetic circuit. For permanent magnetic chucks the reduction in holding force is approx. 3% per degree C of temperature rise.

## Optimizing the Holding Force

1. Reduce the “airgap”: Remove burrs, lumps, rust and scale. Straighten the component if necessary. Use magnetic shims if the component is rocking.
2. Improve or complete the magnetic circuit if a component is small, by using magnetic “packing” pieces. Nest, or cluster multiple small components.
3. Support high components by adequate steel pieces to avoid tipping or tilting during machining.
4. Use back and end stops to support the components against sliding.
5. Make use of adapter plates or pole shoes to support irregularly shaped components.

## Technology Pages

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www.walmag.cz
Ferromagnetic components retain magnetism after having been subjected to a magnetic field. This is called residual magnetism. The level, or amount of residual magnetism depends largely on the kind of material. Materials with alloys, like tool steels, and particularly in hardened condition, retain quite a lot of magnetism.

To eliminate residual magnetism, the component must be subjected to an alternating magnetic field which is gradually reduced to zero.

See sketch below:

DEMAGNETIZING ON AN EM OR EP (GRINDING) CHUCK
Modern electronic chuck controls are capable of generating an alternating and gradually decreasing current and even offer different demagnetizing programs allowing to effectively eliminate residual magnetism in many different materials and components sizes.

DEMAGNETIZING BY MEANS OF A DEMAGNETIZER DEVICE
Certain components or tools for instance, have to be demagnetized by a device like a platen, tunnel or hand demagnetizer. Standard demagnetizers work on 50 Hz, which allows a quick demagnetization. For very hard magnetic materials, the frequency must be reduced in order for the magnetic field to be able to penetrate into the material. Below is a typical representation of the process:

The component enters the field, in the center of the device the field is at maximum strength, further away from the center the field decreases to zero. Typical component speed is approx. 0.2 m/sec.

GENERAL RECOMMENDATIONS FOR STANDARD DEMAGNETIZERS:
- Platen demagnetizers are suitable for flat or small cylindrical components up to 60 mm thick.
- Hand demagnetizers are capable of demagnetizing components to up to 25 mm deep.
- Tunnel demagnetizers are used for box or ring shaped components with wall thicknesses up to 30 mm.