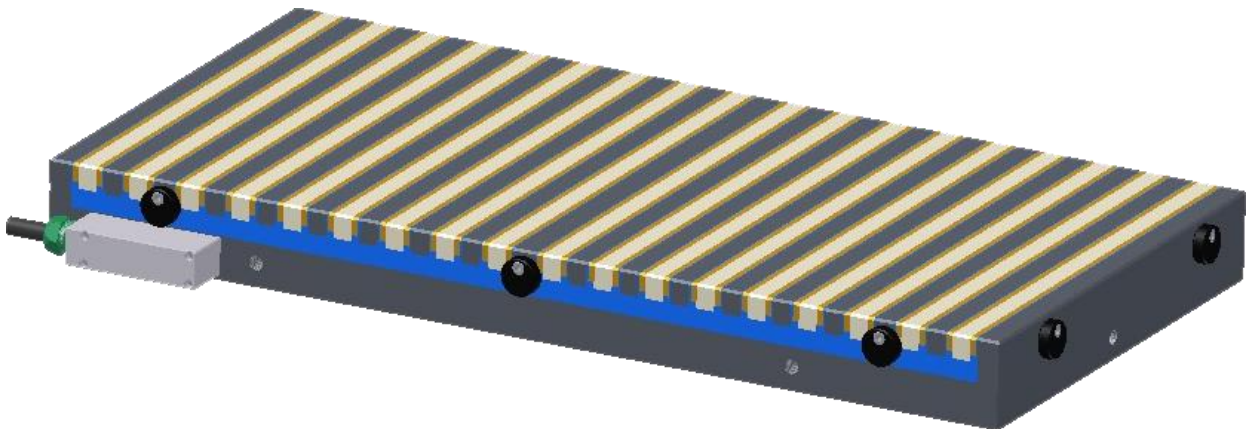


# Electro-permanent chucks for grinding **MSC series**

Assembly and operating manual



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**Technical changes:**

We reserve the right to make alterations for the purpose of technical improvement.

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Dear customer,

congratulation on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase.

Kindest Regards.

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## 1. About this manual

This manual is an integral part of the product and contains important information for a safe and proper assembly, commissioning, operation, maintenance and ensures easier troubleshooting.

Before using the product, carefully read the instructions, especially chapter "Basic safety notes".






### 1.1 Warnings

The following signal words and symbols are used to highlight hazards.

#### 1.1.1 Signal words

<b>DANGER</b>	Dangers for persons. Non-compliance will inevitably cause irreversible injury or death.
<b>WARNING</b>	Dangers for persons. Non-compliance may cause irreversible injury or death.
<b>CAUTION</b>	Dangers for persons. Non-observance may cause minor injuries.
<b>ATTENTION</b>	Information about avoiding material damage.

#### 1.1.2 Symbols

	Warning about a danger point
	Warning about dangerous electrical voltage
	Magnetic field hazard
	Falling pieces hazard
	General mandatory sign to prevent material damage

## 2. Basic safety notes

### 2.1 Intended use

The intended use of the electro-permanent magnetic chucks for grinding is to block, using magnetic force, any piece of ferromagnetic material being processed on grinding machines, machining centres, etc. This series of chucks, by guaranteeing an extremely high magnetic sealing force, allows you to perform high-speed milling processes exploiting the full potential of the machine tools. The ease with which the workpiece is anchored and released also considerably increases the productivity of the machine tools avoiding equipment clamping and changes. The electro-permanent characteristic of this magnetic chuck also allows it to operate in full safety in case of a sudden power failure. This is because the system only needs to be powered when magnetising and demagnetising the chuck. Therefore during an eventual power failure, the machine tool would stop while the magnetic chuck remains magnetised. The requirements of the applicable standards must be observed and complied with. The product may be used only within the scope of its defined application parameters. To use this unit as intended, it is also essential to observe the technical data and installation and operation notes in this manual and to comply with the maintenance intervals.



#### ATTENTION

The electro-permanent chucks **must not** be put into service until the machine tool, for which the chucks were provided, meets the requirements of Machinery Directive 2006/42/EC!

### 2.2 Environmental and operating conditions

- Use the product only within the scope of its defined application parameters. See “Technical data”.
- Make sure that the workplace is clean and the ambient temperature corresponds to the specifications.

### 2.3 Product safety

Using the product can be dangerous if:

- it is not used in accordance with its intended purpose.
- maintenance is not performed on a regular basis.
- the safety notes are not complied with.

Avoid any working method that may interfere with the function and operational safety of the product.



Wear personal protective equipment as required by the Machinery Directive.



**NOTE**

More information is contained in the relative chapters.

**2.4 Personnel qualification**

Assembly, commissioning, maintenance and repair of the product may be performed only by trained, qualified personnel. Every person appointed by the operator to work on the product must have read and understood the assembly and operating manual in its entirety, especially Chapter “Basic safety notes”. This applies particularly to personnel only appointed occasionally, such as maintenance personnel.

	 <b>DANGER</b>
	<p><b>Hazard due to a magnetic field.</b></p> <p>Since these are electro-permanent chucks of magnetic systems, the following categories of people are strictly prohibited from coming into contact with them:</p> <ul style="list-style-type: none"> <li>• People with pacemakers.</li> <li>• People with metal or electronic prostheses.</li> <li>• People using insulin pumps.</li> <li>• People with muscle stimulation systems.</li> <li>• Pregnant women.</li> </ul> <p>The above-mentioned persons must always keep a safe distance of at least 2 metres from the electro-permanent chucks.</p> <p>The magnetic field generated by the product is not such as to create health problems to generally healthy workers in the short term. It is however recommended that all workers always keep a certain safety distance from the magnetised product because there is still a danger for it to attract metal objects.</p>

	 <b>DANGER</b>
	<p><b>Electric shock hazard.</b></p> <p>The electro-permanent chucks are electrically powered systems, often in contact with emulsified water or different types of liquids. It is therefore strictly prohibited to touch the magnetic chuck or any part connected to it (circular connector, for example) when being magnetised and demagnetised.</p>

## 2.5 Using personal protective equipment

When using this product, comply with the relevant industrial safety regulations and use the personal protective equipment (PPE) required.

- Use protective gloves, safety shoes and safety goggles.
- Observe safe distances.
- Minimum safety requirements to use the equipment.

## 2.6 Notes on specific risks

- Perform any installation, modifications, maintenance or adjustments with the magnetic chuck demagnetised.
- Make sure that no residual magnetic energy remains in the system.
- Perform maintenance, changes and integrations outside the danger zone.
- For all work, secure the product against accidental use.

## 3. Warranty

The warranty is valid for 12 months from the delivery date of the product under the following conditions:

- Intended use in 1 work shift.
- Comply with the maintenance and lubrication intervals.
- Observe the environmental and operating conditions.

Parts touching the work piece and parts subject to wear are excluded from the warranty.

### Procedure in the event of a warranty claim

The buyer agrees to send a written detailed report on any defects detected on the magnetic chuck to SCHUNK within 10 days after identification.

## 4. Scope of supply

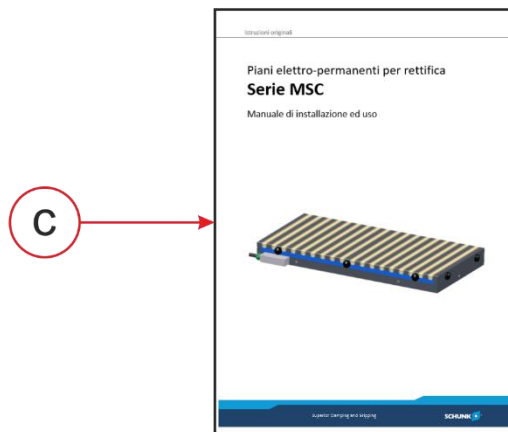
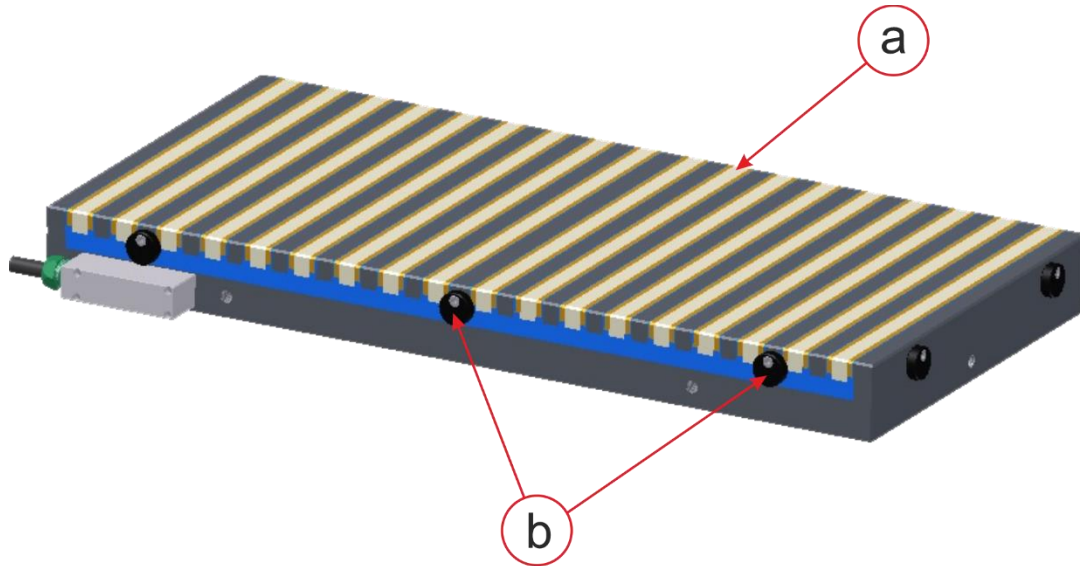


Fig.1

The supply includes:

- a. Magnetic chuck
- b. Striker washers (if any)
- c. Assembly and operating manual

## 5. Technical data

<i>PM60 Series</i>				
Model	Dimensions			Weight
	Length	Width	Height	
PM60.15030	150	300	71	32
PM60.20040	200	400	71	33
PM60.20060	200	600	71	57
PM60.30050	300	500	71	76
PM60.30060	300	600	71	85
PM60.30070	300	700	71	105
PM60.30080	300	800	71	118
PM60.30100	300	1000	71	155
PM60.40060	400	600	71	120
PM60.40070	400	700	71	138
PM60.40075	400	750	71	153
PM60.40080	400	800	71	160
PM60.40100	400	1000	71	200
PM60.40120	400	1200	71	245
PM60.50070	500	700	71	178
PM60.50075	500	750	71	190
PM60.50080	500	800	71	200
PM60.50100	500	1000	71	255
PM60.50120	500	1200	76	304
PM60.50130	500	1300	76	350
PM60.50150	500	1500	76	405
PM60.60100	600	1000	76	325
PM60.60120	600	1200	76	390
PM60.60150	600	1500	76	490

<i>PM62 Series</i>				
Model	Dimensions			Weight
	Length	Width	Height	
PM62.15030	150	300	81	34
PM60.20040	200	400	81	35
PM60.20045	200	450	81	40
PM60.20050	200	500	81	51
PM60.30050	300	500	81	64
PM60.30060	300	600	81	91

<b>PM80 Series</b>			
<b>Model</b>	<b>Dimensions</b>		<b>Weight</b>
	<b>Diameter</b>	<b>Height</b>	
PM80.00300	300	68	50
PM80.00400	400	68	88
PM80.00500	500	68	153

<b>PM81 Series</b>			
<b>Model</b>	<b>Dimensions</b>		<b>Weight</b>
	<b>Diameter</b>	<b>Height</b>	
PM81.00250	250	71	26
PM81.00300	300	71	38
PM81.00350	350	71	52
PM81.00400	400	71	67
PM81.00450	450	71	85
PM81.00500	500	71	105
PM81.00600	600	71	150
PM81.00650	650	71	176
PM81.00700	700	71	205
PM81.00800	800	71	268
PM81.01000	1000	71	418
PM81.01200	1200	71	600

<b>PM82 Series</b>			
<b>Model</b>	<b>Dimensions</b>		<b>Weight</b>
	<b>Diameter</b>	<b>Height</b>	
PM82.00300	300	71	50
PM82.00400	400	81	88
PM82.00500	500	81	153

### 5.1 Rating plate

The rating plate is on the side of the product:  
It bears the following information:



Fig.2

Information	Description
Id. Number	Product code no.
Work number	Product production no.
Serial number	Product serial no.
Year	Year of manufacture
Weight	Weight
Resistance	Ohmic Resistance
Voltage	Supply voltage
Watt	Power (not provided)
Amp. for sec.	Current per second (not provided)

*The rating plate must never be removed!*

Please always have the serial no. at hand when contacting SCHUNK about technical matters.

## 6. Description

### 6.1 Product description

The electro-permanent magnetic chucks are capable of blocking all ferromagnetic materials. However, this is not true for the following materials:

- Aluminium and its alloys
- Bronze
- Brass
- Non-magnetic cast-iron
- *Some STAINLESS steels (such as austenitic, though they can be slightly magnetisable following hardening due to plastic deformation).*

Even among ferromagnetic materials, the greater or lesser clamping force of the piece on the chuck depends on the reluctance of the part to be anchored. This reluctance depends on the chemical composition of the material. This composition can significantly reduce (by up to 20 - 30%) the maximum value of the attraction force that is reached for mild steel.

Material	Efficiency
Conventional steel ( Fe 360 - C40 )	100%
Ferromagnetic raw steel (C10 - C15)	90%
Magnetic stainless steel	65%
Cast-iron	50%

#### Thermal treatments carried out on workpiece.

Some thermal treatments reduce the magnetic attraction properties. Therefore pay the utmost attention to materials which have undergone one of the following treatments:


- hardening in all possible variants
- tempering
- cementing
- nitriding

To take the greatest advantage of the magnetic force, pay attention to:


- positioning the piece onto the magnetic chuck
- the contact surface between the piece to be clamped and the magnetic chuck
- the air gap value (space between chuck and piece to be attracted).

## 7. Installation

1. Check the packaging before accepting the product.
2. Open the package and take the magnetic chuck out.
3. Check the product for transport damage!
4. Compare the product with the specifications given in the order.
5. Clean any rustproof oil from the magnetic chuck.

	<b>ATTENTION</b>
	The machine must be off during installation.

6. Fasten the electro-permanent magnetic chuck to the flatbed of the vehicle with screws or brackets as needed. Upon request, the chuck could be supplied with holes for fixing in the machine.
7. After installation, check that the chuck is fixed securely without being able to move in any direction.

	<b>⚠ DANGER</b>
	<b>Dangers caused by short-circuit.</b> Never power the electro-permanent magnetic chuck if you detect any damage. Inform the carrier or SCHUNK GmbH & Co. KG. immediately if you detect damage and/or missing components (providing all relevant details).

8. Connect the magnetic chuck to the relevant control unit, following the instructions in its user manual.

## 8. Commissioning and normal operation

### 8.1 Commissioning

Connect the control unit to the electric mains as indicated in the manual of the electronic equipment.



After performing the connection to the electric mains, check the following operation:

1. Ensure that the magnetic chuck is not magnetised; you can do this with the steel tip of a screwdriver.



#### NOTE

*There may be a slight residual magnetisation upon delivery, e.g. due to the handling of the chucks with magnetic lifters.*

2. Position one or more pieces on the magnetic chuck, paying attention to the instructions in chapter 6. For a reliable test of the attraction force of the magnetic chuck, you must have a mild steel plate (we recommend UNI Fe 360 steel) at least 30 mm thick and sized 150 x 150 mm.

	 <b>DANGER</b>
	<p><b>Electric shock hazard due to a faulty connection.</b></p> <p>Touching live parts can cause death by electric shock. The following step may only be taken after properly installing and inspecting the protective devices.</p>

3. Follow the instructions in the control unit user manual to magnetise the magnetic chuck.

	 <b>CAUTION</b>
	<p><b>Risk of injury due to a piece coming undone as a result of faulty displays of the magnetic clamping system.</b></p> <p>Ensure that the workpiece is now properly clamped on the magnetic chuck. Take suitable safety precautions when doing so.</p>

4. Manually check that the pieces are secured stably to the chuck.

#### NOTE

*Do not hit the chuck with a hammer to test clamping of the piece. In that case the force would not be equally distributed on the piece but would be concentrated at one sole point, making the test unreliable.*

5. Follow the instructions given in the control unit user manual to demagnetise the magnetic chuck.



6. Make sure the piece can be easily removed from the magnetic chuck.
7. Remove the piece from the magnetic chuck.

*Please contact SCHUNK if the expected results are not achieved, even if you carefully followed the steps described.*



## 8.2 Normal operation

To ensure proper use of the product, follow the steps below:

1. Ensure that the magnetic chuck is not magnetised; you can do this with the steel tip of a screwdriver.

	 <b>WARNING</b>
	<p><b>Suspended loads hazard</b> If workpiece handling requires the use of lifting equipment, cranes etc., observe the respective safety distances.</p>

2. Position one or more pieces on the magnetic chuck, paying attention to the instructions in chapter 6.
3. Follow the instructions in the control unit manual to magnetise the magnetic chuck.



	 <b>CAUTION</b>
	<p><b>Risk of injury due to a piece coming undone as a result of faulty displays of the magnetic clamping system.</b> Ensure that the workpiece is now properly clamped on the magnetic chuck. Take suitable safety precautions when doing so.</p>

4. Manually check that the pieces are secured stably to the chuck.

### NOTE

*Do not hit the chuck with a hammer to test clamping of the piece. In that case the force would not be equally distributed on the piece but would be concentrated at one sole point, making the test unreliable.*

5. The workpiece can now be machined.
6. Demagnetise the chuck according to the instructions in the control unit manual.
7. Make sure the piece can be removed from the chuck.


	 <b>WARNING</b>
	<p><b>Suspended loads hazard</b> If workpiece handling requires the use of lifting equipment, cranes etc., observe the respective safety distances.</p>


8. Remove the workpiece from the magnetic chuck.

**NOTE**

*For ferromagnetic pieces in steel alloy or with particular chemical properties, it may be difficult to detach the pieces from the magnetic chuck especially after long processes. This is not an issue with demagnetisation of the magnetic chuck, but rather magnetisation of the metal workpiece which a careful analysis shows is likely to be affected by very high magnetic residue.*

*Please contact SCHUNK if the expected results are not achieved, even if you carefully followed the steps described.*

	<b>ATTENTION</b>
	<p><b>Chuck deformation due to internal overheating</b></p> <p>The magnetic chuck is designed for optimal use up to 10 cycles / hour. This is the limit that gives the maximum stability to the chuck (intended as minimum deformation). As the number of cycles indicated above increases, the chuck begins to deform due to the heating of the internal circuit.</p>

	<b>ATTENTION</b>
	<p><b>Damage to the product due to overheating.</b></p> <p>The magnetic chuck is designed to withstand a maximum temperature of 80°C. Too close magnetisation/demagnetisation operations or processing very hot pieces can quickly increase the chuck internal temperature. This could cause the resin to rise or blacken. If this happens, it is recommended to remove the cause of overheating to prevent the product from being damaged!</p>

## 9. Troubleshooting

Fault detected	Possible Cause	Suggested intervention
The piece is not sufficiently anchored to the magnetic chuck	The control unit did not carry out the magnetisation phase correctly	See the use and maintenance manual of the control unit
	The workpiece is not positioned properly	Check that recommended in chapter 6
The status of the magnetic chuck does not change	Problem depending on the electronic control unit	See the use and maintenance manual of the control unit.
Tight planarity tolerance or parallelism cannot be obtained for the workpiece	The magnetic chuck could be scored, ruined or with slightly raised resin	Proceed to grind the magnetic chuck. Bear in mind that the upper surface may be ground by max 5mm. Beyond this threshold, the chuck could be irreparably damaged.

*Should you have any problems or need any further information, please contact the technical assistance service.*

## 10. Repairs and maintenance

It is recommended to check the product condition on a regular basis. Excellent and careful maintenance is a decisive factor for optimum safety, functioning and performance and a longer service life of the product.

To ensure optimum efficiency and reliability of the electro-permanent magnetic chuck in the long run, the parts exposed to the greatest strain during operation must be inspected regularly. Please follow the instructions and maintenance intervals given in the table below so as to avoid running into problems and malfunctions requiring product repairs with consequent downtime.

Defective electrical and electromechanical components must always be replaced by SCHUNK service personnel. If components are replaced by the operator, this automatically renders the warranty invalid.



After maintenance and before restarting the electro-permanent magnetic chuck, reinstall all protective devices.

Activity	Description	Frequency			
		Whenever used	Once a week	Once a month	Once a year
Checking the rating plate	Check that the rating plate is not damaged or illegible	•			
Checking the resin	Check that the resin is not raised, broken or ruined.		•		
Inspect seals	Check all the seals of the system (connectors, caps, housings etc.).		•		
Checking the product	Check the whole product for cracks, breaks or deformations			•	
Checking the residual current device	Check proper functioning of the upstream protective system using suitable tests.	Test as often and with the method recommended by manufacturer.			

## 11. Transport and storage

### 11.1 Transport


The electro-permanent magnetic chuck can be lifted with a manually controlled magnetic lift of suitable capacity or else with eyebolts according to the holes applied on the sides.

	 <b>WARNING</b>
	<p><b>Risk of injury and risk of damage to the product if it falls during transport!</b></p> <p>The electro-permanent magnetic chuck could be very heavy and contain electric components. Persons may be injured and the electric components may get damaged!</p> <ul style="list-style-type: none"> <li>• The weight of the packaging is shown on the side label; pay attention to this data during transport and to the total weight of the packed product shown on the transport documents.</li> <li>• Use the required personal protective equipment during its handling and shipping.</li> </ul>

### 11.2 Storage

When storing the electro-permanent magnetic chuck for a longer period of time, observe the following instructions to ensure perfect operation up to the time of installation:

- Ensure adequate packaging by keeping the product in its original packaging.
- The product and its packaging should be inspected at regular intervals.
- Check that the packaging has not deteriorated due to shocks or bad weather.
- Make sure that the temperature remains between 15°C and + 70°C so as not to damage the magnetic chuck.

	<b>ATTENTION</b>
	<p><b>Dispose of all packaging properly.</b></p> <p>Unpacking and positioning the product on the machine tool may require the operation of two or more persons and the use of handling equipment like hoists, cranes etc.</p>

#### **NOTE**

*The presence of magnetic residue on the surface of the new chuck is determined by the use of magnetic lifts when inserting the modules into the crates. This residue disappears as soon as the first demagnetisation cycle is performed.*



## 12. Disposal

This product is made of plastic, iron, permanent magnets and electronic components. If it is decommissioned, it has to be disposed of in compliance with the applicable regulations. As soon as the end of the lifecycle has been reached, the electro-permanent magnetic chuck has to be decommissioned, i.e. put into a state in which it can no longer be used for its original intended use and in which it is still possible to recycle the raw materials contained.

### NOTE

*SCHUNK shall not be held liable for any material damage or personal injury that may result from reusing individual components of the product for purposes other than the original intended use! SCHUNK provides neither implicit nor explicit declarations about any possible usability of recycled components after decommissioning the electro-permanent magnetic chuck.*

### Procedure for final decommissioning and disposal of the product:

	 <b>CAUTION</b>
	<p><b>Risk of injury.</b> Decommissioning, disassembly and disposal of the electro-permanent magnetic chuck must be performed by qualified persons using suitable tools.</p>

- Ensure that the machine tool has safely come to a halt. Disconnect all the electrical, hydraulic and pneumatic connections that could cause unexpected movements of the machine or its components.
- Disconnect the product from all utilities.
- Have the electro-permanent magnetic chuck disposed of by a company that specialises in the disposal of electrical and magnetic equipment.

## 13. Spare parts

To purchase spare parts, contact SCHUNK.