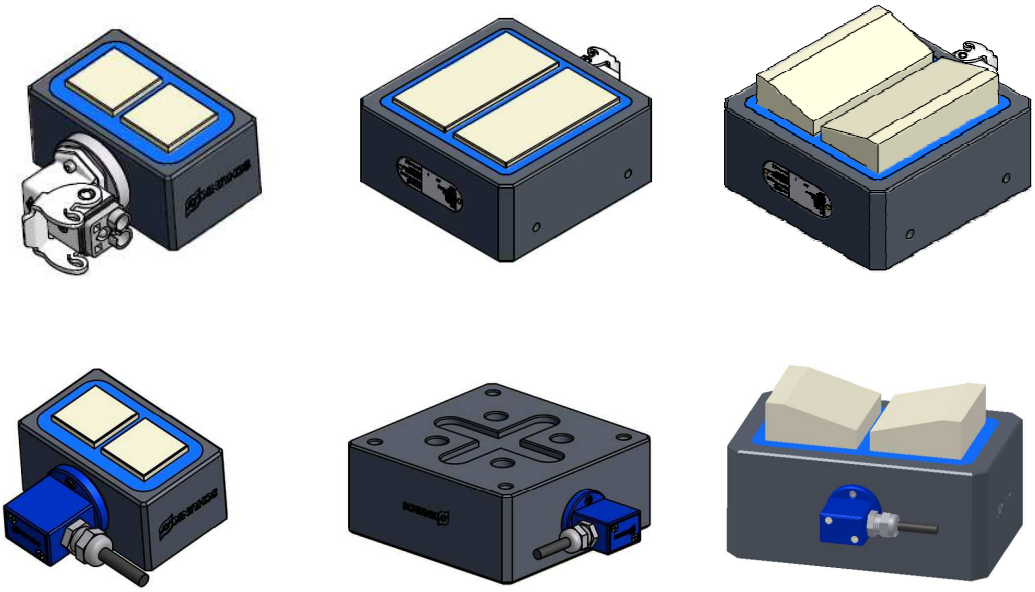
Electro-Permanent Magnetic Chucks Series HSM



Dear Customer
Thank you for choosing our products.
We are pleased to provide you with this manual, which is intended to allow you to operate with maximum levels of safety and productivity.
Please read this technical document carefully.
Our focus is on our customers and their satisfaction. We are therefore available to provide any further essential information.

We wish you success in your work,

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1. SAFETY

1.1 Symbols Used

⚠ This symbol can be found where possible dangers to people are described

 This symbol can be found where possible damage to the product is described

 This symbol can be found next to essential information about the product or its handling

1.2 Product Use

HSM magnetic modules are designed to handle and lift ferrous materials in an automation system.

1.3 Safety

⚠ When using electro-permanent magnetic modules, always comply with the health and safety regulations by adopting the necessary Personal Protective Equipment (PPE):

_ use of gloves,
_ respect of safety distances,
_ minimum safety requirements for using working equipment.

The list above is not intended to be complete. The customer must determine what PPE is required for the specific process to be performed. All PPE must comply with the laws in force concerning safety on the workplace (in Italy, Legislative Decree 106/2009 and subsequent amendments and supplements).
Do not use the magnetic module for operations or services other than what it was intended for.
Do not allow the equipment to be used by unqualified, unsuitable or under age personnel. Use of the equipment is not permitted for:

- People fitted with a PACEMAKER
- People with metallic or electronic prosthesis
- People using insulin pumps
- People with muscular stimulation systems
- Pregnant women

The above mentioned people should keep a safety distance (about 2 m).

Bear in mind that the Robot working area must be delimited and signalled to the personnel in compliance with the Machinery Directive.

1.4 Residual Risks

_ As indicated in the previous section, the magnetic field is dangerous for people, in particular during magnetization and demagnetization.
We recommend all people, even fully suitable ones, to keep a safety distance during magnetization and demagnetization.
_ Do not underestimate the risk that the piece does not grip well to the magnetic module. Always pay attention and make sure that the piece grips well to the magnetic chuck.

1.5 What NOT to do under any circumstances

• use the equipment for the lifting and transport of people, or for services other than what it was intended for;
• lift loads while people are crossing the operation area below;
• cross, stop, work or carry out a manoeuvre underneath the suspended load or stand in a position where falling pieces may cause damage;
• allow the equipment to be used by unqualified or unsuitable personnel;
• fail to pay proper attention during load lifting and moving manoeuvres;
• leave the suspended load unattended;
• exceed the nominal capacity of the equipment;
• lift unequally distributed or unbalanced loads;
• lift more than one piece at a time;
• allow the load to oscillate while being moved;
• lift “guided” loads;
• let the load hit mobile or fixed parts;
• reach the “limit stop” area at full speed during moving operations;
• intervene without first having removed the lifted load;
• magnetize the equipment before placing it on the load;
• move the load before making sure the magnet has taken hold properly;
• lift loads whose temperature is higher than 70°C;
• do cycles of magnetization and demagnetization too close;
• use the equipment without wearing suitable work clothing and PPE.

1.6 Code of Conduct

• Use appropriate tools and personal protection devices during working or maintenance operations;
• check the condition of the equipment;
• place the equipment on the centre of gravity of the piece to be lifted;
• magnetize the equipment only after it has been correctly placed on the piece;
• lift and move the load with care, avoiding unbalancing;
• clean the poles and the surface of the piece in contact with the equipment;
• inform anyone standing within the operation field of the equipment that lifting is about to start;
• carefully place the piece on stable surfaces before starting demagnetization. Make sure that no pieces are still attached;
• after demagnetization, slowly raise the equipment to make sure that the piece is detached;

2. WARRANTY

The original configuration of the product should not be changed for any reason whatsoever. Improper use of the equipment for operations not intended by the manufacturer and not indicated in this manual may damage the product and injure workers.
The warranty term is of 12 (twelve) months from date of delivery except for other written commercial agreements on the order. For components not directly manufactured by us, the manufacturer’s warranty applies.
The warranty only covers the replacement of components and the repair of product failures causing incorrect operation.

The product, under warranty, must be shipped carriage paid to our plants. The warranty does not include technical service at the customer's premises or the location where the equipment is installed. Equipment disassembly from the installation is not included.

Under no circumstances shall the warranty give the right to claim compensation for any direct or indirect injury or damage caused by our equipment to people, property or other machinery resulting from poor use, lack of maintenance or improper use. Repairs under warranty do not imply an extension of warranty or the start of a new period of warranty.

Warranty Exceptions
The warranty does not include any defect entirely or partially resulting from:
- non-compliance with the instructions for inspection and maintenance, or improper use;
- normal wear of the equipment;
- defects resulting from changes or repairs not carried out by the manufacturer or an authorised retailer;
- breakdowns caused by incorrect use, assembling and disassembling;
- damage or injury caused by use of non-original spare parts;

The warranty automatically becomes null and void**:**
_ In the event of non-payment or other breaches provided for by contract;
_ If the serial number is illegible;
_ If the equipment is poorly maintained.

3. COMPONENTS OF SUPPLY
The standard supply includes the complete module with the quick connector. For different supplies see the commercial agreements.

4. TECHNICAL DATA
400V 50/60 Hz standard power supply
Further technical data are available on the catalogue or provided during the commercial phase.

5. TRANSPORT, ASSEMBLY AND INSTALLATION

5.1 Packaging

The modules are packed in cardboard boxes for transport.
At receipt, check for product damage and compliance with the requested criteria.
If the material received does not comply with your order, contact the supplier immediately.


WARNING!
Avoid release to the environment.

5.2 Transport
The module can be lifted up by means of a manually controlled magnetic lifter of suitable capacity or, alternatively, by means of eyebolts suitable for the holes provided on the side.
Before handling the product, check for its weight indicated on the side label.

5.3 Storage
Make sure that the temperature does not exceed values between +5°C and +40°C during transport and storage.
If the magnetic module has to be stored, make sure that the humidity values in the storage area range between 30% and 80%.

NOTE

The presence of magnetic residue on the new module surface is due to the use of magnetic lifters for inserting the modules into the boxes. This residue disappears as soon as the first demagnetization cycle is performed.

5.4 Installation in the Machine

Unpack the magnetic module first (as indicated in section 5.2) and clean it from the rust preventive oil.
Then fix it to the robotic device using the appropriate fixing holes.
After installation, check that the module is safely fixed and cannot move in any directions.

⚠ ***Remember that the robot must be turned off during installation.***
For operation of installation in the machine, worker have to use all IPD necessary to do this operation in absolute safety.

5.5 Electrical Connections

The magnetic module has to be connected directly to the controller
(see the controller manual).

5.6 Materials for Use

Electro-permanent magnetic modules are able to lock all ferromagnetic materials.
The following materials, on the contrary, are excluded:

- Aluminium and its alloys
- Bronze
- Brass
- Non-magnetic cast iron
- *Some types of STAINLESS steel (austenitic type* even if slightly magnetizable after plastic deformation hardening)

Even among ferromagnetic materials, the locking degree of the piece depends on the reluctance of the piece to lock.
The value of reluctance depends on the chemical composition of the material. This composition may cause strong reductions (up to 20 - 30%) in the attraction force maximum value that can be reached with mild steel.

Material	Efficiency
Standard steel (Fe 360 - C40)	100%
Crude ferromagnetic steel	90%
Magnetic stainless steel	80%
Cast iron	70%

Heat treatments performed on the piece to be worked on

Some heat treatments reduce magnetic attraction properties. Special attention should therefore be given to materials which have undergone one of the following treatments:

- Tempering in all possible variants
- Decontamination
- Cementation
- Nitriding

6. OPERATION AND FUNCTIONS

6.1 Positioning the Piece

For optimal use of the magnetic force it is important to pay attention to:

d. The position of the module on the piece;
e. the contact surface between the piece to lock and the magnetic module;
f. the value of the air gap (space between the module and the piece to attract);

6.2 First Operation

Adjust the position of the module connector to prevent the connection cables from restricting the robot movements.

- Give the module a magnetization impulse, perform a little movement in the air and check that the piece grips well to the module.
- Perform a complete movement test at a lower speed than the production cycle one.
- At the end of the movement test check again that the piece grips perfectly well to the magnetic module.
- Give the module a demagnetization impulse and check that the piece detach from the module without difficulty.

Contact the assistance service if the expected results are not obtained with the above-described operations.

6.3 Usual Functions

- Place the module on the piece
- Perform a magnetization operation
- Handle the piece
- Perform a demagnetization operation

It's not advisable to perform too close activations (cycles of magnetization and demagnetization). This is because at every activation, module increases its internal temperature. If the internal temperature is too high, the module loses its magnetic properties.
Please contact us if you know how the temperature increases as the number of activations.

6.4 Factors which limit the magnetic force

Magnetic modules for automation are characterized by a high magnetic attraction force while having an extremely low weight.
However there are several factors that may limit the strength of magnetic modules.
In order to minimize the possibility that piece can fall down, operator that use these modules must remember factors listed below:

1) ***Air Gap***: major is the air gap between piece and module, minor is the magnetic force of the module. To learn the trend of magnetic force according to the gap, please contact our service.
2) ***Material***: as indicated in paragraph 5.6, the magnetic force varies with the material of the piece handled. Refer to the table in paragraph 5.6 to know the efficiency of the magnetic force depending on the material or contact our service.
3) ***Workpiece geometry***: magnetic force is proportional to the contact surface. Major surfaces ensure a greater magnetic force. It is advisable always to move pieces of regular shape (flat or cylindrical, depending on the type of module).
   It 's also important that the piece have to be gripped by two poles of different polarity at least.
4) ***Size of the piece***: pieces with oversized dimensions can create deformations in the same, with creation of moments which reduce the magnetic force. Pieces too small may not be suited to the pole pitch of the module. In this case, we recommend to purchase modules with smaller pole pitch.
5) ***Thickness of the piece***: there are a limit value of thickness of the piece, below which the magnetic force is reduced. To learn the trend of the magnetic force according to the thickness of the piece, please contact our service.

7. TROUBLESHOOTING

Trouble detected	Possible Cause	Suggested Operation
The piece moves from the magnetic module	The module has not performed the magnetization phase correctly	• Check that the supply voltage of the controller is correct. • Check the earth cable. • Check that the contact exchange of the safety relays has occured • Verify the module's resistance. ***Repeat the magnetization phase after the above checks have been performed***
Demagnetization is not performed correctly.	Interferences from the outside tamper with the controller regular operation.	Insert a power filter upstream to the controller.

Should you have any problems or need any further information, please contact the technical assistance service (see contacts in section 13)

8. PRODUCT CARE AND MAINTENANCE

Maintenance should be performed by trained and skilled staff only. Maintenance personnel must carefully read this manual. Good and constant maintenance is a decisive factor for best performance under optimal operating conditions and for an increased operative life.

It is suggested to periodically check the condition of the product.

Before performing any operation, thoroughly clean the module surfaces in contact with the piece to be worked.

9. DISPOSAL

The magnetic module is made up of electric, plastic and iron components. When placing the product out of service, dismantle it and dispose of the materials separately in compliance with the relevant regulations in force.

Magnetic structure can be easily disposed. However, it is necessary to separate various component parts:

- Metal parts (steel and metal), properly separated, may be scrapped;
- Plastic parts are recyclable;
- Resin is a rather special waste (EWC code 04.08.09) and must be properly disposed according to laws;
- Electronic components however are subject to the WEEE Directive and therefore they must be properly disposed according to laws.

Remember that the robot must be turned off during disposal.
For disposal operation, worker have to use all IPD necessary to do this operation in absolute safety.

10. ACCESSORIES

The structure is supplied with all the accessories. If some parts need to be replaced, please contact the technical assistance.

The spare parts available at warehouse are:

- Cable
- Connector

11. DECLARATION OF CONFORMITY

Enclosed

12. INDICE INDEX INHALT

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13. CONTATTI - CONTACTS - KONTAKT

GERMANY
HEAD OFFICE
SCHUNK GmbH & Co.
KGSpann-und Greiftechnik
Bahnhofstr. 106-134
74348 Lauffen/Neckar
Tel. +49-7133-103-0
Fax +49-7133-103-2399
info@de.schunk.com
www.schunk.com

CZECH REPUBLIC
SCHUNK Intec s.r.o.
Ernsta Macha 1
643 00 Brno
Tel. +420-545 229 095
Fax +420-545 220 508
info@cz.schunk.com
www.cz.schunk.com

INDIA
SCHUNK India Branch Office
80 B, Yeswanthpur
Industrial Suburbs,
Bangalore 560 022
Tel. +91-80-40538999
Fax +91-80-41277363
info@in.schunk.com
www.in.schunk.com

POLAND
SCHUNK Intec Sp.z o.o.
ul. Słoneczna 116°
Stara Iwiczna
05-500 Piaseczno
Tel. +48-22-7262500
Fax +48-22-7262525
info@pl.schunk.com
www.pl.schunk.com

AUSTRIA
SCHUNK Intec GmbH
Holzbauernstr. 20
4050 Traun
Tel. +43-7229-65770-0
Fax +43-7229-65770-14
info@at.schunk.com
www.at.schunk.com

DENMARK
SCHUNK Intec A/SStorhaven 7
7100 Vejle
Tel. +45-43601339
Fax +45-43601492
info@dk.schunk.com
www.dk.schunk.com

ITALY
SCHUNK Intec S.r.l.
Via Barozzo
22075 Lurate Caccivio(CO) Tel.
+39-031-4951311
Fax +39-031-4951301
info@it.schunk.com
www.it.schunk.com

ITALY
S.P.D. S.p.A.
Via Galileo Galilei 2/4
24043 Caravaggio (BG)
Tel. +39 0363 350360
Fax +39 0363 52578
www.spd.it
info@spd.it

SWEDEN
SCHUNK Intec AB
Morabergsvägen 28
152 42 Södertälje
Tel. +46-8 554 421 00
Fax +46-8 554 421 01
info@se.schunk.com
www.se.schunk.com

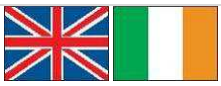
BELGIUM,LUXEMBOURG
SCHUNK Intec N.V./S.A
Bedrijvencentrum Regio Aalst
Industrielaan 4, Zuid III 9320
Aalst-Erembodegem
Tel. +32-53-853504
Fax +32-53-836022
info@be.schunk.com
www.be.schunk.com

FRANCE
SCHUNK Intec SARL
Parc d'Activités des Trois Noyers
15, Avenue James de Rothschild
Ferrières-en-Brie
77614 Marne-la-Vallée Cedex3
Tel. +33-1-64 66 38 24
Fax +33-1-64 66 38 23
info@fr.schunk.com
www.fr.schunk.com

JAPAN
SCHUNK Intec K.K.
45-28 3-Chome Sanno Ohta-
Ku Tokyo 143-0023 Tel. +81-
33-7743731
Fax +81-33-7766500
s-takano@tbk-hand.co.jp
www.tbk-hand.co.jp

SWITZERLAND,LIECHTENSTEIN
SCHUNK Intec AG
Im Ifang 128307 Effetikon
Tel. +41-523543131
Fax +41-523543130
info@ch.schunk.com
www.ch.schunk.com

CANADA
SCHUNK Intec Corp.
190 Britannia Road East,
Units 23-24
Mississauga, ON L4Z 1W6
Tel. +1-905-712-2200
Fax +1-905-712-2210
info@ca.schunk.com
www.ca.schunk.com



GREAT BRITAIN,IRELAND
SCHUNK Intec Ltd.
Cromwell Business Centre
10 Howard Way,
Interchange Park
Newport Pagnell MK16 9QS
Tel. +44-1908-611127
Fax +44-1908-615525
info@gb.schunk.com
www.gb.schunk.com

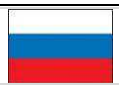
MEXICO, VENEZUELA
SCHUNK Intec S.A. de C.V.
Calle Pirineos # 513 Nave 6
Zona Industrial Benito
JuárezSantiago de Querétaro,
Qro. 76120
Tel. +52-442-211-7800
Fax +52-442-211-7829
info@mx.schunk.com
www.mx.schunk.com

TURKEY
SCHUNK Intec
Bağlama Sistemleri ve
Otomasyon San. ve Tic. Ltd. Şti
Küçükyalı Iş Merkezi
Girne Mahallesi
Irmak Sokak, A Blok, No: 9
34852 Maltepe, Istanbul
Tel. +90-216-366-2111
Fax +90-216-366-2277
info@tr.schunk.com
www.tr.schunk.com

CHINA
SCHUNK GmbH & Co. KG
Shanghai
Representative Office
777 Zhao Jia Bang Road
Pine City Hotel, Room 923,
Xuhui District,
Shanghai 200032
Tel. +86-21-64433177
Fax +86-21-64431922
info@cn.schunk.com
www.cn.schunk.com

HUNGARY
SCHUNK Intec Kft.
Széchenyi út. 70.
3530 Miskolc
Tel. +36-46-50900-7
Fax +36-46-50900-6
info@hu.schunk.com
www.hu.schunk.com

NETHERLANDS
SCHUNK Intec
B.V.Speldenmakerstraat 3d
5232 BH 's-Hertogenbosch
Tel. +31-73-6441779
Fax +31-73-6448025
info@nl.schunk.com
www.nl.schunk.com

			
USA SCHUNK Intec Inc. 211 Kitty Hawk Drive Morrisville, NC 27560 Tel. +1-919-572-2705 Fax +1-919-572-2818 info@us.schunk.com www.us.schunk.com	**SPAIN** SCHUNK Intec S.L. Foneria, 27 08304 Mataró (Barcelona) Tel. +34-937 556 020 Fax +34-937 908 692 info@es.schunk.com www.es.schunk.com	**PORTUGAL** Sales Representative Victor Marques Tel. +34-937-556 020 Fax +34-937-908 692 Mobil +351-963-786445 info@pt.schunk.com www.pt.schunk.com	**RUSSIA** OOO SCHUNK Intec ul. Samojlovoj, 5, lit. C St. Petersburg 192102 Tel. +7-812-326-78-35 Fax +7-812-326-78-38 info@ru.schunk.com www.ru.schunk.com
			
SOUTH KOREASCHUNK Intec Korea Ltd.# 907 JoongangInduspia 2 Bldg., 144-5 Sangdaewon-dong, Jungwon-gu, Seongnam-si, Kyunggi-do, 462-722 Tel. +82-31-7376141 Fax +82-31-7376142 info@kr.schunk.com www.kr.schunk.com	**SLOVAKIA** SCHUNK Intec s.r.o. Mostná 62 949 01 Nitra Tel. +421-37-3260610 Fax +421-37-6421906 info@sk.schunk.com www.sk.schunk.com		