CMG
Magnetic Gripper

COVAL
vacuum managers

EN

OPERATING INSTRUCTIONS

This manual is intended for users of the magnetic grippers, **CMG** series.
It contains all the information you need to integrate the magnetic grippers, as well as the instructions for use and maintenance.

The operating instructions were originally drafted in French (original version).
They must be kept for any future use.
Subject to technical changes, mistakes or printing errors.

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**PRIOR TO COMMISSIONING THIS PRODUCT,
PLEASE CAREFULLY READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS.**

Retrouvez tous les documents en différentes langues sur le site COVAL : https://doc.coval.com/CMG

All documents are available in multiple languages on the COVAL website: https://doc.coval.com/CMG

Finden Sie alle Dokumente in verschiedenen Sprachen auf der COVAL-Homepage: https://doc.coval.com/CMG

Tutti i documenti nelle differenti lingue sono presenti sul sito COVAL: https://doc.coval.com/CMG

Podrá encontrar todos los documentos en diferentes idiomas en la página web de COVAL: https://doc.coval.com/CMG

SUMMARY

1. IMPORTANT INFORMATION

This document contains important instructions and information regarding various stages in the life cycle of the product:

- Commissioning and decommissioning.
- Operating and servicing.

The operating instructions correspond to the product actually delivered.

This document is part of the product and the instructions below must be followed:

- Read this document carefully and observe the instructions to ensure safe installation, optimal operation of the product and to avoid any malfunction.
- Keep the document within reach of the product so that the staff can easily access it.

- **Failure to observe the instructions specified in this document may lead to injury or even death!**
- **COVAL will not be held liable for any damage or breakdown as a consequence of failure to observe instructions.**

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2. SAFETY SIGNS USED IN THE MANUAL

Take note of all the warnings, mandatory, and other signs in this manual. They have the following meanings:

2.1. Warning signs

Warning
Failure to follow the instructions may result in death or serious injury!

Warning
Risk of crushing or entrapment of upper limbs. Keep hands clear.

Warning
Strong permanent magnet. Can be harmful to pacemaker wearers and sensitive equipment.

2.2. Mandatory signs

Notice
Information that needs extra attention!

Important
Wear eye protection

2.3. Target group

This manual, especially the section about safety, shall be read by all staff who will perform any type of work with the product or equipment:

- Installation personnel
- Operating personnel
- Service and maintenance personnel
- Cleaning personnel (cleaning of equipment and the area around it)

2.4. Test conditions

Unless otherwise stated, the values specified in this manual are tested at:

- Room temperature: (20°C [68°F] ± 3°C [5.5°F])
- Standard atmosphere: (101.3 kPa [29.9 inHg] ± 1.0 kPa [0.3 inHg]

3. OPERATING AND SAFETY INSTRUCTIONS

3.1. Assembly / Dismantling

Only qualified personnel is authorized to use the components. Such personnel must be trained in the following areas:

- Installing pressure and electrical equipment.
- Applicable safety rules and requirements for using components and installing them in devices, machines, and machine lines.
- Appropriate handling of components and their respective products.
- Proper use with the operating materials and supplies.

The improper use of components with other operating materials and supplies than those defined, other voltages, and under other environmental conditions can lead to failure, damage, and injury.
This list must be considered as an overview and does not claim to be exhaustive. It can be further expanded by users according to their particular needs.

3.2. Safety instructions

In order to ensure flawless installation and operation, the following rules must also be observed:

- The components must be carefully removed from their packaging.
- The components must be protected against any and all damage.
- During installation and maintenance work, the magnetic grippers must be de-energized and secured against any unauthorized activation.
- Any attempt to alter the components is strictly prohibited.
- Cleanliness in the surrounding area and at the place of use.
- It is forbidden for persons to remain under the payload handled by the magnetic grippers in its transport area.
- Only appropriate fittings and connectors must be used.
- During installation, only flexible tubes and tubes that are suitable for the specific operating material may be used (tubes that come loose or electrical connection lines constitute a major safety hazard-**including risk of death!**).
- Conductive and live cable lines must be insulated, of an adequate size, and properly installed.
- Pneumatic and electric lines must be connected to the component in a stable and safe manner.
- Ensure that any physical contact with electric parts is prevented (protect electrical contacts).
- Only available fastening means described in chapter 7.2 maybe used and tightening torques must be used accordingly.
- The possibility of power or pneumatic supply interruption must be taken into consideration to ensure people and systems are protected at all times.
- Emergency stops should be accounted for when designing the system.
- The latest applicable EC directives, legislations, decrees, and standards, as well as the current state of the technology for its intended use.
- Taking any special measures to meet above said requirements, as well as the current state of the technology.

- **Failure to observe the above safety instructions may lead to failure, damage, and injury—even risk of death.**
- **The components of the device that are no longer in working order must be recycled in an environmentally-friendly manner! (see chapter RECYCLING) !**

3.3. Safe usage

The product described in this instruction is designed for implementation in industrial systems; therefore, it must not be used under conditions other than those specified herein.
Always set the gripper to its off position when in storage.

Warning
Strong permanent magnet. Can be harmful to pacemaker wearers and sensitive equipment.

Warning
Do not use the magnetic gripper in areas where falling loads could cause injury to personnel.

3.4. Commissioning and decommissioning

Commissioning:

- Ensure the flexible tubes for compressed air and power supply are connected correctly using the appropriate connectors.

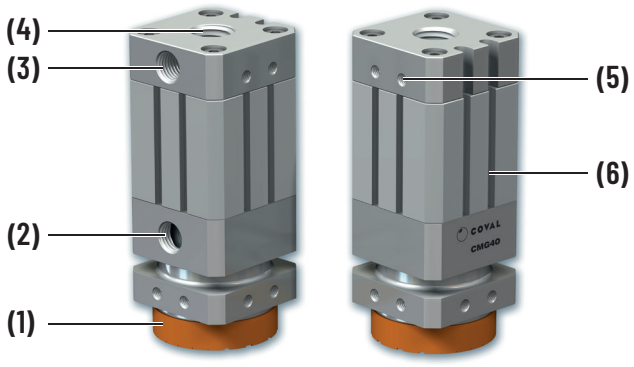
Decommissioning (prior to any disassembly or maintenance work):

- Check that the parts to be handled are not held by the system (load may drop).

3.5. Disposal

When disposing of the system or any of its constituent parts that are no longer functional, follow the procedure below:
Waste electrical and electronic equipment (WEEE) must not be disposed of in urban waste collection bins but given to the appropriate recycling organization (see section on RECYCLING).

4. PRODUCT OVERVIEW



Position	Description
1	Friction ring
2	Compressed air connection for deactivation
3	Compressed air connection for activation
4	Center mounting hole
5	Mounting holes for brackets
6	Slot for magnetic switch

5. INSTALLATION

Warning

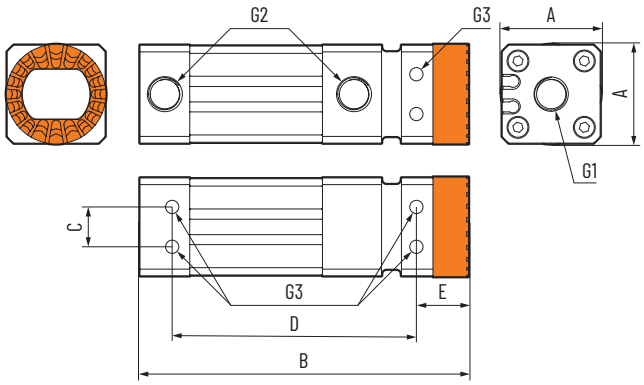
- Do not install or operate your CMG if damaged during transport, handling, or use. A damaged product may result in bursting and cause injury or property damage.
- Before using the product, read the safety instructions to ensure a safe product operation.

5.1. Dimensions and mechanical installation

Important

Strong permanent magnet. Can be harmful to pacemakers and other sensitive equipment.
Maintain a safety distance of at least 25 cm.

Connect push-in fittings to the upper and lower port. For threads, see G2 in figure and table below.



Models	A	B	C	D	E	G1	G2	G3	(g)
CMG20	20	78.2	6.5	55	13.2	G1/8"-F	M5x0.8-F	M3x0.5-F	90
CMG30	30	99.4	12	74	15.7	G1/8"-F	G1/8"-F	M4x0.7-F	223
CMG40	40	99.4	12	74	15.7	G1/4"-F	G1/8"-F	M4x0.7-F	427
CMG50	50	123.4	15	100	15.7	G1/4"-F	G1/8"-F	M5x0.8-F	795

The magnet gripper can be mounted using the central fastening connection (for threads, see G1 in the dimension table), or by using either a ball joint mount or a locking pin mount (for article numbers and descriptions, see the Accessories chapter).

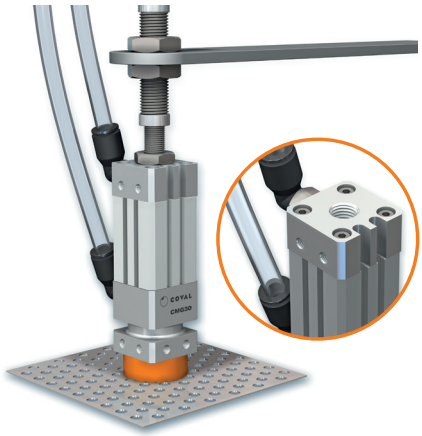


Figure 3. Magnet gripper mounted at the central mounting hole.

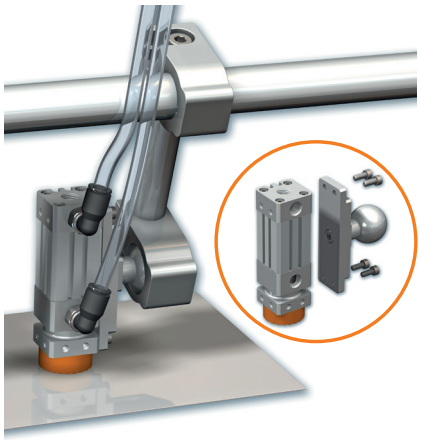


Figure 4. Magnet gripper mounted with a Ball joint bracket.

5.2. Electrical installation

5.2.1. Magnetic switch

Notice
The magnetic switch is capable of sensing only when the magnet is in its deactivated position.

Warning
Before connecting the sensor, ensure that both the voltage and air supply are disconnected.

For safe installation, the following instructions must be observed:
- Use only the supplied connections and attachment materials.
- Protect the sensor from mechanical damage.
- Provide strain relief for the sensor cable.
- Environmental conditions (assembly, magnetic interference fields, etc.) can affect the sensor.

For installation of the magnetic switch, follow these steps:
1. Insert the sensor in the T-slot of the CMG.
2. Fasten the sensor at the top of the main body by tightening it with a screwdriver. Torque 0.2 Nm.

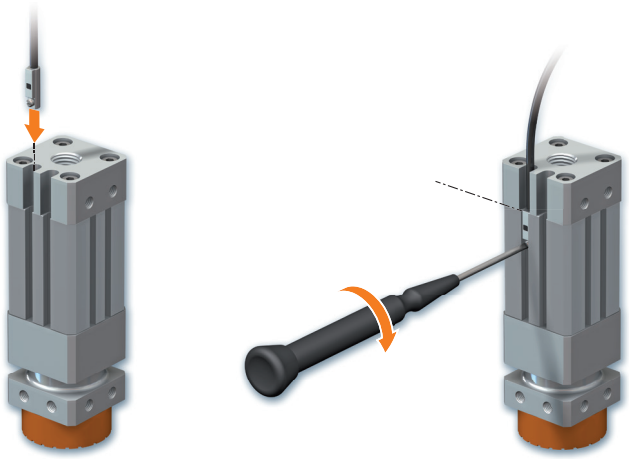
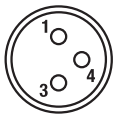


Figure 5. Installation of the sensor onto the CMG.

3. Connect the other end of the sensor cable according to the wiring table below.
4. Verify that the light on the sensor is turned on when the magnet is in the deactivated position and turned off when the magnet is in the activated position.

Electrical connections

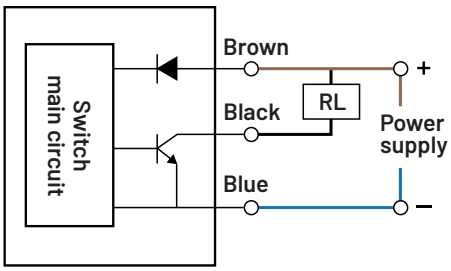


1 = + (Brown)
3 = - (blue)
4 = Out (black)

Figure 6. M8 male connection mode

Wiring diagrams

KT02N_



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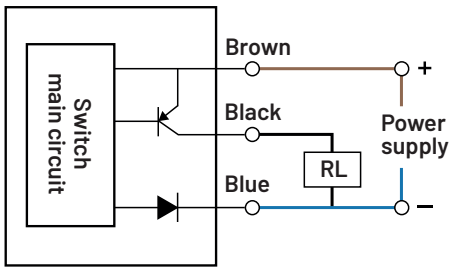


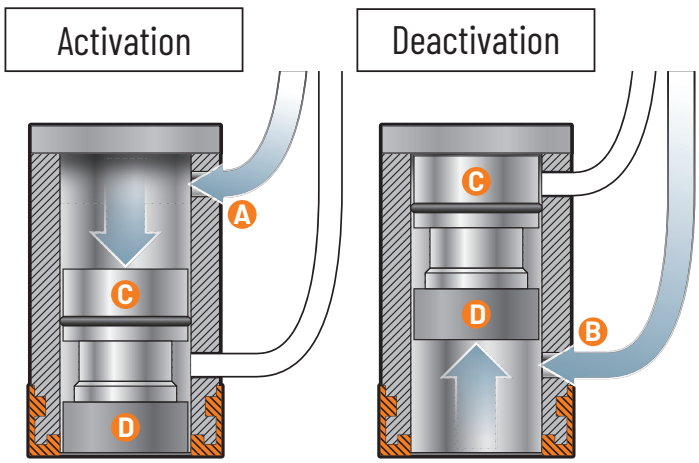
Figure 7. Wiring diagrams for the different Product Models

Models	Output type	Connection	Supply voltage range	Max. starting current	Function
KT02NE	NPN	Opened end (3-wire type)	5 to 30 V DC	80 mA	NO
KT02PE	PNP	Opened end (3-wire type)	5 to 30 V DC	80 mA	NO
KT02NEQD	NPN	M8 male connection	5 to 30 V DC	80 mA	NO
KT02PEQD	PNP	M8 male connection	5 to 30 V DC	80 mA	NO

Notice
Regularly verify that the sensor is securely installed in its slot, especially in fast handling applications or those exposed to vibration.
Avoid exposure to strong magnetic fields, as they can impair the sensor's functionality.
Conduct regular inspections of the sensor, sensor slot, and gripper. Remove any ferromagnetic materials.

6. USE

By pressurizing the upper port (A), the magnets are activated. By pressurizing the lower port (B), the magnets are de-activated.



Position	Description
A	Compressed air connection activation
B	Compressed air connection deactivation
C	Piston
D	Magnet

Figure 8. Activation (1) and de-activation (2) of the magnetic gripper.

7. MAINTENANCE

The CMG has been designed to minimize the need of maintenance. To ensure safe operation the following actions are strongly recommended to take:

- Maintenance must be performed with a fixed period short enough, to ensure a firm grip at all times.
- An overall inspection of the CMG must be performed on a regular basis with a duration depending on the application characteristics.
- All maintenance must be performed in compliance with this manual, including safety instructions.
- Only authorized integrators, or COVAL, shall perform repairs.
- Only use original spare parts.

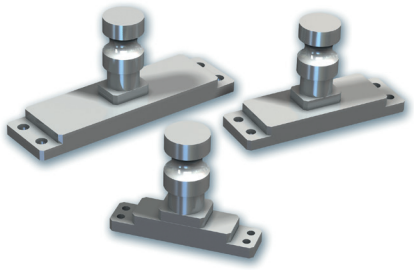
7.1. Spare parts

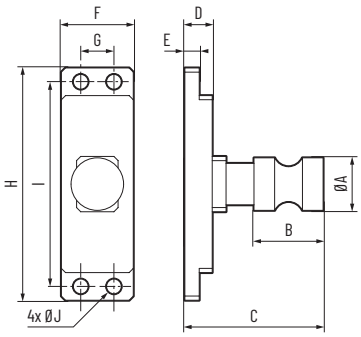
Models	Description
80010594	Friction ring Ø 20 for CMG20 (x5)
80010595	Friction ring Ø 30 for CMG30 (x5)
80010596	Friction ring Ø 40 for CMG40 (x5)
80010597	Friction ring Ø 50 for CMG50 (x5)

Figure 9. Friction ring for CMG.

7.2. Accessories

CMG_FIXA : Locking pin mounting bracket Ø19 mm (supplied with 4 mounting screws).



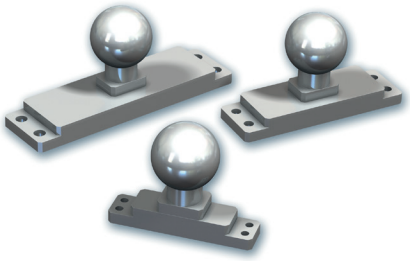


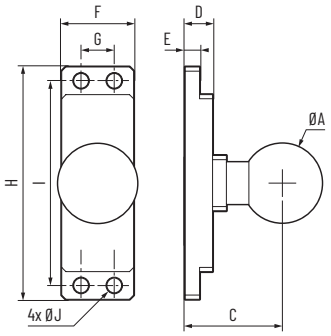
Matière : Aluminum (Stainless steel fasteners)

Models	Compatibility	Ø A	B	C	D	E	F	G	H	I	Ø J	(g)
CMG20FIXA	For CMG20	19	25	50	9.9	5.2	15	6.5	63	55	3.4	48.8
CMG30-40FIXA	For CMG30/40	19	25	50	9.9	5.2	26	12	84	74	4.6	83
CMG50FIXA	For CMG50	19	25	50	9.9	5.2	30	15	110	100	5.5	108

CMG_FIXB : Ball joint mounting bracket Ø28.5 mm (supplied with 4 mounting screws).

Matière : Aluminum (Stainless steel fasteners)





Models	Compatibility	Ø A	B	C	D	E	F	G	H	I	Ø J	(g)
CMG20FIXB	For CMG20	28.5	-	35.05	9.9	5.2	15	6.5	63	55	3.4	63.8
CMG30-40FIXB	For CMG30/40	28.5	-	35.05	9.9	5.2	26	12	84	74	4.6	98
CMG50FIXB	For CMG50	28.5	-	35.05	9.9	5.2	30	15	100	100	5.5	123

8. TECHNICAL DATA

Characteristics

Models	Ø of the friction ring (mm)	(N)/(lbf) Tensile force with/without friction ring						(N)/(lbf) Slipping force			
		Sheet metal thickness 1 mm		Sheet metal thickness 2 mm		Maximum		On dry sheet metal		On oily sheet	
		(N)	(lbf)	(N)	(lbf)	(N)	(lbf)	(N)	(lbf)	(N)	(lbf)
CMG20	20	15/20	3.37/4.49	17/22	3.82/4.94	17/22	3.82/4.94	8	0.40	8	0.40
CMG30	30	70/90	15.73/20.23	85/110	19.10/24.72	85/110	19.10/24.72	32	1.61	23	1.16
CMG40	40	110/125	24.72/28.10	200/280	44.96/62.94	200/320	44.96/71.93	81	4.09	56	2.82
CMG50	50	125/140	28.10/31.47	250/300	56.20/67.44	380/480	85.42/107.90	105	5.30	65	3.28

Holding force values tested on flat metal surface with 3.2 Ra value and steel quality S235JR.

Specifications

Air Supply Pressure: 3.5 - 6.0 bar
Ambient Temperature Range: 5-70°C (41-158°F)
Maximum Contact Temperature: 70°C (158°F)

9. WARRANTY

We provide a warranty for this product and for any COVAL spare parts in accordance with our general terms of sale (GTS).
The exclusive use of COVAL spare parts is a condition required to ensure the product's flawless operation and we will not be held liable for any damage resulting from the use of spare parts or accessories that are not made by COVAL.
Wearing parts are excluded from the warranty.

10. RECYCLING

Waste from electrical and electronic equipment (WEEE) is a category of waste consisting of equipment at the end of its life cycle that uses electricity or electromagnetic fields to operate and designed to be used at a voltage that does not exceed 1000 volts for alternating current and 1500 volts for direct current.

The magnetic grippers are products that fall under this category of waste.

Waste from electrical and electronic equipment (WEEE) requires separately collection and recycling according to the European directive 2012/19/EU and to French legislation: decree no. 2014-928 from 19 August 2014.

For France: COVAL is a member of ECOSYSTEM for the collection, decontamination and recycling of professional WEEE. If you own any COVAL WEEE products, contact ECOSYSTEM who will collect and treat the products. (Collection only applies to France).

https://www.ecosystem.eco/

11. DECLARATION OF CONFORMITY

CE EC DECLARATION OF CONFORMITY

COVAL, the manufacturer, confirms that the product "Magnetic Gripper" described in this manual meets the following applicable EC directives:

- **2014/30/UE** : Electromagnetic Compatibility (EMC)
- **2011/65/UE** : Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- **REACH** (CE 1907/2006).

The following harmonized standards have been applied:

- **EN 61326-1:2013:** Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1 : general requirements.
- **EN 61326-2-3:2013 :** Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3 : particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning.

COVAL
vacuum managers

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A TECHNOLOGICAL PARTNER ON A GLOBAL SCALE

Located in the South of France, COVAL SAS designs, produces, and markets high-performance vacuum components and systems for industrial applications in all sectors worldwide.

An ISO 9001: V2015 certified company, COVAL innovates globally in vacuum handling. Our optimized components integrate intelligent and reliable functionalities, adapt to your industrial context, and safely improve your productivity.

With a strong spirit of innovation and technological advancements, the COVAL team is now recognized as an expert in developing reliable, economical, and productive custom solutions.

COVAL's references are found in major industrial sectors such as packaging, food processing, automotive, plastics, aerospace, and robotics, where vacuum handling is crucial for efficiency and productivity.

COVAL markets its products and services worldwide through its subsidiaries and authorized distributor network. Always attentive to its customers, COVAL supports the implementation of its solutions with a continuous and attentive relationship.

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