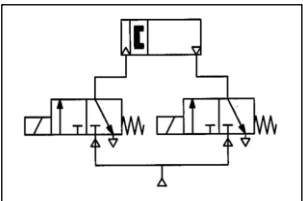
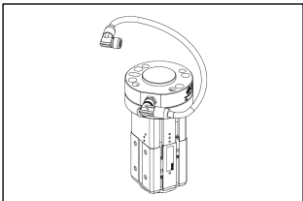




ORIGINAL INSTRUCTIONS

Instruction Manual

Magnet Gripper for Collaborative Robots
MHM-25D-X7400A-CRX



The intended use of this magnet gripper is to convert the potential energy provided by compressed air into a force which causes mechanical movement of a magnet which can then attract a suitable workpiece.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)⁽¹⁾, and other safety regulations.
⁽¹⁾ ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

	Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

- Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

2.1 Product Specifications

Medium	Air	
Action	Double Acting	
Operating Pressure [MPa]	0.2 to 0.6	
Proof Pressure [MPa]	0.9	
Ambient and Operating Temperature [C]	-10 to +50 (No Freezing)	
Gripping Force (0.5 MPa)	Workpiece = 2mm	160 N
	Workpiece = 6mm	200 N
Residual Holding Force	0.3 N or less	
Lubrication	Not Required	
Mass [grams]	590	
Auto Switch Model	D-M9P, D-M9N	
Cable Type	Both sides; M8 8-Pin Connector (Socket)	

2.2 Individual Specifications

2.2.1 Magnet Gripper

Medium	Air	
Action	Double Acting	
Operating Pressure [MPa]	0.2 to 0.6	
Proof Pressure [MPa]	0.9	
Ambient and Operating Temperature [C]	-10 to +60 (No Freezing)	
Gripping Force (0.5 MPa)	Workpiece = 2mm	160 N
	Workpiece = 6mm	200 N
Residual Holding Force	0.3 N or less	

2 Specifications - continued

Lubrication	Not Required
Mass [grams]	244

Note: The gripping force is a theoretical holding force when a low carbon steel plate is held by a surface attraction surface.

2.1.1 3-Port Solenoid Valve (V114-5LU)

Fluid	Air
Ambient and Fluid Temperature [C]	-10 to +50 (No Freezing)
Response time (DC) [ms]	ON: 5 or less OFF: 4 or less
Maximum Operating Frequency [Hz]	20
Lubrication	Not Required
Mounting Position	Unrestricted
Impact / Vibration Resistance [m/s ²]	150 / 30
Enclosure Rating	Dust proof
Electrical Entry	L-plug connector
Coil Rated Voltage [V]	24
Allowable Voltage Fluctuation	-10 to +10%
Power Consumption [W]	0.4 [Starting 0.4, Hold. 0.1]
Indicator LED	LED

2.1.2 Auto Switch (D-M9P)

Electrical Entry Direction	In-line
Wiring	3-wire
Output	PNP type
Applicable load	IC Circuit, Relay, PLC
Power Supply Voltage	DC5 · 12 · 24V (4.5 to 28V)
Current Consumption	10 mA or less
Load Voltage	DC28V or less
Load Current	40 mA or less
Internal Voltage Drop	0.8 V or less at 10 mA (2 V or less at 40 mA)
Current Leakage	100 µA or less at 24 VDC
Indicator LED	Red LED illuminates when turned ON.

3 Installation

3.1 Installation

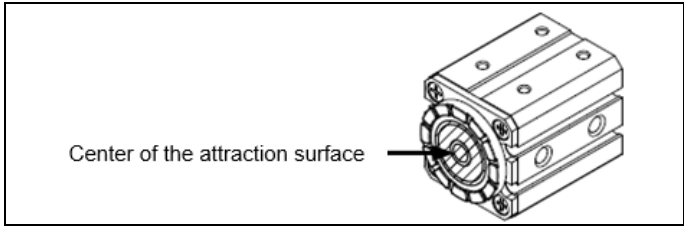
Caution

- Do not install the product unless the safety instructions have been read and understood.
- Allow sufficient space for maintenance and inspection.

- When the magnet moves towards the magnetic attraction surface, holding force is generated on the attraction surface. Make sure that the holding force is not generated when working around the magnetic gripper so that your fingers do not get caught in the magnet gripper.

Warning

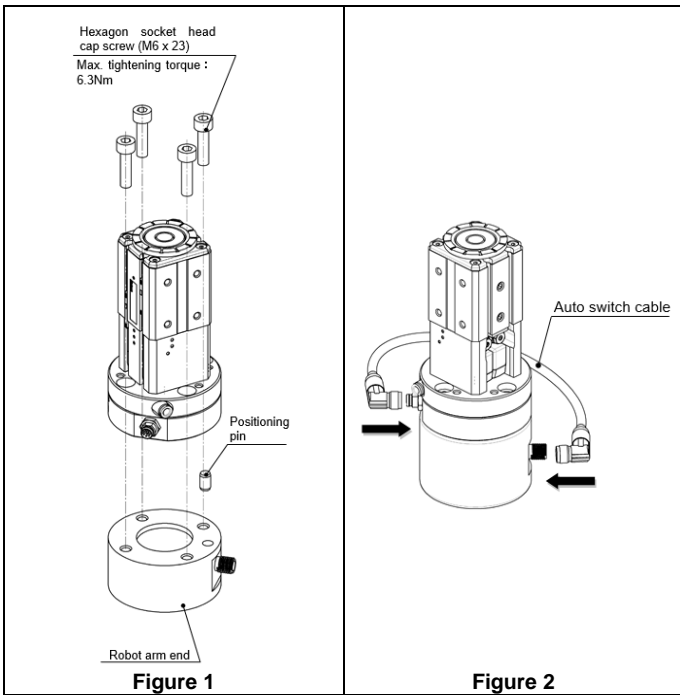
- Do not scratch or dent the magnet gripper by dropping or bumping it when mounting. Even a slight deformation can cause malfunction.
- Be careful with the magnetic attraction of parts of objects around the magnet gripper when mounting the magnet gripper while it is in its holding position (the piston is on the attraction side).
- When mount the product, tighten it with screws of appropriate length at an appropriate torque. Tightening with a torque greater than the specified torque can cause malfunction, while insufficient torque will cause slippage and dropping.
- Do not apply impact load to the centre of the magnetic attraction surface, as it may result in breakage or malfunction.



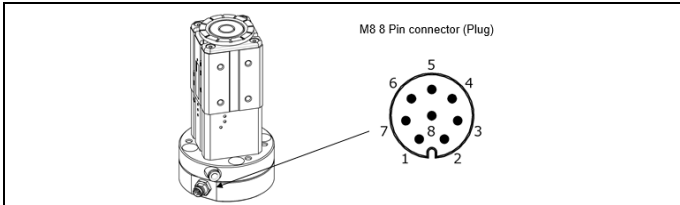
3.1.1 How to mount magnet gripper

- Adjust the robot arm position before mounting so that it is in a comfortable position.
- Mount to the robot arm using **Hexagon Socket Head Cap Screws (M6x23)** and tighten to a **maximum 6.3 N.m torque**. It is important to use a positioning pin to ensure all mounting holes align, see **Figure 1**.
- Ensure that the product is not energized whilst securing the connector. Once attached check that the connector is not loose, see **Figure 2**.

3 Installation - continued



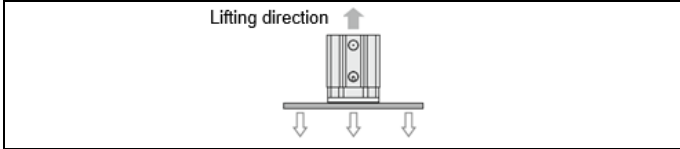
3.1.2 Connector and Pin Layout



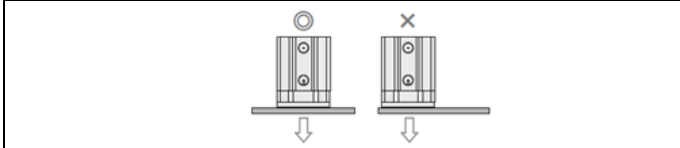
PIN #	Function	Description
1	-	NC
2	-	NC
3	Auto Switch (For holding position)	-
4	Auto Switch (For released position)	-
5	+24V	Power Supply for 24 VDC
6	Valve ON/OFF (For holding position)	-
7	Valve ON/OFF (For released position)	-
8	GND	Power Supply for 0 VDC

3.1.3 Gripping Force – Holding Conditions

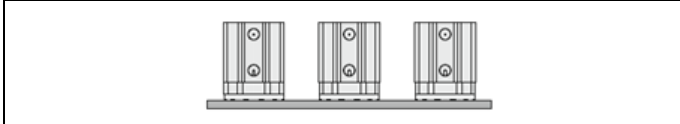
- To lift workpieces **vertically**, be sure to take into consideration; acceleration rate, air pressure, impact etc in addition to workpiece mass.



- Consider the **centre of gravity** of the workpiece to avoid moments being applied to the magnet gripper, as much as possible.

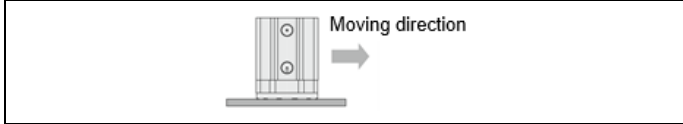


- If using **multiple magnet grippers** to transfer a workpiece with a large surface area, ensure they are distributed evenly.

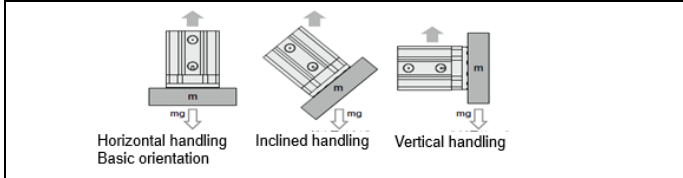


3 Installation - continued

- Horizontal** movement of the magnet gripper may cause “sideslip” of the workpiece depending on the acceleration or friction coefficient between pad and workpiece. In cases like this minimize the acceleration rate to reduce/prevent the lateral movement.



- Use the magnet gripper in a **horizontal** orientation, if using in an inclined or vertical orientation, use an adequate safety factor.



3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.
- Do not use this product in an area that is dusty or in an environment in which water or oil splashes on the product.

3.3 Piping

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.

- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

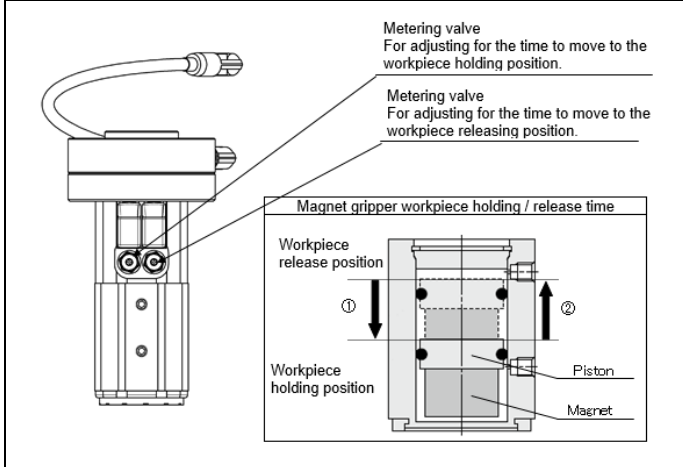
3.4 Lubrication

Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to catalogue for details.

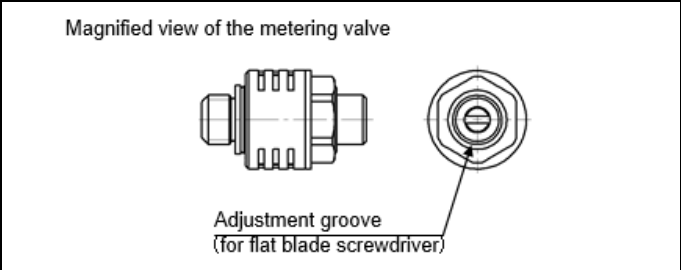
4 Settings

- The piston operating time during workpiece holding/release can be adjusted by adjusting the opening of the metering speed controller valve.



4 Settings - continued

- ① **Workpiece holding time:** This represents the time required when the piston and magnet travel from the workpiece release position to the workpiece holding position.
- ② **Workpiece release time:** Time required when the piston and magnet travel from the workpiece holding position to the workpiece release position.



- Use a flat head blade screwdriver for adjusting the restriction of the metering valves.
- Keep the restriction of the two metering valves approximately the same. If they are different by too much, the operation is likely to become unstable.

5 How to Order

Refer to customer drawing for 'How to Order'.

6 Outline Dimensions

Refer to customer drawing for outline dimensions.

7 Maintenance

7.1 General Maintenance



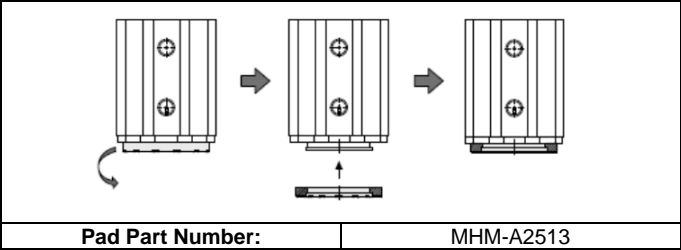
Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.

- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Do not allow people to enter or place objects in the carrying path of the air gripper.
- Do not put hands, etc, in between the air gripper fingers or attachments.
- When removing the air gripper, first confirm that no workpieces are being held and then release the compressed air before removing the air gripper.

7.2 Replacement Pad

- Remove the old pad.
- Place the new pad over the groove.
- Ensure that the pad is correctly in place and does not lift off the surface.



8 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

9 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

10 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor/importer.

SMC Corporation

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