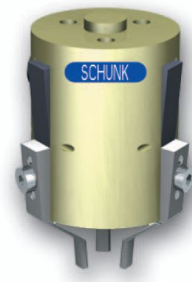


SIMPLE MAGNETIC GRIPPER

SMG AND SMG C (CONTROLLER)



Dear Customer,

Congratulations 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. You can reach us directly at the mentioned addresses in the last chapter of these instructions.

Kindest Regards,

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1 Safety

1.1 Symbol key



This symbol is displayed wherever there is a possibility of **danger to life and limb**.



This symbol is displayed wherever the possibility of **damage to the product** exists.



This symbol denotes **important information** about the product and its handling.

1.2 Appropriate use

The gripper module was designed for gripping and temporary secure holding of workpieces or other objects.

The product is intended for installation / mounting in machines and equipment. The requirements of the applicable directives must be observed and complied with.





The product may be used only within the range of its technical data. Any other use is deemed improper and unintended use. The manufacturer will not be liable for any damages resulting from improper use.


1.3 Environmental and operating conditions


- Use the unit only within the application parameters defined in the Technical Catalog. The most recent version applies (according to Chapter 2.3 of the General Terms and Conditions).
- Clean ambient conditions at room temperature are required. If these conditions are not ensured, the maintenance interval will be shorter, depending on the actual utilization.
- The environment must be free of splashing water and vapors, and also of abrasive dust and process dust. This does not apply to units designed especially for unclean environments.




1.4 Safety notes

1. There are potential risks associated with the unit, for example if:
 - the gripper is improperly used, installed or serviced.
 - the gripper is used other than for the intended purpose.
 - the EC Machine Directive, the accident prevention regulations, the VDE guidelines or the safety and installation instructions are not observed.

2. All personnel who are responsible for installation, commissioning and servicing must have read and understood the entire operating manual, in particular the chapter on »Safety«. It is recommended to have this confirmed in writing.
3. Installation and dismantling, mounting of the proximity switches, connections and commissioning may be carried out only by authorized personnel.
4.  Dangers exist due to units automatically starting up!
 - Do not reach into the open mechanical parts and the area between the gripper fingers.
 - Do not move any parts by hand when the unit is connected to the power supply.
 - Remove the power supply cables for assembly, modification, maintenance and adjustment of the unit.
5.  During connection, adjusting, commissioning and testing, measures must be taken to prevent the risk of inadvertent activation of the unit by the fitter / installer or other persons.
6.  There is a danger due to falling or ejected objects!
 - Take preventive measures to prevent the falling or ejection of potentially dangerous objects (machined workpieces, tools, chips, debris, waste, etc.).
7.  During operation dangers can be caused by the gripper due to:
 - moving or rotating parts
 - or hot surfaces – up to 110°C!

Therefore, suitable protective measures such as protective covers must be provided in accordance with the EC Machine Directive.
8.  **The electric gripper is not suitable for use in potentially explosive areas.**

If the gripper is to be used in special applications (e.g. potentially explosive areas), always comply with the required standards and regulations (e.g. EN 50014 and EN 50018).
The approval for such special areas of application must always be obtained from Schunk in writing.
9.  The correct operation of the unit can be disrupted by contamination or running dry!
 - Observe the maintenance and cleaning intervals.
10. Ensure compliance with EMC directives when connecting the motor and the controller.

11.  The gripper is equipped with an electric drive.
Serious injuries and major damages can be prevented by:
- Assignment of only qualified personnel for all work on/with the unit! (Personnel who are familiar with electric drive systems and with the installation, assembly, commissioning and operation of electric drives.)
 - Compliance with the applicable national accident prevention regulations etc. Cp. IEC 364 and CENELEC HD 384 or DIN VDE 0100 and IEC-Report 664 or VDE 0110 and national accident prevention regulations or VBG 4.)
 - During transport and handling, make sure that no components are bent and that no insulation clearances are changed. (Electric grippers contain electrostatically sensitive components.)
 - Establish all electrical connections in accordance with the information in this documentation and the relevant regulations (e.g. wire size, fuses, protective conductors).
12.  Repairs in and on the electric gripper may be carried out only by the manufacturer or an authorized repair center.
Unauthorized opening and improper handling can result in bodily injury and material damage.
13.  Electronic devices are not fail-safe. The user is personally responsible for ensuring that the drive is in a safe state in the event of a failure.
14. Additional bore holes, threads or attachments not offered by SCHUNK as accessories may be mounted only after obtaining the approval of SCHUNK.
15. In addition, the applicable safety regulations and accident prevention regulations must be observed.

Warning!



The gripping movement is executed very quickly. High impulse forces can occur.

- Please ensure that the workpiece and the attachment fingers are not damaged by these forces.

2 Warranty

The warranty period is 24 months from the date of delivery from the factory, provided that the unit was used appropriately in 1-shift operation and the specified maintenance and lubrication intervals were observed. Wearing parts and components that come into contact with work-pieces are never included in the warranty. In this context, please also see our General Terms and Conditions.

3 Scope of delivery

The scope of delivery of an SMG consists of:

- SMG (without top jaws - please request these separately! The top jaws must be able to withstand high acceleration forces!)

The scope of delivery of an SMG C consists of:

- SMG C

The following accessories must be ordered separately: (see catalog):

- Top jaws

4 SMG (gripper)

4.1 Technical data

Product designation	SMG
ID	306040
Stroke per finger [min]	+ - 3°
Gripping force *	>15 N (at end stop)
Workpiece weight (recommendation) **	15 g
Power supply (nominal range)	24VDC
Current input	0.5A for max. 0.035 s
Minimum opening time	0.03 s
Minimum closing time	0.03 s
Weight	0.11 kg
Max. finger length	30 mm
Repeat accuracy ***	0.02 mm

Table 1: Technical data for the SMG

* The gripping force is the arithmetic total of the individual forces occurring on the claw jaws at distance P

** Values for friction coefficient $\mu = 0.1$ and safety factor $v = 2$. The values might be increased in the event of form-fit clamping.

*** Spread of end positions after 100 consecutive strokes.

The airborne sound emitted from the unit is $\leq 70\text{dB(A)}$

A controller is not needed to operate the gripper. However, we recommend the SMG-C (ID 307 003) to make commissioning easier and to prevent damage to the gripper due to power being supplied for too long.

Please consult our catalog for further technical details.

The latest version is valid in each case (in accordance with chapter 2.3, General Terms and Conditions).

Please check whether the suitability of your individual application has been checked using the calculation program for grippers (SSG). If not, liability will not be accepted.

4.2 Assembly and dimensions

The gripper is fixed by the base. It is centered using the fit bolts at the base and/or using an alignment pin at the base.

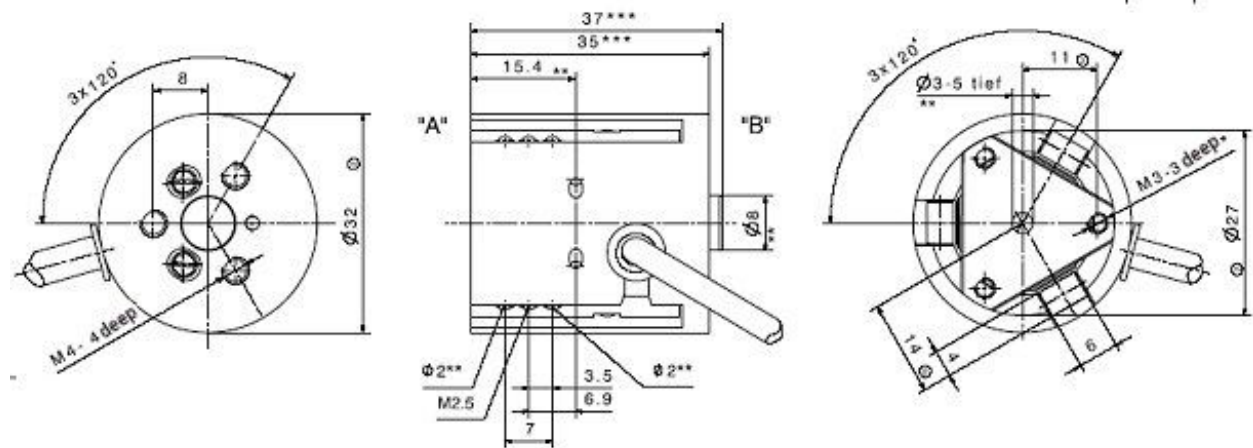


Figure :Connecting dimensions for the SMG

The gripper must not be fixed to a magnetically soft adapter plate (FE, e.g. steel), as it will not work.

4.3 Cable assignment

Important!



Power must not be supplied to the coils for longer than 0.035 seconds and the duty factor must be less than 50%.

Color	Function
Brown	Coil connection 1
Blue	Coil connection 2

Table 2: Pin assignment for X2 connector

+ 24V DC	GND	Function
Red	Blue	Close gripper
Blue	Red	Open gripper

Table 3: Gripper circuit

4.4 Maintenance and care

The base jaws and the guides in the housing are aligned with each other. To replace these parts, send the complete gripper to SCHUNK together with a repair order.

Please observe the following instructions to ensure correct functioning of the gripper:

1. If no other regulations apply, all screws and nuts must be secured with Loctite No. 243 and tightened to a torque that conforms to DIN.
2. Blow the gripper out regularly with compressed air to prevent dirt collecting between the housing and the base jaws.
3. Do not expose the gripper to drilling emulsions.
4. The gripper must not be exposed to metal chips.
5. Only operate the gripper at an ambient temperature of between +5°C and +55°C.
6. Note the bending radii when laying the cable. Torsion movements must be ruled out.

4.5 Troubleshooting

The gripper does not complete a full stroke

- Dirt between the base jaws and the guide or housing

The gripping force is decreasing

- Clean the gripper

The gripper does not open or close

- The gripper is mounted too close to magnetically soft material.
- The gripper is mounted too close to a permanent magnet.
- Power was supplied to the gripper for too long and the coils have burnt out.
- The voltage applied is less than 24 VDC

5 SMG C (controller)

5.1 Technical data

Product designation	SMG-C
ID	307 003
Power supply	24 VDC -2% +10%
Current input, electronics	< 50 mA
Current input with gripper	< 300 mA, depending on the cycle
Current input, gripper	< 500 mA
Weight	0.3 kg
Protection class	IP 30
Nominal temperature range	-10°C to 65°C
Interfaces	2 digital inputs

Table 4: Technical data, SMG-C

5.2 Assembly and dimensions

The SMG-C controller is secured by means of the metal foot locking device to a mounting rail to EN 50022.

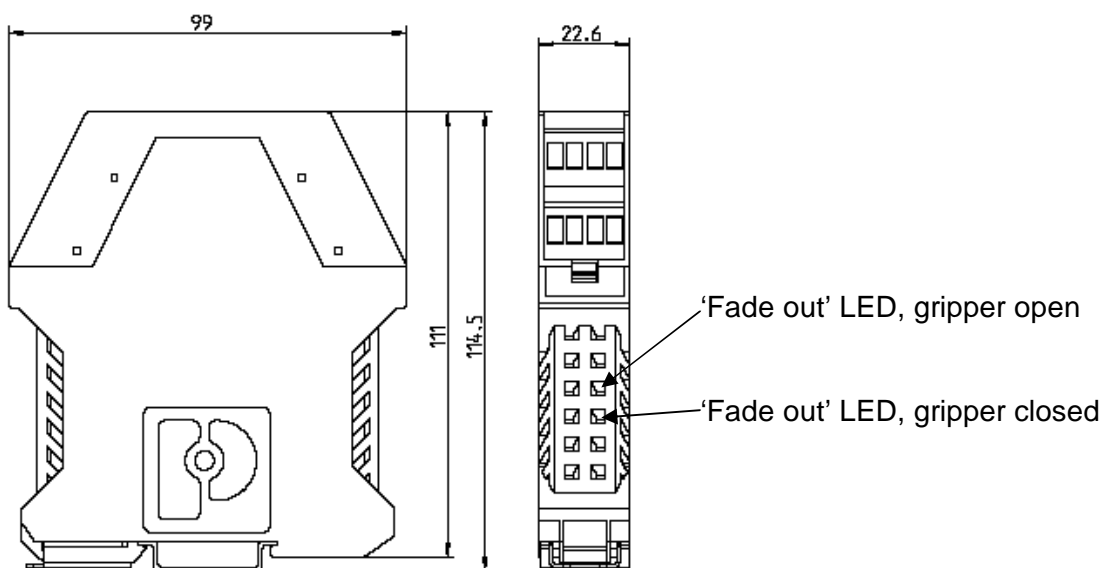


Figure 2: SMG-C dimensions

5.3 Terminal assignment



Terminal	Marking	Function	Other information
1	+24VDC	Power supply connection	24VDC -2% +10%
2	GND	Power supply connection	GND
3	Gripper open	Signal from the master control system	Rising edge to open gripper
4	Gripper closed	Signal from the master control system	Rising edge to close gripper
5			
6			
7	Gripper connection 1	Coil connection 1	Blue
8	Gripper connection 2	Coil connection 2	Brown

Table 5: SMG-C terminal assignment

5.4 Commissioning and function description

Warning!



The gripping movement is executed very quickly. High impulse forces can occur.

- Please ensure that the workpiece and the attachment fingers are not damaged by these forces.

Important!



Power must not be supplied to the coils for longer than 0.035 seconds and the duty factor must be less than 50%.

The electronic actuation system is connected to +24V and is operational when the two green LEDs inside the housing are lit up. These can be seen through the ventilation slot.

Function description of the SMG electronic actuation system

Opening the gripper

- Attach the 'Gripper close' input to GND
- Apply a pulse [0V → 24V → 0V] for a period of approx. 5ms to the 'Gripper open' input.
- → The gripper should then open. The SMG-C supplies power to the gripper for a period of 35ms and does not respond to any other signals for 70ms after the pulse.
- The pulse applied to the gripper is indicated by the upper LED fading out.

Closing the gripper

- Attach the 'Gripper open' input to GND
- Apply a pulse [0V → 24V → 0V] for a period of approx. 5ms to the 'Gripper closed' input.
- → The gripper should then close. The SMG-C supplies power to the gripper for a period of 35ms and does not respond to any other signals for 70ms after the pulse.
- The pulse applied to the gripper is indicated by the lower LED fading out.

The pulse duration of 35 ms is the optimum time for safely opening or closing the gripper. After the opening or closing operation, the gripper requires a break of 35ms before power is supplied again. This mandatory break is ensured by the electronic actuation system, i.e. after a closing operation, the gripper can only be opened again by a pulse after 70ms have elapsed.

5.5 Troubleshooting

Problem	Cause	Remedy
On applying the pulse to the 'Gripper open' input, the gripper closes	Incorrect gripper connection.	Swap blue and red wires around
On applying the pulse to the 'Gripper close' input, the gripper opens	Incorrect gripper connection.	Swap blue and red wires around
The gripper does not move or not all the fingers move.	Voltage too low Dirt between gripper housing and gripper base jaws	Apply an operating voltage of 24VDC -2% $+10\%$. Clean the gripper with compressed air
The fingers move but the gripper does not grip the workpiece	The component is too large or is not positioned centrally.	The base jaws cannot move as far as the end stop and they ricochet off the component. Please note, the gripper should grip by means of form-fit clamping or due to the flexibility of the gripper fingers.

6 Manufacturer's Declaration

As defined by EC Machine Directive 98 / 37 / EC, Appendix II B

Manufacturer

SCHUNK GmbH & CO:KG.
Precision Workholding Systems
Bahnhofstr. 106 - 134
D-74348 Lauffen/ Neckar

We hereby declare that the following...

magnetic gripper modules of the production series SMG

Product type	Product no.
SMG 32	306 040
SMG 32-C	307 003

are designed to be incorporated into machinery and must not be put into service until it has been determined that the machinery into which these products are to be incorporated conforms with the provisions of the EC Machine Directive 98/37/EC.

Applied harmonized standards, in particular:

EN ISO 12100-1 and EN ISO 12100-2

Date / Signature:

2008



Title of signatory

Development Manager

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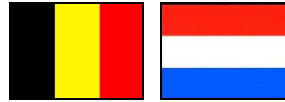
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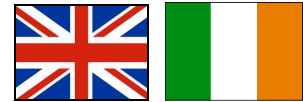
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