



Proximity switch for magnetic gripper

Operating Instructions

Note

The Operating instructions were originally written in German. Store in a safe place for future reference. Subject to technical changes without notice. No responsibility is taken for printing or other types of errors.

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1 Important Information

1.1 Note on Using this Document

J. Schmalz GmbH is generally referred to as Schmalz in these Operating instructions.

These Operating instructions contain important notes and information about the different operating phases of the product:

- Transport, storage, start of operations and decommissioning
- Safe operation, required maintenance, rectification of any faults

The Operating instructions describe the product at the time of delivery by Schmalz.

1.2 Symbol



This symbol indicates useful and important information.

- ✓ This symbol represents a prerequisite that must be met prior to an operational step.
- ▶ This symbol represents an action to be performed.
- ⇒ This symbol represents the result of an action.

Actions that consist of more than one step are numbered:

1. First action to be performed.
2. Second action to be performed.

2 Safety

2.1 Safety instructions

The product is used in combination with an automated handling system (gantry/robot). Therefore, in addition to the safety instructions described here, the safety regulations of the corresponding system apply.

2.2 The technical documentation is part of the product

1. For problem-free and safe operation, follow the instructions in the documents.
 2. Keep the technical documentation in close proximity to the product. The documentation must be accessible to personnel at all times.
 3. Pass on the technical documentation to subsequent users.
- ⇒ Failure to follow the instructions in these Operating instructions may result in injuries!
 - ⇒ Schmalz is not liable for damage or malfunctions that result from failure to heed these instructions.

If you still have questions after reading the technical documentation, contact Schmalz Service at:

www.schmalz.com/services

2.3 Intended use

The proximity switch is used to detect two end positions on magnetic cylinders. Only the PNP variant can be read out and set via IO link.

This device has been designed, developed and constructed solely for industrial and commercial use. Private use is excluded.

Intended use includes the observance of the technical data and the installation and operating instructions in this manual.

2.4 Personnel qualification

Unqualified personnel cannot recognize dangers and are therefore exposed to higher risks!

1. Electrical work and installations may only be carried out by qualified electrical specialists.
2. Assembly and adjustment work may only be carried out by qualified personnel.

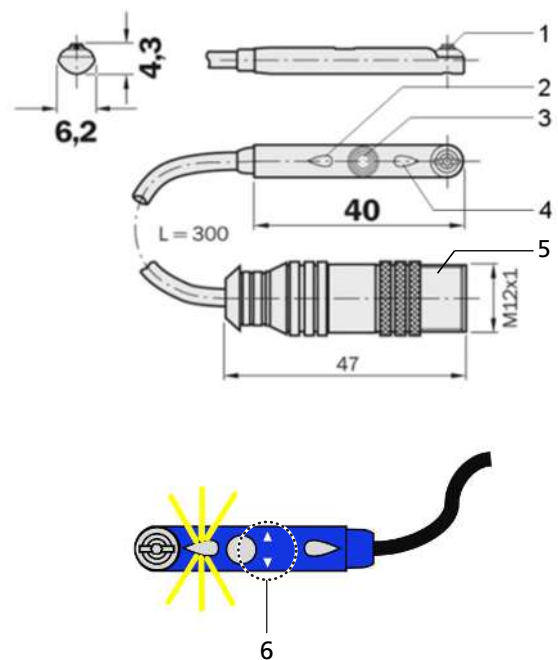
3 Technical data

Power supply U_V PNP	DC 15 to 30 V
Power supply U_V NPN	DC 12 to 30 V
Power consumption (inactive) I	≤ 15 mA
Continuous current I_a	≤ 100 mA
Switching output	PNP/NPN
Output function	Normally open
Connection cable	M12x1 L=0.3 m
EMV	EN 60 947-5-2
Degree of protection	IP 67
Ambient temperature	-20 to +75

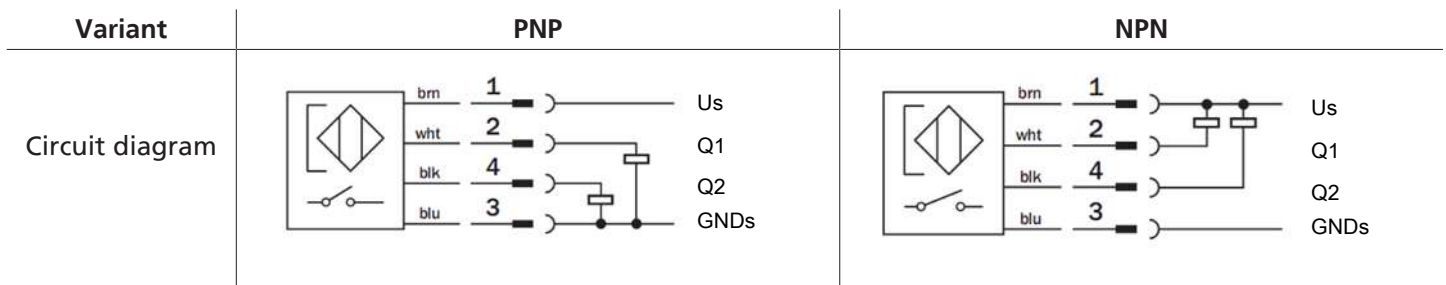
4 Product description

4.1 Dimensions and designations

1	Fastening screw
2	LED 2 – setting down
3	Teach button
4	LED 1 – gripping
5	Electrical connection M12x1
6	Center of sensor



4.2 Electrical connection




Plug M12-1	Pin	Litz wire color	Symbol	PNP function	NPN function
	1	Brown	U_s	Supply voltage	
	2	White	Q1	Signal output 2 (LED 2)	Signal output 1 (LED 1)
	3	Blue	GND_s	Ground	
	4	Black	Q2	Signal output 1 (LED 1)	Signal output 2 (LED 2)

4.3 Variants

Part number	Designation	Accessories for	Spare parts for
10.01.17.00199	NAEH-SCHA SMAGN-PNP S051	SGM-HP, SGM-SV, SGM-HD-SV	SGM-S, SGM-HD-S
10.01.17.00215	NAEH-SCHA SMAGN-NPN S050	SGM-HP, SGM-SV, SGM-HD-SV	SGM-S, SGM-HD-S
10.01.17.00447	MOD-SENS NAEH SGM-HP-20-PNP	SGM-HP 20	—
10.01.17.00448	MOD-SENS NAEH SGM-HP-20-NPN	SGM-HP 20	—

5 Installation

5.1 Installation instructions

 Magnetic grippers of the series SGM-HT-HP ... are not intended for sensor operation due to their application in the high temperature range. Magnetic grippers of the standard series SGM / SGM-HD cannot be operated with a sensor.

For safe installation, the following instructions must be observed:

- Use only the connections and attachment materials that have been provided.
- Protect the sensor from mechanical damage (breaking off). Provide strain relief for the sensor cable.
- Disconnect the voltage and air supply before connecting the sensor.
- Except for the variants SGM-S / SGM-HD-S, the sensor is not delivered preconfigured.
- Environmental conditions (assembly, magnetic interference fields, etc.) can affect the sensor. Therefore, it may be necessary to teach the sensor again after installation.
- The sensor must always be taught after installation.
- **Teach the sensor with the workpiece to be gripped.**

5.2 Mounting

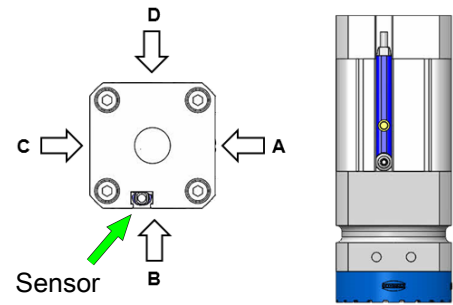
The sensor may be installed in any position.

To ensure that the gripper functions properly and to prevent faults in the sensor function, observe the following installation instructions:

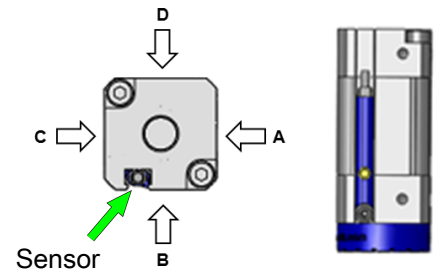
- **Use mounting elements or similar made of non-magnetizable material (aluminum, plastic, etc.)**
- Check on a regular basis that the sensor is securely installed in the slot – in particular when it is used in fast handling processes or ones that are exposed to vibration.
- Strong magnetic fields can impair the functionality of the sensor. As a result, the suitability of the sensor for use, for example in close proximity to welding plants, must be checked separately in each individual case.
- Keep magnetizable objects away from the sensor or place them at a sufficient distance. Observe the minimum distances specified below.
- The sensor, sensor slot, and gripper(s) must be regularly inspected and any ferromagnetic pollutants (such as iron shavings) removed.

Minimum distances of magnetizable objects

Type	SGM-HP			
	20	30	40	50
Direction	A/B/C/D	A/B/C/D	A/B/C/D	A/B/C/D
Rec. minimum distance [mm]	20	20	20	20

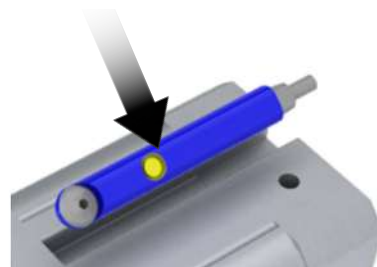


Type	SGM-(HD)-S / SGM-(HD)-SV			
	30	40	50	70
Direction	A/B/C/D	B	B	B
Rec. minimum distance [mm]	15	5	5	5
Distance of 2 SGM-S for block mounting at the side (2 grippers next to each other) and asynchronous operation [mm]	12	0	0	0

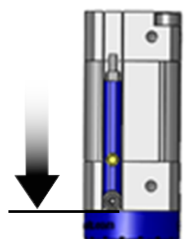
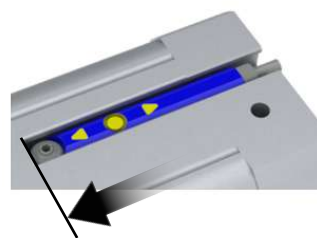


Commissioning of the sensor for first time installation or resetting, where necessary

1. Place sensor centrally in the T-slot.



2. Push the sensor to the stop of the T-slot, or in the case of variants with **open T-slot**, fix the sensor flush with the lower end of the slot (towards the gripping surface).

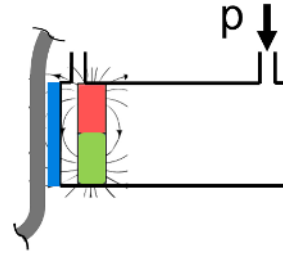


- ▶ Fix the sensor with a screwdriver (torque: 0.2 +/- 0.05 Nm).
- ▶ Connect plug M12x1 and apply operating voltage.

Teaching in the switching points

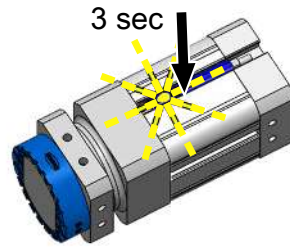
- ✓ Use the supplied teach-in tool or a plastic pin for the teach-in process; do not use magnetic tools (screwdriver, steel hexagonal socket wrench, etc.).
- ✓ The gripping apparatus/gripper tool is in the workpiece pick-up position.

1. Check sensor position: At the end of the T-slot or flush with the slot end.
With the sheet clamped, set/actuate the piston position for the first switching point (front piston in operating position).



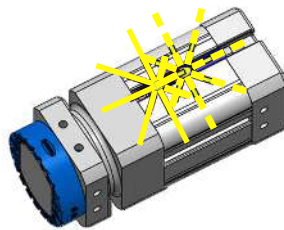
2. Press and hold the Teach button for 3 seconds.

⇒ LED 1 flashes

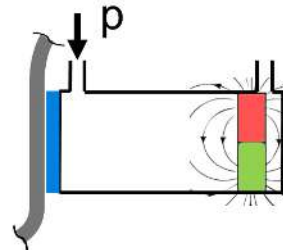


3. Release the Teach button.

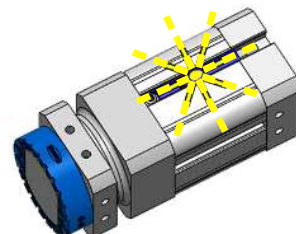
⇒ First switching point is stored (LED 1 lights up and LED 2 flashes)



4. (Put the gripping apparatus/gripper tool in the workpiece depositing position.)
Set/actuate the piston position for the second switching point (rear piston in idle state).

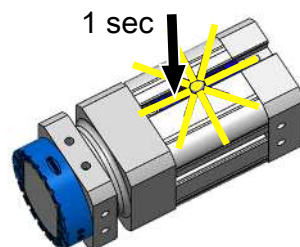


⇒ LED 1 is extinguished and LED 2 flashes.



5. Press the Teach button briefly.

⇒ The second switching point is stored (LED 2 lights up).





Alternatively, teach the sensor via the IO-Link if, for example, teaching with the pin is not possible due to inaccessibility.

Inspection of first switching point

1. Move the piston to the position for the first switching point.
 - ⇒ LED 1 illuminated
2. LED 1 not illuminated.
 - ⇒ Check the operating conditions and adjust accordingly.

Inspection of second switching point

1. Move the piston to the position for the second switching point.
 - ⇒ LED 1 is extinguished and LED 2 lights up.
2. If LED 1 does not turn off or LED 2 does not light up,
 - ⇒ check the operating conditions and adjust accordingly.

6 Maintenance

The sensor does not require maintenance.

We recommend:

1. Check on a regular basis that the sensor is securely installed in the slot – in particular when it is used in fast handling processes or ones that are exposed to vibration.
2. Cleaning the surfaces of the LEDs regularly.
3. Checking the screw union and the plug connection regularly.
4. The sensor, sensor slot, and gripper(s) must be regularly inspected and any ferromagnetic pollutants (such as iron shavings) removed.

7 Spare and wearing parts

Part no.	Type	Designation	Type
10.01.17.00509	ZUB SGM-S NAEH-SCHA Screw	Screw	Spare part
10.01.17.00510	ZUB SGM-S NAEH-SCHA PIN	Plastic pin	Spare part

- ▶ When tightening the fastening screws, observe the maximum tightening torque of 0.2 +/- 0.05 Nm.

8 Disposing of the sensor

1. Dispose of the product properly after replacement or decommissioning.
2. Observe the country-specific guidelines and legal obligations for waste prevention and disposal.

9 IO link configuration for PNP variant only

See also

- Data Dictionary_Näherungsschalter _21.10.01.00118_00.pdf [] 8]



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IO-Link Implementation	
Vendor ID	234 (0x00EA)
Device ID	1179758 (0x12006E)
SIO-Mode	Yes
IO-Link Revision	1.0
IO-Link Bitrate	38.4 kBit/sec (COM2)
Minimum Cycle Time	2.3 ms
Process Data Input	1 bytes
Process Data Output	None

Process Data						
Process Data Input	Name	Bits	Data Type	Access	Special Values	Remark
PD In Byte 0	Switching Point 2	1	Boolean	ro		Logic state of switch point 2
	Switching Point 1	0	Boolean	ro		Logic state of switch point 1

ISDU Parameters								
ISDU Index	Subindex	Display Appearance	Parameter	Size	Value Range	Access	Default Value	Remark
Identification								
Device Management								
16	0x0010	0	Vendor Name	64 bytes		ro	J. SCHMALZ GMBH	Manufacturer designation
18	0x0012	0	Product Name	64 bytes		ro	SMAGN S051	General product name
21	0x0015	0	Serial Number	16 bytes		ro		Serial number
22	0x0016	0	Hardware Revision	64 bytes		ro	1.10	Hardware revision
23	0x0017	0	Firmware Revision	64 bytes		ro	2.42	Firmware revision
24	0x0018	0	Application Specific Tag	16 bytes		rw		User string to store location or tooling information
Parameter								
Device Settings								



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2	0x0002	0		System Command	1 byte	160, 161, 163, 164	wo	0xA0 (dec 160): teaching of switch point 1 0xA1 (dec 161): teaching of switch point 2 0xA3 (dec 163): global key lock 0xA4 (dec 164): global key unlock
⊕ Process Settings								
144	0x0090	0		Teach parameter SP1	8 bytes		ro	taught parameter of switch point 1
145	0x0091	0		Teach parameter SP2	8 bytes		ro	taught parameter of switch point 2
146	0x0092	1		Tolerance Level SP1	1 byte	1 ... 5	rw	1
146	0x0092	2		Tolerance Level SP2	1 byte	1 ... 5	rw	1
147	0x0093	0		Tolerance Level Default	1 byte		ro	1
148	0x0094	0		Teach Button Status	1 byte		ro	0 0...127 teach button not locked 128 teach button locked 129...255 teach button not locked
⊕ Observation								
⊕ Monitoring								
40	0x0028	0		Process Data In Copy	1 byte		ro	Copy of currently active process data input

10 Notes