

INDUCTIVE PROXIMITY SWITCH



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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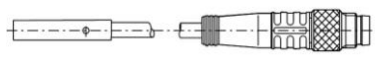
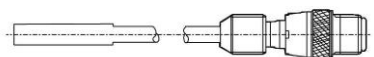
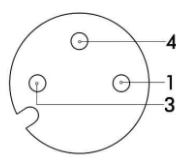
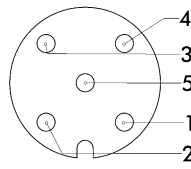
1 Electrical connection

Note



Malfunction of the proximity switch due to incorrect handling and installation.

- Have electrical work carried out only by qualified personnel.
 - Do not pull on the cable!
 - Do not allow the sensor to hang from the cable!
- Do not overtighten the mounting screw or mounting clip!
- Avoid contact of the proximity switches with hard objects and with chemicals, in particular nitric acid, chromic acid and sulphuric acid.
- The maximum bending radius of the cable is 15 times the cable diameter.

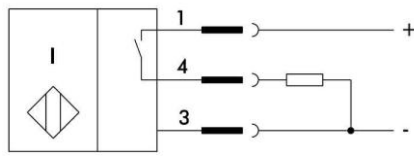
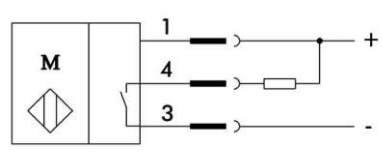
Type	M8	M12
Figure		
Allocation	 <p>Figure 1: M8 connector</p>	 <p>Figure 2: M12 connector</p>
Explanation	<ul style="list-style-type: none"> - 1 = + 10 to 30 V DC - 3 = GND - 4 = output 	<ul style="list-style-type: none"> - 1 = + 10 to 30 V DC - 2 = blind hole - 3 = GND - 4 = output - 5 = blind hole

Type INK


SCHUNK sensors can be ordered in the cable version (INK). You will then receive a sensor connected to a 2m cable with open wires on the end.



Figure 3: Sensor with wires

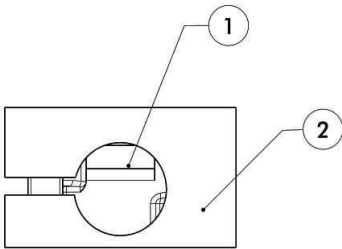
Connection	PNP	NPN
<p>1 = brown 4 = black 3 = blue</p>	<p>(closer)</p> 	<p>(closer)</p> 

2 Installation and adjustment of the sensor

 **Important!**
 Damage to the sensor is possible with gripper models without a stop.
 - Do not insert sensor too far.


Tip

- ⇒ Place switch cam directly under the bracket.
- ⇒ Insert sensor until it comes into contact with the switch cam.
- ⇒ Pull sensor back out somewhat and then tighten the screws on the bracket.



1 – switch cam
 2 – bracket

Figure 4: Place switch cam under bracket

 **Note**

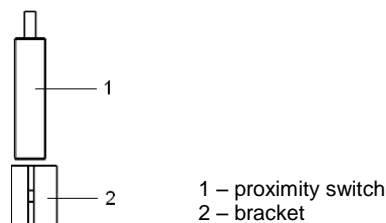
- There are units with a dust cover over the switch cam. Remove the set screws and then take off the dust cover in order to adjust the switch cam.
- The following installation and adjustment example is based on the PGNplus gripper type. The installation and adjustment is similar for all other gripper types. For assistance, refer to the "Accessories" chapter of the operating manual for the respective gripper.

Start

Step 1

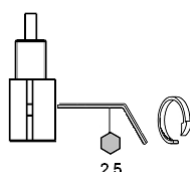
⇒ Move gripper to "open" position.

Step 2



⇒ Insert proximity switch in bracket until it reaches the stop.

Step 3

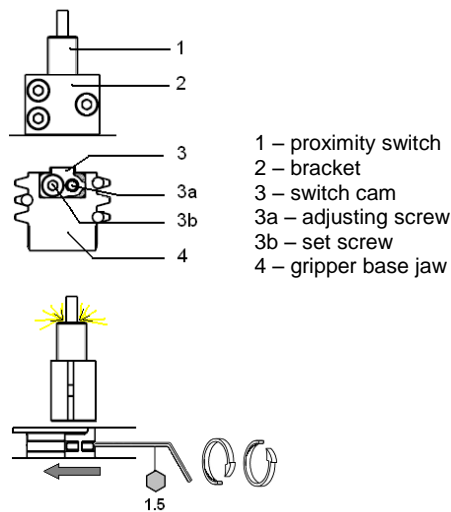


⇒ Tighten the screws of the bracket using an Allen wrench.

Note

The wrench size of the required Allen wrench depends on the size of the gripper.

Step 4

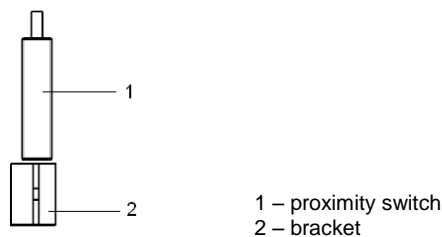


- ⇒ Adjust the switch cam of the gripper.
- ⇒ Use the adjusting screw (3a) and set screw (3b) to screw the switch cam (3) all the way out.
- ⇒ Move the switch cam (3) slowly inward with the adjusting screw until the LED of the sensor lights up.
- ⇒ Turn switch cam about 1 mm further. (LED must continue to light up)
- ⇒ Use the set screw (3b) to fasten the switch cam (3) in this position.

Step 5

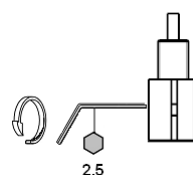
- ⇒ Move gripper to **"closed"** position.

Step 6



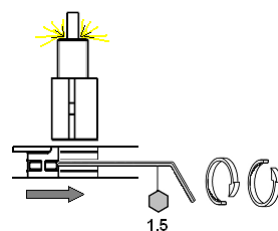
- ⇒ Insert proximity switch in bracket on the opposite side until it reaches the stop.

Step 7



- ⇒ Tighten the screws of the bracket using an Allen wrench.
- ⇒ Adjust the switch cam of the gripper.
- ⇒ Use the adjusting screw (3a) and set screw (3b) to screw the switch cam (3) in until the stop.

Step 8



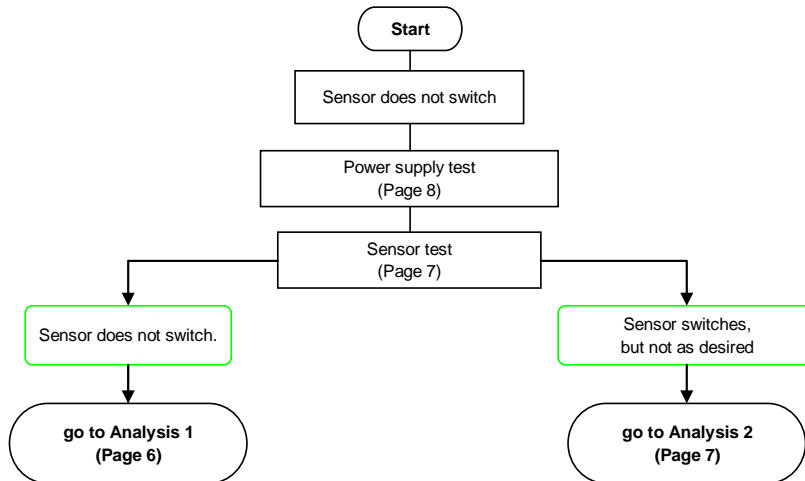
- ⇒ Move the switch cam (3) slowly inward with the adjusting screw until the LED of the sensor lights up.
- ⇒ Turn switch cam about 1 mm further. (LED must continue to light up)
- ⇒ Use the set screw (3b) to fasten the switch cam (3) in this position.

End

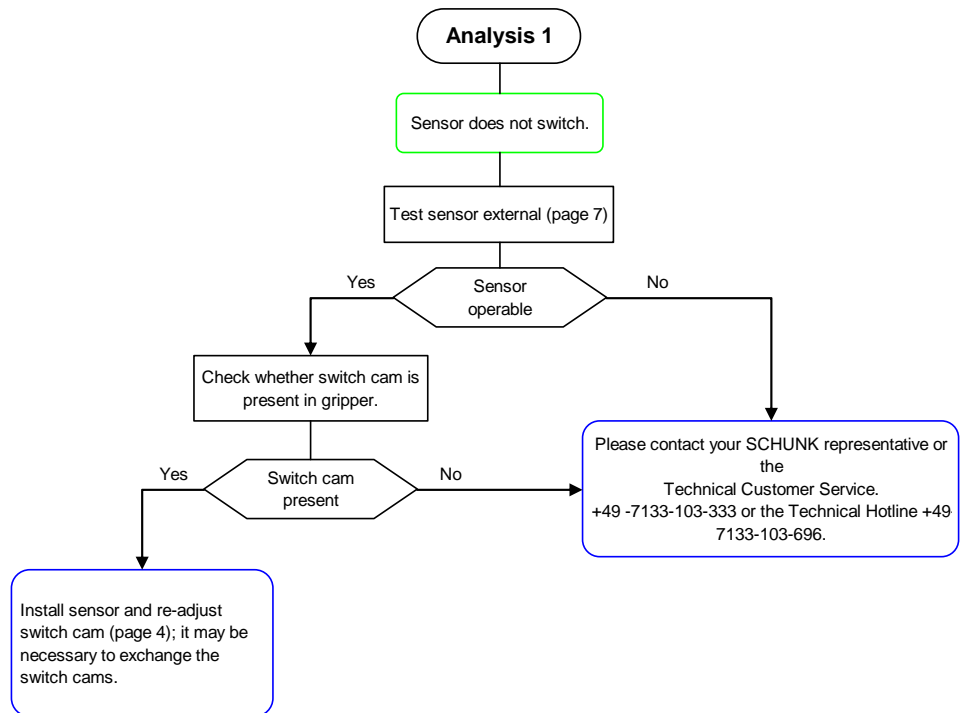
- ⇒ Check the adjustments with the sensor test on page 7.

3 Problem analysis

3.1 General



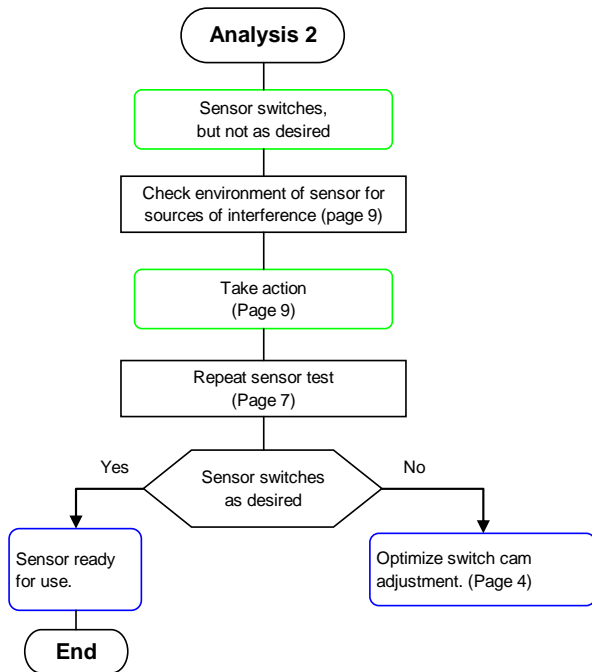
3.2 Analysis 1



Symbols

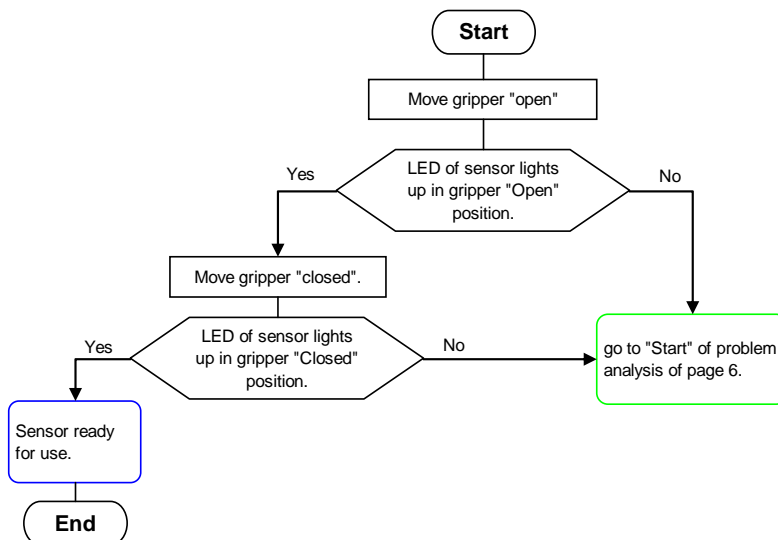
- an action
- possible reaction of an action
- intermediate result of an action
- a result of an action

3.3 Analysis 2



4 Tests

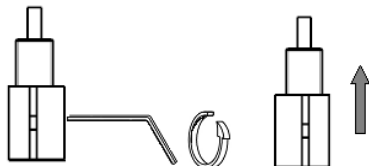
4.1 Sensor test



4.2 Sensor test, external

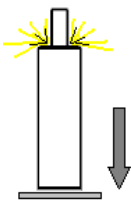
Start ⇒ Sensor should be tested outside of the unit.

Step 1



- ⇒ Remove sensor:
- Switch off unit.
 - Loosen screws of the bracket.
 - Pull sensor from the bracket.

Step 2



- ⇒ The sensor is connected to the power supply (voltage range 10 - 30V DC).
- ⇒ Contact the front of the sensor with an even soft magnetic metal surface (steel).
- ⇒ The sensor is OK (switches) if the LED lights up.

End

⇒ Go to Analysis 1 (page 6), "Sensor functioning" and follow the corresponding branch of the diagram.



Note

This test can also be conducted with the SST sensor tester (see Enclosure, page 10).

4.3 Power supply test

Measure the voltage at the sensor using the multimeter. Is there sufficient voltage? The voltage must be within the range of 10 - 30V DC.

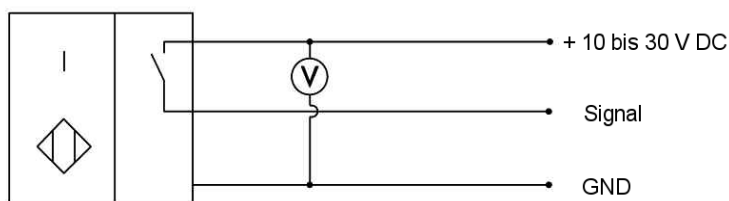


Figure 5: PNP circuit diagram for voltage test



Note

The external sensor test (see Chapter 4.2 above) can be used to determine whether or not there is a broken cable.

- (1) If the sensor switches (LED lights up) during this test, there is sufficient voltage.
- (2) If the sensor does not switch (LED does not light up), then please contact your SCHUNK representative or our Technology Hotline at +49-7133-103-696.



5 Sources of interference

The functions of sensors can be affected by external magnetic fields in the immediate vicinity. Magnetic fields can be created by:

- motors (coils)
- relays
- linear motors
- identical or similar products
- electric welding

Magnetic fields can also be created by self-magnetizing materials. "Self-magnetizing materials" are soft magnetic materials. The main component of such materials is iron, for example.

Soft magnetic materials (examples)	Non soft magnetic materials (examples)
<ul style="list-style-type: none"> - Fe tools (e.g. Allen wrenches, etc.) - Fe workpieces - Fe screws - Fe adapter plates - Liquids with soft magnetic chips 	<ul style="list-style-type: none"> - aluminum - almost all plastics

6 Actions

Description of cause	Source of interference	Action
The sensor is disturbed or affected by external magnetic fields or soft magnetic materials (Fe).	motors (coils) ----- relays ----- linear motors ----- electric welding	Increase the distance between the sensor and these sources of interference (until the sensor switches correctly).
	magnetic workpieces (workpieces made of iron (Fe) or similar materials) ----- magnetized components and tools (adapter plates made of Fe, screws made of Fe, or hexagon socket screws made of Fe, etc.)	
The sensor is affected by another sensor.	identical or similar product	Increase the distance between the sensors to at least 2 mm.
The sensor is affected by accumulations of magnetic chips in the vicinity (in the air gap).	Liquids with magnetic chips or similar materials.	Clean the area directly surrounding the sensor on a regular basis. (The higher the exposure to such liquids, the more frequent the area has to be cleaned.)

7 Enclosure

Sensor test with the SST sensor tester

The SST enables a simplified testing variant. This sensor testing unit can be used to check the operation of sensors, whether they are already installed or not. The SST has a switch for changing the setting from PNP to NPN. The correct operation of the sensor is indicated by a sound and by an LED.

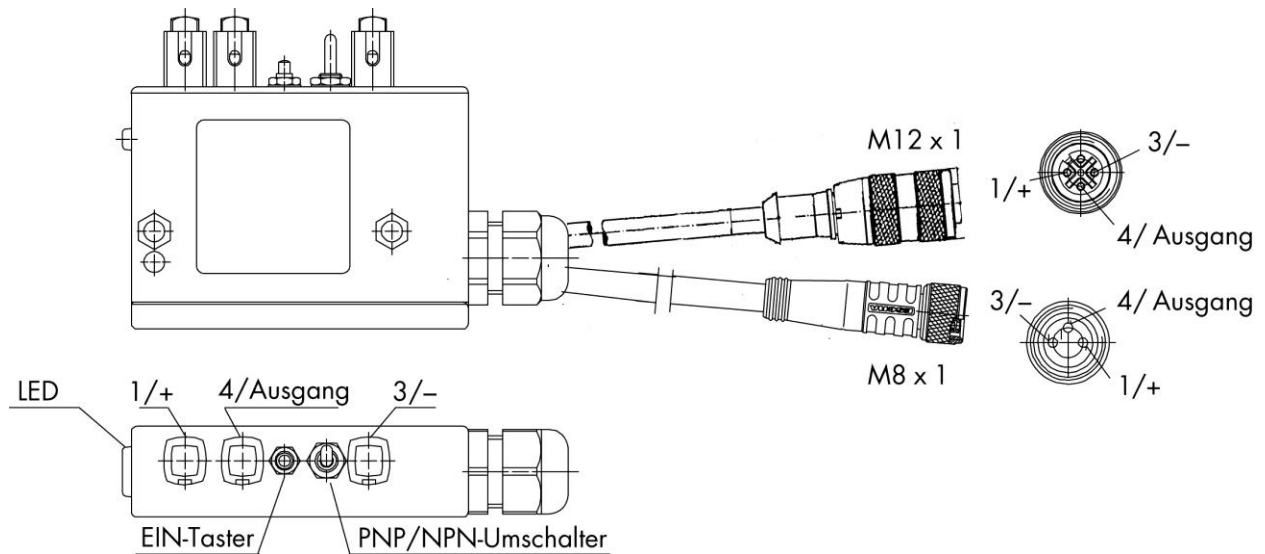


Figure: SST

Connection scheme for SST sensor tester:

- ⇒ brown to + (1)
- ⇒ black to output (4)
- ⇒ blue to - (3)

Testing with the SST sensor tester:

- (1) Connect the sensor according to the above connection scheme.
- (2) Press the On button.
- (3) Move the sensor toward a magnetic metal surface. The SST makes a sound and the LED (on the side) lights up when the sensor switches.



Note

If the LED does not light up, move the PNP/NPN switch in the other direction and repeat steps (2-3).
(Towards the sign is the PNP setting and away from the sign, as shown above, is the NPN setting.)

The SST sensor tester is available as an accessory for sensors. For more detailed information, please see our catalog 'Gripper modules / Automation', chapter "Accessories for sensors" on page 954. Further information is also available from your SCHUNK representative.

⇒ You can order the SST sensor tester under order number 0301400.

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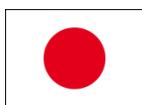
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