Assembly and operating manual

PPD

Pneumatic Positioning Unit

Translation of Original Operating Manual

Hand in hand for tomorrow

Imprint

Technical changes:
We reserve the right to make technical improvements.

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Dear Customer

Dear Customer,

Thank you for putting your trust in our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. We look forward to your challenging questions. We will find a solution!

Best regards,

Your SCHUNK team

Customer Management
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cmg@de.schunk.com

Please read the operating manual in full and keep it close to the product.

Table of contents

1 General

1.1 About this Manual

This manual contains important information for the safe, correct use of the product.

The manual is an integral part of the product and must be kept accessible by personnel at all times.

Personnel must have read and understood this manual before beginning any work. The observance of all safety notes in this manual is the precondition for all safe working.

Besides this manual, other documents which apply are those listed under ▸ 1.1.5 [🗋 6].

NOTE: The illustrations in this manual are intended to provide a basic understanding and may deviate from the actual version.

1.1.1 Illustration of safety notes

To make risks clear,the following signal words and symbols are used for safety notes.

⚠ DANGER

Danger to individuals!

Ignoring a safety note such as this will certainly lead to irreversible injury and even death.

⚠ WARNING

Danger to individuals!

Ignoring a safety note such as this can lead to irreversible injury and even death.

⚠ CAUTION

Danger to individuals!

Non-observance can cause minor injuries.

NOTICE

Material damage!

Information about avoiding material damage.

1.1.2 Definition of Terms

The term "product" replaces the product name on the title page in this manual.

1.1.3 Symbol definition

The following symbols are used in this manual:

■ Prerequisite for an action

1. Action 1
2. Action 2
   ⇨ Intermediate results

⇨ Final results

▸ 1.1.3 [🗋 6]: chapter number and [page number] in hyperlinks

1.1.4 Trademarks

- IO-Link is a registered trademark of PROFIBUS Nutzerorganisation e.V.

1.1.5 Applicable documents

- General terms and conditions *
- Catalog data sheet for the purchased product *
- Assembly and operating manuals for accessories *
- Software manual PPD *

The documents labeled with an asterisk (*) can be downloaded from **schunk.com/downloads**.

1.1.6 Variants

This operating manual applies to the following variations:

- PPD 10 - IOL
- PPD 20 - IOL
- PPD 40 - IOL

1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the date of delivery from the production facility under the following conditions:

- Refer to the applicable documents, ▸ 1.1.5 [🗋 6]
- Observe the ambient conditions and operating conditions, ▸ 2.3 [🗋 8]

1.3 Scope of delivery

The scope of delivery includes:

- Pneumatic Positioning Unit PPD in the version ordered

(Gripper, position sensor as well as required cables and pneumatic accessories have to be ordered separately according to the application)

1.4 Accessories

The following accessories, which must be ordered separately, are required for the product:

- Connection cable for communication IO-Link (1540697)
- Connection cable for voltage supply (1540660)

Optional accessories:

- Mounting set PPD (1540705)
- Cable extension 1.5 m (1540662)
- Cable extension 3m (1540663)

For information regarding which accessory articles can be used with the corresponding product variants, see catalog data sheet.

2 Basic safety notes

2.1 Intended use

Pneumatic Positioning Unit PPD is designed for pneumatic control of a gripper.

The product may be used only in the context of its defined application parameters ▶ 3 [🗋 10].

To comply with the intended use, it is also essential to comply with the manufacturer's specifications regarding assembly, commissioning, maintenance, operation and ambient conditions.

2.2 Not intended use

- Any use that exceeds or differs from the appropriate use is regarded as misuse.

2.3 Ambient conditions and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is only used within its defined application parameters, ▶ 3 [🗋 10].

2.4 Structural changes

Implementation of structural changes

Modifications, changes or reworking, e.g. additional threads, holes, or safety devices, can damage the product or impair its functionality or safety.

- Structural changes should only be made with the written approval of SCHUNK.

2.5 Personnel qualification

Inadequate qualification of personnel

Work on the product by inadequately qualified personnel can lead to serious injuries and considerable material damage.

- Order all work to be performed only by appropriately qualified personnel.
- Personnel must have read and understood the complete manual before beginning any work on the product.
- Observe national accident prevention regulations and the general safety notes.

The following personnel qualifications are required for the various types of work on the product:

Qualified electrician Qualified electricians have the professional training, knowledge, and experience to work on electrical systems, to recognize and avoid potential dangers, and know the relevant standards and regulations.

Specialist personnel Specialist personnel have the specialized training, knowledge, and experience to perform the tasks entrusted to them, to recognize and avoid potential dangers, and know the relevant standards and regulations.

Instructed person Instructed persons have been instructed by the user regarding the tasks entrusted to them and the potential dangers of inappropriate behavior.

Manufacturer's service personnel The manufacturer's service personnel have the specialized training, knowledge, and experience to perform the work entrusted to them and to recognize and avoid potential dangers.

2.6 Notes on particular risks

⚠ WARNING

Risk of injury due to sudden movements!

If the energy supply is switched on or if residual energy is still present in the system, this can cause components to move unexpectedly, which may result in serious injuries.

- Before starting any work on the product: Switch off the energy supply and secure against re-connection.
- Ensure that no residual energy remains in the system.

3 Technical data

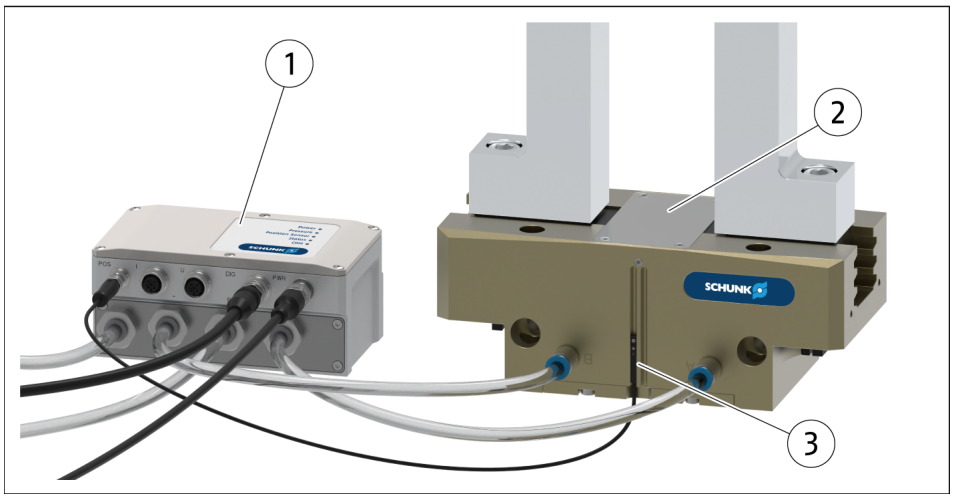
Basic data	Weight [kg]	1.8
	Noise emission [dB(A)] Mechanical sound level Sound level with exhaust air	 70 85
Pneumatic operating data	Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:2010 [7:4:4]
	Operating pressure [bar]	4 - 8
	Control pressure [bar]	2 - 8
Electric(al) operating data	Rated voltage [VDC]	24 +/- 10%
	Current consumption rated/max [A]	0.42 / 6.5
IO Link	Pins	Pin 10, 11 and 12.
	Version	1.1
	Transmission rate	COM2
	Minimum cycle time [ms]	10
Environmental and operational conditions	IP protection class	67
	Operating temperature [°C] – Min. – Max.	 0 60

* Without using a sound absorber. The sound level of the exhaust air can be reduced by using a sound absorber

More technical data is included in the catalog data sheet. Whichever is the latest version.

4 Design and description

4.1 Design

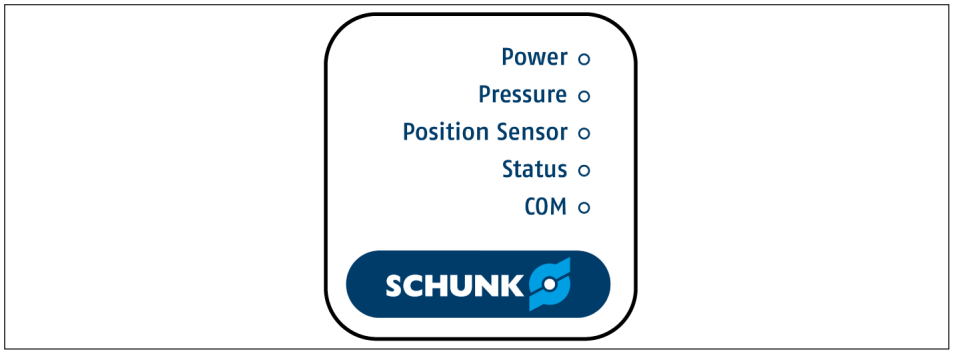


1	Pneumatic Positioning Unit PPD
2	Pneumatic gripper
3	Position sensor

4.2 Description

The pneumatic positioning unit is an accessory for pneumatic grippers. Together with a position sensor, any position of the gripper fingers can be approached in addition to the end positions (gripper open and gripper closed). Four integrated high-speed 2/2 valves together with the position sensor signal and the integrated Electronic ensure a closed control loop

4.3 LED status display



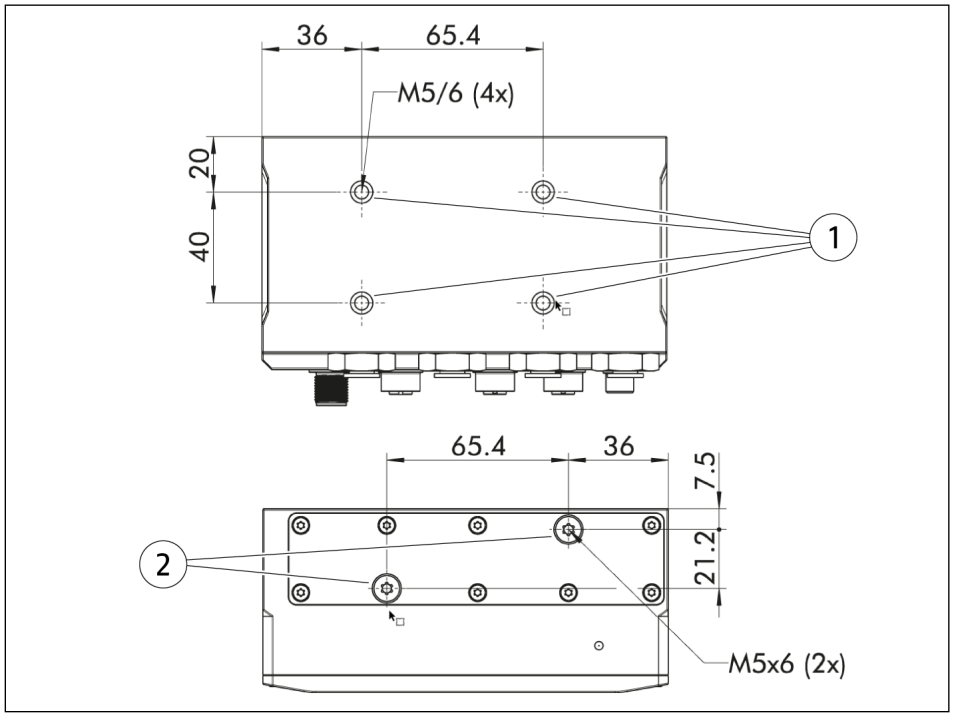
LED	Description
Power	LED on: supply voltage applied LED off: no supply voltage is applied
Pressure	LED on: pneumatic pressure is ok (Control pressure > 1,5 bar) **Note:** "LED on" does not indicate the supply pressure, but the control pressure. During start up, the LED may bi On although there is no pressure supply LED flashing: pneumatic pressure in not ok (<1 bar in both chambers "A" and "B") LED off: no information about pneumatic pressure
Position Sensor	LED on: sensor signal ok LED off: no sensor signal available
Status	LED on: the product is ready for operation LED flashing: the product is not ready for operation LED off: no supply voltage is applied
COM	LED on: IO-Link communication inaktive or no cable is connected at COM LED flashing: IO-Link communication active LED off: no supply voltage is applied

5 Assembly and settings

5.1 Mechanical connection

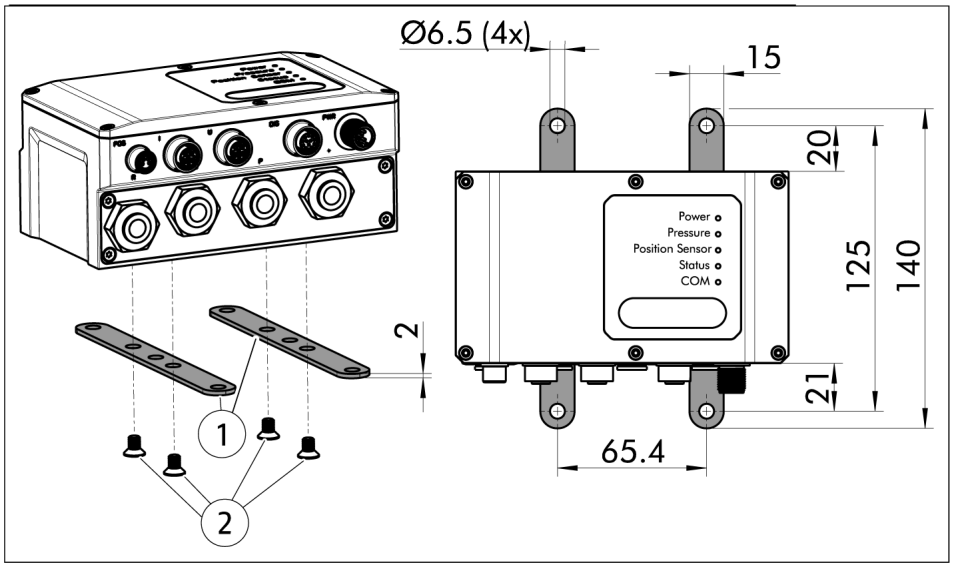
Connections at the housing

The product can be assembled from two sides.



1	Fastening at rear side on 4 threaded holes M5
2	Remove screws and fastening at the 2 threaded holes M5

Optional accessories "PPD mounting set

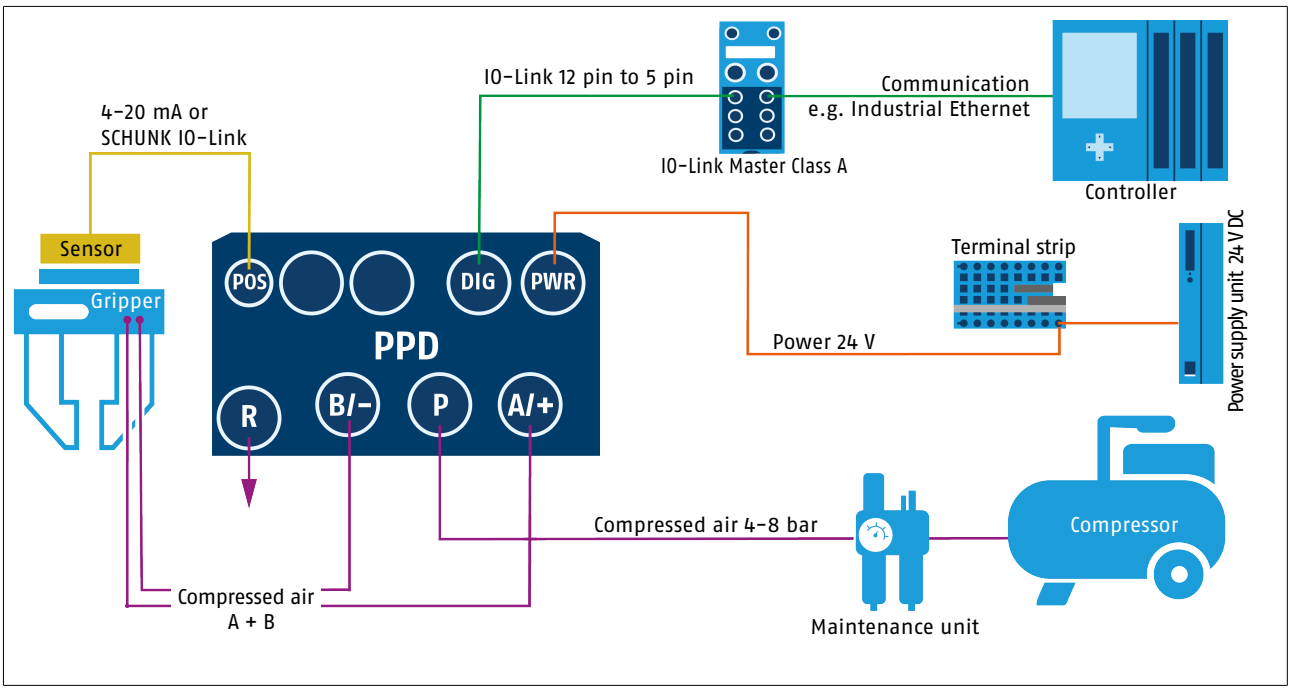


Alternatively mounting options of the PPD from above.

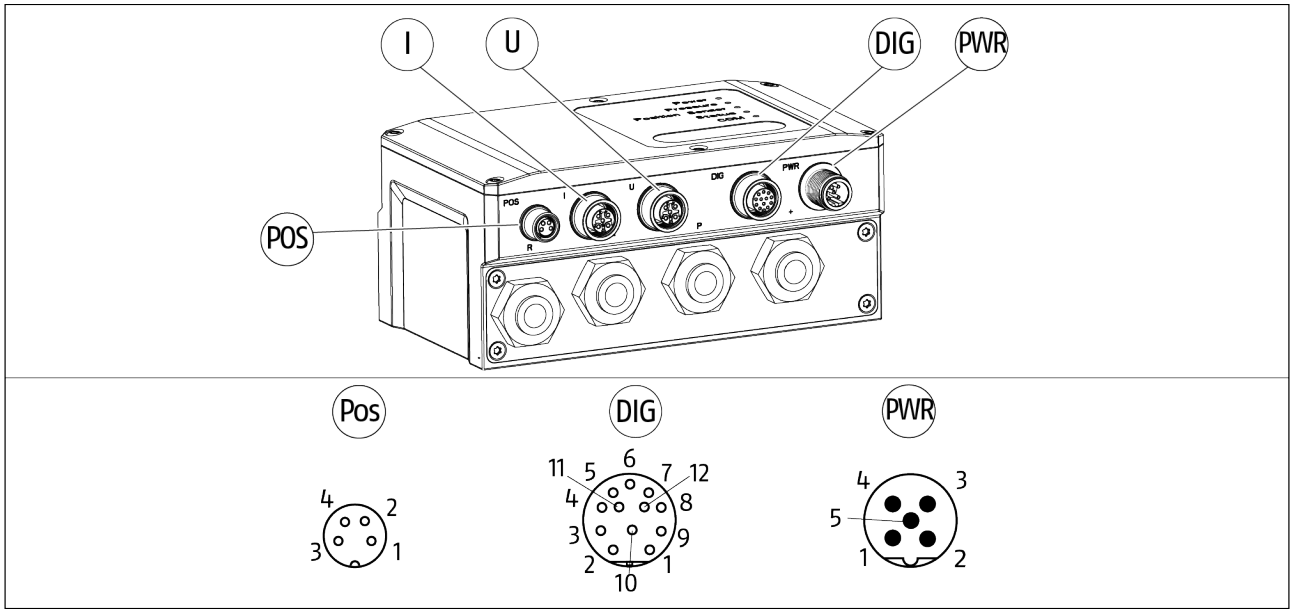
The scope of delivery includes two stainless steel mounting brackets (1) and four M5x5 stainless steel screws (2).

5.2 Connections

5.2.1 Connection diagram



5.2.2 Electrical connection



Marking	Designation	Plug connector	Pin	Description
POS	Position sensor	M8 socket 4-pin-A	1	+24 VDC
			2	4-20 mA *
			3	GND/-
			4	Signal IO-Link
I	Intended for future functions			
U	Intended for future functions			
DIG	Communication	M12 socket 12-pin-A	1 - 9	Not used
			10	IO-Link, L+
			11	IO-Link, CQ
			12	IO-Link, GND
PWR	Voltage supply	M12 connector 5-pin-B	1	+24 VDC
			2	GND/- *
			3	Not used
			4	Not used
			5	GND/- *

* The signal input is not protected. Do not apply voltage, otherwise the electronics of the PPD will be damaged.

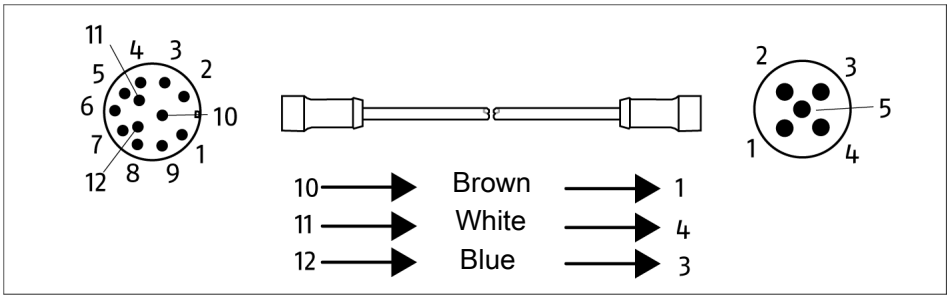
⚠ CAUTION

Unexpected movements of the gripper jaws possible

An incorrect signal from the position sensor for the set position can cause an undesired malfunction.

- Before commissioning, make sure that the position sensor signals are correct.

5.2.3 Connection cable for communication IO-Link

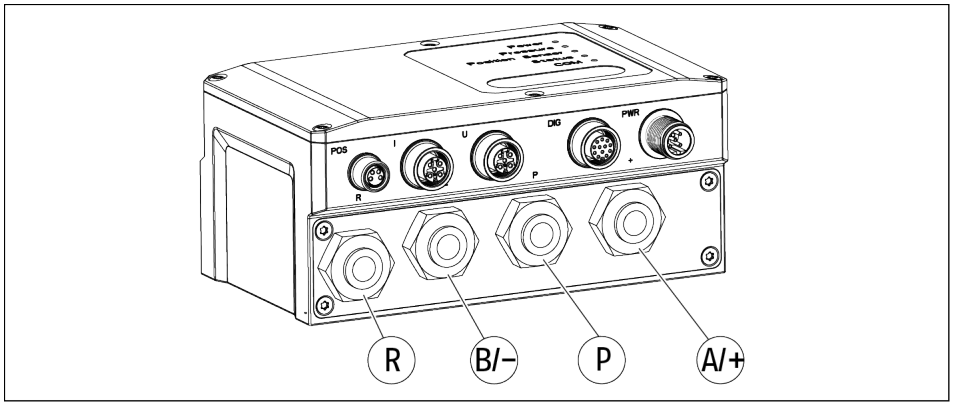


A special connection cable is required to connect the PPD to an IO-Link master.

The cable has a 12-pin M12 connector on one side for connection to the PPD. On the other side is a 5-pin M12 connector for connection to an IO-Link master.

ID of the connection cable: ▸ 1.4 [🗋 7]

5.2.4 Pneumatic connection



Marking	Hose-Ø (Thread in housing)	Description
R	8 mm (G3/8")	Exhaust air
B/–	8 mm (G3/8")	Control of pneumatic connection B on gripper
P	8 mm (G3/8")	Supply pressure
A/+	8 mm (G3/8")	Control of pneumatic connection A on the gripper

⚠ WARNING

Danger due to unexpected movements when inserting external locking or booster valves.

Missing signals and pressure loss possible

When using booster valves, consider the effects of missing signals and pressure losses.

NOTE

Keep the hoses between the PPD and gripper as short as possible.

- Shorter hoses lead to better results than long hoses.
- Recommendation: <3 m.
- Both hoses must be the same length.

6 Notes on Commissioning and operation

The commissioning and operation of the Pneumatic Positioning Unit PPD are described in the "PPD Software Manual".

Notes on commissioning

NOTE

- Many sensor systems can be taught to reverse the direction and/or adjust the range. When the sensor is taught to a new range, the new length should also be used in the settings to ensure a correct reading.
- During initial commissioning and after venting the piston chambers, a few gripping cycles may be required to build up pressure.

⚠ WARNING

The PPD normally uses normally closed 2-way valves internally.

Air pockets can cause danger during operation and maintenance due to unexpected movements of the connected gripper.

- Consider the safety of applications and users when designing systems to minimize the effects of pressurized piston chambers.
- Ensure that the system is ventilated before maintenance.

⚠ WARNING

Risk of injury due to uncontrolled rapid movements.

Movements against empty piston chambers can cause uncontrolled (fast) movements.

- Consider the safety of the application and the user when designing systems to account for the effects of rapid movement.

Notes on operation

⚠ WARNING

Oscillations may occur if the adjustment is too aggressive for the application.

- Set up the system in a safe manner and avoid limit settings for speed, accuracy, and controller gain.

⚠ CAUTION

Incorrect setting may cause unwanted behavior in application

⚠ CAUTION

Undesired exhaust may cause uncontrolled movement, consider potential risks when using Exhausting functions.

⚠ CAUTION

Supply pressure loss may cause the system to exhaust the air when trying to compensate for pressure loss.

⚠ CAUTION

Leakage may cause impaired function, uncontrolled movement, and increased noise levels.

7 Troubleshooting

7.1 Safety

⚠ WARNING

Risk of injury due to sudden movements!

If the energy supply is switched on or if residual energy is still present in the system, this can cause components to move unexpectedly, which may result in serious injuries.

- Before starting any work on the product: Switch off the energy supply and secure against re-connection.
- Ensure that no residual energy remains in the system.

⚠ CAUTION

Risk of injury due to electromagnetic interference!

Electromagnetic interference can cause malfunctions and lead to unexpected movements.

- Use electrical components, e.g. sensors, controllers, etc. according to EN 61000-5-7.

NOTE

- For information on error codes and possible troubleshooting measures, see the commissioning instruction, ▸ 1.1.5 [🗋 6].
- For information on LEDs, see chapter ▸ 4.3 [🗋 12].
- Contact SCHUNK Service if troubleshooting with the measures listed below was not successful.

7.2 Delayed reaction

Possible cause	Remedial measures
Long hoses and/or hoses with restricted flow can delay the reaction and impair the function.	Keep hoses as short as possible. Check the hose guide for crushing and constrictions.

7.3 Movement of the gripper restricted

Possible cause	Remedial measures
Too low a force/pressure setting can restrict the movement of the gripper.	Adjust force/pressure setting accordingly.
Position sensor incorrectly installed or incorrect value for finger stroke is used.	Control and correct accordingly.

7.4 The PPD does not work

Possible cause	Remedial measures
Signal from the position sensor has been lost	Check position sensor

7.5 The gripper jaws remain stuck in one end position

Possible cause	Remedial measures
Position sensor signal inverted or out of range	Check position sensor

7.6 Continuous opening and closing of the gripper jaws when in absolute positioning

Possible cause	Remedial measures
Default values for acyclic data exchange (piston stroke, stroke per jaw, piston surface A/B) are not set.	Set acyclic default values as described in the software manual for the pneumatic positioning unit.

7.7 Sensor calibration not possible

Possible cause	Remedial measures
Power supply unit output too low.	Use a power supply unit with a higher output, see "Max. current consumption" in the "Technical data" chapter ▶ 3 [🗋 10].

8 Maintenance

The product is maintenance-free.

In case of damage, send the product to SCHUNK with a repair order.

9 EU-Declaration of Conformity

Manufacturer/ Distributor	SCHUNK SE & Co. KG Spanntechnik | Greiftechnik | Automatisierungstechnik Bahnhofstr. 106 – 134 D-74348 Lauffen/Neckar
Product designation:	Pneumatic Positioning Unit / PPD /elektro-pneumatic
ID no.	

We hereby declare on our sole authority that the product meets the requirements of the following directives at the time of the declaration.
The declaration is rendered invalid if modifications are made to the product.

- **Machinery Directive 2006/42/EG**
- **EMC Directive 2014/30/EU**
- **RoHS Directive 2011/65/EU**
- **REACH Regulation EC No. 1907/2006**
- **The protection objectives of the Low Voltage Directive have been complied with in accordance with Annex I, No. 1.5.1 of the Machinery Directive**

Applied harmonized standards, especially:

EN ISO 12100:2010	Safety of machinery – General principles for design – Risk assessment and risk reduction
EN 61000-4-2:2009	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test (IEC 61000-4-2:2008)
EN IEC 61000-6-2:2019	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments
EN IEC 61000-6-4:2019	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments

Signed for and on behalf of: SCHUNK SE & Co. KG

Signature: see original declaration

Lauffen/Neckar, April 2025

Dr.-Ing. Manuel Baumeister,
Head of Systems Engineering,
Technology & Innovation

10 UKCA Declaration of Conformity

Manufacturer/ Distributor	SCHUNK Intec Limited Clamping and gripping technology 3 Drakes Mews, Crownhill MK8 0ER Milton Keynes
Product designation:	Pneumatic Positioning Unit PPD
ID no.	

We hereby declare on our sole authority that the product meets the requirements of the following directives at the time of the declaration.
The declaration is rendered invalid if modifications are made to the product.

- **Machinery Directive 2006/42/EG**
- **Electromagnetic Compatibility Regulations 2016**
- **RoHS Directive 2011/65/EU**
- **REACH Regulation EC No. 1907/2006**
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EN IEC 61000-6-4:2019	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments

Person authorized to compile the technical documentation:
Marcel Machado, address: refer to manufacturer's address

Signed for and on behalf of: SCHUNK SE & Co. KG

Lauffen/Neckar, April 2025

Dr.-Ing. Manuel Baumeister,
Head of Systems Engineering,
Technology & Innovation

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Spanntechnik | Greiftechnik | Automatisierungstechnik

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