Installation and Operating Instructions

Gripping Unit

Type: PGM

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Edition 04/2017
Translation of Original Installation and Operating Instructions

NOTICE

Important! – Read carefully before use – Keep for future reference!

The installation and operating instructions are an integral part of the device and must be available to the operating and maintenance personnel at all times.

The safety information contained in them must be heeded accordingly.

If the device is resold, these installation and operating instructions must always be delivered with it as well.
Technical changes:
We reserve the right to make changes in the interests of technical improvements.

The latest version is to be found on the Internet at the manufacturer's website: http://www.wagnerautomation.de

Warranty and guarantee conditions:
See chapter 6.1, Warranty and guarantee conditions.

The **warning and safety symbols** are explained in chapters 3.1 and 3.1.1.

Translation
If the device is sold to a country in the EEA, these installation and operating instructions must be translated into the language of the country in which the device is to be used. Should the translated text be unclear, the original installation and operating instructions (German) must be consulted or the manufacturer contacted for clarification.

Document name:
Dss739 BA_724_Greifeinheit_28.11.2016.doc

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1.4 Declaration of incorporation

Friedemann Wagner GmbH
Robert-Bosch-Straße 5
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Declaration of incorporation

pursuant to the

- **EC Machinery Directive 2006/42/EC**
- **EC EMC Directive 2014/30/EU**

We hereby declare that the design of the

Designation: Gripping Unit

Type: PGM-X-X-X-K-0-0-P

as delivered complies with the above directives.
Harmonized DIN EN standards applied pursuant to the Official Journals for the directives:

Directive / Standard	Title
DIN EN ISO 82079-1 :2012	Preparation of instructions for use – Structuring, content and presentation – Part 1: General principles and detailed requirements
2006/42/EC	**EC Directive: Machinery** *effective from 2009-12-29*
DIN EN ISO 12100 :2010	Safety of machinery – General principles for design – Risk assessment and risk reduction

- This declaration only applies to the gripping unit in the state in which it was placed on the market.
- The essential health and safety requirements according to Annex I of the Machinery Directive were applied and are fulfilled.
- The following chapters in Annex I of the Machinery Directive 2006/42/EC were considered in the risk assessment:
  1.1.2, 1.1.3, 1.1.5, 1.2.6, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.6, 1.3.7, 1.3.8.2, 1.3.9,
  1.4.1, 1.4.2.1, 1.5.3, 1.5.4, 1.5.9, 1.5.11, 1.5.15, 1.6.1, 1.6.4, 1.7.1, 1.7.2, 1.7.3, 1.7.4.
- The special technical file according to Annex VII B was compiled and will be presented to the competent national authorities in electronic form on demand.
- The gripping unit may not be put into service until the final machinery into which it is incorporated has been declared in conformity with the provisions of the directives.
- The person authorized to compile the technical documentation is:
  Name: Mr. Andreas Wagner
  Address: Robert-Bosch-Straße 5, D-78559 Gosheim / Germany

Gosheim, April 2017

.....
Authorized Signature
(Name, Position, Title)

2 Overview and intended use

2.1 Overview of the device

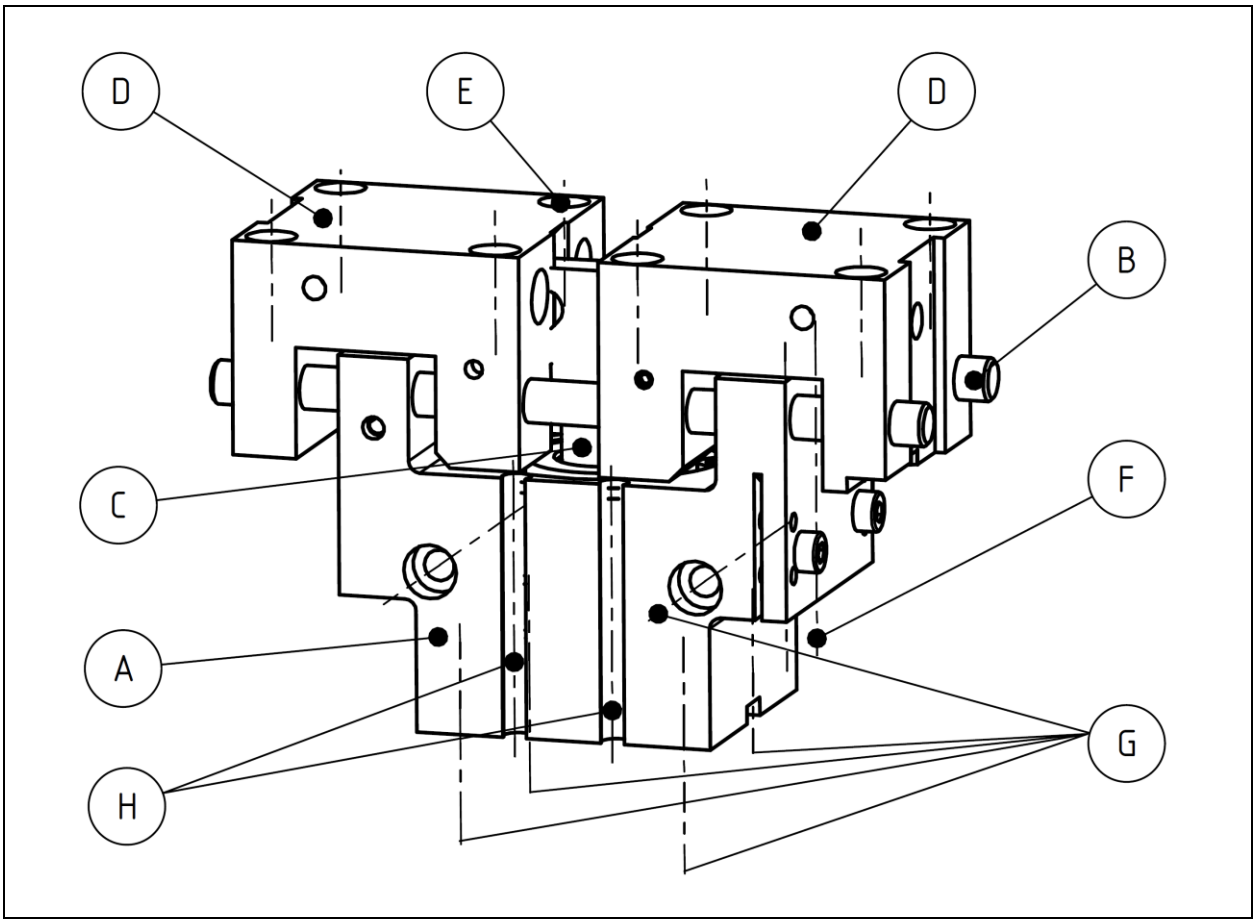


Fig. 2-1 Diagram of the parts of the gripping unit

The PGM gripping unit consists of the following main components:	
(A) Housing of high strength aluminum, hard anodized	**(E)** Mounts for centering rings for highest fit accuracy
(B) Stainless steel guide shafts, hardened, polished steel, for universal use and long life	**(F)** Mounts for proximity switches, e.g. for monitoring of open, closed, gripped
(C) Piston with diverter	**(G)** Various fastening possibilities
(D) Movable jaws of high strength aluminum, hard anodized, stroke per jaw 2-15 mm	**(H)** C-slots for magnetic field sensors

2.2 Intended use

The gripping unit was developed to grip components and hold them safely for a certain period of time.

This device was developed, designed and built exclusively for industrial and light-industrial use. Private use is prohibited.

DANGER

This device is intended solely for the purpose described above. Any other use or modification of the device without the written consent of the manufacturer is deemed improper.

Modification without written agreement will lead to ***serious to deadly injuries****.*
The manufacturer accepts no liability for resultant damage. The risk is borne solely by the operator. The device may only be put into operation when it has been ensured that all safety devices have been installed and are fully functional.

Proper use of the device in accordance with its intended purpose includes compliance with the manufacturer's instruction handbooks and operating manuals and performance of all specified maintenance and service work.

Foreseeable misuse:

NOTICE

Products that could form explosive dust/air or gas/air mixtures may not be processed in critical concentrations (above LEL)!
The device does not fulfil any EX requirements and may therefore also not be installed and operated in ATEX zones!
**) LEL = Lower Explosive Limit*

The device is not suitable for use in machining operations, especially of aluminum, titanium and magnesium, as, depending on product compositions, particle sizes, chip sizes and distribution of quantities, potentially explosive atmospheres can result. The final decision on use lies in the end user's judgment.

2.2.1 Product identification

The type key is laser-engraved on the connection side of the gripping unit. The following table explains the type key:

Product key

Module	Design size	Version	Stroke	Shock absorber	Energy feedthrough	Drive
PGM	29 38 50 60 82 96 120 140	N Ö S	2 3 4 5 10 12 15	K	0-0	-P
		N=normal Ö=high open force S=high close force		K=unavailable	0- = pneumatic -0 = electric	P=pneumatic

Selection guide

Designation	Clamping force at 6 bar [N]	Spreading force at 6 bar [N]	Moment of inertia [kg mm2]	Recommended component weight [kg]	Stroke per jaw [mm]	Max. finger length [mm]	Available variants with clamp force or spreading retention
PGM-29	**16**	**20**	**2.51**	**0.13**	**2**	**15**	
PGM-38	**25**	**35**	**6.32**	**0.16**	**3**	**20**	**G/S**
PGM-50	**37**	**47**	**27.8**	**0.3**	**4**	**40**	**G**
PGM-60	**85**	**105**	**76.7**	**0.79**	**5**	**50**	**G/S**
PGM-82	**165**	**180**	**416**	**1.27**	**10**	**65**	**G/S**
PGM-96	**270**	**290**	**787**	**1.94**	**12**	**80**	**G/S**
PGM-120-N	**380**	**405**	**1890**	**2.9**	**12**	**110**	**G**
PGM-120-Ö/S	**630**	**655**	**1890**	**4.3**	**12**	**110**	**G**
PGM-140-N	**650**	**685**	**5360**	**4.8**	**15**	**140**	**G**
PGM-140-Ö/S	**1050**	**1090**	**5360**	**7.2**	**15**	**140**	**G**

***Notice:** The recommended component weight is calculated for force-fit with a friction coefficient μ = *0.1* and a safety factor of *2 and clamp height of 0.3xImax (max. finger length)*. Significantly higher component weights are possible with form-fit.

2.2.2 Incorporation information (for the partly completed machinery) for the constructor of the final machinery

- Stainless steel rod guide, polished, hardened, for long life in universal use.
- The centering system enables easy centering of all superstructures, e.g. gripping fingers, via form-fitting centering rings.
- There are separate accessories, e.g. proximity switches, available for the gripping units.
- Control is effected via a 4/2 or 5/2 directional-control valve (not included in the delivery).
- The clamp force can be adjusted smoothly with a pressure reducing valve. (Not included in the delivery)

After considering all these points, the integrator of the final machinery can put this device into service as a safe device.

He must supply overall instructions for use and a declaration of conformity for the complete machinery and affix a type plate with CE marking to the machinery. The responsibility for the risk assessment for the complete machinery lies internally with the integrator.

2.3 Technical data

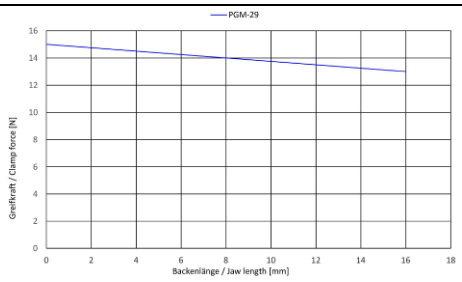
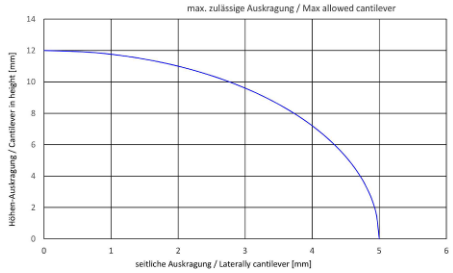
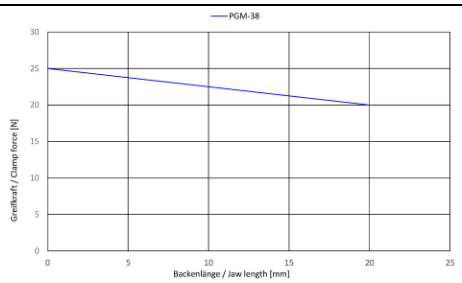
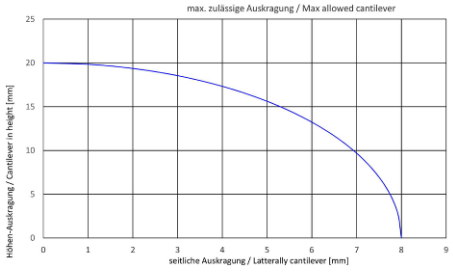
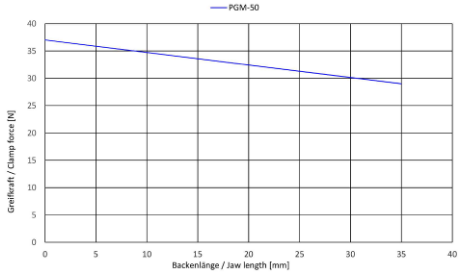
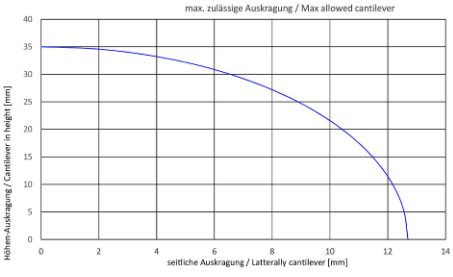
2.3.1 Dimensions and weight

Drive	Compressed air (2-8 bar), constant, filtered (10 µm) and dry, lubricated or unlubricated				
Control	4/2 or 5/2 directional-control valve				
Housing material	High strength aluminum, hard anodized				
Type	**PGM-29**	**PGM-38**	**PGM-50**	**PGM-60**	**PGM-82**
Stroke per jaw	2 mm	3 mm	4 mm	5 mm	10 mm
Max. finger length	15 mm	20 mm	40 mm	50 mm	65 mm
Max. mass per finger	0.01 kg	0.017 kg	0.035 kg	0.07 kg	0.17 kg
Clamping force at 6 bar	16 N	25 N	37 N	85 N	165 N
Spreading force at 6 bar	20 N	35 N	47 N	105 N	180 N
Clamping time / Opening time	0.03 s	0.03 s	0.04 s	0.05 s	0.07 s
Recommended component weight	0.13 kg	0.16 kg	0.3 kg	0.79 kg	1.27 kg
Cylinder diameter	10 mm	14 mm	16 mm	25 mm	32 mm
Air consumption/double stroke	0.4 cm^3	1.0 cm^3	1.7 cm^3	5.0 cm^3	16.1 cm^3
Connection	M3	M5	M5	M5	M5
Moment of inertia	2.51 $kgmm^2$	6.32 $kgmm^2$	27.8 $kgmm^2$	76.7 $kgmm^2$	416 $kgmm^2$
Weight	0.025 kg	0.05 kg	0.105 kg	0.21 kg	0.6 kg
Type	**PGM-96**	**PGM-120-N**	**PGM-120-Ö/S**	**PGM-140-N**	**PGM-140-Ö/S**
Stroke per jaw	12 mm	12 mm	12 mm	15 mm	15 mm
Max. finger length	80 mm	110 mm	110 mm	140 mm	140 mm
Max. mass per finger	0.28 kg	0.58 kg	0.58 kg	1.0 kg	1.0 kg
Clamping force at 6 bar	270 N	380 N	630 N (S)	650 N	1050 N (S)
Spreading force at 6 bar	290 N	405 N	655 N (Ö)	685 N	1090 N (Ö)
Clamping time / Opening time	0.08 s	0.1 s	0.1 s	0.12 s	0.12 s
Recommended component weight	1.94 kg	2.9 kg	4.3 kg	4.8 kg	7.2 kg
Cylinder diameter	40 mm	50 mm	50 mm	63 mm	63 mm
Air consumption/double stroke	30.2 cm^3	47.2 cm^3	47.2 cm^3	94 cm^3	94 cm^3
Connection	G1/8	G1/8	G1/8	G1/8	G1/8
Moment of inertia	787 $kgmm^2$	1,890 $kgmm^2$	1,890 $kgmm^2$	5,360 $kgmm^2$	5,360 $kgmm^2$
Weight	0.84 kg	1.26 kg	1.26 kg	2.55 kg	2.55 kg

2.3.2 Environmental conditions

- Noise emission <= 70 dB(A)
- Operation only in closed rooms and low-vibration environments (no potentially explosive or condensing atmospheres).
- No operation in environments with spray water, vapors, process dusts or abrasion dusts.
- Gripping units with proximity switches should not be used in areas with static discharges, high-frequency oscillations or strong magnetic fields. Otherwise it can happen that the proximity switches for recognition of the end positions deliver wrong signals.
- Due to their IP30 protection, the gripping units are only suitable for use in environments with spray water to a limited extent. It might be necessary to protect them against ingressing spray water with a suitable cover.

2.3.3 Characteristics

Gripping unit	Clamp force	Cantilever
PGM-29		
PGM-38		
PGM-50		

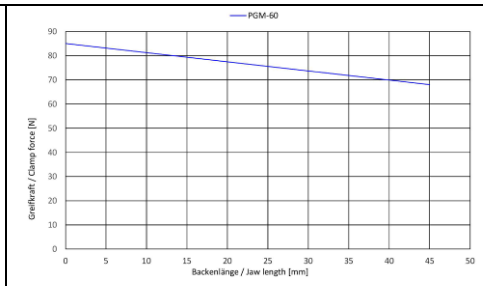
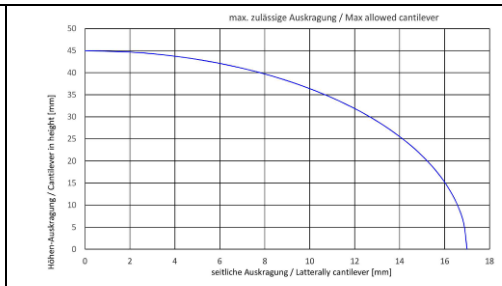
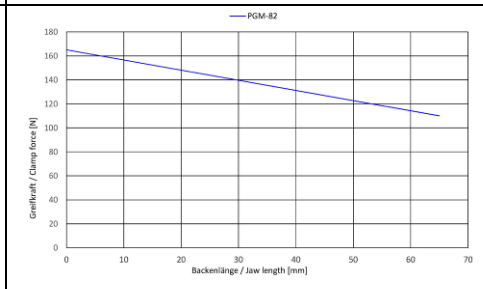
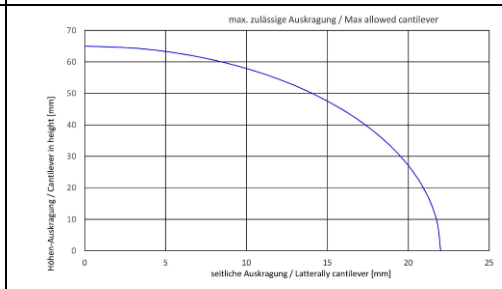
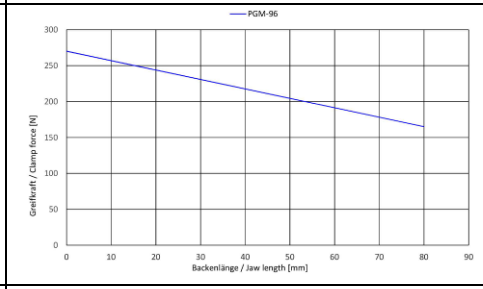
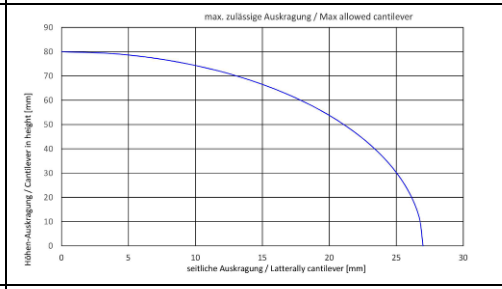
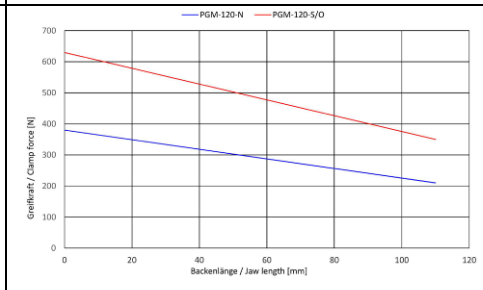
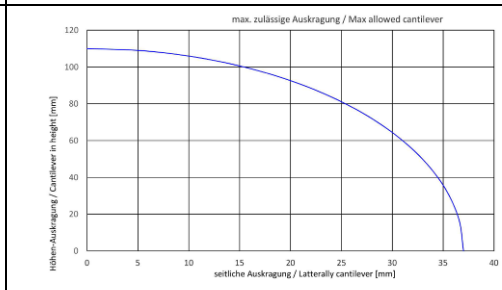
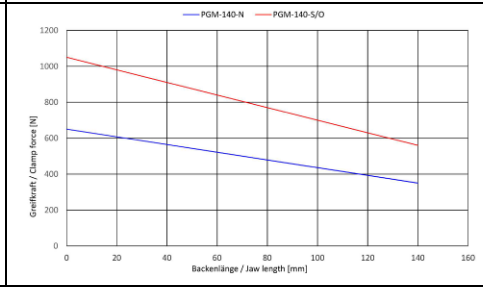
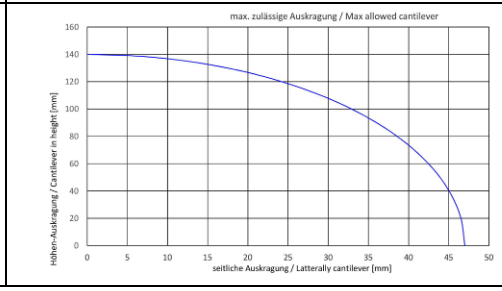
PGM-60		
PGM-82		
PGM-96		
PGM-120		
PGM-140		

Fig. 2-2 Characteristics

Admissible moments and forces

The following equation must be fulfilled in the case of combined loads.

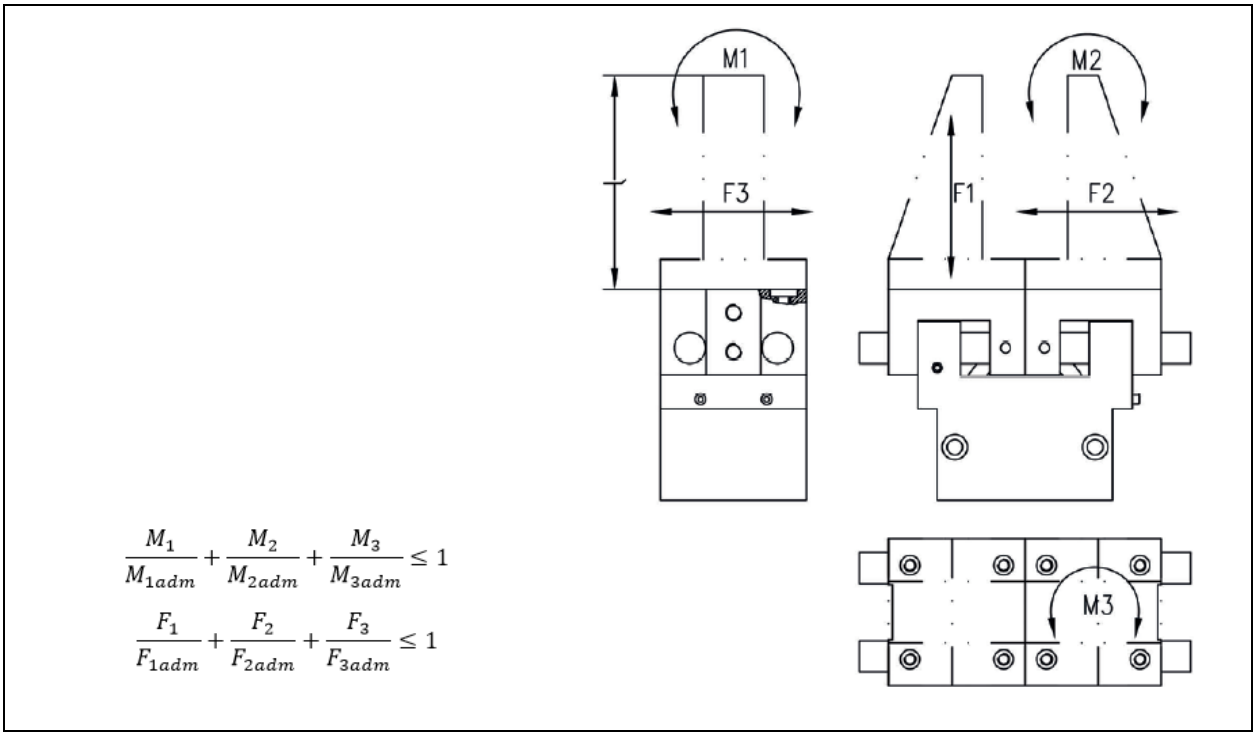


Fig. 2-3 Admissible moments (Madm) and forces (Fadm)

Gripping unit	$M1_{adm}$	$M2_{adm}$	$M3_{adm}$	$F1_{adm}$	$F2_{adm}$	$F3_{adm}$
PGM-29	1.2 Nm	1.0 Nm	1.0 Nm	110 N	78 N	130 N
PGM-38	1.6 Nm	1.5 Nm	1.5 Nm	140 N	84 N	140 N
PGM-50	3.9 Nm	3.7 Nm	1.3 Nm	250 N	82 N	71 N
PGM-60	6.0 Nm	6.0 Nm	1.6 Nm	280 N	100 N	72 N
PGM-82	12 Nm	14 Nm	12 Nm	540 N	150 N	400 N
PGM-96	27 Nm	30 Nm	12 Nm	1100 N	640 N	340 N
PGM-120	57 Nm	67 Nm	95 Nm	1500 N	350 N	2100 N
PGM-140	87 Nm	94 Nm	201 Nm	1900 N	890 N	3700 N

2.3.4 General data

Operating temperature range:

Temperature range device: +5° … + 65° C
Relative air humidity: max. 70 %, non-condensing

Storage conditions:

Minimum temperature: - 10° C
Maximum temperature: + 50° C
Relative air humidity: max. 70 %, non-condensing

3 Safety

3.1 Notes and explanations

DANGER

"DANGER" warns of dangerous situations. Avoid these dangerous situations!

Otherwise serious injuries or death will result.

WARNING

"WARNING" warns of dangerous situations. Avoid these dangerous situations!

Otherwise serious injuries or death can result.

CAUTION

"CAUTION" in combination with the warning symbol warns of dangerous situations. Avoid these dangerous situations!

Otherwise minor or light injuries could result.

NOTICE

*"NOTICE" gives recommendations on how to proceed. Ignoring these recommendations will **not lead to personal injuries**.*

*Follow the recommendations to **avoid damage to the unit** and problems in general!*

NOTICE

References to installation and operating instructions / documentation are marked with a book symbol (see external documentation).

*Follow the recommendations to **avoid damage to the unit** and problems in general!*

3.1.1 Explanation of safety symbols used

DANGER

Crushing hazards, dangers of injuries to the hands *(closing movements of mechanical parts).*

Ignoring this warning will result in serious injuries or death.
Do not carry out any manual work on such parts during movements.

WARNING

Mandatory: Safety boots *must be* ***worn.***

Ignoring this warning could result in serious injuries or death.
Take note of the dangers to the lower limbs.

WARNING

Mandatory: Protective gloves *must be* ***worn.***

Ignoring this warning could result in serious injuries or death.
Take note of the dangers to the hands.

WARNING

Mandatory: Hands *must be* ***washed.***

Ignoring this warning could result in serious injuries or death.
Take note of the dangers due to deficient hygiene.

NOTICE

The ***environment sign*** *marks actions to protect the environment (warning of environmental pollution, in the chapter Disposal).*

Damage to the environment will result if ignored.
Improper disposal can result in serious damage to the environment.

3.2 Safety precautions (to be carried out by the operator)

- The gripping units may only be installed, serviced and modified by qualified skilled personnel. This personnel must have read and understood the operating instructions.
- The energy and compressed air supply must be disconnected from the gripping unit before any service, maintenance or modification work. Make sure there are no residual energies present.
- Only use the gripping units if they are in perfect technical condition and do not carry out any unauthorized modifications.
- The gripping units can be heavy. Secure them so that they cannot fall down.
- In the event of an emergency, malfunction or other irregularity, switch off the gripping unit, disconnect it from the energy and compressed air supply and lock against reconnection.
- Carry out a visual inspection of the compressed air lines regularly. Operation with damaged compressed air lines is prohibited.
- Make sure that the technical specifications and environmental conditions specified in the product documentation are adhered to.
- The gripping unit may only be operated in accordance with its intended use.
- Take note of the valid regulations on accident prevention and environmental protection.
- Implement the safeguards required by EC directives.
- Pressurize your complete equipment with compressed air slowly to avoid uncontrolled movements.
- Only put your equipment into service if you are sure that no personnel or foreign objects can be caught by the moving parts.

3.3 Safety inspections and tests

Factory inspections and tests by the manufacturer.

1. Risk assessment according to Machinery Directive 2006/42/EC (to Annex I) and to DIN EN ISO 12100:2010.

4 General warnings

4.1 Dangers

The safety systems and safety instructions described in these installation and operating instructions are to be heeded accordingly.

DANGER

Pay attention to the possible ***danger of injuries to the hands and/or body*** *when carrying out adjustment, maintenance and repair work!*

Otherwise serious injuries or death will result.

The machine builder must implement safety equipment to ensure safe operation.

4.2 Spare and wearing parts

Spare parts and accessories that have not been supplied by us have also not been tested and approved by us. The fitting and/or use of such products could therefore negatively affect the design characteristics of your device.
We accept no liability whatsoever for damage arising from the use of non-original parts and accessories.

Standard parts can be bought through the specialized trade.

NOTICE

***Part lists** and **technical data sheets** are to be found in the **technical reference documents**.*

Otherwise the unit will be damaged.
Damage can arise if the attached technical reference documents are ignored.

NOTICE

***Lists** of **spare parts** and **wearing parts** are to be found in the **technical reference documents**.*

Otherwise the unit will be damaged.
Damage can arise if the attached technical reference documents are ignored.

Service

When necessary, these parts can be obtained from:

Friedemann Wagner GmbH
Robert-Bosch-Straße 5
D-78559 Gosheim / Germany
Telephone: +49 (0) 7426 / 94900-0
Fax: +49 (0) 7426 / 94900-9
Email: info@wagnerautomation.de

5 Installation

5.1 Scope of delivery

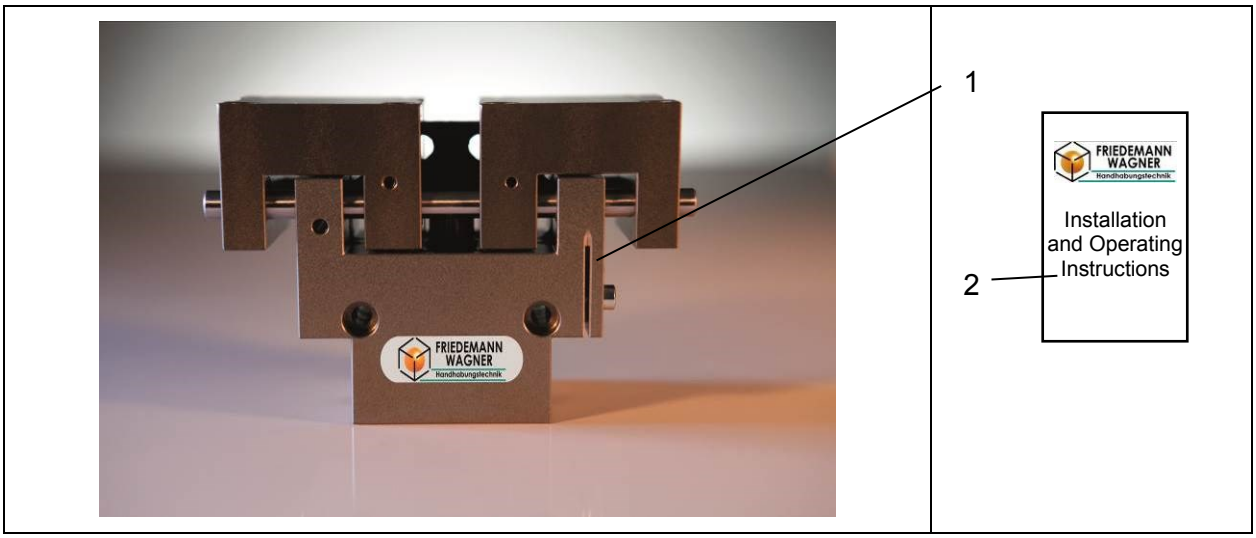


Fig. 5-1 Scope of delivery of the device

The scope of delivery comprises:

1 Gripping unit including base construction
2 These installation and operating instructions with declaration of incorporation
3 6 pc. centering ring
4 Cardboard packaging

5.2 Transport and packaging

The customer is sent a specification of the scope of delivery before shipment begins. It contains details on:

- date of delivery,
- number and type of transport units.

The devices are carefully inspected and packed before shipment, but it is nevertheless still possible that they might become damaged during transit.

5.2.1 Delivery (also of spare and replacement parts)

Receiving inspection:

- Check the shipment against the delivery note to ensure that it is complete!

If the packaging is damaged

- Check the shipment itself for damage (visual inspection)!

Complaints

If the shipment was damaged during transit:

- Immediately contact the last carrier!
- Keep the packaging material (for possible inspection by the carrier or for return shipment).

Packaging for return shipment

Use the original packaging material as far as possible.

5.2.2 Temporary storage/Storage conditions

The freight packaging of the device and spare and replacement parts is designed for a storage period of 3 months from delivery.

After dismantling of the device, it must be stored properly to enable reuse.

	***NOTICE***
	Temporary storage: Store with desiccant in a dry factory hall. ***Otherwise the unit will be damaged.*** *Moisture could penetrate into the device and cause major damage.*

Storage conditions

-See chapter 2.3.4, Technical data

- No direct sunlight.
- No exposure to direct rain, condensation, water.

5.3 Mounting

WARNING

Disconnect the gripping unit from the compressed air supply and lock against reconnection.

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

5.3.1 Mounting of the gripping unit

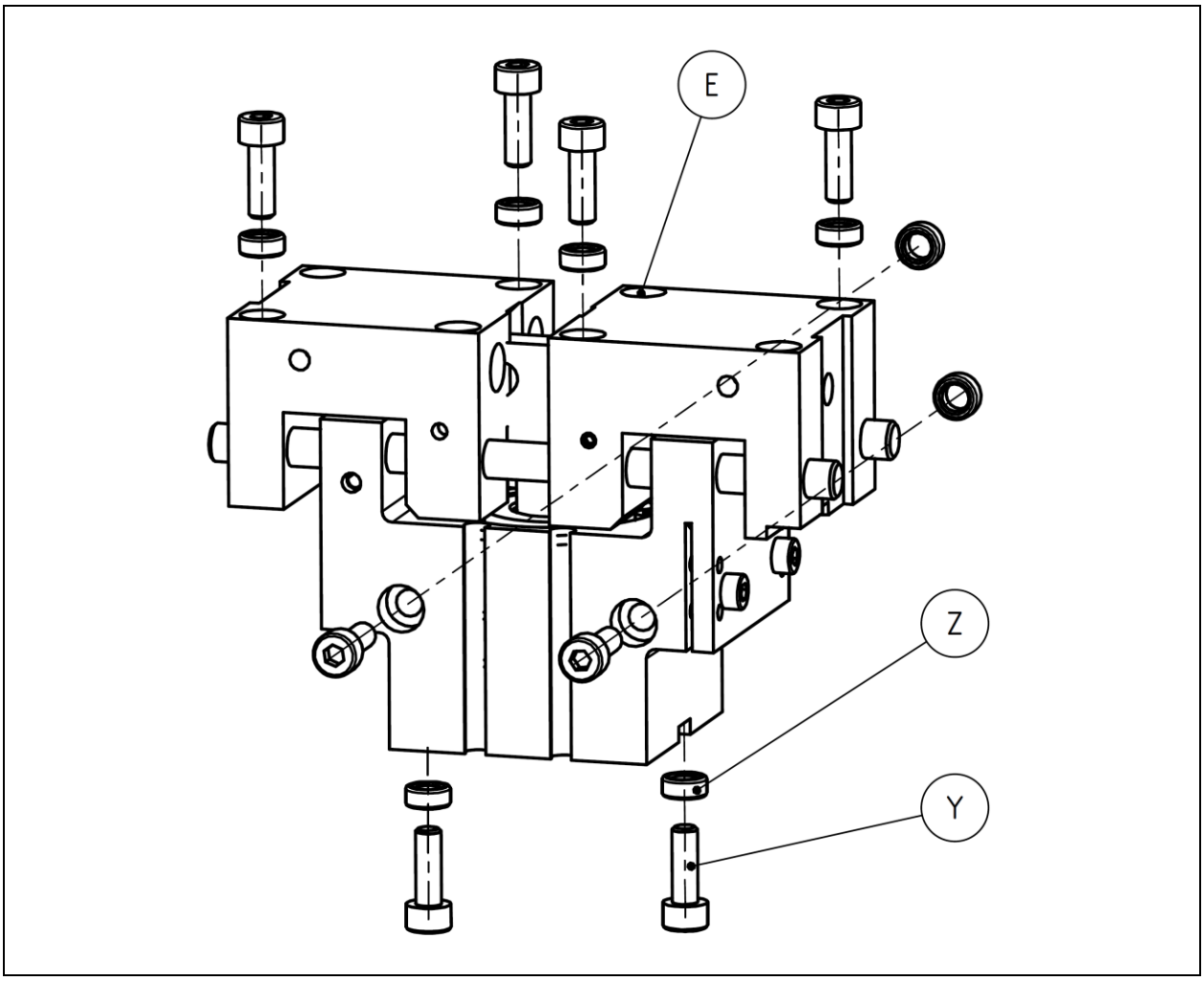


Fig. 5-2 Mounting of the gripping unit

- ▶ To mount, place at least 2 diagonally offset centering rings (Z) (are included in the delivery) in the holes (E) provided.
- ▶ Screw the gripping unit tight with the screws (Y).
- ▶ Make sure the mounting surfaces are flat as specified in the table below.
- ▶ The module can be mounted from the side or back.

NOTICE

If a centering ring (Z) is stuck in a hole, you can remove it from the hole easily as from ZR-4 with a threaded screw. The centering rings have an internal thread specifically for this purpose. Simply screw a suitable screw into the thread of the centering ring and pull the screw plus centering ring out of the hole.

Centering ring	Internal thread
ZR-3	-
ZR-4-A5	M4
ZR-4	M5
ZR-6	M8
ZR-9	M10

Admissible roughness in dependence on edge lengths

Edge lengths [mm]	**Admissible roughness [mm]**
< 100	< 0.02
> 100	> 0.05

Position	**Fastening**	**-29**	**-38**	**-50**	**-60**	**-82**	**-96**	**-120**	**-140**
1	Module from the back	4xM3 4.5 deep	-	-	-	-	-	-	4xM6 10 deep
2		4xM2.5 5 deep	4xM3 6 deep	2xM4 10 deep	2xM4 10 deep	4xM4 10 deep	4xM6 11 deep	4xM6 12 deep	2xM8 12 deep
3	Through hole on the side	-	M3	M4			M6		M8
4	Top jaws	2xM3 4 deep	2xM3 7 deep	4xM4 8 deep		4xM4 10 deep	4xM6 11 deep	4xM6 12 deep	4xM6 12 deep
5	Top jaws side	1xM3 4 deep	1xM3 6 deep	1xM4 8 deep	1xM5 10 deep	1xM6 10 deep	1xM8 12 deep	2xM8 12 deep	2xM8 12 deep

5.3.2 Connection examples

WARNING

Disconnect the gripping unit from the compressed air supply and lock against reconnection.

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

NOTICE

The following figures show connection examples and illustrate how the gripping unit can be connected.

NOTICE

A function check must be carried out with compressed air after connection.

NOTICE

If the maximum admissible mass per finger is exceeded, a regulator must be implemented so that the jaw movement is effected smoothly and without bouncing.

5.3.2.1 Example of standard pneumatic connection

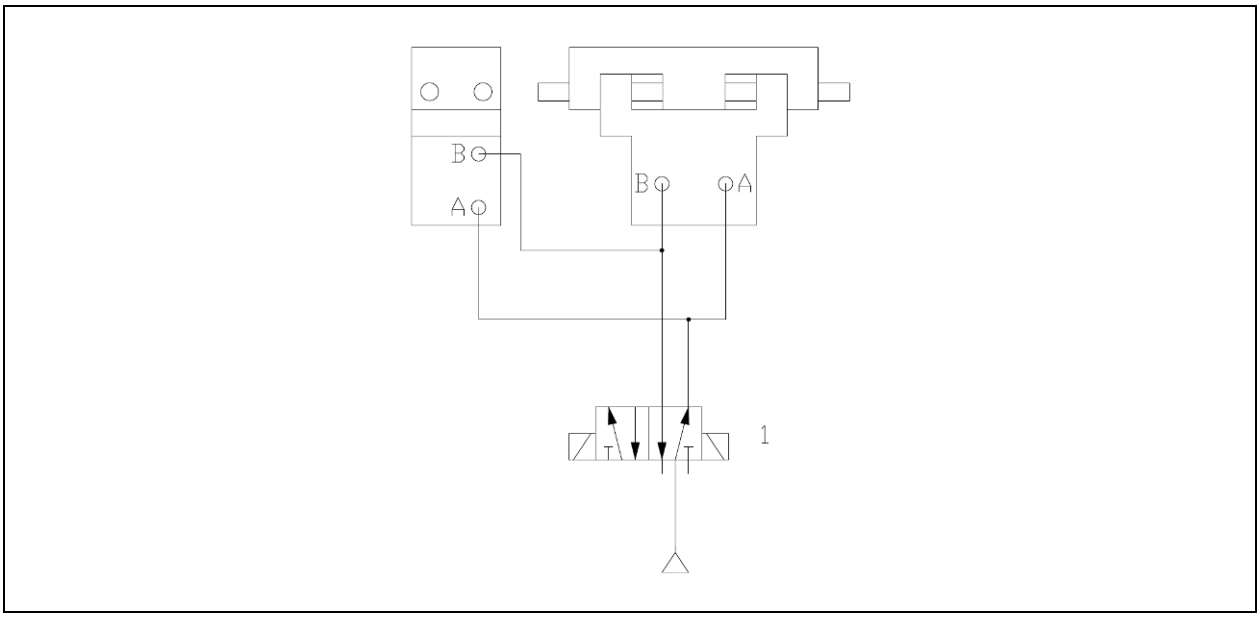


Fig. 5-3 Standard circuit

A. Compressed air connection A (open)
B. Compressed air connection B (close)
1. Proximity switch left
2. Proximity switch right
3. Mains

5.3.3 Adjustment possibilities for the gripping unit

5.3.3.1 Set force

The force can only be adjusted if necessary by way of an upstream pressure reducer.

5.4 Startup

WARNING

Take special care whenever carrying out adjustment work and keep sufficiently far away from danger zones.

Otherwise light to serious injuries can result.

Wear personal protective equipment such as gloves or safety glasses if necessary.

WARNING

Risk of injury from moving masses.
Make sure that no personnel or foreign objects can be caught by moving parts.
Disconnect the gripping unit from the compressed air supply.

Otherwise serious injuries or death can result.

Avoid these dangerous situations!

- ▶ Do not overload the devices.
- ▶ Connect all air hoses and signal cables correctly.
- ▶ Pre-set the clamp force.
- ▶ Mount and pre-set the sensors.
- ▶ Close all regulators and then open them again by one revolution.
- ▶ Make sure that no personnel or foreign objects can be caught by moving parts.
- ▶ Pressurize your equipment slowly with compressed air.
- ▶ Start a trial run.
- ▶ Set the proximity switches (if available).
- ▶ End the trial run.

5.4.1 Mounting of proximity switches (accessories)

WARNING

Disconnect the gripping unit from the compressed air supply and lock against reconnection.

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

NOTICE

The standard device does not come with proximity switches. However, to query end positions, it is necessary to retrofit proximity switches. The proximity switches can be obtained separately in various versions as accessories.

NOTICE

Gripping units with proximity switches should not be used in areas with static discharges, high-frequency oscillations or strong magnetic fields. Otherwise it can happen that the proximity switches for recognition of the end positions deliver wrong signals.

NOTICE

Damage to the sensor possible when operating the gripper.

Follow the steps for different mounting of the respective type of sensor.

NOTICE

To support the cables, work with cable ties if necessary.

Sensors

Type of sensor	Type designation	Diameter	K=Cable S=Connector	Length
Inductive	NSI-*	4 mm 6.5 mm	-S -K	-27 -30 -45 -55
Magnetic	NSR-*	C-slot 4 mm	-S -K	-24

Inductive sensors of the type NSI*

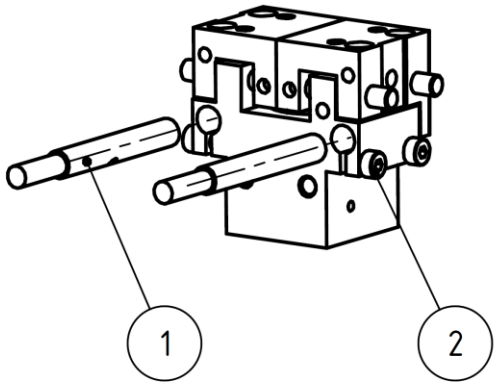
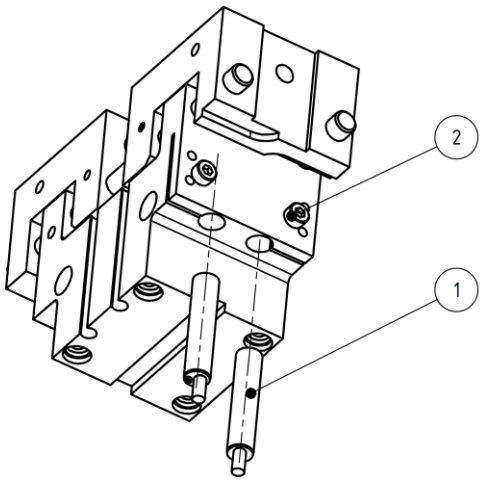
PGM-29	PGM-38 .. PGM-140
Inductive sensors NSI-*	Inductive sensors NSI-*
	

*Fig. 5-4 Inductive sensors of the type NSI**

- ▶ Connect the proximity switches (1) with the cables.
- ▶ Mount the proximity switches (1) so that the LED of the switch lights up when the respective end position is reached.
- ▶ Fasten the proximity switches by tightening the screw (2) with a hexagon key.
- ▶ Test the function by closing and then opening the gripper again.

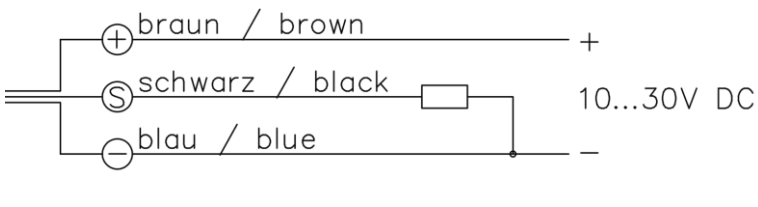


Fig. 5-5 Connection diagram for proximity switches

Please note

The inductive proximity switches are protected against polarity reversal and short circuits.
For proper handling of the proximity switches:

- Do not pull the cable of the sensor.
- Do not let the sensor dangle from the cable.
- Do not tighten the fastening screw or clamps too tight.
- Observe the admissible bending radius of the cable.
- Avoid contact between the proximity switches and hard objects as well as chemicals, particularly nitric, chromic and sulfuric acid.

- The inductive proximity switch is an electronic component that can react sensitively to high-frequency interferences and electromagnetic fields.
- Check mounting and installation of the cable. The distance to sources of high-frequency interference and their supply lines must be adequately large.
- Although it is permitted to connect multiple sensor outputs of the same type (npn, pnp) in parallel, this does not increase the permissible load current.
- Please note that the stray current of the individual sensors (approx. 2 mA) adds up.

Magnetic sensors of the type NSR*

	NOTICE
	Ferromagnetic components, e.g. steel, have an influence on the magnetic field and hence change the switch position of magnetic switches. This can also be caused by, for example, magnetic caliper gages used to set the sensors.

	NOTICE
	The switching characteristic of mechanical magnetic switches is dependent on the orientation of the magnetic field. If magnetic switches from other manufacturers are used, the functional fitting situation might therefore have to be reversed.

NOTICE

Mechanical magnetic switches react less sensitively than electronic switches and have higher inaccuracies and a different switching characteristic. We therefore recommend use of electronic switches (cf. Accessories, e.g. NSR-C4-S or -K).

NOTICE

Depending on the magnetic switch used, its length and fitting situation or the size of the gripping unit, the switch elements and their cables can protrude. Make sure that the cable does not rub against the jaws and that the switch elements are not damaged by pinching or friction. Provide recesses if necessary.

- Push each magnetic field sensor (1) axially into the slot or turn in the sensor and clamp.
- Move the gripping unit manually to position 1.
- After adjustment, fasten the sensor (1) with the screw (2).
- Move the gripping unit manually to position 2.
- Mount the remaining sensor in the same way.
- Check the opening and closing action.

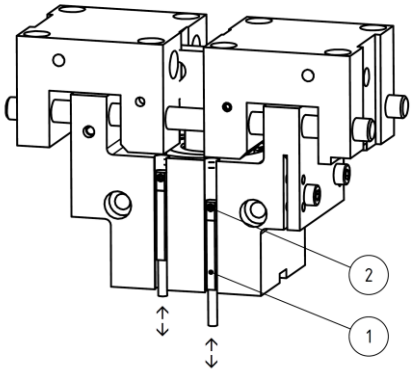


*Fig. 5-6 Magnetic sensors of the type NSR**

NOTICE

When the jaws are open, the piston is in extended position and the switching point must thus be sensed in the direction of the jaws. When the jaws are closed, the piston is retracted and the sensor must thus be sensed in the direction of the housing bottom.

NOTICE

Depending on the monitoring situation, the sensor can also be placed in the slot from the other side – the warnings about protrusions and avoidance of rubbing and pinching at the jaws must, however, be observed.

Technical data of the sensors

Type	NSI / NSR
Switching distance (for NSI)	0.8 - 1.5 mm
Switching field strength (for NSR)	2.4 kA/m
Circuit type	PNP
Switching characteristic	NO
Supply voltage	10-30 V DC
Current consumption	<10 mA
Switching current	100 mA - max. 200 mA
Switching frequency	Max. 5 kHz
LED	Yes
Protected against polarity reversal	Yes
Short-circuit proof	Yes
Protection	IP 65/ IP 67

6 Maintenance/Servicing

WARNING

Disconnect the gripping unit from the compressed air supply and lock against reconnection!

Otherwise light to serious injuries can result.

Make sure there are no residual energies present.

NOTICE

If you have opted for use with an oil/air mixture, the device should then later not be operated otherwise because the lubricating film could fail.

Servicing

After a modification, all moving parts and their guides should be smeared with our special grease.

Only clean the gripping unit with soft cloths and agents that do not damage the material or, for example, compressed air.

Grease the rod guides of the grippers from the outside every 6 months or every 5 million cycles.

The seals and the grease inside the gripping unit can age depending on use; we therefore recommend that you send the device in to us for servicing every 3 years, after 20,000,000 cycles or should you notice a fault in the movement.

Contact with aggressive media and grinding dust should be avoided.

6.1 Warranty and guarantee conditions

The statutory warranty period of the manufacturer / distributor is 24 months from the date of delivery.
For spare parts, we guarantee delivery according to chapter (see also DIN EN 82079-1).

We grant a warranty of 24 months (from the date of delivery ex works) on the proviso that the device is treated correctly in 1-shift operation and the application and environmental conditions are complied with. This includes replacement or repair of defective parts of Friedemann Wagner GmbH and presupposes that the maintenance and lubrication intervals were observed.
Wearing parts (e.g. shock absorbers) are not covered by the warranty.

During the warranty period repairs may only be carried out or authorized by Friedemann Wagner GmbH.

7 Troubleshooting

Fault	Cause	Correction
Irregular movement	Regulator is turned in too far	Set regulator correctly, see chapter 5.3.3.1
	Air ducts are blocked	Clean air ducts with compressed air
No movement	Connected incorrectly	Connect compressed air connections correctly, see chapter 5.3.2
	Indexing unit controlled incorrectly	Check program and change
	Incorrect switching signal or signal sets in too soon	Set proximity switch correctly, see chapter 5.4.1
	Faulty switching	Pressurize compressed air connection B (B) with compressed air and ……
	Regulator is turned in too far	Set regulator correctly, see chapter 5.3.3.1
Proximity switch emits incorrect signals No switching signal	Proximity switch is set incorrectly	Set proximity switch correctly, see chapter 5.4.1
	Proximity switch is defective	Replace proximity switch, see chapter 5.4.1
Module does not move	Base jaws jammed in housing, e.g. because mounting surface is not smooth enough	Check mounting surface for smoothness. See chapter 5.3.1. Loosen the fastening screws of the module and then operate the module again.
	Below minimum pressure	Check air supply, see chapter 5.4
	Compressed air lines interchanged	Check compressed air lines
	Sensor defective or set incorrectly	Repair sensor
	Regulator valve closed	Open regulator valve
	Fastening screws are pressing against the guide shafts	Use shorter fastening screws
	Component broken, e.g. due to overload	Replace component or send module in to Wagner with a repair order. Only use the module within its specified operating parameters.

Fault	Cause	Correction
		Calculate/Check the respective case of application beforehand
Module does not execute the full stroke	Dirt deposits between the base jaws and guide.	Dismantle module and clean
	Below minimum pressure	Check air supply, see chapter 5.4
	Mounting surface not smooth enough	Check mounting surface for smoothness. See chapter 5.3.1.
	Components have come loose, e.g. due to overload	Dismantle module completely
Module opens or closes in jerky fashion	Not enough grease in the rod guides of the module	Clean module and regrease (see chapter 6 for lubrication interval)
	Compressed air lines are blocked	Check compressed air lines for pinching or damage
	Mounting surface not smooth enough	Check mounting surface for smoothness.
	Throttle non-return valve missing or set incorrectly	Fit and set throttle non-return valve
	Load too high	Check admissible weight and length of the fingers
Clamp force diminishes	Compressed air can escape	Check seals; if necessary, dismantle module and replace seals
	Too much grease in the mechanical movements spaces of the module	Clean module and regrease, see chapter 6
	Below minimum pressure	Check air supply, see chapter 5.4
Opening and closing times are not reached	Compressed air lines not implemented optimally	If available: open screw fitting at the module. The jaw movement must nevertheless still be executed smoothly and without bouncing. Check compressed air lines. The internal diameter of the compressed air lines must be large enough in relation to the compressed air consumption. The compressed air lines must be kept as short as possible between the module and directional-control valve. Flow through the directional-control valve is large enough in

Fault	Cause	Correction
		relation to the compressed air consumption? Notice! The throttle non-return valve does not need to be removed even if the gripper does not achieve the opening and closing times. If, despite optimal air connections, the opening and closing times as specified in the catalog are not reached, we recommend use of quick bleed valves directly at the module.
	Load too high	Check admissible weight and length of the top jaws

Table 1 Troubleshooting

You can obtain further help from:

Friedemann Wagner GmbH, D-78559 Gosheim / Germany
Telephone: +49 (0) 7426 / 94900-0
Fax: +49 (0) 7426 / 94900-9
Email: info@wagnerautomation.de

8 Dismantling / Disposal

Dismantling

Dismantling work may only be carried out by skilled personnel.
Make sure the shutdown procedure is followed before beginning dismantling work.
Further, the following must be followed where applicable / available:

- Release the energy in the pressure accumulator.
- Release all tensioned springs.

Disposal

The gripping unit is primarily made of steel and aluminum (except for the electrical equipment) and is to be disposed of in accordance with local environmental protection regulations applicable **at the time** of disposal.
Dispose of according to properties, existing laws and regulations as, for example:

- electric and electronic scrap (circuit boards), PC system, keyboard, mouse, monitor (according to WEEE regulations);
- batteries, fluorescent lamps/energy-saving lamps (collection points);
- plastics (housing), rubber;
- metal, steel, copper, aluminum (separated by sorts).

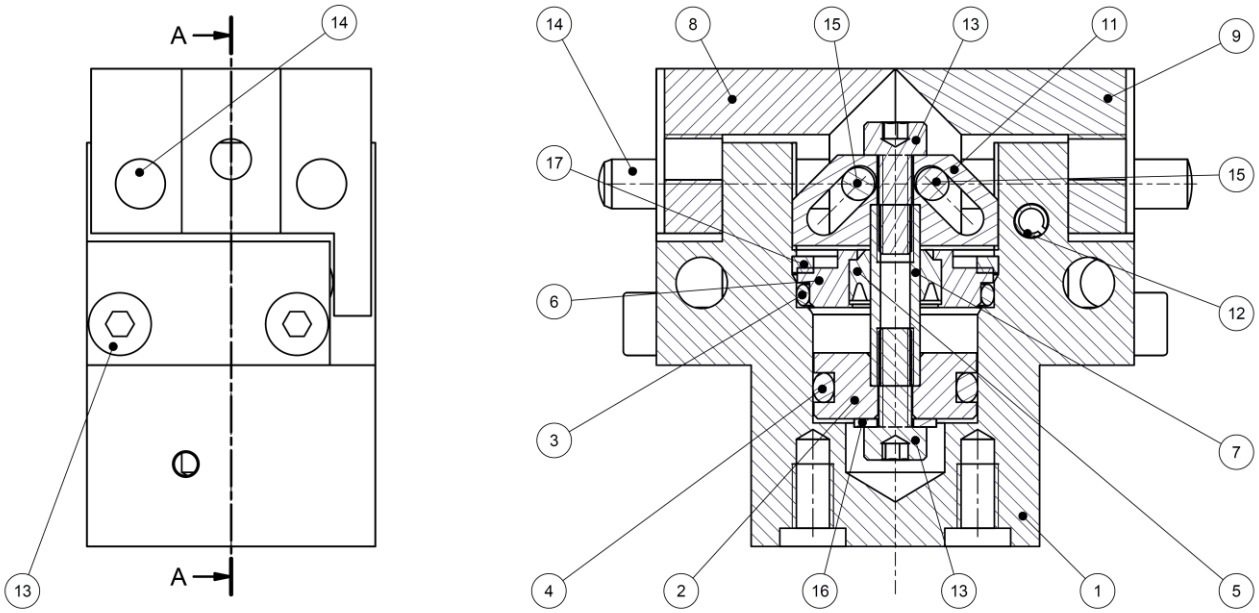
All parts touched by media must be decontaminated before disposal. Hazardous substances are to be removed from the device.
For proper disposal of hazardous substances, observe the material safety data sheets (MSDS) and current applicable disposal regulations.

Oils, solvents, cleaning agents and contaminated cleaning materials (brushes, cloths, etc.) must be disposed of according to local regulations, the applicable disposal codes and the information in the manufacturer's material safety data sheets.

9 Spare part lists and accessories

9.1 Spare part lists

Spare part list PGM-29



object	qcs	item#	name
1	1	2059.600.101	housing
2	1	2059.601.103	piston
3	1	6210.049	O-ring 10x1
4	1	6210.023	O-ring 7x1,5
5	1	6216.012	sealing wiper 3x5,6
6	1	2059.500.101	guiding cap
7	1	2059.601.101	piston rod
8	1	2059.000.101	jaw left
9	1	2059.000.102	jaw right
11	1	2059.601.102	diverter
12	1	6042.006	clamping pin Ø2x16
13	5	6003.073	cylinder screw M2x6
14	2	2059.000.103	pin-rework
15	2	6040.036	pin Ø2x8
16	1	6020.019	washer M2
17	1	6031.012	locking ring B12

Fig. 9-1 Spare part list PGM 29

Spare part list PGM 38- 140

PGM-38

Pos.	name	item#	pcs
1	guide shaft Ø3x40	2055.000.102.10	2
2	clamping jaw	2055.000.101.10	2
3	pin Ø3x18	6040.010	2
4	diverter	2055.601.102	1
5	cylinder screw M3x25	6003.039	1
6			
7	combined element 6x11,2	6216.006	1
8	locking ring 14x1 B.	6031.013	1
9	O-ring 10x1	6210.049	1
10	locking pin Ø2x16	6042.006	1
11	housing	2055.600.101.10	1
12	guiding cap	2055.500.101	1
13	washer M3	6020.012	1
14	O-ring 3x1	6210.057	1
15	piston	2055.601.103	1
16	piston rod	2055.601.101	1
17	cylinder screw M3x6	6003.038	2
18			
19	O-ring 11x1,5	6210.081	1
20			

PGM-50

Pos.	name	item#	pcs
1	guide shaft Ø4x60	2052.000.102	2
2	clamping jaw	2052.000.103.10	2
3	pin Ø2,5x20	6040.026	2
4	diverter	2052.601.102	1
5	cylinder screw M3x30	6003.030	1
6	drill bushing 2,5x5x6	6255.003	2
7	combined element 6x11,2	6216.006	1
8	locking ring 18x1 B.	6031.010	1
9	O-ring 15x1,5	6210.025	1
10	locking pin Ø3x24	6042.001	1
11	housing	2052.600.101.10	1
12	guiding cap	2052.500.101	1
13	washer M3	6020.012	1
14	O-ring 3x1	6210.057	1
15	piston complete 16x4,5	6211.005	1
16	piston rod	2052.601.101	1
17	cylinder head screw M3x8	6003.027	2
18	setscrew with cone M3x3	6001.009	2
19			
20			

PGM-60

Pos.	name	item#	pcs
1	guide shaft Ø5x70	2051.000.102	2
2	clamping jaw	2051.000.103.10	2
3	pin Ø2,5x20	6040.026	2
4	diverter	2051.601.102	1
5	cylinder screw M4x35	6003.024	1
6	drill bushing 2,5x5x6	6255.003	2
7	combined element 5x14,2	6216.005	1
8	locking ring 25x1,2 B.	6031.003	1
9	O-ring 20x2	6210.019	1
10	locking pin Ø3x24	6042.001	1
11	housing	2051.600.101.10	1
12	guiding cap	2051.500.101	1
13	washer M4	6020.022	1
14	O-ring 4x1,5	6210.045	1
15	piston complete 25x7	6211.033	1
16	piston rod	2051.601.101	1
17	cylinder screw M3x8	6003.027	2
18	set screw with cone M3x3	6001.009	2
19			
20	washer	2051.601.103	1

PGM-82

Pos.	name	item#	pcs
1	guide shaft Ø6x100	2054.000.102	2
2	clamping jaw	2054.000.103.10	2
3	pin Ø2,5x24	6040.014	2
4	diverter	2054.601.102	1
5	cylinder screw M4x40	6003.077	1
6	drill bushing 2,5x5x6	6255.003	2
7	combined element 10x16,2	6216.007	1
8	locking ring 34x1,5 B.	6031.006	1
9	O-ring 26x3	6210.034	1
10	locking pin Ø3x36	6042.003	1
11	housing	2054.600.101.10	1
12	guiding cap	2054.500.101	1
13	washer M4	6020.022	1
14	O-ring 3,3x2,4	6210.001	1
15	piston complete 32x8	6211.034	1
16	piston rod	2054.601.101	1
17	cylinder screw M3x8	6003.027	2
18	set screw with cone M3x3	6001.009	2
19			
20			

PGM-96

Pos.	name	item#	pcs
1	guide shaft Ø8x120	2053.000.102	2
2	clamping jaw	2053.000.103.10	2
3	pin Ø6x28	6040.027	2
4	diverter	2053.601.102	1
5	cylinder screw M6x45	6003.031	4
6	drill bushing 5x8x8	6255.004	2
7	combined element 10x16,2	6216.007	1
8	locking ring 42x1,75 B.	6031.009	1
9	O-ring 34,2x3	6210.036	1
10	locking pin Ø6x40	6042.004	1
11	housing	2053.600.101.10	1
12	guiding cap	2053.500.101	1
13	washer M6	6020.010	1
14	O-ring 5x1,5	6210.051	1
15	piston complete 40x8	6211.035	1
16	piston rod	2053.601.101	1
17	cylinder screw M3x8	6003.027	2
18	set screw with cone M6x6	6001.002	2
19			
20			

PGM-120

Pos.	name	item#	pcs
1	guide shaft Ø12x145	2057.000.102	2
2	clamping jaw	2057.000.102.10	2
3	pin Ø5x22	6040.009	2
4	diverter PGM-120-N	2057.601.102.01	1
5	diverter PGM-120-S	2057.601.102.02	1
6	diverter PGM-120-O	2057.601.102.03	1
7	cylinder screw M6x45	6003.031	1
8	drill bushing 5x8x8	6255.004	2
9	combined element 10x16,2	6216.007	1
10	locking ring 52x2 B.	6031.017	1
11	O-ring 46x2	6210.022	1
12	guiding cap	6042.007	1
13	washer M6	6020.010	1
14	O-ring 6x1,5	6210.056	1
15	piston	2057.601.103	1
16	piston rod	2057.601.101	1
17	cylinder screw M4x8	6003.002	2
19	piston seal PZ 50	6211.017	1

PGM-140

Pos.	name	item#	pcs
1	guide shaft Ø16x171	2058.000.102	2
2	clamping jaw	2058.000.102.10	2
3	pin Ø6x28	6040.027	2
4	diverter PGM-140-N	2058.601.102.01	1
5	diverter PGM-140-S	2058.601.102.02	1
6	diverter PGM-140-O	2058.601.102.03	1
7	cylinder screw M6x55	6003.033	1
8	drill bushing 5x8x8	6255.004	2
9	combined element 10x16,2	6216.007	1
10	locking ring 65x2,5 B.	6031.018	1
11	O-ring 57x3	6210.069	1
12	locking pin Ø5x55	6042.007	1
13	housing	2058.600.101.10	1
14	guiding cap	2058.500.101	1
15	washer M6	6020.010	1
16	piston rod	2058.601.101	1
17	cylinder screw M4x8	6003.002	2
19	piston seal PZ 63	6211.018	1

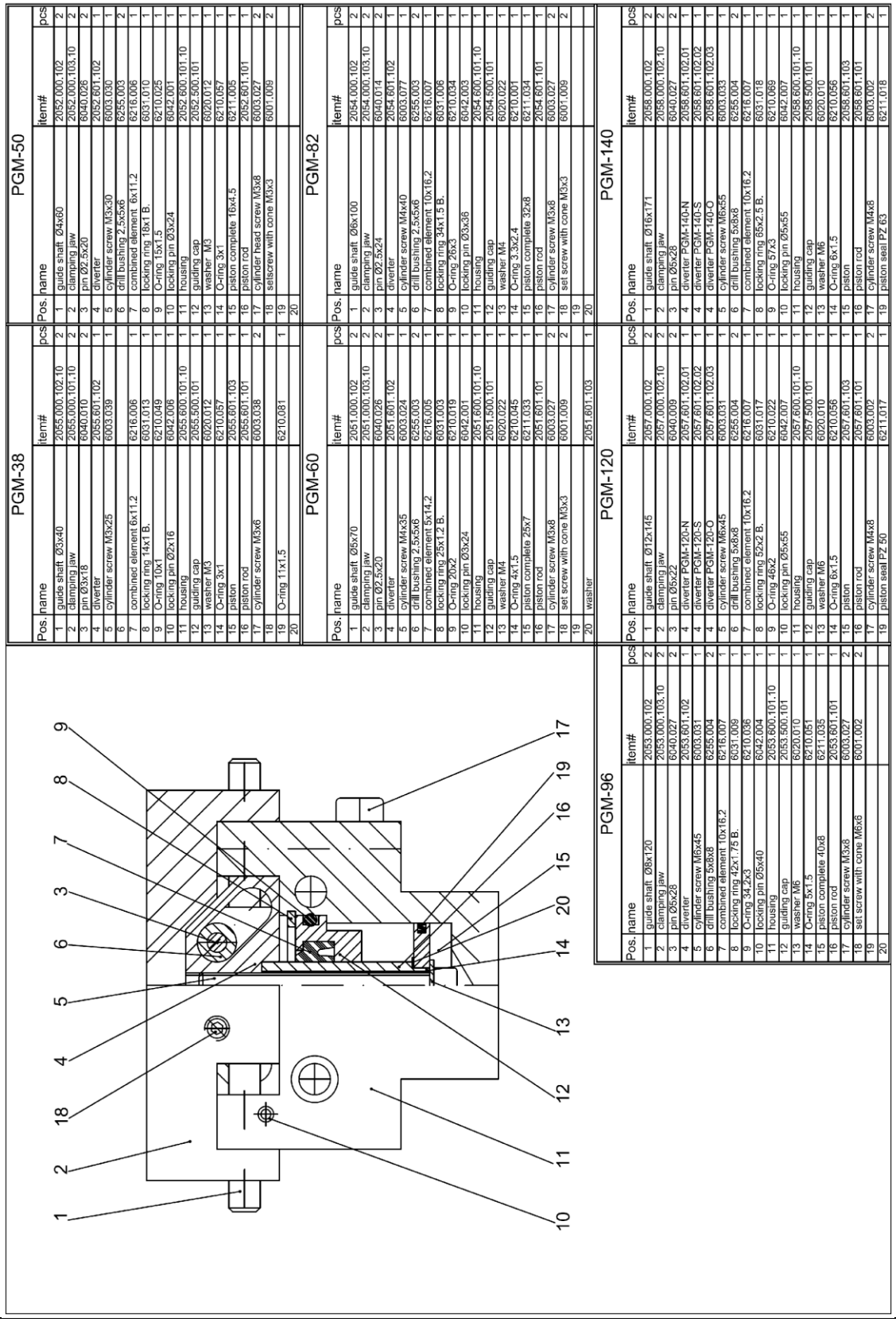


Fig. 9-2 Spare part list PGM 38 to PGM 140

9.2 Accessories

Proximity switches / Gripping unit	NSI-O4-K-27	NSI-O4-S-27	NSI-O6.5-K-30	NSI-O6.5-S-30	NSI-O6.5-K-45	NSI-O6.5-S-55	NSR-C4-K-24	NSR-C4-S-24
PGM-29	•	•						
PGM-38	•	•						
PGM-50			•	•				
PGM-60			•	•			•	•
PGM-82			•	•			•	•
PGM-96					•	•	•	•
PGM-120					•	•	•	•
PGM-140					•	•	•	•

Accessories / Gripping unit	Centering rings ZR-3	Centering rings ZR-4	Centering rings ZR-6	Centering rings ZR-9	Connector cable	Clamp force retention	Spreading force retention
PGM-29	•				•		
PGM-38		•			•	•	•
PGM-50		•			•	•	
PGM-60		•			•	•	•
PGM-82		•			•	•	•
PGM-96			•		•	•	•
PGM-120			•		•	•	
PGM-140			•	•	•	•	