PGN-plus-P vs. GPP5000

The technology in detail comparison

Superior Clamping and Gripping

SCHUNK

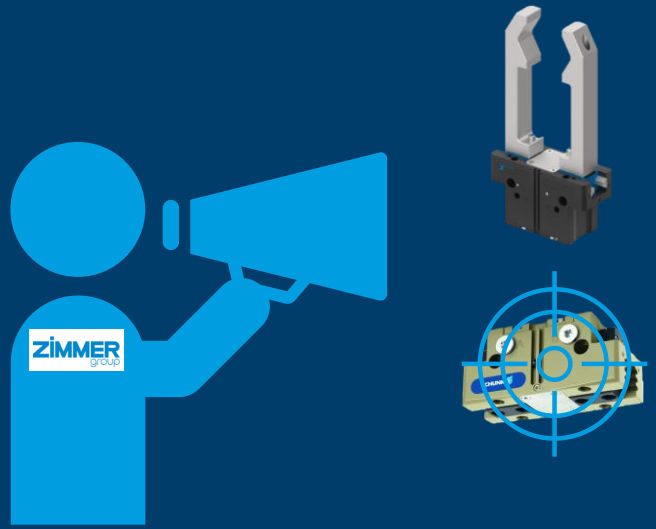
Agenda

1. How does Zimmer promote?

2. SCHUNK fact check

1. How does Zimmer promote?

1.1 Homepage
1.2 Flyer „product comparison“
1.3 Flyer „product recoding“
1.4 direct customer contact via email
1.5 Advertise promises of Zimmer



1.1 Homepage

Serie GPP5000 – „THE BEST"

- **Steel Linear Guide – The superior guidance system concept** (steel/steel)
  - up to 30 mio. maintenance intervals
- **Leakproof and corrosion protected – The universal gripper**
  - IP67 as standard
  - corrosion protected as standard
  - reduced the range of models
- **Aluminium Linear Guide – The alternative** (steel/aluminium)
  - better performance when compared to a similar gripper with a T-slot sliding guide
  - on par with the best principles of toothed guidance systems

Source: Zimmer Homepage

1.2 Flyer „product comparison“

JGP is written, but they compare to PGN-plus!

Product comparison PGN-plus / GPP5000

- up to 30% more gripping force than the benchmark
- 10% more static forces and torques than the benchmark
- Gripper fingers up to 10% longer then the benchmark
- Gripper fingers weight up to 15% higher then the benchmark
- sealed guide IP64 / Protector version IP67
- protected against corrosion
- up to 30 million cycles without maintenance

PRODUKTVERGLEICH
SERIE JGP / GPP5000

ZIMMER group

► PRODUKTVORTEILE

„Der Universelle“

- Bis zu 30% mehr Greifkraft als der Benchmark
- 10% höhere statische Kräfte und Momente als der Benchmark
- 10% längere Greifbacken als beim Benchmark
- 15% höheres Greifbackengewicht als beim Benchmark
- Abgedichtete Führung IP64 / Protektorversion IP67
- Korrosionsgeschützt
- Bis zu 30 Millionen Zyklen Wartungsfreiheit

► NUTZEN IM DETAIL

(1) Zwangsgeführtes Keilhakengetriebe
- Hohe Kräfte- und Momentenaufnahme über Schrägzug
- Synchronisierte Bewegung der Greiferbacken

(2) Greiferbacke
- Korrosionsgeschützt mittels DLC Beschichtung
- Greifbackenmontage über abnehmbare Zentrierhülsen

(3) Steel Linear Guide
- Stahl in Stahl geführt
- Ermöglicht das Anbringen extrem langer Greifbacken

(4) Klemmbock
- Aufnahme für induktiven Näherungsschalter

(5) Integrierte Greifkraftsicherung
- Im Zylinderraum eingesetzte Feder als Energiespeicher

(6) Antrieb
- Doppeltwirkender Pneumatikzylinder

(7) Befestigung und Positionierung
- Alternativ an mehreren Seiten für eine individuelle Montage
- Pneumatische und elektrische Version bis auf das Höhenmaß identisch

(8) Abtriebsnut
- Befestigung und Positionierung der Magnetfeldsensoren

(9) Doppellippendichtung
- IP64 und bis zu IP67 bei der Protektorversion
- Verhindert das Austreten von Fett, dadurch erhöhte Lebensdauer

► TECHNISCHE DATEN

	Schunk	Zimmer Group
Artikelnummer	PGN-plus 125-1	GPP5013N
Mr	100 [Nm]	106 [Nm]
Mx	145 [Nm]	135 [Nm]
My	120 [Nm]	128 [Nm]
Fa	2800 [N]	2700 [N]
Hub pro Backe	13 [mm]	13 [mm]
Greifkraft beim Schließen	1060 [N]	1410 [N]
Greifkraft beim Öffnen	1170 [N]	1490 [N]
Durch Feder abgesicherte Greifkraft min.	-	-
Schließzeit	0,1 [s]	0,09 [s]
Öffnungszeit	0,1 [s]	0,09 [s]
Wiederholgenauigkeit +/-	0,01 [mm]	0,01 [mm]
Betriebsdruck min.	2,5 [bar]	3 [bar]
Betriebsdruck max.	8 [bar]	8 [bar]
Betriebstemperatur min.	-10 [°C]	-10 [°C]
Betriebstemperatur max.	+90 [°C]	+90 [°C]
Zylindervolumen pro Zyklus	61 [cm³]	68 [cm³]
Gewicht	1,35 [kg]	1,5 [kg]
Preis in EUR	XX,YY	XX,YY

Alle Werte gemessen bei 6 Bar

SCHUNK

1.3 Flyer „product recoding“

GREIFERFAMILIE 5000

ZIMMER group

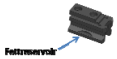
UNIVERSELL EINSETZBAR

Steel Linear Guide

- 10% längere Greifbacken als beim Benchmark
- Zulässiges Greifbackengewicht 15% höher als beim Benchmark
- Verschleißfester und bessere Gleiteigenschaften als Stahl / Aluminium Führung

Diamant Like Carbon beschichtete Greiferbacken

- Korrosionsgeschützt und verschleißfest
- Erhöht den Wirkungsgrad des Greifers
- Bis zu 30 Millionen Zyklen wartungsfrei

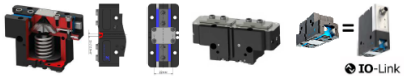


TPU Doppellippendichtung

- Resistent gegen Öle, Fette und viele Lösungsmittel
- Verhindert den Verlust des Schmiermittels
- IP64

Nutzen im Detail

- Stützsteg an der Kulisse
- Durchgängige Aufnahmenut für Magnetfeldsensorik
- Induktiver Näherungsschalter ohne Klemmbock montierbar
- Anschlag für induktiven Näherungsschalter
- Stiftbohrungen unter dem Abdeckblech für kundenspezifische Anbauteile
- IP67 Protektorversion
- Pneumatisch, elektrisch - gleiches Bohrbild, Ansteuerung integriert - IO oder IO-Link



GREIFERFAMILIE 5000

ZIMMER group

Produktschlüssel

Gleiches Anschlussbohrbild, gleiche Höhe, gleiche Backenanbindung, mehr Performance – Serie 5000

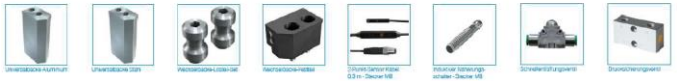
PGN / PZN-plus	SCHUNK	ZIMMER
GPP / GPD5000	40	5003
	50	5004
	64	5006
	80	5008
	100	5010
	125	5013
	160	5016
	200	5025
	240	5030
	300	5035
	380	5045

-1	N
-2	S

-AS	C
-IS	O

SD [IP64]	Standard
-K	Standard
-V	T
-KVZ	V
-P	Auf Anfrage

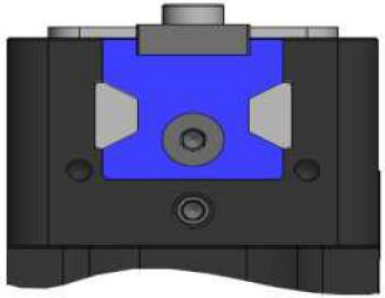
Zubehörauswahl



SCHUNK

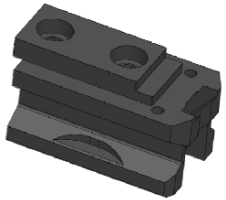
1.3 Flyer „product recoding“

- Steel Linear Guide
  - Gripper fingers up to 10% longer then the benchmark
  - Gripper fingers weight up to 15% higher then the benchmark
  - more wear resistant and better sliding properties than steel/aluminum guide

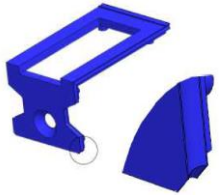


1.3 Flyer „product recoding“

- **D**iamant **L**ike **C**arbon coated gripper jaws
  - corrosion protected and wear resistant
  - increases the efficiency of the gripper
  - up to 30 million cycles without maintenance

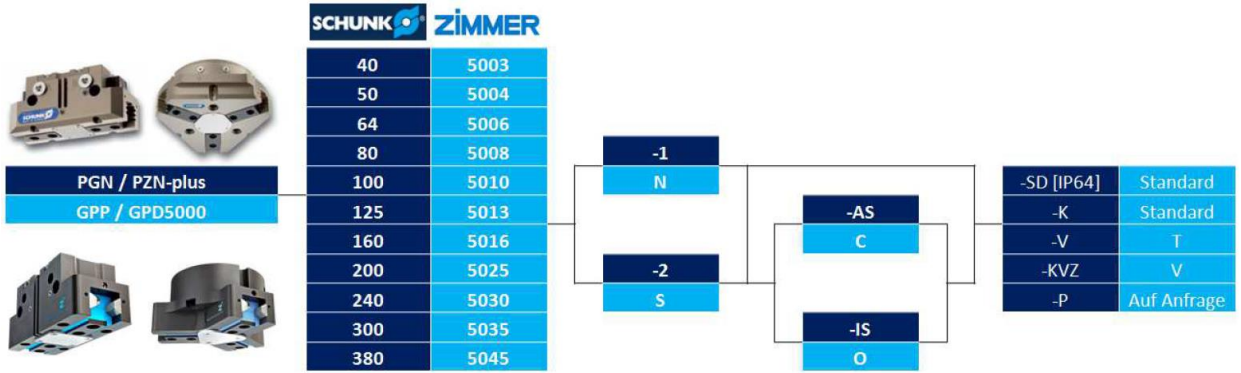


- TPU dual lip seal
  - Resistant against oils, greases and many solvents
  - Prevents grease from being squeezed out
  - IP64



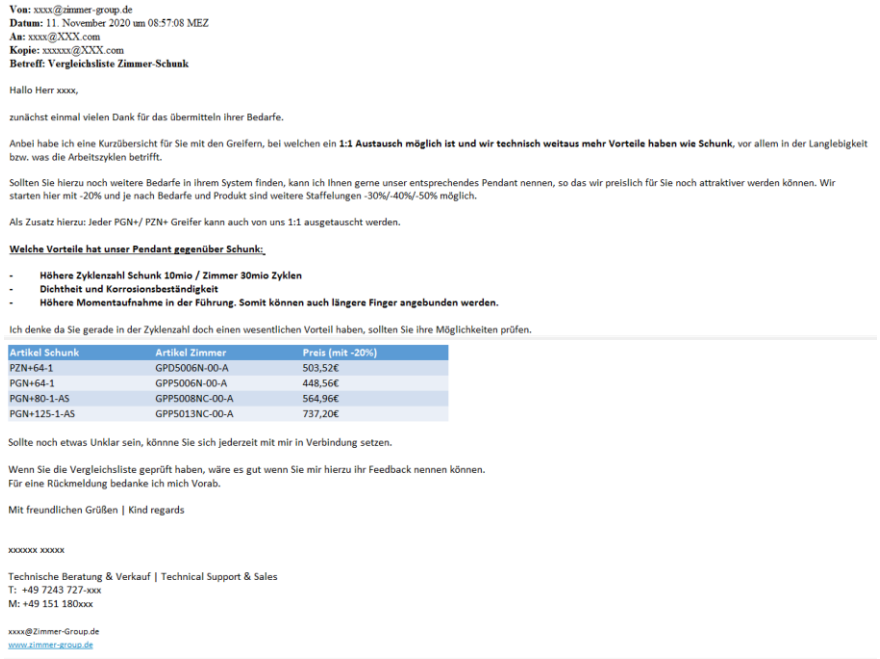
1.3 Flyer „product recoding“

– same connection bore pattern, same height, same jaw connection, more performance - 5000 series



1.4 direct customer contact via email

- comparison list Zimmer – SCHUNK
- 1:1 interchangeable
- higher number of cycles Schunk 10 million / Zimmer 30 million cycles
- sealed and corrosion protected
- higher static forces and torques in the guidance
- high discounts



Von: xxxx@zimmer-group.de
Datum: 11. November 2020 um 08:57:08 MEZ
An: xxxx@XXX.com
Kopie: xxxxxx@XXX.com
Betreff: Vergleichsliste Zimmer-Schunk

Hallo Herr xxxx,

zunächst einmal vielen Dank für das übermitteln ihrer Bedarfe.

Anbei habe ich eine Kurzübersicht für Sie mit den Greifern, bei welchen ein **1:1 Austausch möglich ist und wir technisch weitaus mehr Vorteile haben wie Schunk**, vor allem in der Langlebigkeit bzw. was die Arbeitszyklen betrifft.

Sollten Sie hierzu noch weitere Bedarfe in ihrem System finden, kann ich Ihnen gerne unser entsprechendes Pendant nennen, so das wir preislich für Sie noch attraktiver werden können. Wir starten hier mit -20% und je nach Bedarfe und Produkt sind weitere Staffelungen -30%/-40%/-50% möglich.

Als Zusatz hierzu: Jeder PGN+/ PZN+ Greifer kann auch von uns 1:1 ausgetauscht werden.

Welche Vorteile hat unser Pendant gegenüber Schunk:

- **Höhere Zyklenzahl Schunk 10mio / Zimmer 30mio Zyklen**
- **Dichtheit und Korrosionsbeständigkeit**
- **Höhere Momentaufnahme in der Führung. Somit können auch längere Finger angebunden werden.**

Ich denke da Sie gerade in der Zyklenzahl doch einen wesentlichen Vorteil haben, sollten Sie ihre Möglichkeiten prüfen.

Artikel Schunk	Artikel Zimmer	Preis (mit -20%)
PZN+64-1	GPD5006N-00-A	503,52€
PGN+64-1	GPP5006N-00-A	448,56€
PGN+80-1-AS	GPP5008NC-00-A	564,96€
PGN+125-1-AS	GPP5013NC-00-A	737,20€

Sollte noch etwas Unklar sein, könnne Sie sich jederzeit mit mir in Verbindung setzen.

Wenn Sie die Vergleichsliste geprüft haben, wäre es gut wenn Sie mir hierzu ihr Feedback nennen können.
Für eine Rückmeldung bedanke ich mich Vorab.

Mit freundlichen Grüßen | Kind regards

xxxxxx xxxxx

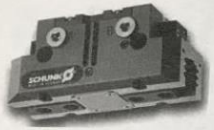
Technische Beratung & Verkauf | Technical Support & Sales
T: +49 7243 727-xxx
M: +49 151 180xxx

xxxx@Zimmer-Group.de
www.zimmer-group.de

1.4 direct customer contact via email

Gegenüberstellung Greifer

Schunk (PGN-plus 100-1-AS)



Typ:	PGN-plus 100-1-AS
Hub:	10 mm
Greifkraft:	900N (6bar)
Schutzklasse:	IP40
Korrosionsgeschützt	Nein
Führung	Aluminium - Stahl
Zyklen:	bis zu 10 Mio.

Schunk (PGN-plus P 100-1-AS)

Typ:	PGN-plus P 100-1-AS
Hub:	10 mm
Greifkraft:	1300 (6bar)
Schutzklasse:	IP40
Korrosionsgeschützt	Nein
Führung:	Aluminium - Stahl
Zyklen:	bis zu 30 Mio.
Wartung:	Nach 10 Mio. Zyklen

Schunk (PGN-plus P 100-1-AS-SD)

Typ:	PGN-plus P 100-1-AS-SD
Hub:	10 mm
Greifkraft:	1300 (6 bar)
Schutzklasse:	IP64
Korrosionsgeschützt	Nein
Führung	Aluminium - Stahl
Zyklen:	bis zu 30 Mio.
Wartung:	Nach 10 Mio. Zyklen

Zimmer (GPP5010NC-00-A)

Typ:	GPP5010NC-00-A
Hub:	10 mm
Greifkraft:	1260 (6bar)
Schutzklasse:	IP64
Korrosionsgeschützt	Ja
Führung	Stahl - Stahl
Zyklen:	bis zu 30 Mio.
Wartung:	Wartungsfrei. Auch in widrigen Umgebungsbedingungen !!!

Peter Helmling; Gebietsverkaufsleiter; 15.04.2021

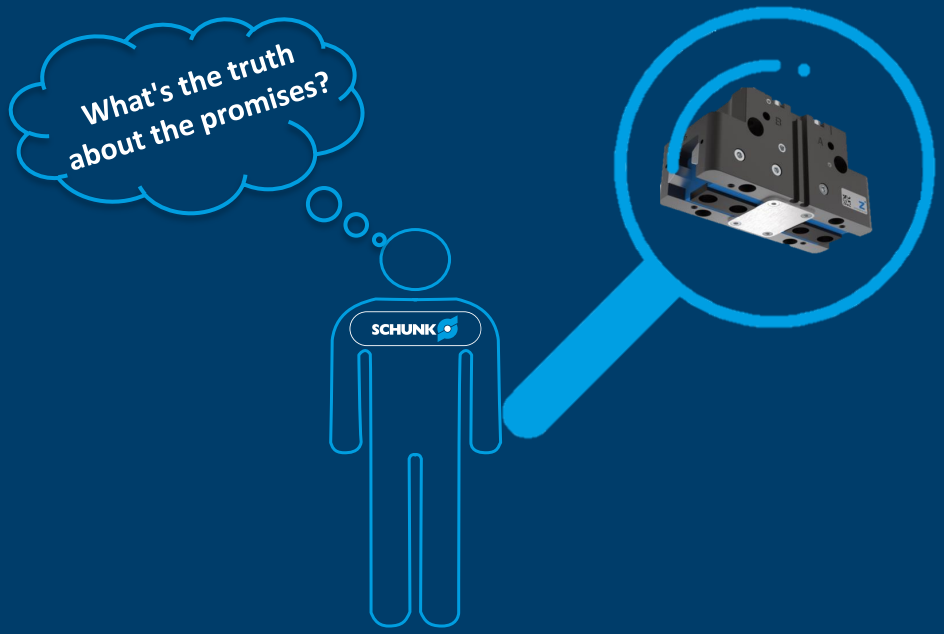
ZIMMER group

1.5 Advertise promises of Zimmer

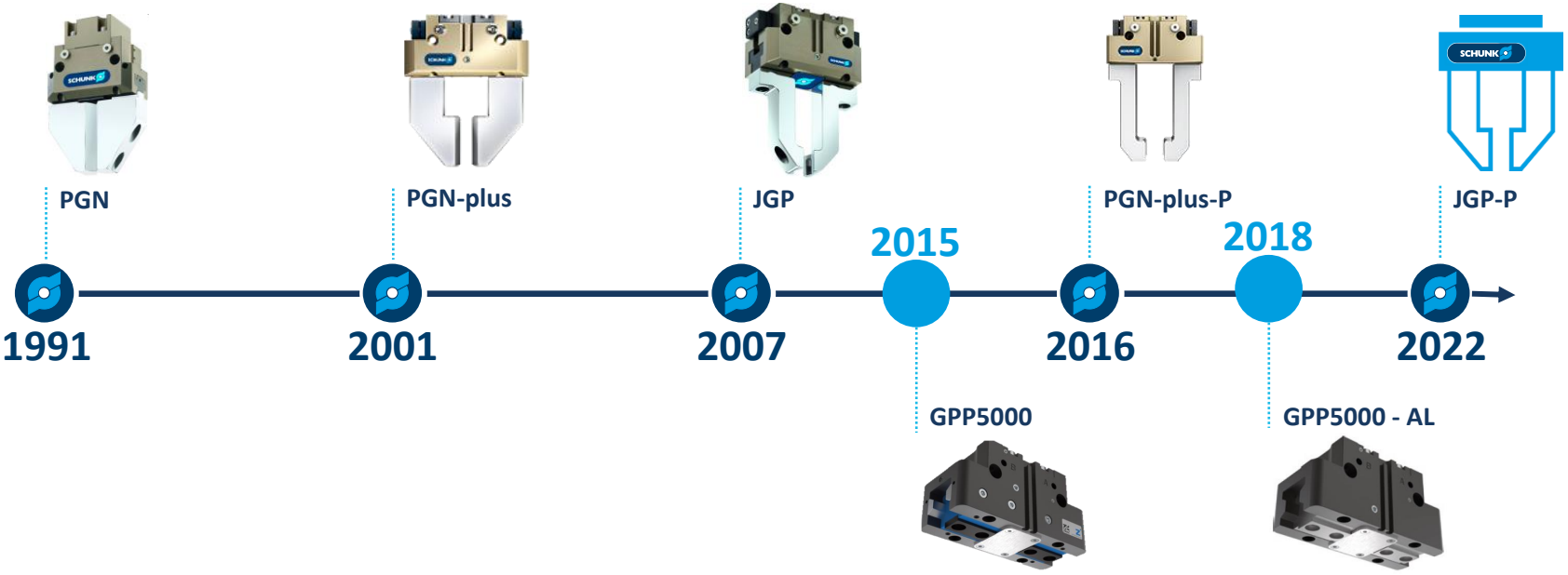
- 1:1 interchangeable
- Steel Linear Guide – The superior guidance system concept
  - more wear resistant and better sliding properties than steel / aluminum guide
  - higher static forces and torques in the guidance
  - 10% more static forces and torques than the benchmark
  - Gripper fingers up to 10% longer then the benchmark
  - Gripper fingers weight up to 15% higher then the benchmark
  - up to 30% more gripping force than the benchmark
  - up to 30 million cycles without maintenance
  - higher number of cycles Schunk 10 million / Zimmer 30 million cycles
- TPU dual lip seal
  - Resistant against oils, greases and many solvents
  - Prevents grease from being squeezed out
  - IP64
- Leakproof and corrosion protected
  - corrosion protected and wear resistant
  - SCHUNK corrosion protected: no
  - Protector version IP67

2. SCHUNK fact check

2.1 PGN-plus-P vs. GPP5000
2.2 1:1 interchangeable
2.3 guidance concept | material mix
2.4 guidance concept | shape
2.5 max. forces and torques
2.6 finger length
2.7 finger weight
2.8 lubricant pocket
2.9 maintenance free
2.10 wedge hook
2.11 gripping force
2.12 corrosion protection
2.13 IP protection class



2.1 GPP5000 vs. PGN-plus-P



2.1 GPP5000 vs. PGN-plus-P

Zimmer consistently compares to the 20-year-old **PGN-plus**!

GPP 5000

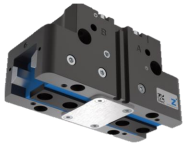
ZIMMER group

PGN-plus

But our current **PGN-plus-P** must be used as a comparison!

PGN-plus-P

SCHUNK

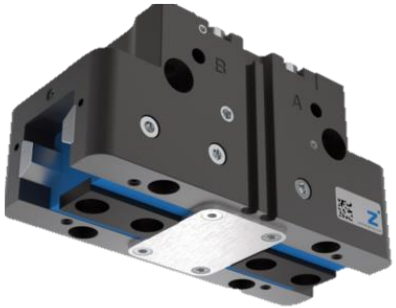


GPP 5000

SCHUNK

2.2 1:1 interchangeable

Dimensionally, the GPP5000 and PGN-plus-P grippers are **1:1 interchangeable**!



But the **technical** values are **not comparable** 1:1!

2.2 1:1 interchangeable

GPP	PGN-plus-P
5003	40
5004	50
5006	64
5008	80
5010	100
5013	125
5016	160
5025	200
5030	240
5035	300
5045	380

GPP - 5 - 006 - NC - IL - 00 - A

Gripper type

GPP	PGN-plus / PGN-plus-P
GPD	PZN-plus
GPW	PWG-plus

Series

Stroke / Size

Variant

Zimmer	SCHUNK
N	-1
NC	-1-AS
N0	-1-IS
S	-2
SC	-2-AS
SO	-2-IS

IO-Link

-IL integrated valves and control with IO-Link (only for grippers with IO-Link)

Option

Zimmer	Description	SCHUNK
00	Basic version (IP64 and anti-corrosion)	-SD and -K
10	integrated valves	no standard product
20	up to 130°C	-V
21	IP 67	DPG-plus
24	up to 130°C and IP 67	DPG-plus ...-V
	higher gripping forces	-KVZ (not for PGN-plus-P)
	higher accuracy	-P
	for explosive environments	-EX
AL	cost-optimised variant	JGP

Version (Currently without signification)

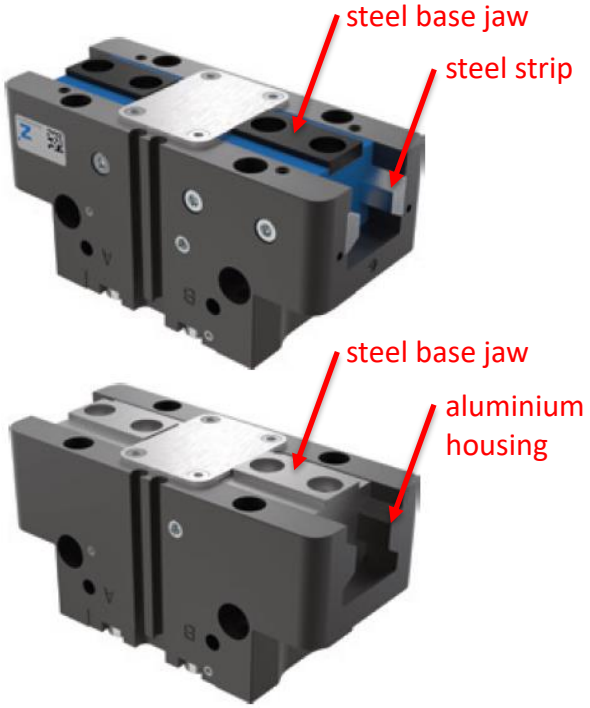
2.3 guidance concept | material mix

„Steel Linear Guide – The superior guidance system concept?“

- Steel / Steel guidance
- stands for lasting precision, robustness and a long service life
- up to **30 mio.** maintenance **intervals**

„Aluminium Linear Guide – The alternative“

- Steel / Aluminium guidance
- reduced to those aspects which are the most important
- offers significantly better performance when compared to a similar gripper with a T-slot sliding guide
- **on par with the best principles of toothed guidance systems**



2.3 guidance concept | material mix

comparison

segmentation

GUIDE CHARACTERISTICS

Steel / aluminum guide and steel / steel guide in comparison

In general, the maximum possible length of gripper fingers of a steel / aluminum guide is lower in comparison to the steel / steel guide, due to the lower yield point of aluminum. While the maximum gripper finger length in the horizontal (a) and vertical (b) direction can be fully utilized for the steel / steel guide, the maximum gripper finger length that is specified in the technical data for the steel / aluminum guide is reduced by 20% at a horizontal (a) projection. The lower efficiency of a steel / aluminum guide also leads to a higher decrease in gripping force at an increased gripping finger length and to a reduction in service life as a result of a lower resistance to wear.

Steel / aluminum guide

Steel / aluminum guides are very common worldwide. They are available in many different forms and are installed in virtually all commercially available grippers from an extremely wide variety of manufacturers. The steel / aluminum grippers from Zimmer Group are available as AL variants of the tried-and-tested 5000 Series. Their designs are geared toward the important aspects and they are very cost-effective.

Steel / steel guide

Steel / steel guides are the best and first choice wherever durability and robustness are essential. The Steel Linear Guide from Zimmer Group is also clearly distinguished from a steel / aluminum guide thanks to its exclusive design featuring higher material characteristics.

Source: GPP5000 catalogue chapter

2.3 guidance concept | material mix

„Tribology / material mix – It‘s all about a good cooperation “

	St – St	St – AL (hard anodized)
load	★★★★★ Due to the high elastic modulus of steel, a high static load is possible.	★★★★☆ Hard anodizing creates an extremely wear-resistant and hard protective layer of Al2O3 (ceramic protective layer), which is firmly fused with the base material. It is not a usual coating that is only "applied" and can flake off under high loads.
lubrication	★☆☆☆☆ This material mix requires a permanently sufficient lubrication (especially in applications with high cycles). Even coatings do not provide sufficient dry-running properties.	★★★★☆ Hard anodized surface has good dry-running properties. The properties of the ceramic protective layer (hard anodizing) support lubrication. The pore structure of the ceramic protective layer embeds the lubricants and prevents the lubricant from being washed out better than smooth surfaces such as steel.
wear (lifetime)	★★★★★ Guide rails are usually hardened and therefore low-wear, if they are sufficiently lubricated.	★★★★★ Hard anodizing creates an extremely wear-resistant and hard protective layer of Al2O3 (ceramic protective layer), which is firmly fused with the base material.
applications	**Optimal** for products with very high loads and low cycles, such as lathe chucks, as regular relubrication is possible. However, the entire housing should be made of steel, as the high loads must be dissipated via the housing. **Conditionally suitable** for products with a high number of cycles (e.g. grippers), as permanent lubrication must be ensured. Without lubrication, the guide will quickly fail.	**Optimal** for products with high loads and a high number of cycles, such as grippers, because the ceramic protective layer (hard anodizing) has good dry-running properties and extremely high wear resistance. **Conditionally suitable** for products that serve as clamping devices for machining such as lathe chucks or clamping force blocks.

2.3 guidance concept | material mix

SCHUNK relies on the material mix St-AL, instead of St-St!

- **perfect** combination **for slide-guided grippers** that need to achieve a **high number of cycles**
- Combination steel on steel requires a lot of grease and is susceptible to deficient lubrication
  → e.g. Lathe chucks must be relubricated very frequently
- we only use steel in grippers where it is necessary → e.g. Wedge-hook
- **Weight advantage** of aluminum over steel is always important, especially in handling applications
  → e.g. max. robot payload
- the lower **wear** of steel compared to aluminum is **not** necessarily **the only relevant factor** of a guidance
- At SCHUNK, the **gripper housing** which is **made from a high-strength aluminium alloy is hard anodized**. This chemical process creates an **extremely wear-resistant protective layer** of Al2O3 (a ceramic protective layer is created which is firmly bonded to the base material and is not only superficially coated as in other coating processes) this has **very good sliding properties**

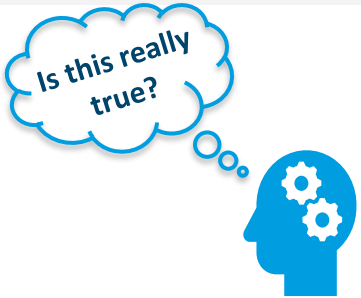
2.4 guidance concept | shape

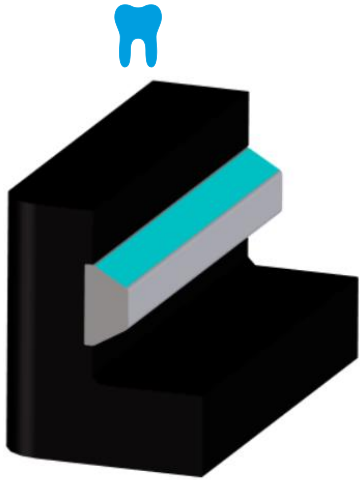
„The superior guidance system concept!“

2-JAW PARALLEL GRIPPERS
SERIES GPP5000

"THE BEST"

- **Steel Linear Guide –**
  The superior guidance system concept
  The steel / steel guide stands for lasting precision, durability and a long service life —featuring maintenance intervals of up to 30 million gripping cycles. Benefit from these features and increase the profitability and process reliability of your machine.





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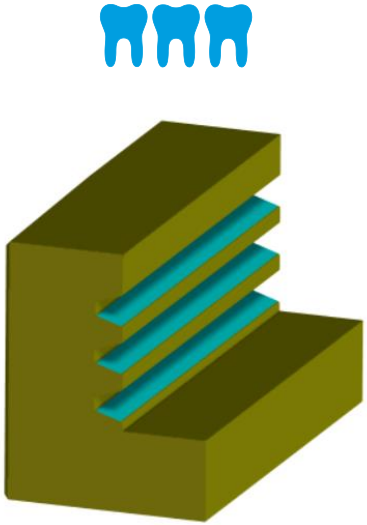
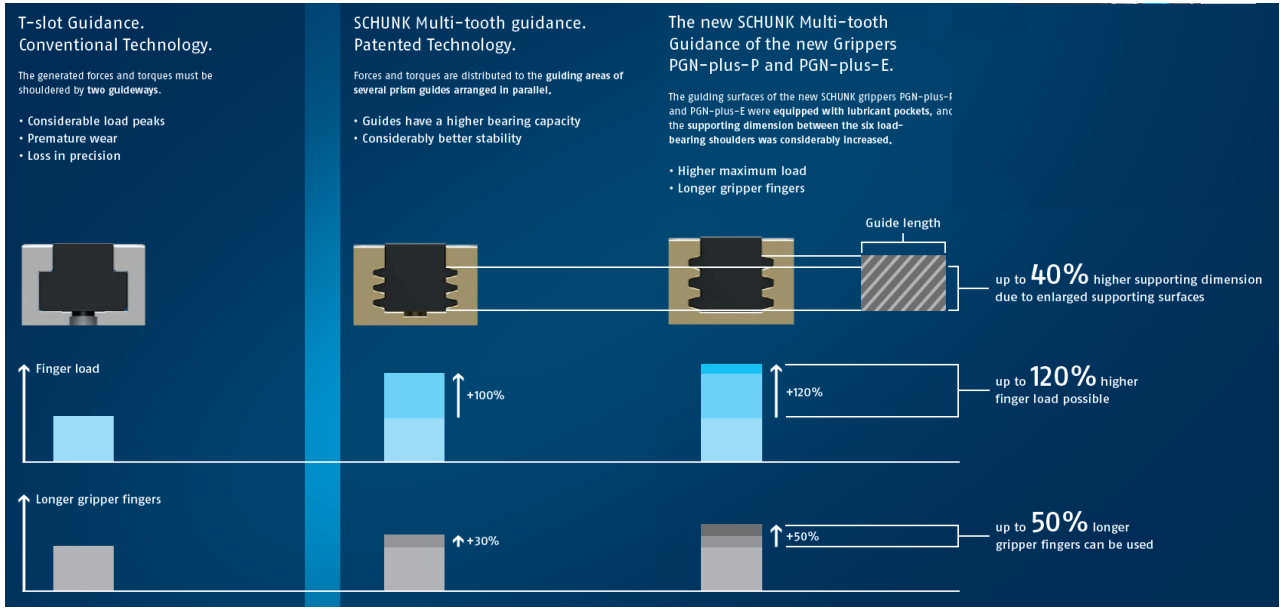


SCHUNK

SCHUNK

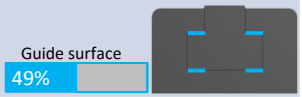
2.4 guidance concept | shape

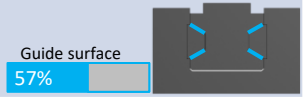
„SCHUNK Multi-tooth guidance – superior technology“



2.4 guidance concept | shape

	T-slot guidance	1-tooth guidance	Multi-tooth guidance
Guide surface	The T-slot guidance distributes the load over four small surfaces. This means that the surface pressure is significantly higher for the same load.	The 1-tooth guidance also distributes the load over four small surfaces. Although these are larger than in a T-slot guidance due to the angled arrangement, they are significantly smaller than in a multi-tooth guidance. This means that the surface pressure is significantly higher for the same load.	The multi-tooth guidance distributes the load over several teeth and has a low surface pressure at the same load due to the large guide surface.





49% 57% 100%

2.4 guidance concept | shape

	T-slot guidance	1-tooth guidance	Multi-tooth guidance
Space required for the guidance	The guidance requires approx. 25% of the total width of the housing. The smaller the space requirement the better, since the remaining width determines the stability of the housing and the width of the wedge-hook. 	The guidance requires approx. 25% of the total width of the housing. The smaller the space requirement the better, since the remaining width determines the stability of the housing and the width of the wedge-hook. 	The multi-tooth guidance requires only 16% of the total width of the housing due to the overlapping teeth. The space gained (9% compared to the other guide forms) is used for a wider wedge-hook and a more stable housing. 

2.4 guidance concept | shape

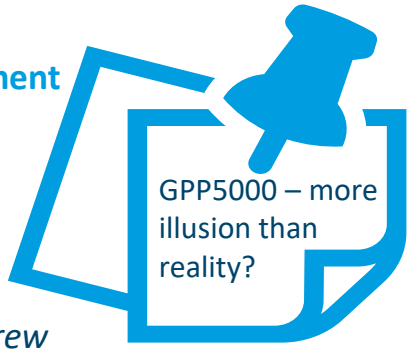
SCHUNK relies on Multi-tooth guidance, instead of 1-thooth guidance!

- due to the multi-tooth guidance, a **max. possible guide surface is achieved**
  (3 teeth = 3 contact surfaces = low surface pressure)
  → ALL other guidances are using 1 contact surface and therefore have higher pressures in the material
- the load is distributed on several shoulders
  → **ideal force flow**
- due to the multi-tooth guideance, a **wider wedge hook** is possible
  → There are the highest pressures in the force flow!
- due to the multi-tooth guidance, an **improvement of the critical cross-sections** of all components is possible (e.g. in the housing), as the force flow is ideally introduced

2.5 max. forces and torques

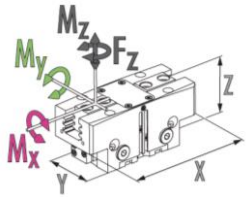
„10% more static forces and torques than the benchmark!“

- Comparing the catalog values of the GPP5000 **Steel-Lienar-Guide** with those of the **PGN-plus-P**, Zimmer has partly higher numerical values
- the individual values must be considered in detail depending on the size, a **general statement +10%** is **not correct** in any case!
- the **naming** of the moments is **not comparable**



Zimmer's values are in some cases too high in the opinion of our development department (screw load between top jaw and base jaw). Until a short time ago, we were unable to explain the high values and therefore sometimes knowingly stayed below the values specified by Zimmer.

2.5 max. forces and torques



SCHUNK	ZIMMER group
Mx	My
My	Mx
Mz	Mr
Fz	Fa

Produktname	Mx	My	Mz	Fz
PGN-plus-P 40-1	10	15	5	650
PGN-plus-P 50-1	27	25	15	670
PGN-plus-P 64-1	47	60	53	1300
PGN-plus-P 80-1	67	95	55	2500
PGN-plus-P 100-1	87	115	80	2700
PGN-plus-P 125-1	167	145	137	5000
PGN-plus-P 160-1	190	180	200	10000
PGN-plus-P 200-1	215	200	250	12000
PGN-plus-P 240-1	280	250	260	14000
PGN-plus-P 300-1	400	400	250	8000
PGN-plus-P 380-1	560	560	370	10000

Already converted!

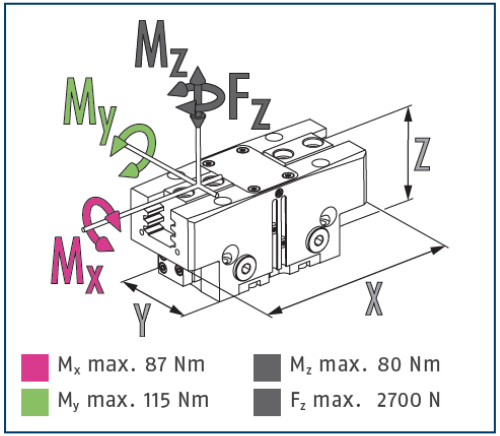
Produktname	Mx	My	Mz	Fz
GPP5003N-00-A	13	14	7	550
GPP5004N-00-A	23	29	14	750
GPP5006N-00-A	46	70	43	1250
GPP5008N-00-A	65	105	60	1900
GPP5010N-00-A	95	125	75	2700
GPP5013N-00-A	130	150	110	3300
GPP5016N-00-A	185	195	145	5200
GPP5025N-00-A	225	205	180	7500
GPP5030N-00-A	310	290	210	9500
GPP5035N-00-A	450	430	260	10400
GPP5045N-00-A	600	580	390	11500

Mx	My	Mz	Fz
-3	1	-2	100
4	-4	1	-80
1	-10	10	50
2	-10	-5	600
-8	-10	5	0
37	-5	27	1700
5	-15	55	4800
-10	-5	70	4500
-30	-40	50	4500
-50	-30	-10	-2400
-40	-20	-20	-1500

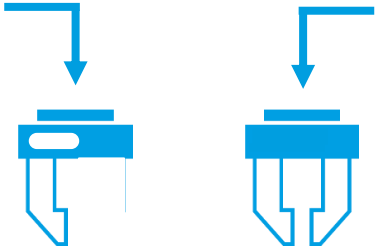
2.5 max. forces and torques

SCHUNK

Dimensions and maximum loads



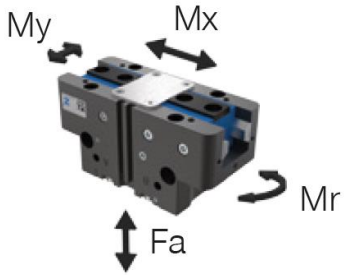
ⓘ The indicated moments and forces are statical values, apply for each base jaw and should not appear simultaneously. Loads may additionally occur to the moment produced by the gripping force itself.



ZIMMER group

▶ **Forces and moments**

Displays static forces and moments that can also have an effect, besides the gripping force.



SCHUNK

2.5 max. forces and torques

Clever, but not clever enough.

Values at **Zimmer** refer to the **entire gripper** and not to a base jaw.

	PGN-plus-P 80-1	GPP5008N-00-A	PGN-plus-P 80-1	GPP5008N-00-A
M_x / M_y	67 Nm	65 Nm	**67 Nm**	32,5 Nm
M_y / M_x	95 Nm	105 Nm	**95 Nm**	52,5 Nm
M_z / M_r	55 Nm	60 Nm	**55 Nm**	30 Nm
F_z / F_a	2500 N	1900 N	**2500 N**	950 N

: 2

2.6 finger legth

„Gripper fingers up to 10% longer than the benchmark!“

✔ The **PGN-plus-P** has the **same** max. finger length **than** the **GPP5000** in the steel/steel version

SCHUNK

Description		PGN-plus-P 80-1
ID		0318520
Stroke per jaw	[mm]	8
Closing/opening force	[N]	550/610
Min. spring force	[N]	
Weight	[kg]	0.51
Recommended workpiece weight	[kg]	2.75
Fluid consumption double stroke	[cm³]	29
Min./nom./max. operating pressure	[bar]	2.5/6/8
Min./max. air purge pressure	[bar]	0.5/1
Closing/opening time	[s]	0.035/0.035
Closing/opening time with spring	[s]	
Max. permissible finger length	[mm]	125
Max. permissible mass per finger	[kg]	0.7
IP protection class		40
Min./max. ambient temperature	[°C]	5/90
Repeat accuracy	[mm]	0.01
Dimensions X x Y x Z	[mm]	96 x 42 x 49

ZIMMER group

Order no.	▶ Technical GPP5008N-00-A
Stroke per jaw [mm]	8
Gripping force in closing [N]	520
Gripping force in opening [N]	560
Gripping force secured by spring min. [N]	
Closing time [s]	0.035
Opening time [s]	0.035
Dead weight of mounted gripper finger max. [kg]	0.7
Length of the gripper fingers max. [mm]	125
Repetition accuracy +/- [mm]	0.01
Operating pressure min. [bar]	3
Operating pressure max. [bar]	8
Nominal operating pressure [bar]	6
Operating temperature [°C]	-10 ... +90
Air volume per cycle [cm³]	22
Protection to IEC 60529	IP64
Protected against corrosion	Yes
Weight [kg]	0.53

SCHUNK®

2.7 finger weight

„Gripper fingers weight up to 15% higher than the benchmark!“

✔ The **PGN-plus-P** has the **same** max. finger weight **than** the **GPP5000** in the steel/steel version

SCHUNK

Description		PGN-plus-P 80-1
ID		0318520
Stroke per jaw	[mm]	8
Closing/opening force	[N]	550/610
Min. spring force	[N]	
Weight	[kg]	0.51
Recommended workpiece weight	[kg]	2.75
Fluid consumption double stroke	[cm³]	29
Min./nom./max. operating pressure	[bar]	2.5/6/8
Min./max. air purge pressure	[bar]	0.5/1
Closing/opening time	[s]	0.035/0.035
Closing/opening time with spring	[s]	
Max. permissible finger length	[mm]	125
Max. permissible mass per finger	[kg]	0.7
IP protection class		40
Min./max. ambient temperature	[°C]	5/90
Repeat accuracy	[mm]	0.01
Dimensions X x Y x Z	[mm]	96 x 42 x 49

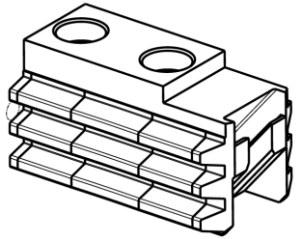
ZIMMER group

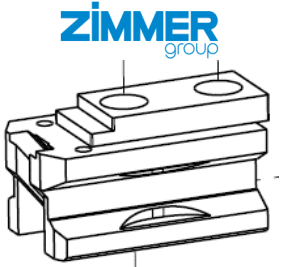
Order no.	▶ Technical GPP5008N-00-A
Stroke per jaw [mm]	8
Gripping force in closing [N]	520
Gripping force in opening [N]	560
Gripping force secured by spring min. [N]	
Closing time [s]	0.035
Opening time [s]	0.035
Dead weight of mounted gripper finger max. [kg]	0.7
Length of the gripper fingers max. [mm]	125
Repetition accuracy +/- [mm]	0.01
Operating pressure min. [bar]	3
Operating pressure max. [bar]	8
Nominal operating pressure [bar]	6
Operating temperature [°C]	-10 ... +90
Air volume per cycle [cm³]	22
Protection to IEC 60529	IP64
Protected against corrosion	Yes
Weight [kg]	0.53

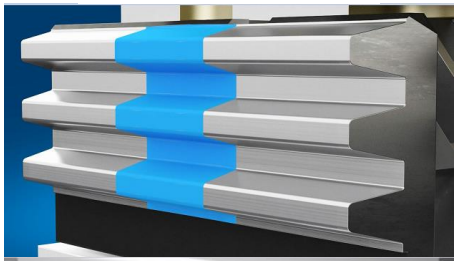
2.8 lubricant pocket

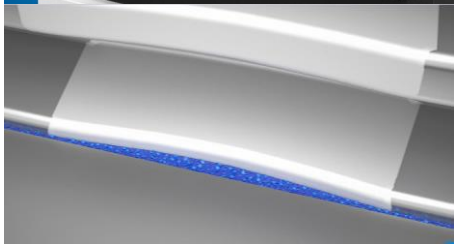
“Those who grease, well will grip well – The challenge is in the detail”

A **permanently lubricated** condition is important for a functioning sliding guidance and therefore a factor that guarantees the **long service life** of the gripper.









2.8 lubricant pocket

- SCHUNK uses a cleverly devised process for initial lubrication before leaving the factory. This process is combined with the **patented lubrication pocket in the multi-tooth guidance** and enables the maximum service life to be achieved
- the properties of the **ceramic protective** layer of the **gripper housing** support this effect, as the pore structure created in the process **embeds the lubricants** and prevents the lubricant from being washed out more effectively. (This is not possible with steel, for example, as the surface is smooth and does not permit embedding)
- **good emergency running properties** due to grease embedded in the pores (solid lubricant in the grease)
- compared to conventional milled lubrication pockets (and therefore relatively deep pockets), a significant advantage of the SCHUNK **lubrication pocket in the contour of the multi-tooth guidance** is, that the **grease** is **closer to the friction partner** and lubricates the entire guide surface and does not remain ineffectively hidden in the depth of the lubrication pocket or only selectively lubricates a small area of the guide surface
- the **milled** deep **lubricant pocket** on the **GPP5000** further **reduces** the load on the **guidance surface**

2.9 maintenance free

„higher number of cycles: Schunk 10 million / Zimmer 30 million cycles“

✔ The **PGN-plus-P** is **maintenance free** the GPP5000
has max. 30 million maintenance-free cycles in the steel/steel version.

ZIMMER group

9. Maintenance

Maintenance-free operation of the different gripper variants is ensured within the following parameters.

Cycles Variant	AL	00	20	21	24
15 million maintenance-free cycles (max.)	X				
30 million maintenance-free cycles (max.)		X	X	X	X

The maintenance interval may shorten under the following circumstances:

- Operation with compressed air that does not comply with DIN ISO 8573-1 [4:4:4]
- Dirty environment
- Improper use and use that does not comply with the power specifications
- Ambient temperature above 60 °C

Even though the gripper is, as mentioned, maintenance-free, carry out a visual inspection on a regular basis to check for any damage or soiling.

We recommend allowing maintenance and seal replacement to be carried out by Zimmer Customer Service.

Dismantling and reassembling the gripper without authorization may result in complications, as special installation equipment is required in some cases. Zimmer GmbH accepts no liability for any resulting malfunctions or damage.

SCHUNK

7.2 Maintenance intervals

If products are used at room temperature and the ambient and operating conditions are adhered to, these variants are maintenance-free, Technical data [▸ 16].

Products for special ambient conditions are excluded, e.g. higher temperatures, dirty environment.

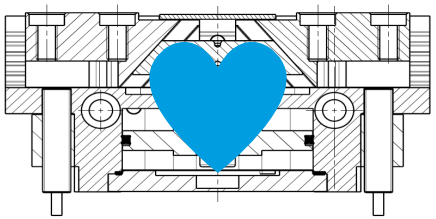
If products are not used at room temperature or in special ambient conditions, the following maintenance intervals apply

Interval (million cycles)	Maintenance work
10	Clean the product dry without a degreasing agent, check for damage and wear.
10	If necessary: Replace seals, Replace seals [▸ 50].
10	Treat all grease areas with lubricant, Lubricants/Lubrication points (basic lubrication) [▸ 49], Lubricate product [▸ 49]

For extreme ambient and application conditions, shortened maintenance cycles can ensure the lifespan is maintained.

SCHUNK

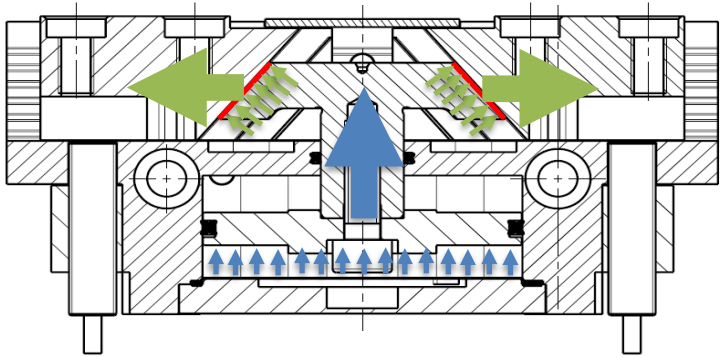
2.10 wedge hook



„ The wedge hook - The heart of the gripper“

"What is the advantage of high drive power if it cannot be transported to the workpiece?"

✓ Compared to other kinematics, wedge-hook kinematics are better for power transmission because larger surfaces are in contact.



- piston movement is converted into jaw movement
- driving force becomes gripping force
- synchronization of the base jaws

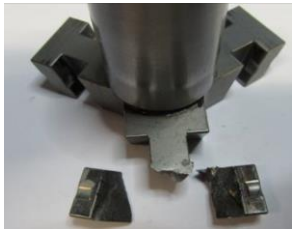
2.10 wedge hook

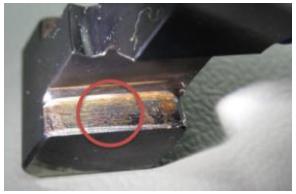
Why is a wide wedge hook important?

- the entire **gripping force** is **transferred** to the base jaws **via** the **wedge-hook** kinematics, this is where the highest loads occur and the material is subjected to the greatest stress

- the wedge hook is usually the first part on the gripper that worn in under overload or continuous load, it is therefore **important** to provide a **large surface area** for the transmission of the forces in order **to keep** the **surface pressure** and the material stress **low**.

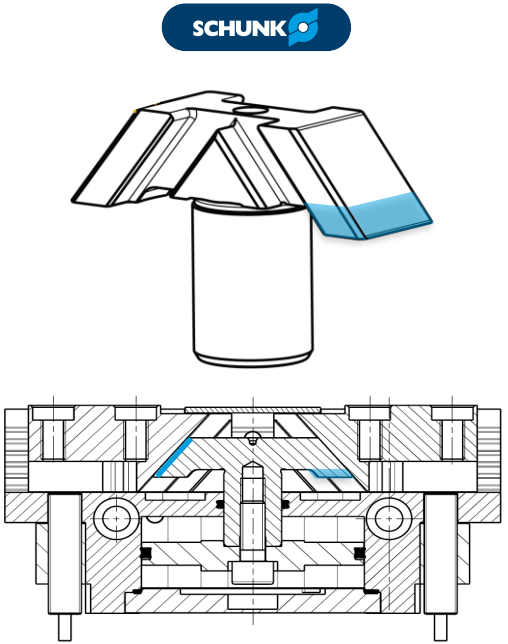
- due to the **new multi-tooth guidance**, the **wedge hook** can be made even **wider** than with other types of guidance
  → clear advantage compared to the competition without multi-tooth guidance





2.10 wedge hook

- the maximum surface area results in **minimized wear**, **increased service life** and **increased process reliability**
- additional **extension of the wedge hook surfaces** to achieve the highest possible overlap in all stroke positions
- SCHUNK uses a **highly hardened and tempered basic material for the wedge hooks** and base jaws (this sets us apart from many competitors who use less expensive materials...)

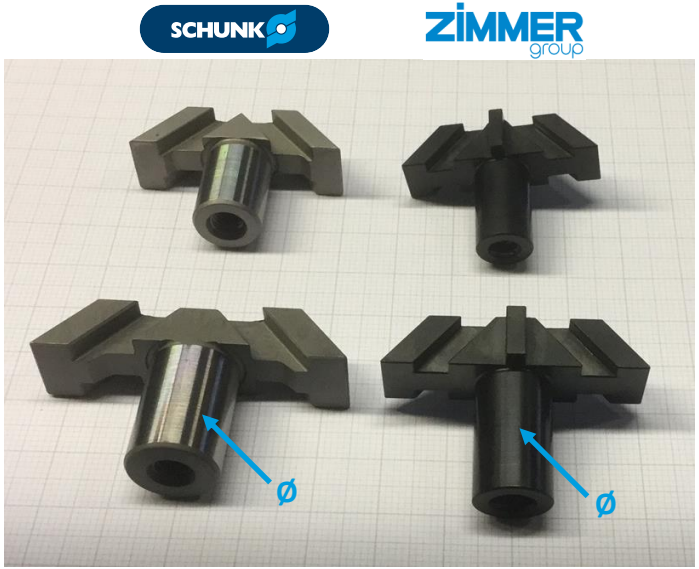


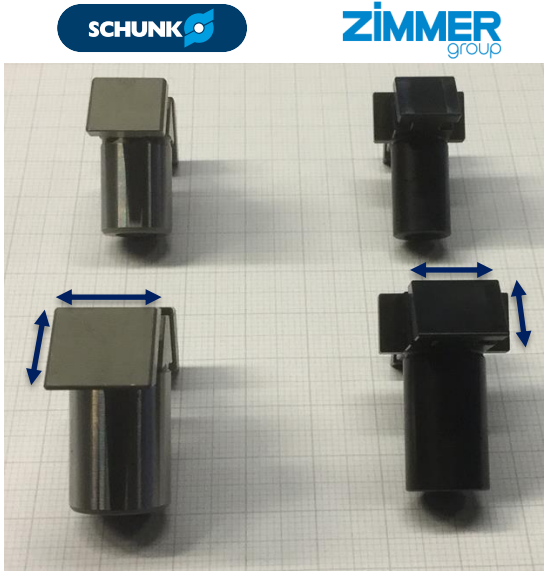
2.10 wedge hook

Comparison of SCHUNK PGN-plus-P and ZIMMER GPP5000 wedge hooks

size 80

size 100





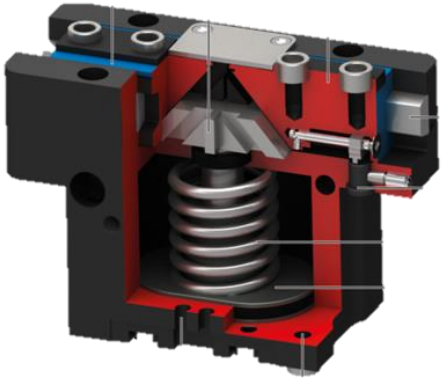
2.10 wedge hook

- SCHUNK has the **largest possible wedge hook geometry** compared to our competitors
  - minimization of wear
  - increases the service life
  - increases process reliability

- The **larger wedge hook surface** allows
  - a lower surface pressure
  - a lower material stress

2.11 gripping force

ZIMMER group



Zimmer uses **oval pistons** comparable to our PGN-plus.

SCHUNK

SCHUNK has once again **optimized** the **geometry** of the piston and **achieved** an **increased piston surface** area as a result.

✓ high gripping force

SCHUNK®

2.11 gripping force

Specification of the gripping force

- **Zimmer** specifies the gripping force at the upper edge of the housing (finger length 0 mm)
- **SCHUNK** specifies the gripping force at **Point P**

→ Zimmer increases his gripping force artificially with this trick

Attention, don't be fooled!

SCHUNK

Description		PGN-plus-P 80-1
ID		0318520
Stroke per jaw	[mm]	8
Closing/opening force	[N]	550/610
Min. spring force	[N]	
Weight	[kg]	0.51
Recommended workpiece weight	[kg]	2.75
Fluid consumption double stroke	[cm³]	29
Min./nom./max. operating pressure	[bar]	2.5/6/8
Min./max. air purge pressure	[bar]	0.5/1
Closing/opening time	[s]	0.035/0.035
Closing/opening time with spring	[s]	
Max. permissible finger length	[mm]	125
Max. permissible mass per finger	[kg]	0.7
IP protection class		40
Min./max. ambient temperature	[°C]	5/90
Repeat accuracy	[mm]	0.01
Dimensions X x Y x Z	[mm]	96 x 42 x 49

ZIMMER group

Order no.	▶ Technical GPP5008N-00-A
Stroke per jaw [mm]	8
Gripping force in closing [N]	520
Gripping force in opening [N]	560
Gripping force secured by spring min. [N]	
Closing time [s]	0.035
Opening time [s]	0.035
Dead weight of mounted gripper finger max. [kg]	0.7
Length of the gripper fingers max. [mm]	125
Repetition accuracy +/- [mm]	0.01
Operating pressure min. [bar]	3
Operating pressure max. [bar]	8
Nominal operating pressure [bar]	6
Operating temperature [°C]	-10 ... +90
Air volume per cycle [cm³]	22
Protection to IEC 60529	IP64
Protected against corrosion	Yes
Weight [kg]	0.53

SCHUNK

2.11 gripping force

Specification of the gripping force

→ on the homepage we also give the theoretical values for finger length 0 mm

Technical data PGN-plus-P 80-1

ID	0318520
Stroke per jaw [mm]	8
Closing force [N]	550
Opening force [N]	610
Closing force (with finger lengths of 0 mm) [N]	590
Opening force (with finger lengths of 0 mm) [N]	670
Weight [kg]	0.51
Recommended workpiece weight [kg]	2.75
Fluid consumption double stroke [cm³]	29
Min. operating pressure [bar]	2.5
Max. operating pressure [bar]	8

General notes about the series

Gripping force
is the arithmetic sum of the individual force applied to each jaw at distance P (see illustration).
Finger length
is measured from the reference surface as the distance P in direction to the main axis.
The maximum permissible finger length applies until the nominal operating pressure is achieved. With higher pressures, the finger length must be reduced proportionally to the nominal operating pressure.
Repeat accuracy
is defined as a distribution of the end Position for 100 consecutive strokes.
Workpiece weight
is calculated for force-fit gripping with a coefficient of static friction of 0.1 and a safety factor of 2 against workpiece slippage at acceleration due to gravity g. For form-fit or capture gripping, there are significantly higher permissible workpiece weights.
Closing and opening times
are purely the times that the base jaws or fingers are in motion. Valve switching times, hose fill times, or PLC reaction times are not included, and are to be considered when cycle times are calculated.
Operating principle
Wedge gear with surface power transmission

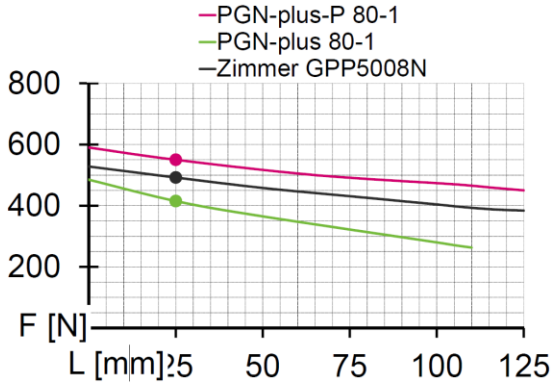
Link to Homepage

2.11 gripping force

„up to 30% more gripping force than the benchmark“

Compared to the **PGN-plus-P**, this is **not true**.

PGN-plus-P has a **higher gripping force!**

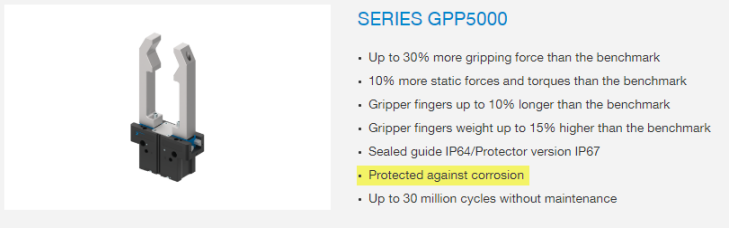


Documentation for internal use only (12)

Availability of variants & options
Greifer in schwieriger Umgebung 2014
Gripping force diagram SCHUNK and Zimmer (PGN-plus/PGN-plus-P/GPP5000)
PGN-plus realisierte Anwendungen
PGN-plus sales proposition against Zimmer serie 5000
PGN-plus-P Benefit arguments
Portfolio overview gripping Zimmer - SCHUNK
Product overview SCHUNK - ZIMMER 5000
SCHUNK vs. ZIMMER - Erkenntnisse 2018
Sales Info Zimmer GPP - SCHUNK PGN+P
Sensoren von Drittherstellern - Freigabe an SCHUNK-Produkten
Tolerance comparison of basic version and precision version

2.12 corrosion protection

ZIMMER group



SERIES GPP5000

- Up to 30% more gripping force than the benchmark
- 10% more static forces and torques than the benchmark
- Gripper fingers up to 10% longer than the benchmark
- Gripper fingers weight up to 15% higher than the benchmark
- Sealed guide IP64/Protector version IP67
- Protected against corrosion
- Up to 30 million cycles without maintenance

ZIMMER offers the grippers with DLC coating of the base jaws and wedge hooks **in the standard version**.

SCHUNK

Options and special information

Gripping force maintenance version AS/IS: The mechanical gripping force maintenance version ensures minimum gripping force even in the event of a pressure drop. In the AS/S version this acts as a closing force, in the IS version as an opening force.
High-temperature version V/HT: for use in hot environments
Precision version P: for the highest accuracy
Anti-corrosion version K: for use in corrosion-inducing atmospheres
ATEX version EX: for explosive environments
Dustproof version SD: absolutely dustproof, increased degree of protection against ingress of materials.
Additional versions: Various options can be combined with each other.
Integrated air purge connection: impedes the ingress of dirt into the inside of the gripper

SCHUNK offers the corrosion protection version **as a standard additional option**.

→ The corrosion protection advertised as standard is **not a unique selling point** and advantage compared to our grippers.

SCHUNK®

2.12 corrosion protection

ZIMMER group

GPP5000 St / AL

Is **not protected** against corrosion by a DLC coating as standard.

GPP5000 St / St

Is the **DLC coating required** as standard for the steel/steel version in order to achieve better sliding properties**?**

(DLC coating not only increases corrosion protection but also provides good emergency running properties in the case of insufficient lubrication.)

SCHUNK

PGN-plus-P

The **PGN-plus-P** is also equipped **with corrosion protection in the basic version**!

(short-time gas-nitrided, oxidized/burnished)

This is **eough for 99%** of the applications.

If our basic corrosion protection is not enough, the **corrosion protection version** can be used. At this version we also have **DLC coated** steel parts.

SCHUNK

2.13 IP protection class

Original definition / origin:

The term "IP protection class" is defined by the IEC/EN 60529 and DIN40050 standards and describes the degree of protection provided by a housing **for electrical equipment**

- ✓ Contact protection
- ✓ Protection against foreign particles
- ✓ Protection against water

The transformation of the norm is common practice.

Transferred definition:

- ✓ IP protection class describes the **suitability of a system for various environmental conditions** based on various German and international standards
- ✓ IP protection class provides information on the **degree of protection against the ingress of foreign particles and liquids to a damaging level**

2.13 IP protection class

IP code according to IEC/EN 60529:

- The description of the protection class always consists of the letters **IP** (**I**nternational **P**rotection) with two attached code numbers.
- The first code number defines the **protection against foreign particles**
- the second code number defines the **protection against water**

→ e.g. IP40, IP64, …

IP 6 4

	Degree of protection against ingress of foreign particles	***Degree of protection in humid and wet environment***
no protection (diameter > 50mm)	**0**	**0** no protection
protected against solid particles> 50mm e.g. hands	**1**	**1** protected against dropping water
protected against solid particles> 12 mm e.g. fingers	**2**	**2** protected against dropping water when the housing is tilted up to 15°.
protected against solid particles> 2,5 mm e.g. tools	**3**	**3** protected against water spray
protected against solid particles> 1 mm e.g. wires, screws	**4**	**4** protected against splash water
Complete protection against contact and dust protected	**5**	**5** protected against jet water
complete protection against contact and dustproof	**6**	**6** protected against strong jets of water
		7 protected against temporary immersion
		8 protected against permanent immersion
		9K protected against water during high pressure / steam jet cleaning

2.13 IP protection class

Who defines the IP protection class?

- **in the past:** the manufacturers themselves
- **today:** external laboratories offer tests under standardized conditions with exactly standardized test equipment and setups
- **BUT:** The manufacturers still interpret the result by themselves, if desired in coordination with a laboratory

In contrast to a cleanroom certificate, which is issued by an external testing company, the classification of a system to a specific IP protection class is done by the manufacturer himself.

2.13 IP protection class

GPP5000 / IP protection class

- The version with **steel / aluminum** - guide is specified with **IP40**
  - *4 = protected against solid particles> 1 mm*
    - *0 = no protection*
- ZIMMER promises **IP64** protection for the **basic version** of the **steel / steel** - guide
  - *6 = dustproof*
    - *4 = protected against splash water*
- **IP67 (with air purge)** is specified for the **protector version**
  - *6 = dustproof*
    - *7 = protected against temporary immersion*

ZIMMER group

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2.13 IP protection class

PGN-plus-P / IP protection class

- The **PGN-plus-P** has an IP protection class of **IP40**
  4 = protected against solid particles> 1 mm
  0 = no protection

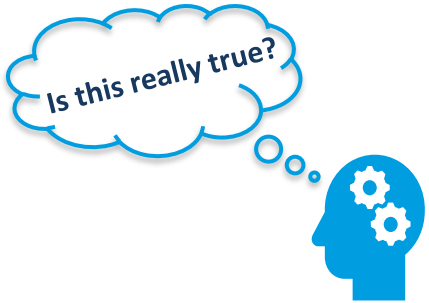
- The **PGN-plus-P -SD** has an IP protection class of **IP64**
  6 = dustproof
  4 = protected against splash water

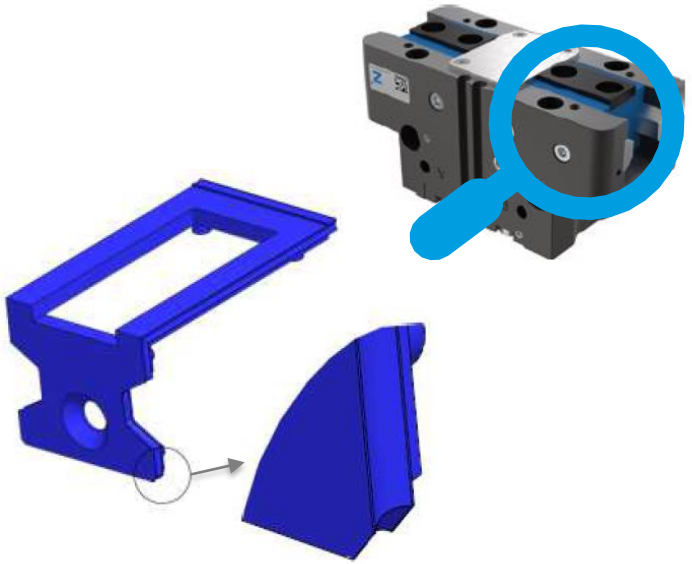
2.13 IP protection class

How does ZIMMER explain the IP64?

Sealed guidance by **TPU dual lip seal**

- Resistant against oils, greases and many solvents
- Prevents grease from being squeezed out

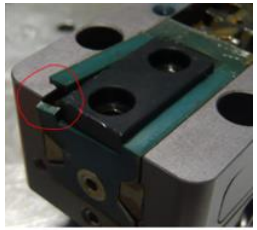


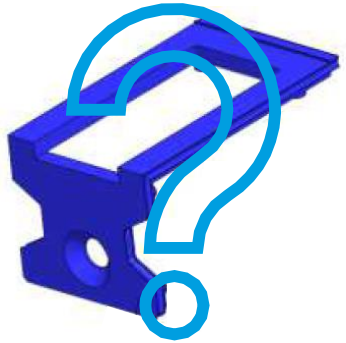


2.13 IP protection class

Tests at SCHUNK showed

– **Not temperature resistant**!
  - color changed due to temperature stress
  - can become brittle and then break
  - odor formation





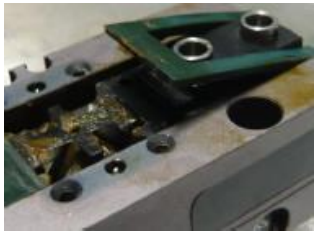
→ The TPU dual lip seal is also used in the high-temperature version (GPP5008N-**20**-A / GPP5008N-**24**-A). Isn't the permissible temperature of the TPU here below the max. operating temperature of the gripper (130°C)?

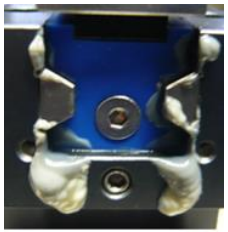
2.13 IP protection class

Tests at SCHUNK showed

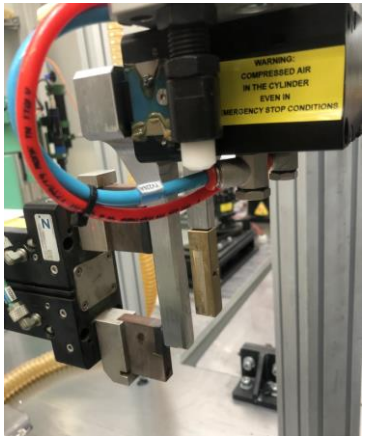
- must be **glued to the base jaw**, glue spot may fail
- TPU dual lip seal has to be seen as **a rubber wiper** and **not** as a **"seal"**, because:
  - Grease still leaks from the gripper
  - 100% loss of lubricant is therefore **not ensured**
- **not wear-resistant**, e.g. in case of sharp-edged chips, as is the case in metal cutting
- must be considered **critically**
  - actual medium resistance?
  - abrasion (resulting particles)?
  - pretension sufficient (grease leaks out)?

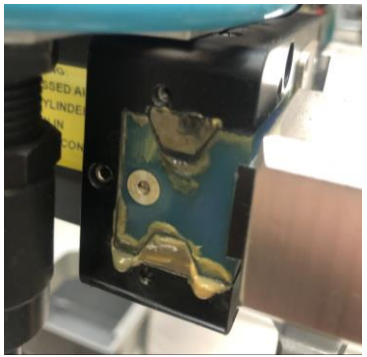
Test at SCHUNK





Field application



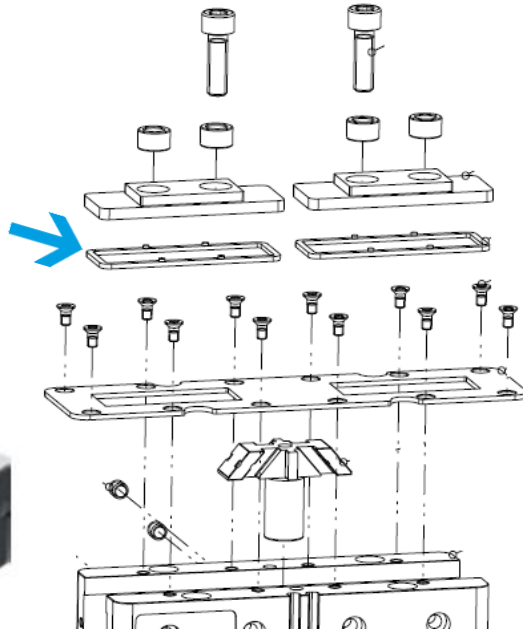


2.13 IP protection class

How does ZIMMER explain the IP67?

GPP5000 protector version

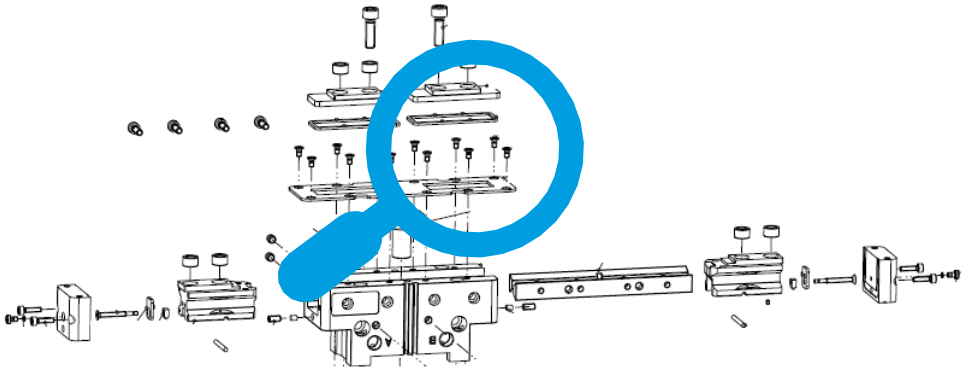
- With the metal covers around the guidance?
- With a seal between the metal intermediate jaws?



2.13 IP protection class

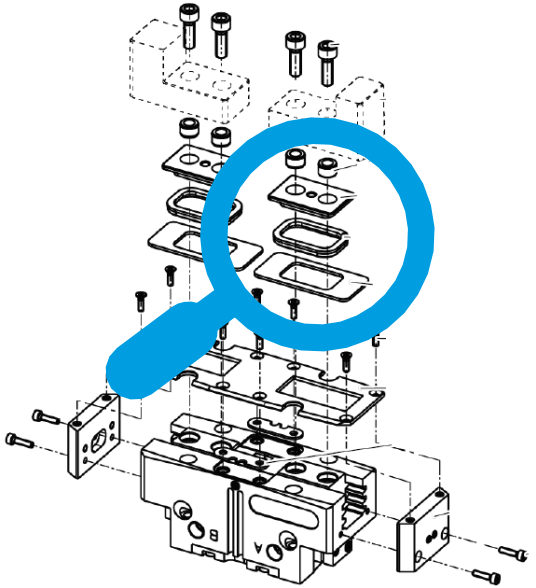
ZIMMER group

Protector version



SCHUNK

SD-version

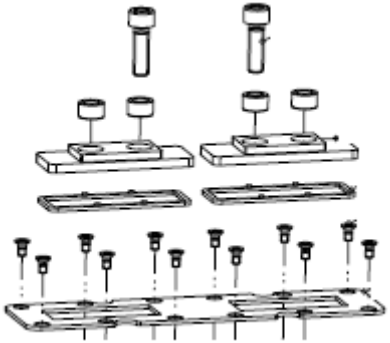


Zimmer and SCHUNK have each integrated a seal.

2.13 IP protection class

Technically not the best solution!

ZIMMER group



Seal is between two moving parts (intermediate jaws and metal cover)

SCHUNK

static seal (no additional seal between the metal covers)

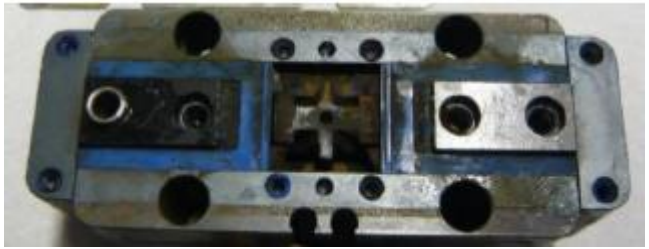
Proven technical solution!

SCHUNK

2.13 IP protection class

Tests at SCHUNK showed

Zimmer has a seal between metallic sliding surfaces. However, this seal is damaged after a short time because it slides on the cover plate when the jaws move.



→ **no reliable protection according to IP67**

2.13 IP protection class

SCHUNK's evaluation of the IP protection class?

- Does the **dual lip seal** by itself justify the higher IP protection rating of **IP64**?

  fact is:

  - a seal can be promoted well, because it is technically explainable
  - But does it really deliver what is promised?

- **Protector version IP67** is technically comparable to the SD-Version with IP64?

  fact is:

  - ZIMMER relies on its protector version
  - to achieve IP67, air purge is additionally required
  - With the DPG-plus, SCHUNK has a standard product that actually complies with IP67
    (2021: DPG-plus 80-1 = 685€; GPP5008N-21-A = 820€ / -20%)

2.13 IP protection class

Only round is sealed!

If the

PGN-plus-P

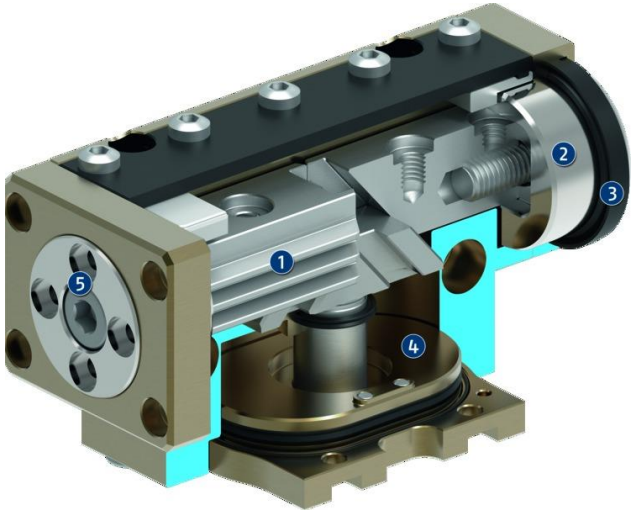
or the

PGN-plus-P-SD

reaches its limits, SCHUNK has designed the

DPG-plus series

(incl. the proven multi-tooth guidance).



2.13 IP protection class

Comparison GPP 5000 / PGN-plus-P

SCHUNK

PGN-plus-P  IP40

PGN-plus-P -HUE

IP65

PGN-plus-P -SD  IP64

DPG-plus  IP 67

ZIMMER group

IP64  GPP5000 St / St

with air purge IP67  GPP5000 St / St Protector version

SCHUNK

Superior Clamping and Gripping

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