



Comparison SCHUNK and Zimmer

Electric grippers

Superior Clamping and Gripping



Index:

- Informations regarding the presentation
- Function and integration of SCHUNK grippers
- Compare drive concepts
- Zimmer GEP2000
- Zimmer GEP5000/GED5000
- Zimmer GEH6000/GED6000
- Zimmer GEH8660
- Zimmer GEP1400
- Zimmer GEP9000
- Explanations IP-Protection class

Informations

- This presentations includes slides which are internal use only
- Writing in this colour describes the properties of the Zimmer products
- An explanation regarding the IP-Protection class can be found on the last page
- Date of the presentation - 02.08.2021

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SCHUNK Grippers – General informations

Grippers general:

- Gripping force independent of the workpiece
- No minimum travel distance for the base jaws
- Gripping force doesn't change due to asynchronous base jaw contact z.B.:
 - Picking from chucks
 - Picking out of a tray
 - Uncertainties with the positioning (Robot/Tray/Workpieceorientation)
- Gripping force is generated via motor torque

Grippers with digital I/O:

- Control via I/O
- Gripping force adjustable in 4 levels (manually)
- Easy to integrate
- Workpiece recognition via external sensors

Grippers with IO-Link:

- Jaws can be freely positioned
- Repeat accuracy unidirectional 0,01mm (positioning from end stops)
- Repeat accuracy unidirectional bidirectional 0,15mm (positioning from Pos 1, then positioning to Pos 2)
- Gripping force adjustable in 4 levels(see slide 4, comparison Zimmer) (via PLC, during the process, gripping force can be changed while gripping)
- IO-Link Master with Class B connector – one cable solution current demand below 2A
- Servicedata/processdata accessible, enables better planning of the maintenance
- Position feedback, Gripping force, motor current etc.

Intelligent grippers:

- Support different interfaces Profinet, Profibus, CAN, (in the future: EtherCat, EtherNet IP)
- Freely programmable (force, acceleration, speed and position)
- Real time-capability
- Availability of process data/service data to make the process more verifiable
 - Service depending on the cycle count
 - Cloud-applications possible, data storage to verify the process

SITOP PSU 8600
24 V Powersupply

SIEMENS

Controll/Peripherie

SIMATIC S7-1500



PROFINet

PROFINet

PROFINet

SIMATIC ET 200 AL



Digitale I/O



SIMATIC
ET 200 eco PN
IO-Link Master

IO-Link



Digital I/O



IO-LINK



Intelligent grippers

SCHUNK

Automation components

Basic functions adaptive and intelligent Grippers

	Digital I/O	IO-Link	Industrial Ethernet
Gripping and Releasing <i>for gripping and holding workpieces</i>	✓	✓	✓
Grip force adjustment <i>to adapt to sensitive workpieces</i>	✓ (manual)	✓	✓
Positioning <i>for pre-positioning of the gripper fingers</i>	-	✓	✓
Finely tune motion profile <i>e.g. speed, motor current etc.</i>	-	-	✓

Integrated Sensors and diagnostic functions

	Digital I/O	IO-Link	Industrial Ethernet
Individual positions <i>e.g. opened, closed, workpiece gripped</i>	✓ (external)	✓	✓
Position over the entire stroke <i>for workpiece detection and inspection</i>	-	✓	✓
Maintenance und diagnostic messages <i>e.g. voltage, temperature, cycle count, etc.</i>	-	✓	✓
Identification data <i>e.g. material number, SN, HW and FW versions</i>	-	✓	✓
Extended sensor data <i>e.g. speed, motor current etc.</i>	-	-	✓

Integration and Connectivity

	Digital I/O	IO-Link	Industrial Ethernet
PLC connection without additional modules <i>for easy integration into the machine</i>	- (I/O Modul)	- (IO-Link Master)	✓
Real-time capable <i>for time-critical applications</i>	✓	-	(✓)
Web server <i>for easy commissioning</i>	-	-	✓
Transmission rate and bandwidth <i>for smart factory and cloud applications</i>	-	+	++++

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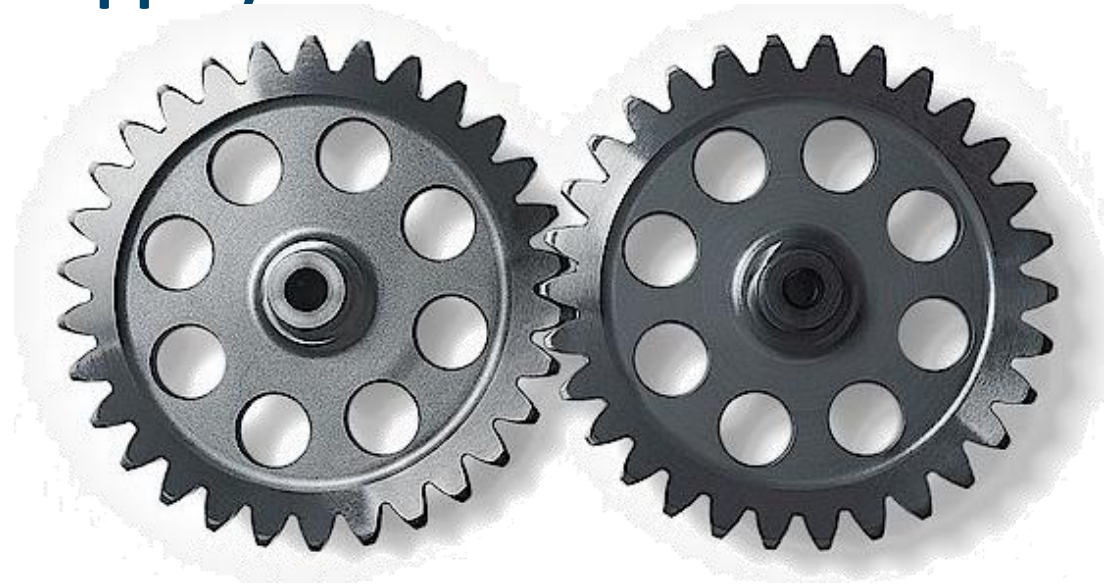
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Comparison worm gear / rack and pinion

Principle worm gear (Zimmer-Gripper)



Principle rack and pinion (SCHUNK Gripper)



Two common drive solutions for electrical gripping

Principle worm gear



Kinetic energy/impuls defines the gripping force

- + Self-locking
- + Inherent gripping force maintenance
- + Compact
- Low efficiency
- Gripping force is depending on the velocity
- Minimum travel distance necessary

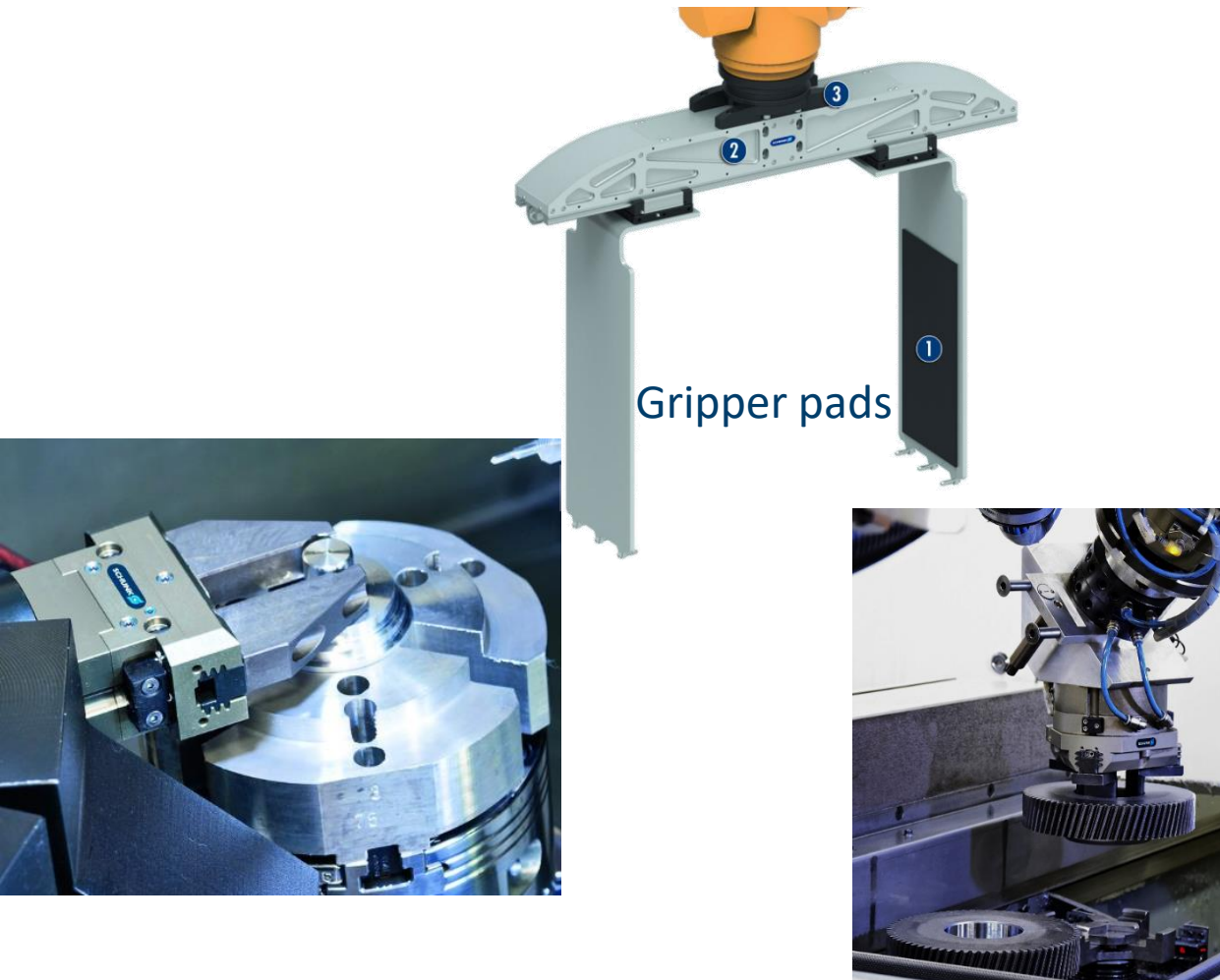
Principle rack and pinion



Torque defines gripping force

- + High efficiency
- + No minimum travel distance
- + Task independent gripping force
- No gripping force maintenance
- Bigger size
- Higher costs

Tasks with impulse reduction – disadvantage worm gear



- Flexible
 - Workpiece (elastic)
 - Fingers (aluminium, plastics, pads)
- Asynchronous finger contact
 - Picking from chucks
 - Lifting with one finger
 - Undefined workpiece orientation
- Velocity
 - Gently handling the workpiece
 - Teaching the process

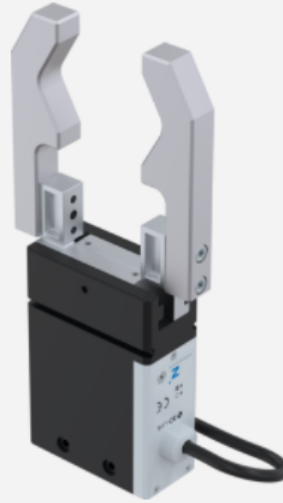
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Zimmer GEP 2000

Competitor product for the SCHUNK EGP

2-JAW PARALLEL GRIPPERS SERIES GEP2000



"THE ELECTRIC COMPACT ONE"

- ▶ **Largest stroke in small installation space**
Do you require a large stroke, due to the fact that you are operating either a form fit gripper or a large range of parts but the installation space and the load capacity of your application is limited? Then this gripper is perfect for you!
- ▶ **The simplest activation**
It is your choice whether you want to control the gripper by means of I/O ports—like a valve—or if you prefer the version with IO-Link. Both have this in common: they are easy to integrate into your control system.
- ▶ **Positionability via IO-Link**
Gives you the ability to position the gripper jaws of the IL-03 variant. This means the stroke can be adjusted to the workpiece very flexibly. As a result, you save time and avoid interference contours in the process.

SERIES FEATURES

 10 million maintenance-free cycles (max.)	 Integrated sensing	 IP40
 Self locking mechanism	 Magnetic field sensor	 Positionable
 Gripping force adjustable	 IO-Link	 Digital I/O

OVERVIEW

BENEFITS IN DETAIL

INSTALLATION SIZE: GEP2006

Order-No.	Control	Integrated position sensing	Stroke per jaw	
GEP2006IL-00-B	IO-Link	Using process data	6 [mm]	
GEP2006IL-03-B	IO-Link	Using process data	6 [mm]	
GEP2006IO-00-B	Digital I/O	No	6 [mm]	
GEP2006IO-05-B	Digital I/O	Analog 0 to 10 V	6 [mm]	
GEP2006IO-12-B-01	Digital I/O	Analog 0 to 10 V	6 [mm]	

Installation size	Stroke per jaw [mm]	Gripping force [N]	Weight [kg]	IP class
GEP2006	6	40 - 145	0.18	IP40
GEP2010	10	50 - 200	0.31	IP40
GEP2013	13	90 - 360	0.54	IP40
GEP2016	16	125 - 500	0.9	IP40

Zimmer GEP 2000 – new Version

Gripping force maintenance due to worm gear for version -00.
Version -03 has no gripping force maintenance – they „lie“ in the file. If the customer wants to be able to position the gripper he has no gripping force maintenance.



"The electric compact one"

- ▶ **Largest stroke in small installation space**
Do you require a large stroke, due to the fact that you are operating either a form fit gripper or a large range of parts but the installation space and the load capacity of your application is limited? Then this gripper is perfect for you!
- ▶ **Adjustable gripping force**
Using pressures that are too high can damage your workpieces! You can optimally adjust the gripping force to your workpiece by means of the integrated potentiometer or over the control system via IO-Link.
- ▶ **The simplest activation**
It is your choice whether you want to control the gripper by means of I/O ports—like a valve—or if you prefer the version with IO-Link. Both have this in common: they are easy to integrate into your control system.

PRODUCT REQUEST

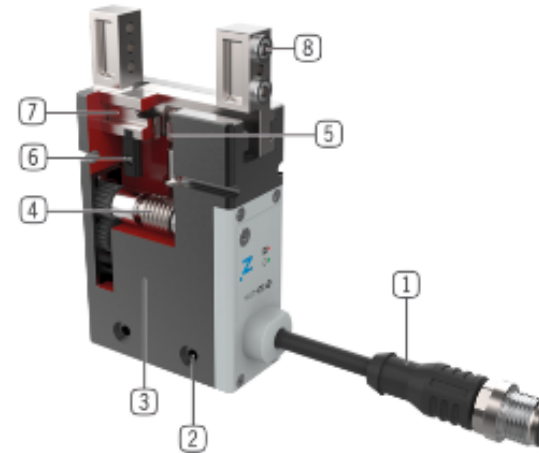
Order no.	Technical data			
	GEP2010IL-00-B	GEP2010IL-03-B	GEP2010IO-00-B	GEP2010IO-05-B
Control	IO-Link	IO-Link	Digital I/O	Digital I/O
Positionable		Yes		
Integrated position sensing	Using process data	Using process data	No	Analog 0 to 10 V
Stroke per jaw [mm]	10	10	10	10
Self locking mechanism	mechanical		mechanical	mechanical
Control time [s]	0.03	0.03	0.03	0.03
Dead weight of mounted gripper finger max. [kg]	0.1	0.1	0.1	0.1
Length of the gripper fingers max. [mm]	80	80	80	80
Repetition accuracy +/- [mm]	0.02	0.02	0.02	0.02
Operating temperature [°C]	5 ... +60	5 ... +60	5 ... +60	5 ... +60
Voltage [V]	24	24	24	24
Current consumption max. [A]	1	1	1	1
Minimum positioning path per jaw [mm]	0.5	0.5	0.5	0.5
Protection to IEC 60529	IP40	IP40	IP40	IP40
Weight [kg]	0.31	0.31	0.31	0.31

DOWNLOADS	TECHNICAL DATA	ACCESSORIES	BENEFITS IN DETAIL
Control	IO-Link		
Operating temperature min.	+5 [°C]		
Operating temperature max.	+80 [°C]		
Operating temperature	+5 ... +80 [°C]		
Weight	0.54 [kg]		
Stroke per jaw	13 [mm]		
Length of the gripper fingers max.	100 [mm]		
Minimum positioning path per jaw	0.5 [mm]		
Protection to IEC 60529	IP40		
Voltage	24 [V]		
Current consumption max.	2 [A]		
Repetition accuracy +/-	0.02 [mm]		
Permissible weight per jaw max	0.15 [kg]		
Gripping force	90 - 380 [N]		
Gripping force safety device	mechanical		
Integrated position sensing	Using process data		
Positionsabfrage	Integrierte Abfrage		

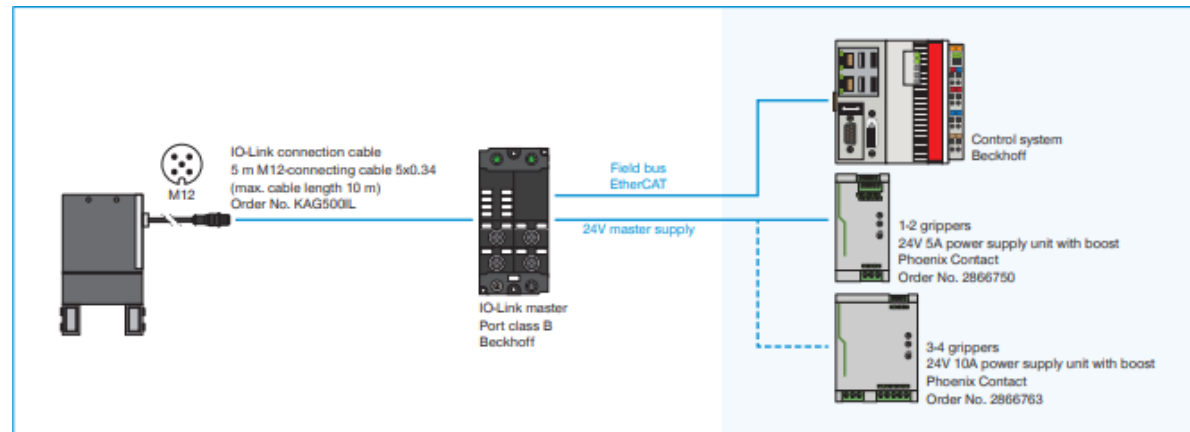
Zimmer GEP 2000 - Facts

- Fingers can not be positioned in the 00 version
- No gripping force maintenance in the 03 version
- Gripping force depending on velocity

Zimmer is able to offer a 1-cable solution just like SCHUNK

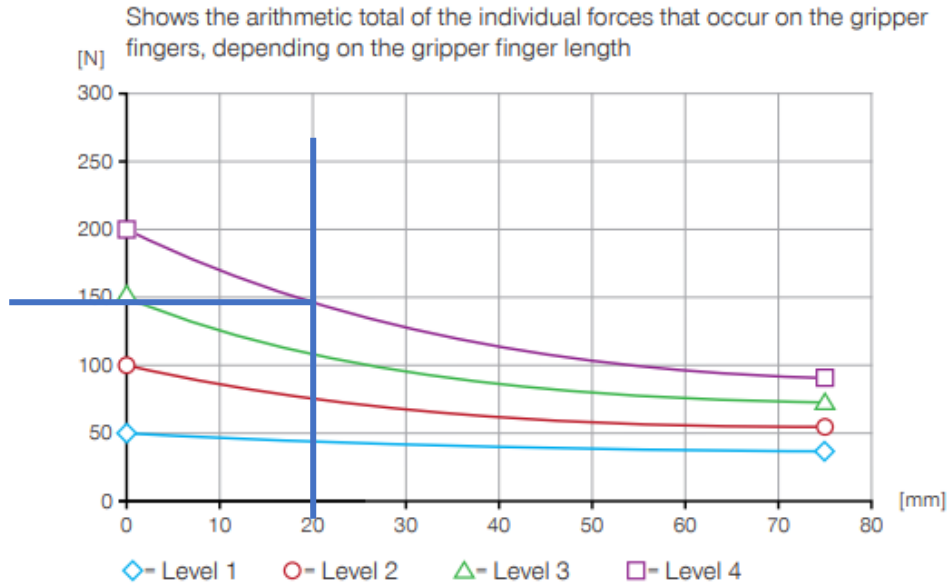


- Control**
Via I/O ports (IO) or via IO-Link (IL)
- Mounting and positioning**
mounting possible from several sides for versatile positioning
- BLDC motor**
wear-resistant brushless DC motor
- Helical worm gear**
self locking mechanism in case of power drop
- Synchronization**
via rack and pinion
- Position sensing**
Permanent magnet for direct query of jaw movement via magnetic field sensors
- Gripper jaw**
individual gripper finger mounting
- Removable centering sleeves**
quick and economical positioning of the gripper fingers



Zimmer GEP 2000 – Gripping force

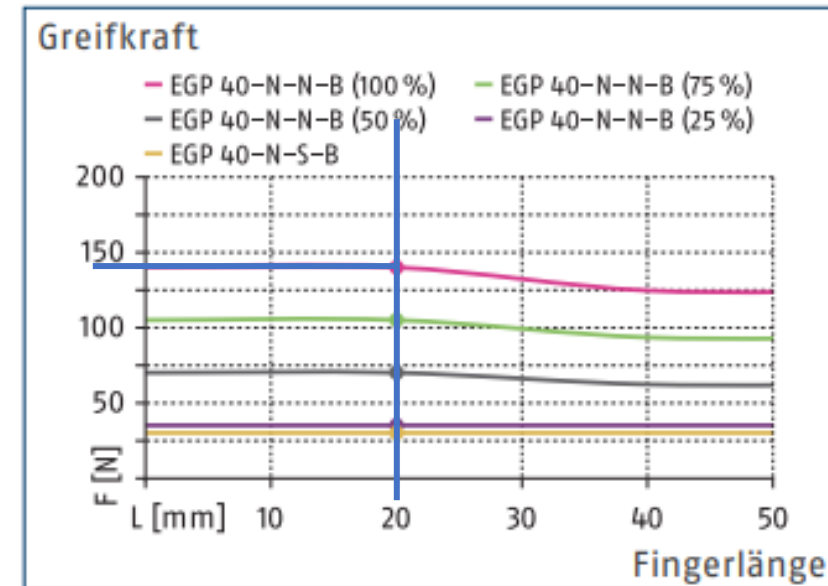
► Gripping force diagram



Zimmer GEP 2000

With a finger length of 20mm the gripping force is comparable to the EGP the longer the fingers get the worse the gripping force

Greifkraft



SCHUNK EGP 40

Gripping force is the same or higher with longer fingers.

Finger length 20 mm = 140 N gripping force

Zimmer GEP 2000 - Conclusion

Advantages Schunk EGP:

- SCHUNK IO-Link enables more functionalities, pre positioning (standard)
- Better gripping force for the EGP with „usable“ finger length
- No minimum travel distance, enables close pre positioning to the workpiece
- Continuous gripping force

Similarity:

- 1 cable solution with a class-B IO-Link master possible

Advantages Zimmer GEP:

- Gripping force maintenance due to worm gear in version -00
- Smaller drive – lighter weight
- Bigger stroke
- Higher maximum gripping force with short fingers
- IP 40

*Explanation IP – protection class see page 48

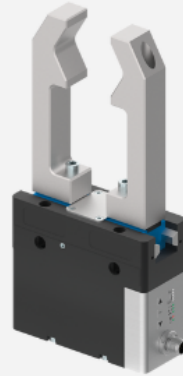
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Zimmer GEP 5000

Competitor product for the SCHUNK PGN+E

2-Jaw Parallel Grippers
Series GEP5000



"ALL in ONE"

- ▶ Approximately the same gripping force as a comparable pneumatic gripper
- ▶ Self locking mechanism in case of power drop
- ▶ Same connection hole patterns as a comparable pneumatic gripper
- ▶ Plug and play – single-cable solution, supports incredibly easy control using I/O signals or IO-Link
- ▶ Integrated ACM control module - option of configuring gripping force, travel time and switching points
- ▶ Protected from corrosion and sealed in accordance with IP64
- ▶ Brushless DC motor – up to 30 million cycles without maintenance

OVERVIEW

BENEFITS IN DETAIL

Installation Size: GEP5006

Order-No.	Stroke per jaw	Current consumption max.	Repetition accuracy +/-
GEP5006IL-00-A	6 [mm]	5 [A]	0.01 [mm]
GEP5006IO-00-A	6 [mm]	5 [A]	0.01 [mm]

Installation Size: GEP5008

Order-No.	Stroke per jaw	Current consumption max.	Repetition accuracy +/-
GEP5008IL-00-A	8 [mm]	5 [A]	0.01 [mm]
GEP5008IO-00-A	8 [mm]	5 [A]	0.01 [mm]

Installation Size: GEP5010

Order-No.	Stroke per jaw	Current consumption max.	Repetition accuracy +/-
GEP5010IL-00-A	10 [mm]	5 [A]	0.01 [mm]
GEP5010IO-00-A	10 [mm]	5 [A]	0.01 [mm]

Installation size	Stroke per jaw [mm]	Gripping force [N]	Weight [kg]	IP class
GEP5006	6	540 - 960	0.79	IP64 *
GEP5008	8	650 - 1150	1.16	IP64 *
GEP5010	10	980 - 1520	1.66	IP64 *

IP64 only with air purge

Zimmer GEP 5000

Competitor product for the SCHUNK PGN+E

Zimmer does not have any gripping force maintenance for neither the GEP 5000 or GED 5000. But they advertise the „self locking mechanism“. This results from the resistance of motor, spindle and spindle nut.

Zimmer doesn't state any force regarding the self locking mechanism

Since SCHUNK uses the same kinematic we also have this self locking mechanism but we dont advertise with it since it's hard to state actual numbers

GEP5006IL-00-A



"ALL in ONE"

- ▶ Approximately the same gripping force as a comparable pneumatic gripper
- ▶ Self locking mechanism in case of power drop
- ▶ Same connection hole patterns as a comparable pneumatic gripper
- ▶ Plug and play – single-cable solution, supports incredibly easy control using I/O signals or IO-Link
- ▶ Integrated ACM control module - option of configuring gripping force, travel time and switching points
- ▶ Protected from corrosion and sealed in accordance with IP64
- ▶ Brushless DC motor – up to 30 million cycles without maintenance

[PRODUCT REQUEST](#)[DOWNLOADS](#)[TECHNICAL DATA](#)[ACCESSORIES](#)[BENEFITS IN DETAIL](#)

Control	IO-Link
Drive	BLDC motor
Operating temperature	5 ... 50 [°C]
Operating temperature max.	50 [°C]
Operating temperature min.	5 [°C]
Weight	0.79 [kg]
Stroke per jaw	6 [mm]
Length of the gripper fingers max.	100 [mm]
Protection to IEC 60529	IP64
Self locking mechanism	mechanical
Voltage	24 [V]
Current consumption max.	5 [A]
Repetition accuracy +/-	0.01 [mm]
Permissible weight per jaw max	0.4 [kg]
Positionsabfrage	Integrierte Abfrage

Zimmer GEP 5000 - Facts

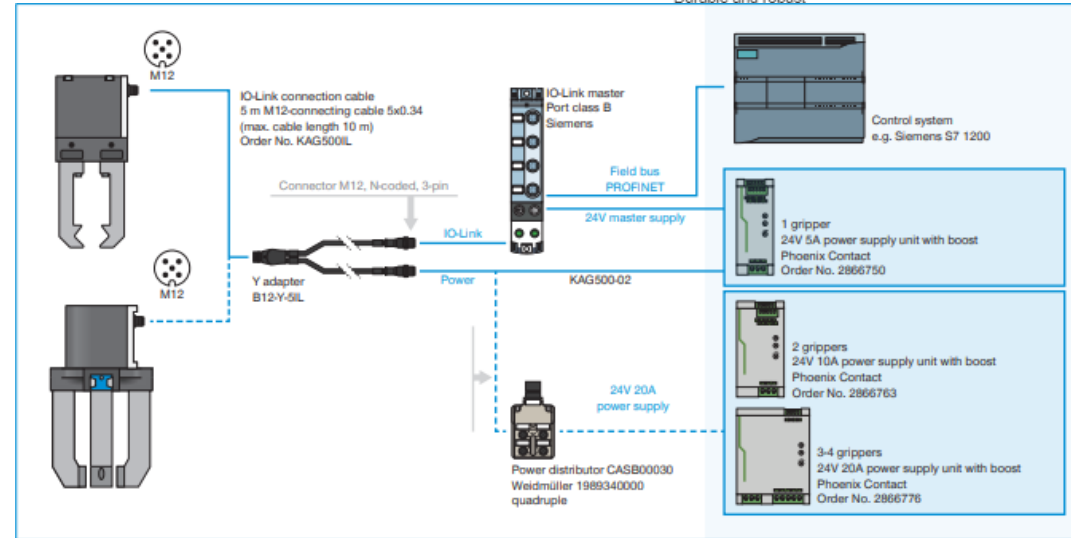
- Fingers can't be pre positioned
- Gripping force depends on the velocity
- Due to the high motor current of up to 5A Zimmer can't offer a 1 cable solution for IO-Link
- IP64 only with air purge



- Wedge hook mechanism**
Supports to absorb high forces and moments
Synchronized gripper jaw movement
- Gripper jaw**
Gripper fingers mounted using removable centering sleeves
Lubricated for life via incorporated lubrication slots
- Dual lip seal**
Enables IP64
Prevents grease from being squeezed out, increasing service life
- Steel Linear Guide**
Steel in steel guide
Enables use of extremely long gripper fingers
- Mounting and positioning**
Alternatively, on several sides for customized mounting
Pneumatic and electrical versions identical apart from height
- BLDC motor**
wear-resistant brushless DC motor
- Advanced control module**
Integrated control module with single-cable solution
Gripping force, travel time and query programmable via the control panel on the housing
- Drive train**
Combination of trapezoidal spindle and gear
Durable and robust

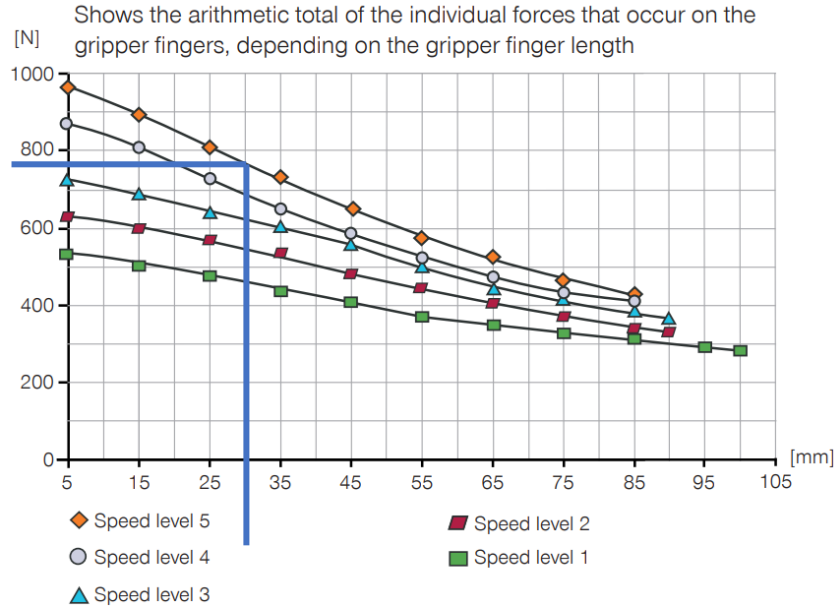
► SERIES CHARACTERISTICS

Installation size	Variants	
	IL-00	IO-00
GEP50XX		
IO-Link	•	
Digital I/O		•
30 million maintenance-free cycles (max.)	•	•
Integrated sensing	•	•
Gripping force adjustable	•	•
Self locking mechanism	•	•
Protected against corrosion	•	•
Purged air	•	•
IP 64	•	•



Zimmer GEP 5000 – Gripping force

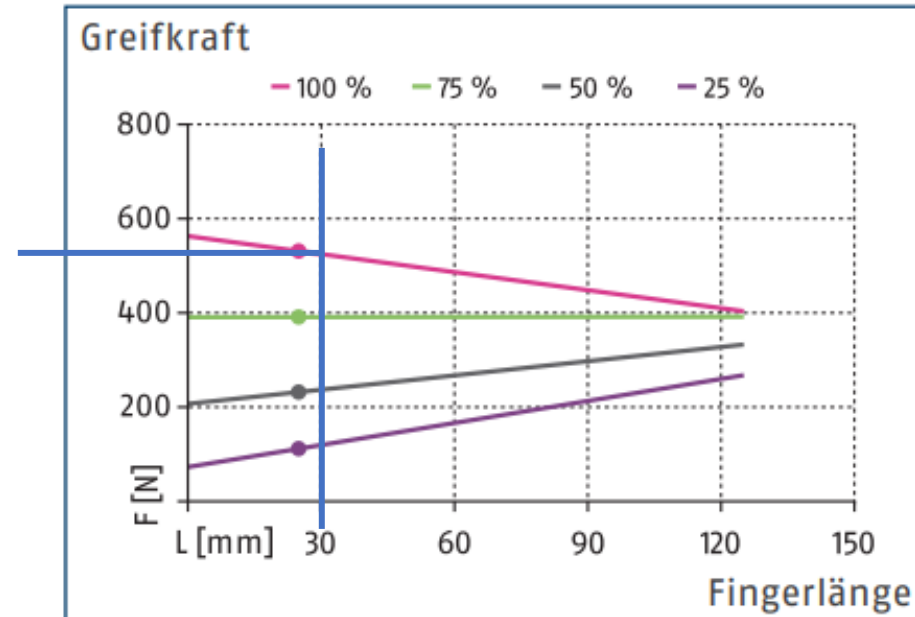
► Gripping force diagram



Zimmer GEP 5000

- With 30 mm long fingers the gripping force is about 770N. The longer the fingers the lower the gripping force.

Greifkraft

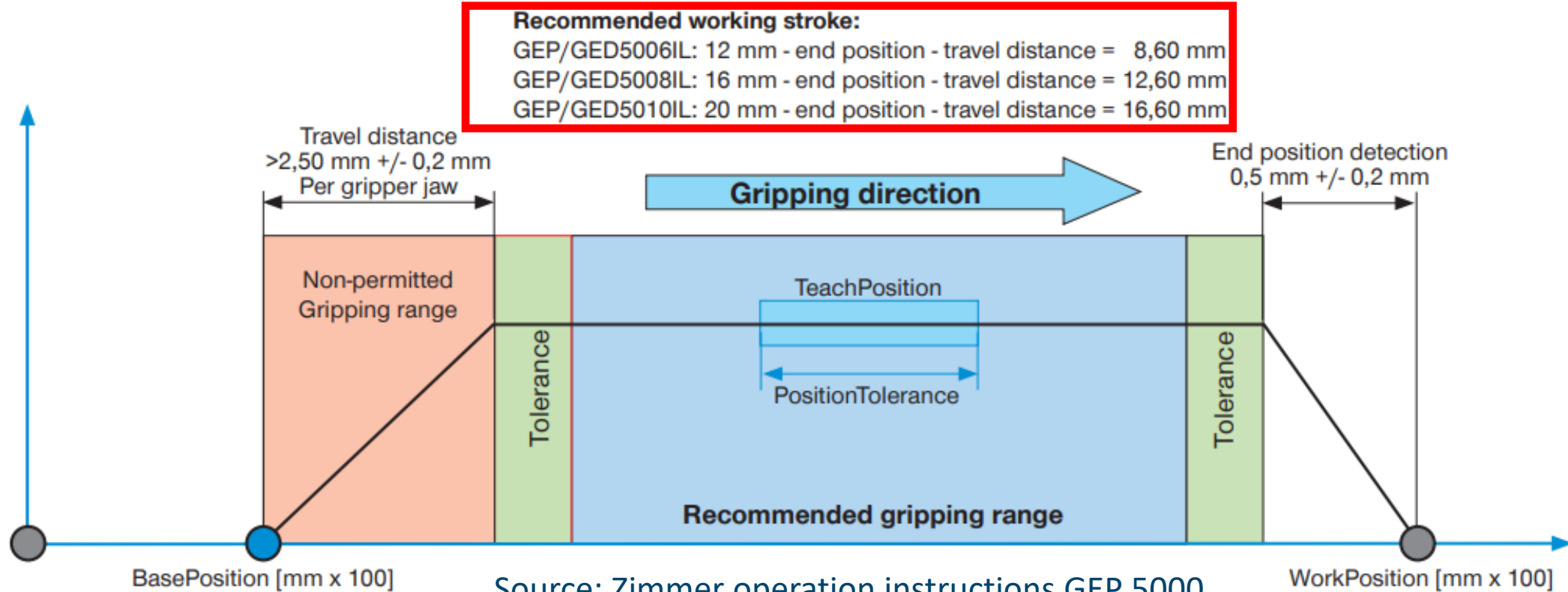


SCHUNK PGN-plus-E

- Gripping force is lower with short fingers but the longer the fingers the better the PGN+E compares to the Zimmer gripper

Explanation minimum travel distance

7.6.1 Travel of gripper in the direction of "WorkPosition"



Zimmer GEP 5000/GED 5000

- The catalogue stroke is highly compromised due to the non permitted gripping range. The stroke is reduced by 3,4mm

Zimmer GEP 5000 - Conclusion

Advantages Schunk PGN+E:

- SCHUNK IO-Link enables more functionalities, pre positioning
- Better gripping force for the EGP with „usable“ finger length
- No minimum travel distance, enables close pre positioning to the workpiece
- IP 64 for Zimmer only with purged air

Similarity:

- Self locking mechanism due to the same cinematic.
- Comparable stroke range
- IP 64 available für both grippers*

Advantages Zimmer GEP:

- Higher maximum gripping forces
- 3 finger grippers available (see below)

*Explanation IP – protection class see page 48

Zimmer GED 5000

Competitor product for the SCHUNK EZN

3-JAW CONCENTRIC GRIPPERS SERIES GED5000



"ALL IN ONE"

- ▶ Approximately the same gripping force as a comparable pneumatic gripper
- ▶ Self locking mechanism in case of power drop
- ▶ Same connection hole patterns as a comparable pneumatic gripper
- ▶ Plug and play – single-cable solution, supports incredibly easy control using I/O signals or IO-Link
- ▶ Integrated ACM control module – option of configuring gripping force, travel time and switching points
- ▶ Protected from corrosion and sealed in accordance with IP64
- ▶ Brushless DC motor – up to 30 million cycles without maintenance

SERIES FEATURES

	30 million maintenance-free cycles (max.)		Integrated sensing		IP 64
	Protected against corrosion		Self locking mechanism		Purged air
	Gripping force adjustable		IO-Link		Digital I/O

OVERVIEW

BENEFITS IN DETAIL

INSTALLATION SIZE: GED5006

Order-No.	Control	Drive	Stroke per jaw	
GED5006IL-00-A	IO-Link	BLDC motor	6 [mm]	
GED5006IO-00-A	Digital I/O	BLDC motor	6 [mm]	

INSTALLATION SIZE: GED5008

Order-No.	Control	Drive	Stroke per jaw	
GED5008IL-00-A	IO-Link	BLDC motor	8 [mm]	
GED5008IO-00-A	Digital I/O	BLDC motor	8 [mm]	

INSTALLATION SIZE: GED5010

Order-No.	Control	Drive	Stroke per jaw	
GED5010IL-00-A	IO-Link	BLDC motor	10 [mm]	
GED5010IO-00-A	Digital I/O	BLDC motor	10 [mm]	

Installation size	Stroke per jaw [mm]	Gripping force [N]	Weight [kg]	IP class
GEP5006	6	540 - 960	0.79	IP64 *
GEP5008	8	650 - 1150	1.16	IP64 *
GEP5010	10	980 - 1520	1.66	IP64 *

IP64 only with air purge

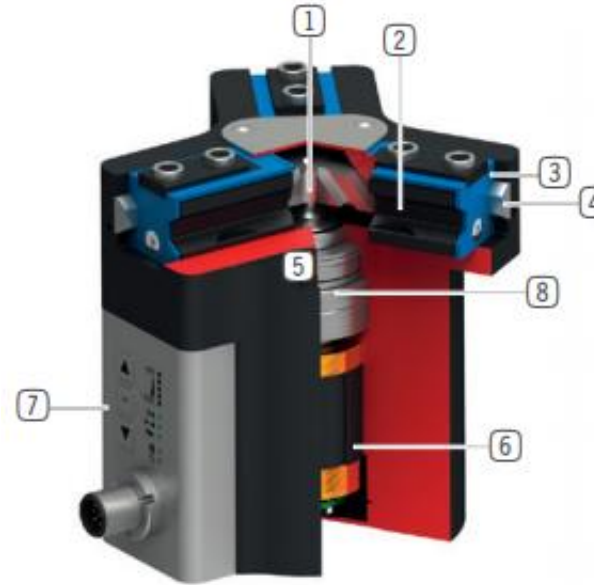
Zimmer GED 5000 - Facts

Competitor product for the SCHUNK EZN

Zimmer does not have any gripping force maintenance for neither the GEP 5000 or GED 5000. But they advertise the „self locking mechanism“. This results from the resistance of motor, spindle and spindle nut.

Zimmer doesn't state any force regarding the self locking mechanism

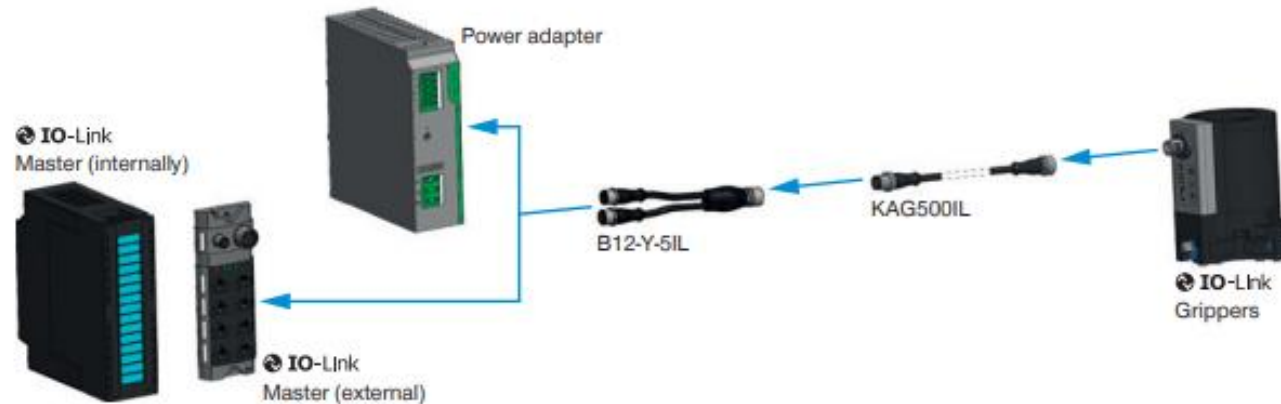
Since SCHUNK uses the same kinematic we also have this self locking mechanism but we dont advertise with it since it's hard to state actual numbers



- ① **Wedge hook mechanism**
 - high forces and moments capacity
 - Synchronized gripper jaw movement
- ② **Gripper jaw**
 - Gripper fingers mounted using removable centering sleeves
 - Lubricated for life via incorporated lubrication slots
- ③ **Dual lip seal**
 - Enables IP64
 - Prevents grease from being squeezed out, increasing service life
- ④ **Steel Linear Guide**
 - Steel in steel guide
 - Enables use of extremely long gripper fingers
- ⑤ **Mounting and positioning**
 - Alternatively, on several sides for customized mounting
 - Pneumatic and electrical versions identical apart from height
- ⑥ **BLDC motor**
 - wear-resistant brushless DC motor
- ⑦ **Advanced control module**
 - Integrated control module with single-cable solution
 - Gripping force, travel time and query programmable via the control panel on the housing
- ⑧ **Drive train**
 - Combination of trapezoidal spindle and gear
 - Durable and robust

Zimmer GED 5000 - Conclusion

- The other properties are the same as the GEP5000
- The grippers work similar, the problems are the same
- EZN is able to compete here but we have the drawback of the mechanical connection, interface (PB/CAN/PN) as well as the external controller
- No IO-Link from SCHUNK but IO-Link is not always accepted by the customers



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Zimmer GEH 6000

Competitor product for the EGL

2-Jaw Parallel Grippers with Long Stroke
Series GEH6000IL



"Highest performance"

- ▶ 5 million maintenance-free cycles
- ▶ Integrated sensing via IO-Link
- ▶ Servo drive with integrated controller
Brushless drive technology, position, speed and force control guarantee the highest amount of functionality
- ▶ IO-Link on board
In addition to the unshielded single-cable solution, the future-proof, hot-pluggable activation provides you with a wide variety of travel profiles for easy implementation into your control system
- ▶ Gentle yet powerful
Power version -03 for handling heavy workpieces with mechanical self-locking and version -31 for gently gripping of delicate parts

OVERVIEW

BENEFITS IN DETAIL

Installation Size: GEH6040IL

Order-No.	Drive	Stroke per jaw, adjustable	Repetition accuracy +/-
GEH6040IL-03-B	BLDC motor	40 [mm]	0.02 [mm]
GEH6040IL-31-B	BLDC motor	40 [mm]	0.02 [mm]

Installation Size: GEH6060IL

Order-No.	Drive	Stroke per jaw, adjustable	Repetition accuracy +/-
GEH6060IL-03-B	BLDC motor	60 [mm]	0.02 [mm]
GEH6060IL-31-B	BLDC motor	60 [mm]	0.02 [mm]

Installation Size: GEH6140IL

Order-No.	Drive	Stroke per jaw, adjustable	Repetition accuracy +/-
GEH6140IL-03-B	BLDC motor	40 [mm]	0.02 [mm]

Installation Size: GEH6180IL

Order-No.	Drive	Stroke per jaw, adjustable	Repetition accuracy +/-
GEH6180IL-03-B	BLDC motor	80 [mm]	0.02 [mm]

Installation size	Stroke per jaw, adjustable mm	Gripping force [N]	Weight [kg]	IP class
GEH6000IL	40 - 60	10 - 1000	0,7 - 0,9	IP54
GEH6100IL	40 - 80	150 - 1800	1,9 - 2,6	IP54

Zimmer GEH 6000-03

Gripping force maintenance
via worm gear.

We have no directly
comparable gripper, our
gripper with similar stroke
and force are adaptive or
intelligent grippers.

For example EGL/EGA/PEH



"Highest performance"

- ▶ 5 million maintenance-free cycles
- ▶ Integrated sensing via IO-Link
- ▶ Servo drive with integrated controller
Brushless drive technology, position, speed and force control guarantee the highest amount of functionality
- ▶ IO-Link on board
In addition to the unshielded single-cable solution, the future-proof, hot-pluggable activation provides you with a wide variety of travel profiles for easy implementation into your control system
- ▶ Gentle yet powerful
Power version -03 for handling heavy workpieces with mechanical self-locking and version -31 for gently gripping of delicate parts

PRODUCT REQUEST

DOWNLOADS

TECHNICAL DATA

ACCESSORIES

BENEFITS IN DETAIL

► SERIES CHARACTERISTICS

Installation size	Version
GEH60XXIL	-03
Powerful	•
Gentle	•
Gripping force adjustable	•
High movement speed	•
Integrated sensing	•
Positionable	•
IO-Link	•
Self locking mechanism	•
5 million maintenance-free cycles (max.)	•
IP 54	•

Drive	BLDC motor
Operating temperature max.	+50 [°C]
Operating temperature min.	5 [°C]
Control	IO-Link
Weight	0.7 [kg]
Gripping force min.	100 [N]
Stroke per jaw, adjustable	40 [mm]
Length of the gripper fingers max.	100 [mm]
Nominal gripping force	1000.0 [N]
Protection to IEC 60529	IP54
Self locking mechanism	mechanical
Jaw speed in positioning mode max.	60 [mm/s]
Max. movement speed per gripper finger	60 [mm/s]
Repetition accuracy +/-	0.02 [mm]
Permissible weight per jaw max	0.3 [kg]
Voltage	24 [V]
Current consumption max.	5.00 [A]
Minimum positioning path per jaw	3 [mm]
Positionsabfrage	Integrierte Abfrage

Zimmer GEH 6000-31

No gripping force maintenance

We have no directly comparable gripper, our grippers with similar stroke and force are intelligent grippers.

For example EGI or WSG



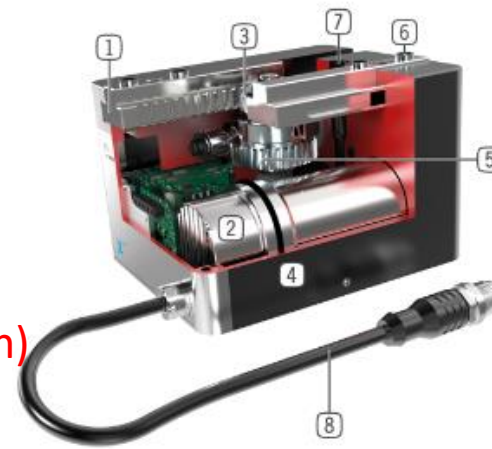
► SERIES CHARACTERISTICS

Installation size	Version
GEH60XXIL	-31
 Powerful	
 Gentle	•
 Gripping force adjustable	•
 High movement speed	•
 Integrated sensing	•
 Positionable	•
 IO-Link	•
 Self locking mechanism	
 5 million maintenance-free cycles (max.)	•
 IP 54	•

Gentle	
Powerful	
Self locking mechanism	
Control	IO-Link
Drive	BLDC motor
Stroke per jaw, adjustable	40 [mm]
Nominal gripping force	180 [N]
Gripping force min.	10 [N]
Current consumption max.	2 [A]
Self locking mechanism	-
Permissible weight per jaw max	0,3 [kg]
Length of the gripper fingers max.	100 [mm]
Max. movement speed per gripper finger	120 [mm/s]
Repetition accuracy +/-	0.02 [mm]
Operating temperature min.	5 [°C]
Operating temperature max.	+50 [°C]
Protection to IEC 60529	IP54
Weight	0.7 [kg]

Zimmer GEH 6000 - Facts

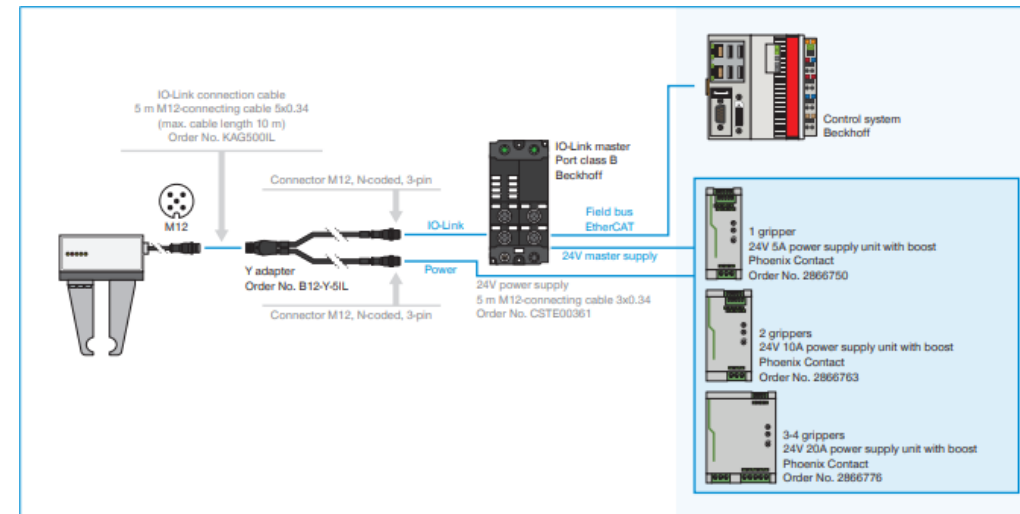
- Fingers can be pre positioned (like SCHUNK)
- Gripping force depending on velocity
- STO-Function integrated in the gripper (special version)
- Not possible to realise a 1 cable solution with this gripper due to the high motor current.



- Precise T-Slot guide**
high forces and moments capacity
- Drive**
Brushless DC servomotor
- Rack and pinion gear**
synchronized the movement of the gripper jaws
high force transfer
- Robust, lightweight housing**
Hard-coated aluminum alloy
- Helical worm gear**
self locking mechanism in case of power drop (only version -03)
- Removable centering sleeves**
quick and economical positioning of the gripper fingers
- Mounting and positioning**
mounting possible from several sides for versatile positioning
- Energy supply**
standardized connector

► SERIES CHARACTERISTICS

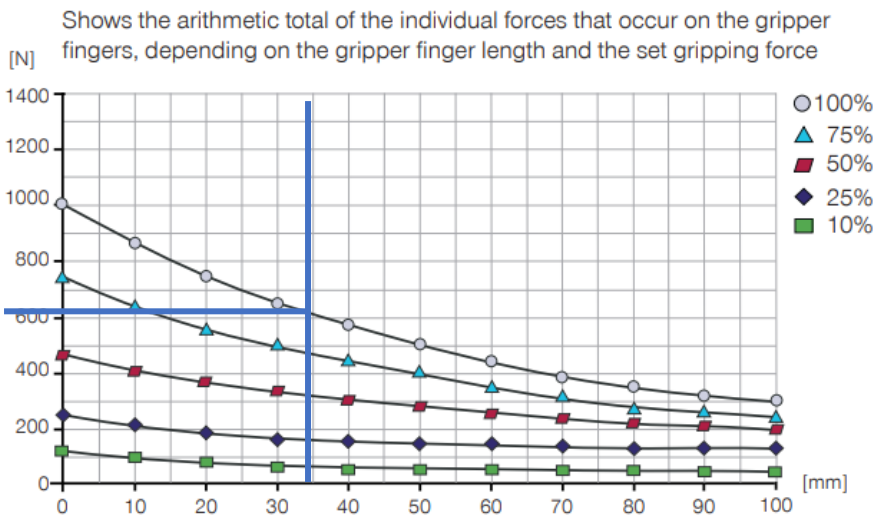
Installation size	Version	
GEH60XXIL	-03	-31
Powerful	•	
Gentle		•
Gripping force adjustable	•	•
High movement speed		•
Integrated sensing	•	•
Positionable	•	•
IO-Link	•	•
Self locking mechanism	•	
5 million maintenance-free cycles (max.)	•	•
IP 54	•	•



Zimmer GEH 6000-03 – Gripping forces

► Gripping force diagram

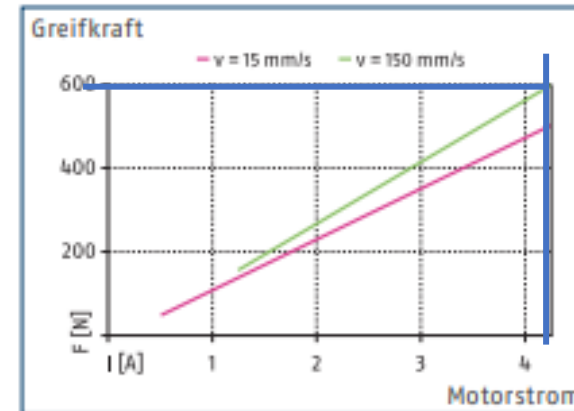
GEH6040IL-03-B



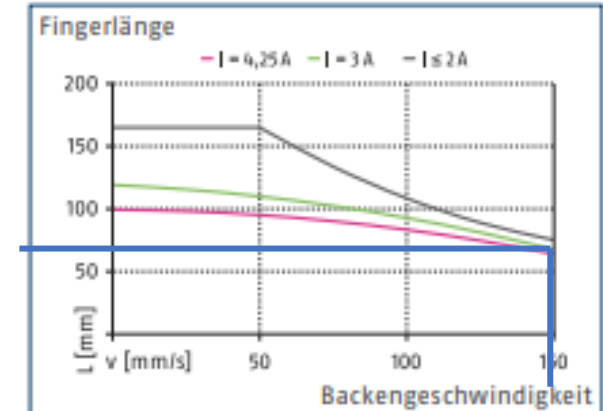
Zimmer GEP 6040

With a finger length of only 35mm the gripping force is already only as high as the EGL's.

Greifkraft



Fingerlänge



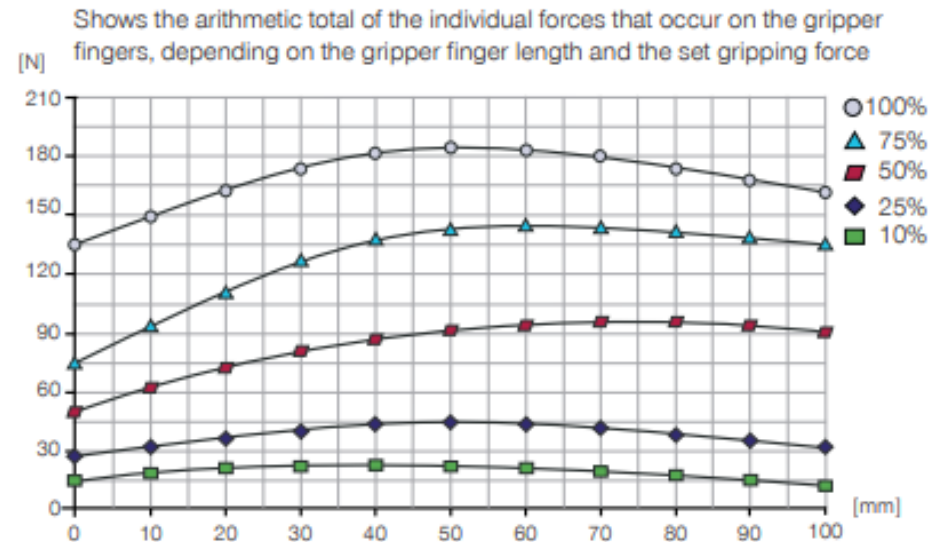
SCHUNK EGL

Gripping force is lower with shorter fingers, the longer the fingers the better the EGL's gripping force compared to the GEH. Finger length 60mm allows 600N gripping force.

Zimmer GEH 6000-31 – Gripping Force

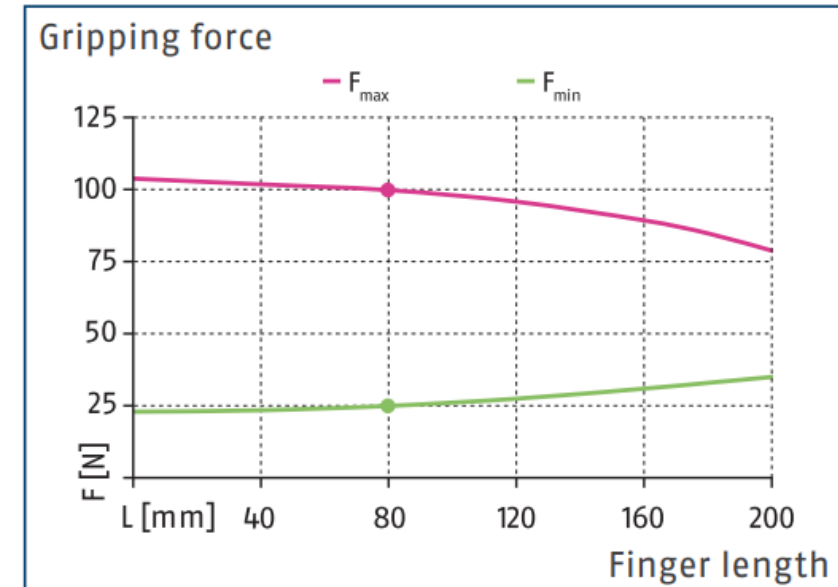
► Gripping force diagram

GEH6040IL-31-B



EGI 80

Gripping force



Zimmer GEP 6000 – From the manual

The two mode groups “60” and “70” are usually used for an optimized gripping cycle of hard workpieces because the main focus here is on a quick gripper movement with relatively low current values. If the gripper is stopped suddenly by a spring-loaded workpiece, it is no longer able to generate the desired gripping force.

For this reason, mode groups “65” and “75” should be used for elastic/flexible workpieces. In these mode groups, the gripper has a relatively low movement speed because the majority of the gripping force is created directly by means of the electrical current.

However, it will no longer be possible to generate full gripping force. The gripping force generated in these mode groups depends on the elasticity of the workpiece.

Page about programming and which commands should be used in which situation.

They specifically talk about the fact that the will lose gripping force when gripping with low speed or gripping an elastic workpiece

Zimmer GEH 6000 - Conclusion

Advantages Schunk:

- No minimum travel distance
- Industrial Bus/Ethernet interfaces
- More functionality/ data
- IP 46*

Similarity:

- Both grippers can be pre positioned

Advantages Zimmer:

- Higher gripping forces compared to the EGL90 (according to the catalogue)
- Gripping force maintenance
- Small size
- Light weight
- IO – Link
- IP 54*

*Explanation IP – protection class see page 48

Zimmer GED 6000

No direct product to compete with

3-JAW CONCENTRIC GRIPPERS SERIES GED6000IL



"HIGHEST PERFORMANCE"

- ▶ 5 million maintenance-free cycles
- ▶ Integrated sensing via IO-Link
- ▶ Servo drive with integrated controller
Brushless drive technology, position, speed and force control guarantee the highest amount of functionality
- ▶ IO-Link on board
In addition to the unshielded single-cable solution, the future-proof, hot-pluggable activation provides you with a wide variety of travel profiles for easy implementation into your control system
- ▶ Gentle yet powerful
Power version -03 for handling heavy workpieces with mechanical self-locking and version -31 for gently gripping of delicate parts

SERIES FEATURES

- 5 million maintenance-free cycles (max.)
- Self locking mechanism
- High movement speed
- IO-Link
- Integrated sensing
- Positionable
- Gentle
- IP 54
- Gripping force adjustable
- Powerful

OVERVIEW

INSTALLATION SIZE: GED6040IL

Order-No.	Control	Type of drive	Stroke per jaw, adjustable	
GED6040IL-03-A	IO-Link	electrical	40 [mm]	
GED6040IL-31-A	IO-Link	electrical	40 [mm]	

INSTALLATION SIZE: GED6140IL

Order-No.	Control	Type of drive	Stroke per jaw, adjustable	
GED6140IL-03-A	IO-Link	electrical	40 [mm]	

Installation size	Stroke per jaw, adjustable mm	Gripping force [N]	Weight [kg]	IP class
GED6000IL	40	15 - 800	2,8	IP54
GED6100IL	40	210 - 1700	4,9	IP54

Zimmer GEH 6000-03

Gripping force maintenance via worm gear.

We have no directly comparable gripper. The EZN has a way smaller stroke



► SERIES CHARACTERISTICS

Installation size	Version	
GED60XXIL	-03	-31
Powerful	•	
Gentle		•
Gripping force adjustable	•	•
High movement speed		•
Integrated sensing	•	•
Positionable	•	•
IO-Link	•	•
Self locking mechanism	•	
5 million maintenance-free cycles (max.)	•	•
IP 54	•	•

Control	IO-Link
Type of drive	electrical
Stroke per jaw, adjustable	40 [mm]
Nominal gripping force	800 [N]
Gripping force min.	180 [N]
Current consumption max.	5 [A]
Self locking mechanism	mechanical
Dead weight of mounted gripper finger max.	0,3 [kg]
Length of the gripper fingers max.	100 [mm]
Minimum positioning path per jaw	4 [mm]
Repetition accuracy +/-	0.02 [mm]
Operating temperature min.	5 [°C]
Operating temperature max.	+50 [°C]
Protection to IEC 60529	IP54
Weight	2.8 [kg]

Zimmer GED 6000-31

No gripping force maintenance

We have no directly comparable grippers

The EZN has a way smaller stroke



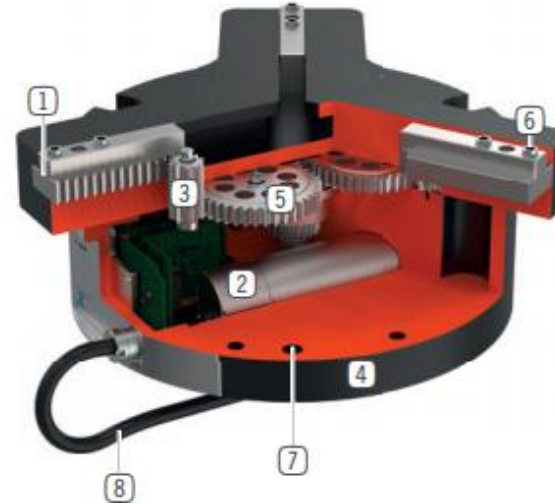
► SERIES CHARACTERISTICS				
Installation size	Version		Control	IO-Link
GED60XXIL	-03	-31	Type of drive	electrical
Powerful	•		Stroke per jaw, adjustable	40 [mm]
Gentle		•	Nominal gripping force	165 [N]
Gripping force adjustable	•	•	Gripping force min.	15 [N]
High movement speed		•	Current consumption max.	2 [A]
Integrated sensing	•	•	Self locking mechanism	0,3 [kg]
Positionable	•	•	Dead weight of mounted gripper finger max.	100 [mm]
IO-Link	•	•	Length of the gripper fingers max.	4 [mm]
Self locking mechanism	•		Minimum positioning path per jaw	0.02 [mm]
5 million maintenance-free cycles (max.)	•	•	Repetition accuracy +/-	5 [°C]
IP54	•	•	Operating temperature min.	+50 [°C]
			Operating temperature max.	IP54
			Protection to IEC 60529	Weight
				2.8 [kg]

Zimmer GED 6000 - Facts

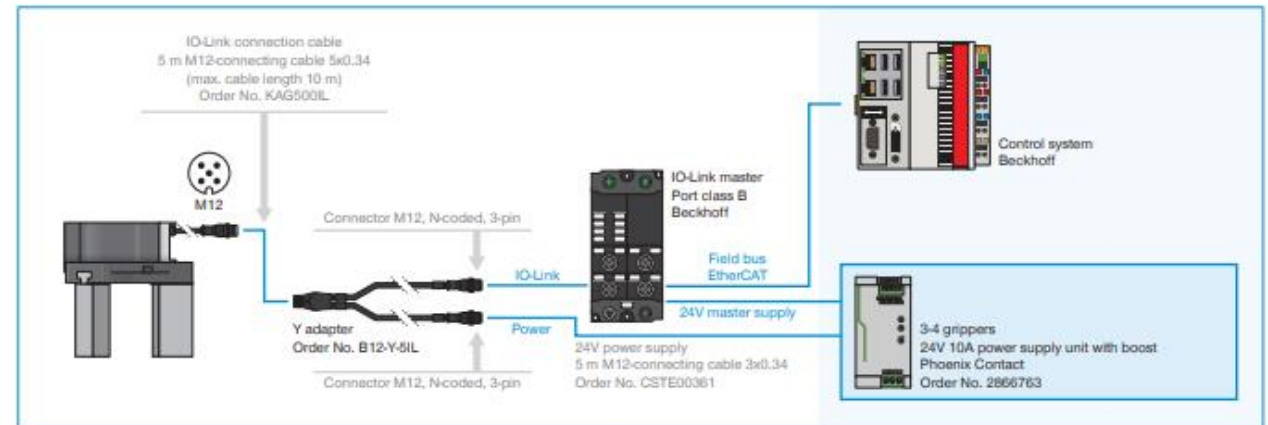
- Fingers can be pre positioned (like SCHUNK)
- Gripping force depending on velocity
- Not possible to realise a 1 cable solution with this gripper due to the high motor current.
- No gripping force maintenance for version -31

► SERIES CHARACTERISTICS

Installation size	Version	
GED60XXIL	-03	-31
 Powerful	•	
 Gentle		•
 Gripping force adjustable	•	•
 High movement speed		•
 Integrated sensing	•	•
 Positionable	•	•
 IO-Link	•	•
 Self locking mechanism	•	
 5 million maintenance-free cycles (max.)	•	•
 IP 54	•	•



- Precise T-Slot guide**
 - high forces and moments capacity
- Drive**
 - Brushless DC servomotor
- Rack and pinion gear**
 - synchronized the movement of the gripper jaws
 - high force transfer
- Robust, lightweight housing**
 - Hard-coated aluminum alloy
- Helical worm gear**
 - self locking mechanism in case of power drop (only version -03)
- Removable centering sleeves**
 - quick and economical positioning of the gripper fingers
- Mounting and positioning**
 - mounting possible from several sides for versatile positioning
- Energy supply**
 - standardized connector



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- Zimmer GEH6000/GED6000
- Zimmer GEH8660
- Zimmer GEP1400
- Zimmer GEP9000
- Explanations IP-Protection class

Zimmer GEH 8660

- Integrated BOSCH MSM019 motor
- Bosch drives necessary to controll the gripper

Competitor product EGA/LEG

GEH8660-B



2-JAW PARALLEL GRIPPERS WITH LONG STROKE SERIES GEH8000

"THE STRONG"

- ▶ **High gripping force**
Using the high gripping force, you can safely handle even the heaviest workpieces
- ▶ **Servo drive**
Position, speed and force control in combination with a mechanical self locking mechanism guarantee the highest functionality
- ▶ **Multibus**
How you stay flexible: PROFIBUS, SERCOS III, PROFINET IO, EtherNet/IP or EtherCat - You decide what harmonises best with your system

[ADD TO REQUEST CART](#)
[ADD TO COMPARE](#)

EQUIPMENT/OPTIONS



10 million maintenance-free cycles (max.)



Integrated sensing



IP40



Self locking mechanism



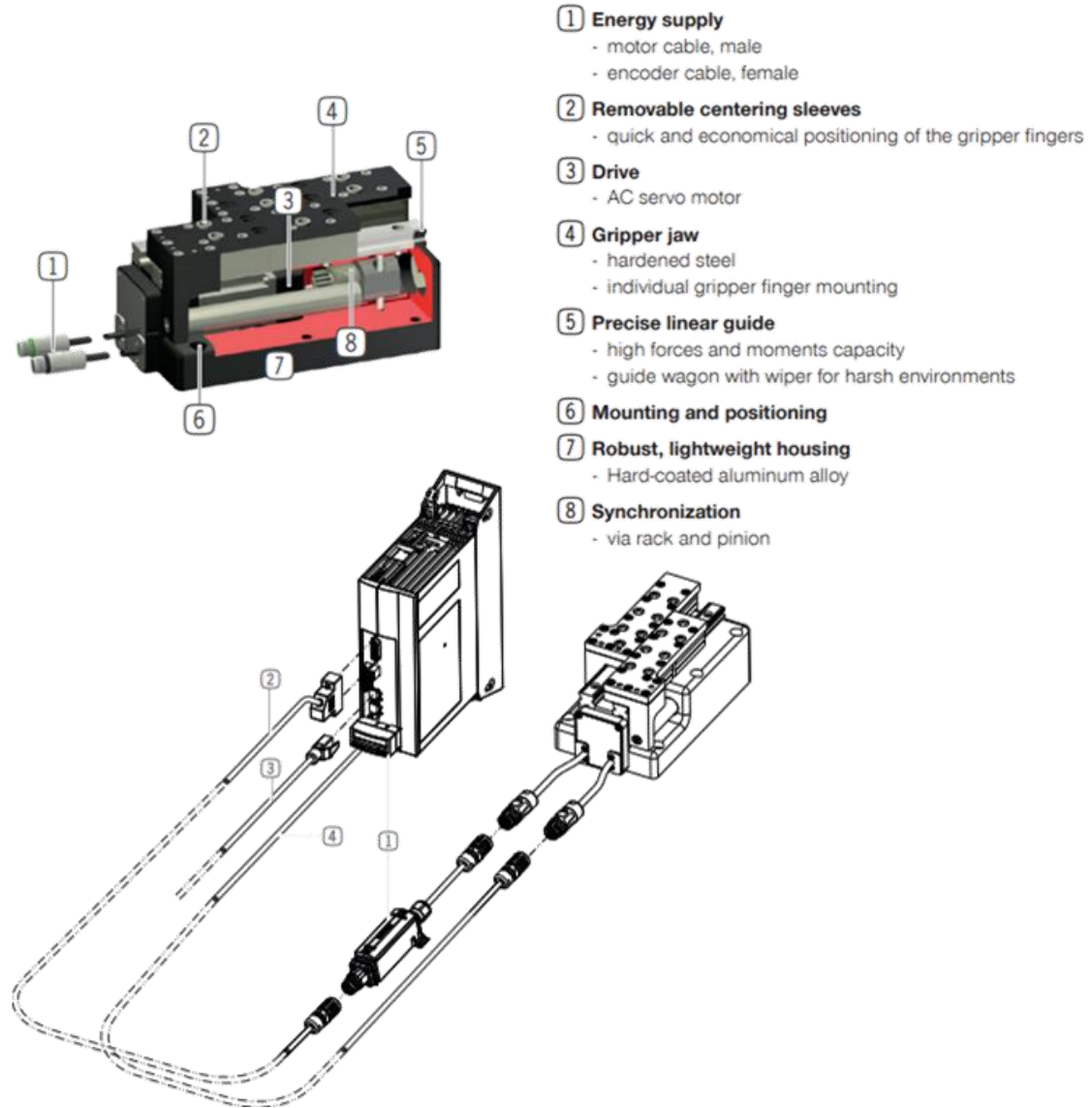
Profinet, EtherCat, EtherNet/IP, Sercos

Drive	AC servo motor
Stroke per jaw	60 [mm]
Max. retention force (at 100% opening usage)	3200 [N]
Retention force min.	200 [N]
Self locking mechanism	gear rack / worm drive
Power transfer	Rack / worm gear
Closing time / Opening time at maximum stroke	1.5 [s]
Repetition accuracy +/-	0.05 [mm]
Operating temperature min.	5 [°C]
Operating temperature max.	+80 [°C]
Protection to IEC 60529	IP40
Weight	10 [kg]

Zimmer GEH 8660 - Facts

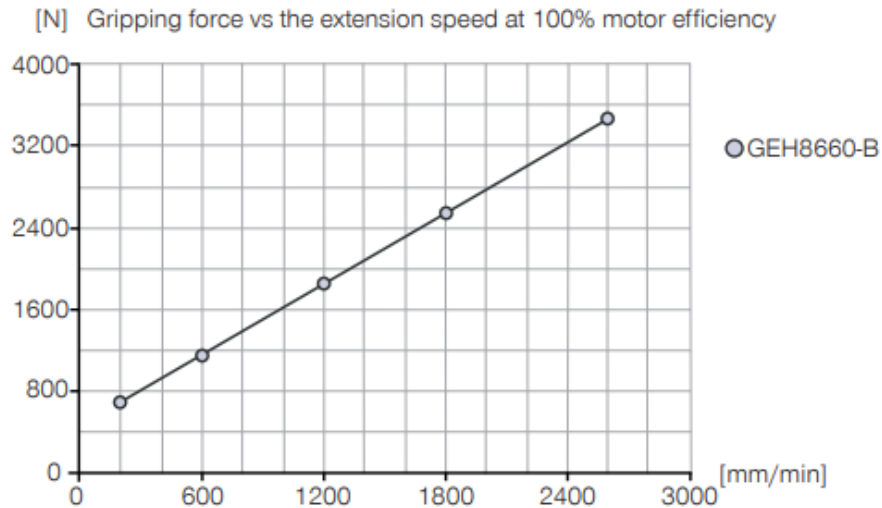
- Intelligence via drive and controller
- Gripping force depending on velocity
- Rack/worm gear – gripping force maintenance

Order no.	► Technical data
	GEH8660-B
Drive	AC servo motor
Stroke per jaw [mm]	60
Max. retention force (at 100% opening usage) [N]	3200
Retention force min. [N]	200
Self locking mechanism	gear rack / worm drive
Power transfer	Rack / worm gear
Closing time / Opening time at maximum stroke [s]	1.5
Repetition accuracy +/- [mm]	0.05
Operating temperature min. [°C]	5
Operating temperature max. [°C]	+80
Protection to IEC 60529	IP40
Weight [kg]	10
Drive	
Load gear output revolution	49
Load gear input revolution	375
Feed constant [mm/rev]	3.1415

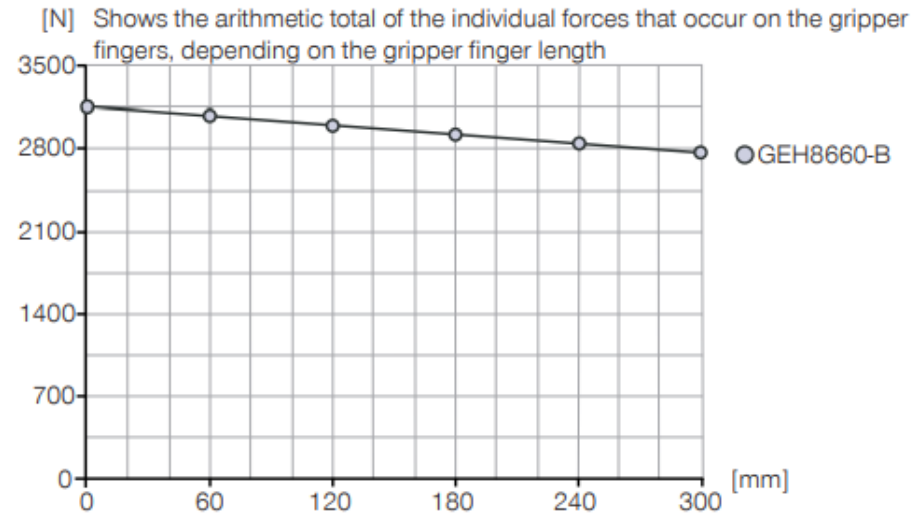


Zimmer GEH 8660 – Gripping force

► Gripping force diagram



► Gripping force diagram



Their Motor only has 0,32Nm of nominal torque, max torque of 0,95Nm the nominal speed is 3000 1/min and the max speed is 5000 1/min. In order to be able to generate gripping force they have to be VERY fast and have some minimum travel distance. I guess that temperature could be a problem for the gripper if you do a lot of cycles in a short time.

Zimmer GEH 8660 - Conclusion

Advantages Schunk:

- Able to develop the gripping force with less speed
- No hard hitting on the surface
- More drives available
- More stroke

Similarity:

- Both grippers can be used with BOSCH

Advantages Zimmer:

- Higher gripping forces compared to standard LEG/EGA grippers
- Gripping force maintenance
- Small size

*Explanation IP – protection class see page 48

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- Zimmer GEH8660
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- Zimmer GEP9000
- Explanations IP-Protection class

Zimmer GEP 1400

Competitor product for the EGP

No longer on the
Zimmer website

2-Jaw Parallel Grippers
Series GEP1400



"The robust"

- ▶ **Proven T slot guide**
This established and proven guiding technology stands for the highest process reliability like no other
- ▶ **Integrated position sensing**
You can detect the gripper status safely via the motor current using your control system
- ▶ **The simplest activation**
The included control unit is controlled easily via plus and minus buttons, while you can optionally adjust the gripping force using the potentiometer

OVERVIEW

BENEFITS IN DETAIL

Installation Size: GEP1402

Order-No.	Stroke per jaw	Gripping force in closing (adjustable) max.
GEP1402	2 [mm]	140 [N]

Protection to IEC 60529

IP52

Installation Size: GEP1406

Order-No.	Stroke per jaw	Gripping force in closing (adjustable) max.
GEP1406C	6 [mm]	350 [N]
GEP1406O	6 [mm]	-

Protection to IEC 60529

IP52

IP52

Installation size	Stroke per jaw [mm]	Gripping force [N]	Weight [kg]	IP class
GEP1402	2	140	0.3	IP52
GEP1406	6	350	1	IP52

Zimmer GEP 1400 - Facts

No gripping force maintenance

No longer on the Zimmer website

► SERIES CHARACTERISTICS

Installation size		Version		
GEP140X			C	O
 I/O	Digital I/O	•	•	•
 External gripping			•	
 Internal gripping				•
 5 million maintenance-free cycles (max.)		•	•	•
 IP52		•	•	•

2-Jaw Parallel Grippers Series GEP1400

GEP1402



"The robust"

- **Proven T slot guide**
This established and proven guiding technology stands for the highest process reliability like no other
- **Integrated position sensing**
You can detect the gripper status safely via the motor current using your control system
- **The simplest activation**
The included control unit is controlled easily via plus and minus buttons, while you can optionally adjust the gripping force using the potentiometer

PRODUCT REQUEST

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TECHNICAL DATA

ACCESSORIES

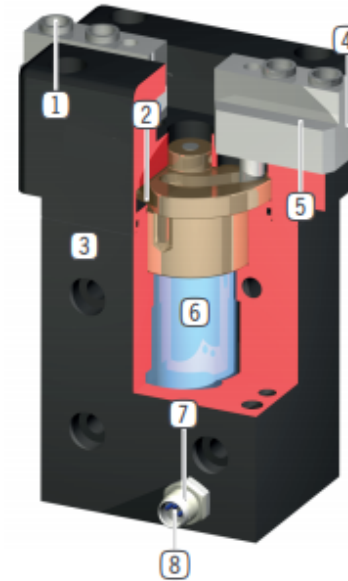
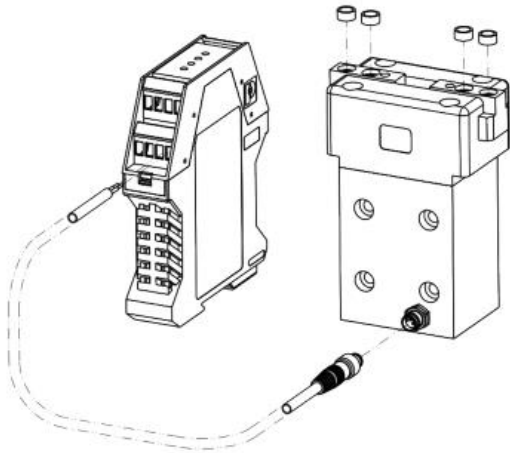
BENEFITS IN DETAIL

Stroke per jaw	2 [mm]
Gripping force in closing (adjustable) max.	140 [N]
Gripping force in opening (adjustable) max.	140 [N]
Closing time	0.2 [s]
Opening time	0.2 [s]
Repetition accuracy +/-	0.1 [mm]
Voltage	24 [V]
Max. current regulable by potentiometer	140 [mA]
Operating temperature min.	5 [°C]
Operating temperature max.	+60 [°C]
Protection to IEC 60529	IP52
Weight	0.3 [kg]

Zimmer GEP 1400

External controller necessary

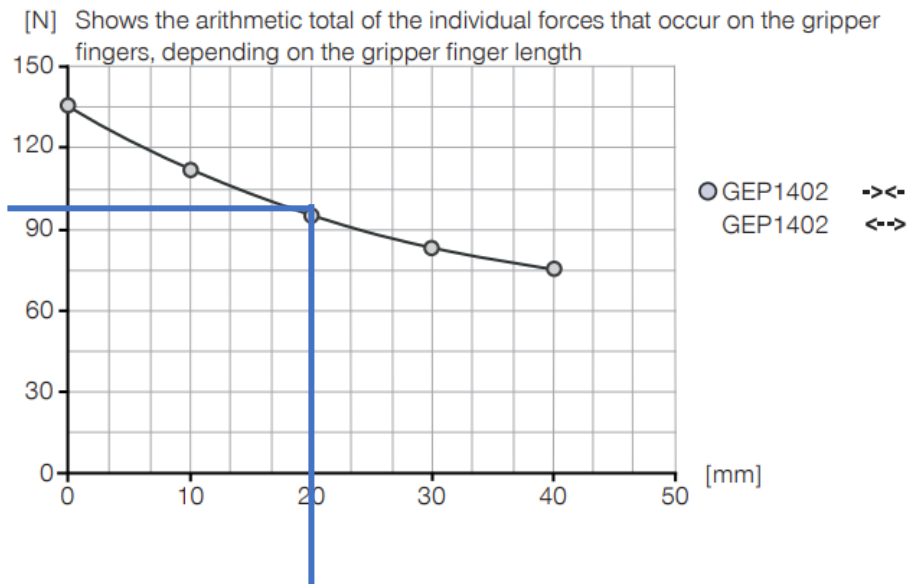
6.4 GEP1400/GED1300 control ELEGR01 (included in the scope of delivery of the gripper)



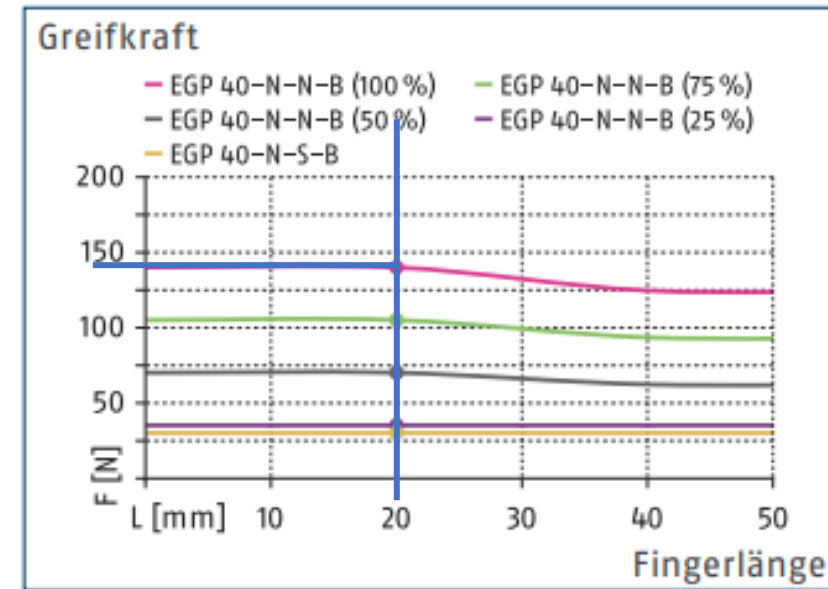
- ① **Removable centering sleeves**
 - quick and economical positioning of the gripper fingers
- ② **Positively driven curve disc**
 - synchronized the movement of the gripper jaws
 - high force transfer
 - rapid stroke and force stroke (version with 6 mm stroke per jaw)
- ③ **Robust, lightweight housing**
 - Hard-coated aluminum alloy
- ④ **Gripper jaw**
 - hardened steel
 - individual gripper finger mounting
- ⑤ **Guide**
 - precise T-Slot guide for high forces and moments capacity
- ⑥ **Drive**
 - electric drive by 24 VDC step motor
- ⑦ **Position sensing**
 - measured at the end of stroke via power increase on the motor
- ⑧ **Energy supply**
 - standardized interface M8 round plug
 - signal control line (use only cable without diode)

Zimmer GEP 1400

► Gripping force diagram



Greifkraft



Zimmer GEP 1400 - Conclusion

Advantages Schunk EGP:

- lighter
- More stroke in different sizes
- Integrated logic and powerrelectronic

Gemeinsamkeiten:

- Controll via digital I/O
- Gripping force adjustable
- No gripping force maintenance

Advantages Zimmer GEP1400:

- IP 52

*Explanation IP – protection class see page 48

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- Zimmer GEH8660
- Zimmer GEP1400
- Zimmer GEP9000
- Explanations IP-Protection class

Zimmer GEP 9000

Competitor product for the EGP (Speed)

No longer on the
Zimmer website

2-Jaw Parallel Grippers
Series GEP9000



"The quickest"

- ▶ **Plug and play**
Reduce programming and assembly costs to a minimum with the integrated control system and the 3 position query
- ▶ **250 cycles per minute**
No more worrying about cycle times: There is nothing faster on the market!
- ▶ **Failure-free continuous operation**
Our "Made in Germany" quality guarantees up to 30 million maintenance-free gripping cycles

OVERVIEW

BENEFITS IN DETAIL

Installation Size: GEP9002

Order-No.	Stroke per jaw	Grip force in grip direction min.	Grip force in grip direction max.
GEP9002NC-B	2 [mm]	11 [N]	15 [N]
GEP9002NCV-B	2 [mm]	20 [N]	30 [N]
GEP9002NO-B	2 [mm]	11 [N]	15 [N]

Installation Size: GEP9004

Order-No.	Stroke per jaw	Grip force in grip direction min.	Grip force in grip direction max.
GEP9004NC-B	4 [mm]	14 [N]	26 [N]
GEP9004NCV-B	4 [mm]	30 [N]	50 [N]
GEP9004NO-B	4 [mm]	14 [N]	26 [N]

Installation size	Stroke per jaw [mm]	Gripping force [N]	Weight [kg]	IP class
GEP9002	2	11 - 30	0,25 - 0,34	IP40
GEP9004	4	14 - 50	0,57 - 0,79	IP40

GEP9002NC-B

Zimmer GEP 9000

- No gripping force maintenance
- Gripping force can only be applied in one direction
- No longer on the Zimmer website



"The quickest"

- ▶ Plug and play
- ▶ 250 cycles per minute
- ▶ Failure-free continuous operation

PRODUCT REQUEST

► SERIES CHARACTERISTICS

Installation size		Version		
GEP900X		NC	NO	NCV
I/O	Digital I/O	•	•	•
W	Spring closing C	•		•
CV	Spring closing / Power-assisted Version			•
W	Spring opening O		•	
W	30 million maintenance-free cycles (max.)	•	•	•
W	Integrated sensing	•	•	•
IP 40	IP40	•	•	•

DOWNLOADS

TECHNICAL DATA

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BENEFITS IN DETAIL

Stroke per jaw	2 [mm]
Grip force in grip direction min.	11 [N]
Grip force in grip direction max.	15 [N]
Permanent operation cycle count max.	200 [cycle/min]
Cycle count max.	250 [cycle/min]
Operating time	<20 [ms]
Repetition accuracy +/-	0.05 [mm]
Length of the gripper fingers max.	40 [mm]
Weight per jaw max.	20 [g]
Fixing for gripping jaws / Tightening torque	M2,5 / 1 [Nm]
Mr	1.5 [Nm]
Mx	1.5 [Nm]
My	2.1 [Nm]
Fa	270 [N]
Pulse time in closing	7 [ms]
Pulse time in opening	25 [ms]

Debounce time	10 [ms]
Current consumption per pulse max.	5 [A]
Current consumption in a stand-by mode	0.02 [A]
Cable length max.	10 [m]
Protection to IEC 60529	IP40
Certification	CE
Operating temperature min.	5 [°C]
Noise level	<70 [db(A)]
Operating temperature max.	+50 [°C]
Weight	0.25 [kg]
Installation position	any
Permissible unevenness of mounting surface	<0.02 [mm]
Fixing for gripper / Tightening torque	M3 / 1.5 [Nm]
Replacement accuracy	<0.02 [mm]
Positionsabfrage	Integrierte Abfrage
Control	Digital I/O

Zimmer GEP 9000

- High current demand
- Closes when a „high signal“ is applied on PIN1 and opens when the „high signal“ is no longer on
- 3 Feedbacks
- Springs in the base jaw
- Pot magnet kinematic

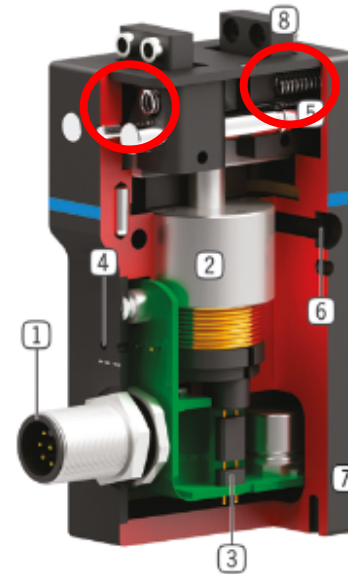
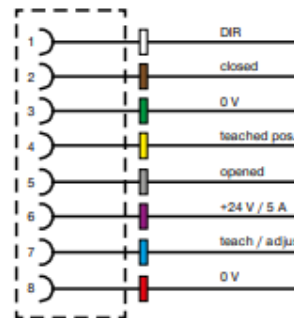
6. Start-up

6.1 Drive

For the application of the gripper, power supply is needed at input 3 and 8 (0V) and as well as input 6 (+24VDC/5A). Input 1 (DIR) serves as control input of the gripper. It can be opened and closed with regard to this control unit. The input signal 1 (DIR) has to be activated as long as a reverse movement of gripper jaws is needed. Current consumption during the procedure of gripper jaws is around $\leq 5A$. During stand-by mode, current consumption of gripper is around 0,02A.

PIN	Farbe	Funktion	Erklärung
1	white	DIR	IIN control input gripper open/close 24VDC
2	brown	closed	OUT message gripper closed
3	green	GND	Power supply 0VDC
4	yellow	teached position	OUT message work piece gripped
5	grey	opened	OUT message gripper opened
6	pink	+24VDC	Power supply +24VDC/5A
7	blue	teach/adjust	IN programming
8	red	GND	Power supply 0VDC

Cables



- Energy supply**
standardized interface M12 round connector
- Drive**
via Pot magnet and coil bobbin according to the coil system principle
energy consumption only at opening and closing (<25ms)
- Position sensing**
integrated Hallsensor
3 positions monitorable
- Status control**
optical LED position display
gripper opened, gripper closed, "workpiece available"
- Wedge hook mechanism**
self locking mechanism at stop position
- Mounting and positioning**
mounting possible from several sides for versatile positioning
- Robust, lightweight housing**
Hard-coated aluminum alloy
- Gripper jaw**
from high-strength, hard-anodized aluminium
removable centering sleeves for individual gripper finger mounting

Function Pot magnet drive

3. Function

A current impulse can set the integrated drive of the plunger coil in motion. Generated travelling distance is transferred to gripper jaws via kinematics and results in lifting.

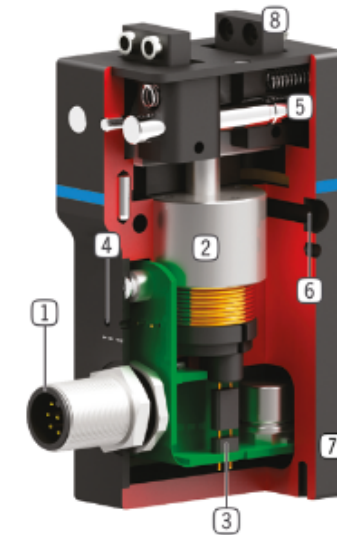
NC is suitable for exterior gripping ►◄ and NO is suitable for interior gripping ◄►.

Gripper works like a spring reset valve

Current impulse magnetizes the coil and pulls down the drive.

The coil will be magnetic as long as the power is applied.

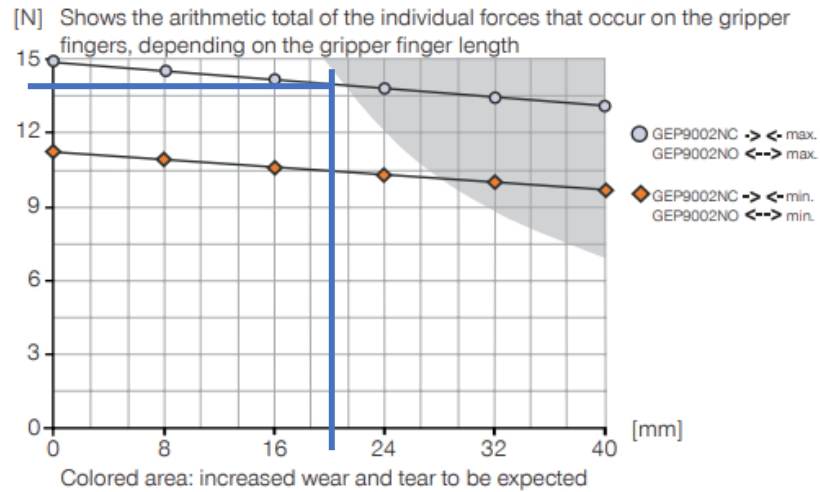
As soon as the +24V are no longer applied the magnetic field will disappear and the spring loaded base jaws will move the drive off the coil, the fingers will open.



- 1 **Energy supply**
standardized interface M12 round connector
- 2 **Drive**
via Pot magnet and coil bobbin according to the coil system principle
energy consumption only at opening and closing (<25ms)
- 3 **Position sensing**
integrated Hallsensor
3 positions monitorable
- 4 **Status control**
optical LED position display
gripper opened, gripper closed, "workpiece available"
- 5 **Wedge hook mechanism**
self locking mechanism at stop position
- 6 **Mounting and positioning**
mounting possible from several sides for versatile positioning
- 7 **Robust, lightweight housing**
Hard-coated aluminum alloy
- 8 **Gripper jaw**
from high-strength, hard-anodized aluminium
removable centering sleeves for individual gripper finger mounting

Zimmer GEP 9000

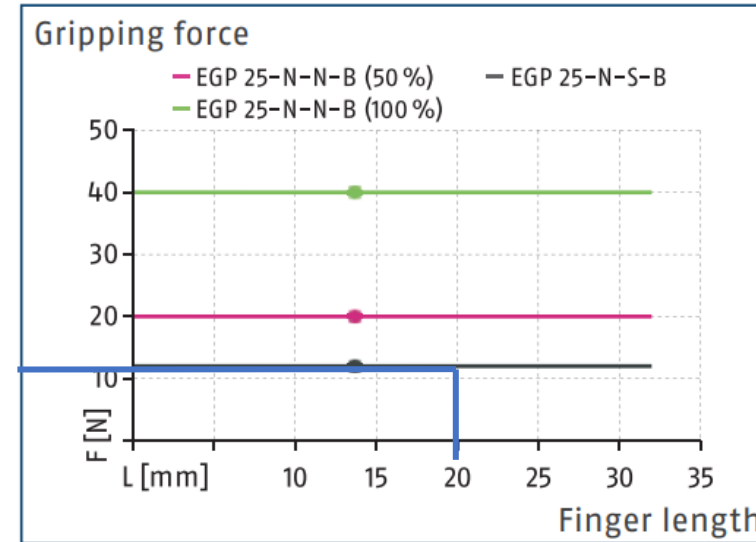
► Gripping force diagram



GEP 9000

Finger length of 20mm results in round about 13,5N gripping force

Gripping force



EGP 25 Speed

Finger length of 20mm results in round about 12N gripping force.

Zimmer GEP 9000 - Conclusion

Advantages Schunk EGP:

- Lighter weight
- Bigger stroke
- Smaller current
- Gripping in both directions possible with the same gripper

Similarity:

- Controlled via digital I/O
- Same / similar gripping force

Advantages Zimmer GEP1400:

- Up to 250 cycles per minute
- Spring loaded
- Low maintenance
- IP 40

*Explanation IP – protection class see page 48

Index:

- Informations regarding the presentation
- Function and integration of SCHUNK grippers
- Compare drive concepts
- Zimmer GEP2000
- Zimmer GEP5000/GED5000
- Zimmer GEH6000/GED6000
- Zimmer GEH8660
- Zimmer GEP1400
- Zimmer GEP9000
- Explanations IP-Protection class

IP protection class

Ingress Protection



Protection against water

Protection against touches/ hard objects

First number protection against solids	IP	Second number protection against liquids	
0	No protection	0	No water protection
1	Protected against solid objects up to 50mm	1	Protected against vertically falling drops of water e.g. condensation
2	Protected against solid objects up to 12mm	2	Protected against direct sprays of water up to 15 degree from the vertical
3	Protected against solid objects up to 2,5mm	3	Protected against direct sprays of water up to 60 degree from the vertical
4	Protected against solid objects up to 1mm	4	Protected against water sprayed from all directions – limited ingress permitted
5	Protection against dust – limited ingress (no harmful deposit)	5	Protected against low pressure jets of water from all directions – limited ingress permitted
6	Totally protected against dust	6	Protected against strong jets of water – limited ingress permitted
7		7	Protected against the affects of immersion between 15cm and 1m
8		8	Protected against long periods of immersion under pressure
9		9	Protected against the affect of immersion even under high pressure enviroument

Quellen:

GEP 2000:

- <https://www.zimmer-group.de/de/structure/%24mg5-16176017/serie+gep2000>
- <https://www.zimmer-group.de/dbassets/som dok mon som dok mon ddoc00245 gep2000 sgerman apd v10.pdf>
- <https://www.zimmer-group.de/dbassets/gd pg sgerman gep2006.pdf>

GEP/GED 5000:

- <https://www.zimmer-group.de/de/structure/%24mg5-15509094/serie+gep5000>
- <https://www.zimmer-group.de/dbassets/som dok mon som dok mon ddoc00211 gep ged5000il sgerman apd v8.pdf>
- <https://www.zimmer-group.de/dbassets/gd pg sgerman gep5006.pdf>

GEH 6000:

- <https://www.zimmer-group.de/de/structure/%24mg5-15605571/serie+geh6000il>
- <https://www.zimmer-group.de/dbassets/som dok mon som dok mon ddoc00212 geh6000il ged6000il sgerman apd v15.pdf>
- <https://www.zimmer-group.de/dbassets/gd pg sgerman geh6040il.pdf>

Quellen:

GEP 1400:

- <https://www.zimmer-group.de/de/structure/%24mg5-15405791/serie+gep1400>
- [https://www.zimmer-group.de/dbassets/som dok mon som dok mon ddoc00216 gep1400 ged1300 sgerman apd v1.pdf](https://www.zimmer-group.de/dbassets/som_dok_mon_som_dok_mon_ddoc00216_gep1400_ged1300_sgerman_apd_v1.pdf)
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GEP 9000:

- <https://www.zimmer-group.de/de/structure/%24mg5-15405790/serie+gep9000>
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