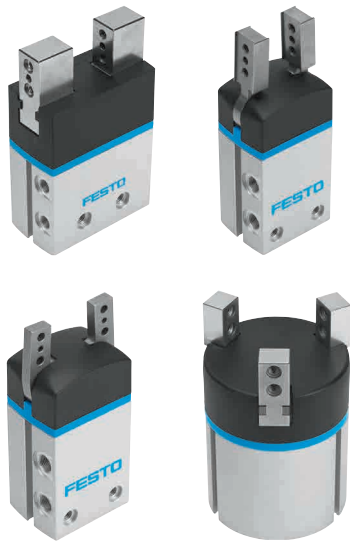


Front-end unit Your interface to the workpiece

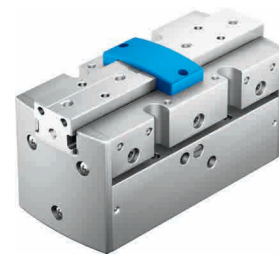
FESTO



A variety of gripper functions, designs and performance



Standard



Precise



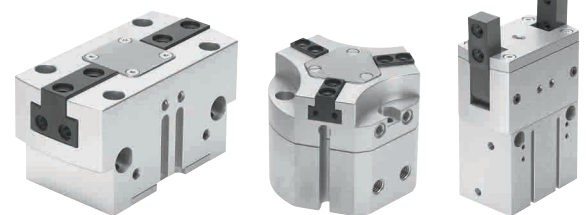
Bellows



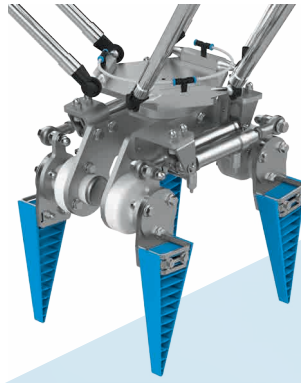
Micro



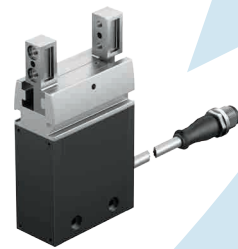
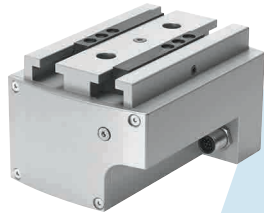
Vacuum



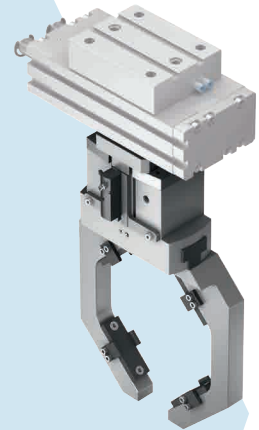
Sturdy



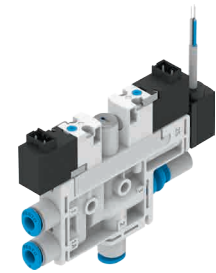
Adaptive



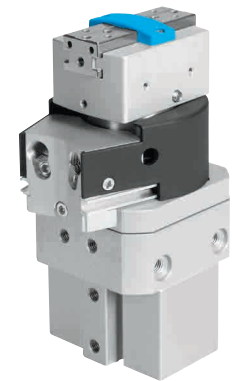
Electric



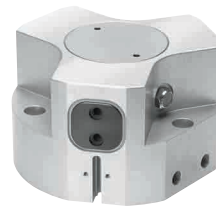
**Function combination
Gripper finger**



Vacuum



Function combination



Sealed



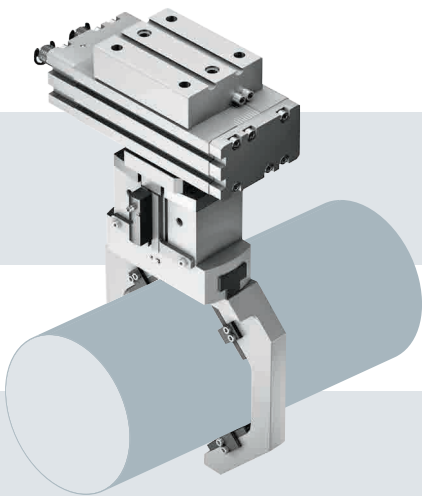
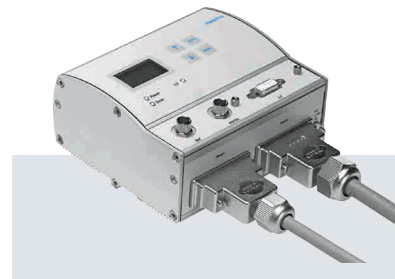
Long stroke

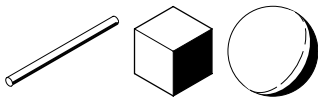

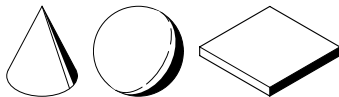
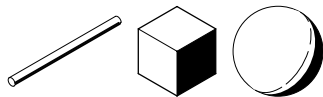
From the workpiece to the gripper element

Gripping begins with the workpiece. It determines parameters such as optimum hold, sufficient clamping force, precise positioning, reliable motion.

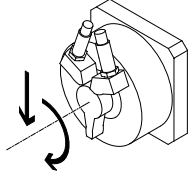



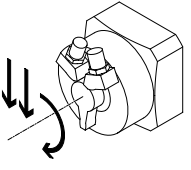

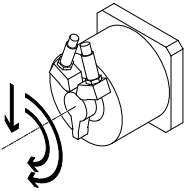









Festo offers a wide range of components for gripping, from straightforward gripping movements to components that enable workpieces to be rotated, screwed in, as well as for moving the front-end unit.

The overview shown here lists several partial movements, the products associated with them and the finished units for a combination of different movements.

















Pneumatic					Electric	
	Gripping			Suction		Gripping
Timing control	X					Controller (page 21)
Orientation	Swivel/gripper unit (page 8, 23)	Rotary/swivel units (page 6, 10)			Rotary/swivel units (page 6, 13)	
Force application		Gripper (page 7, 14)	Bellows gripper (page 20)	Vacuum generator (page 9, 24)	Vacuum gripper (page 9, 29)	Gripper (page 7, 21)
Contact element	Gripper finger (page 8, 22)			Suction cup (page 9, 28)		Gripper finger (page 8, 22)
Application	Rods, long materials, compact objects		Cylindrical, hollow shapes	Balls/cones/plates/plastic film		Rods, long materials, compact objects
						

Rotary/swivel units

Swivel units (vanes)		Pneumatic	Rotary units (pinion/gear unit)	Pneumatic/electric
Swivelling up to 270° 		 DSM-B*	Swivelling up to 200° 	 DRRD
		 DSM-HD		
		 DSM-T		
Rotating >360° 			Rotating >360° 	 ERMB with toothed belt
				 ERMO with gear unit
Screwing in up to 270° 		 DSL-B	Screwing in >360° 	 EHMB

*Additional variant with integrated measuring system type DSMI

Grippers and bellows grippers

Design			Universal	Powerful	
Pneumatic	Two-jaw	Parallel Long stroke		 HGPL	
		Parallel	 DHPS	 HGPT-B*	
			Precise HGPP Sealed HGPD	 HGPP	 HGPD
		Angle	 DHWS		
		Radial	 DHRS	 HGRT	
	Three-jaw		 DHDS	 HGDT*	
		Sealed		 HGDD	
		Internal (circular)		 DHEB	
	Electric	Two-jaw	Parallel	 EHPS	 HGPLE

*Additional high-force variant available type HGPT-B-F or HGDT-F

Contact elements and complete units

Gripper finger

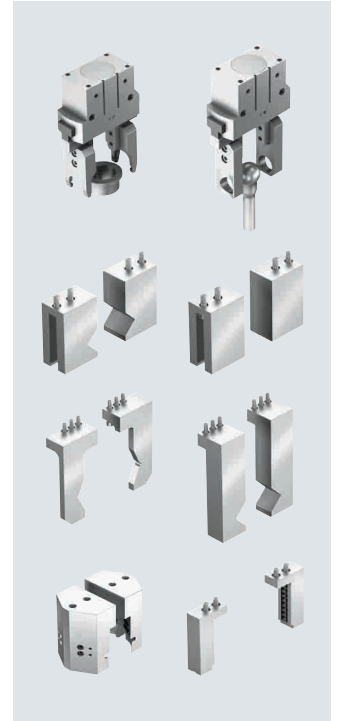


DHAS-GF

Flexible gripper fingers can adapt to the workpiece shape.

Static gripper fingers/ gripper jaws

Examples of static gripper fingers/gripper jaws that were produced by the customer for tailored workpiece gripping.



Swivel/gripper unit


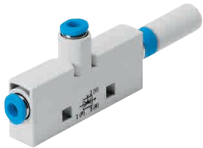

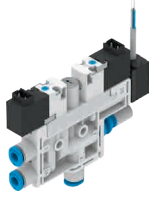


HGDS

A combination of a parallel gripper with T-slot guide and a swivel module DSM. Infinitely adjustable swivel angle (max. 210°), supply ports and position sensing outside the swivel range. High performance (torque, mass moment of inertia). All connections are accessible from one side. Compact design and low weight.

The swivel angle can be precisely adjusted by unscrewing or screwing in the cushioning component. Swivelling to a metal stop enables high repetition accuracy.

Vacuum generators

Cartridges directly installed in the drill hole	Attachment with housing	With additional functions	
			
VN	VN	OVEM	OVEL
		<ul style="list-style-type: none"> • Compact vacuum generation and monitoring in a single unit with display • Solenoid valve "vacuum ON/OFF", solenoid valve for ejector pulse • Integrated vacuum switch 	<ul style="list-style-type: none"> • Mounting on a common supply manifold with max. 8 spaces • Solenoid valve "vacuum ON/OFF" • Optional with ejector pulse • Integrated vacuum sensor

Suction cups



The suction cup insert is compatible with the ESG suction gripper range. It is suitable for bellows suction cups with 3.5 convolutions and is simply snapped into the bellows. The support offered by the suction cup insert enables delicate and fragile workpieces to be transported.

Areas of application:

- Semiconductor industry (wafers, solar cells)
- Electronics industry (printed circuit boards, thin film)
- Paper industry
- PE film

Suction gripper



The solution for low-contact gripping of pliable, porous, brittle gripping workpieces.

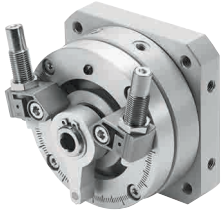
Functional principle

The incoming compressed air flows radially through the gripper and flows back out between the workpiece and gripper surface. The air is routed through a very thin gap between the gripper body and the core of the gripper, thus greatly accelerating its speed. The high outflow speeds generate a vacuum between the gripper and the workpiece.

Spacers hold the workpiece at a distance to ensure that the air can flow off smoothly. Vacuum generation according to the Bernoulli principle enables a wide range of workpieces to be gripped gently and with very little contact.

Rotary/swivel units

Swivel module DSM



DSM-B

The unique swivel module

For infinitely variable swivelling up to 270°. With adjustable fixed stop for maximum energy absorption and precision. The projecting metal sleeve for the adjustable elastomer cushioning and the shock absorber acts as an end stop for the greatest possible accuracy.

Optimal triple cushioning

- 1 For low energy absorption and fast cycle times: elastomer cushioning.
- 2 For maximum energy absorption and optimal repetition accuracy of 0.1°: hydraulic shock absorbers
- 3 For fast cycle times and outstanding repetition accuracy with medium energy absorption: adjustable elastomer cushioning.

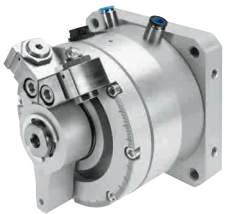
Space-saving sensing

A magnet in the stop lever makes it possible to use proximity sensors. The economical and space-saving sensing solution is quick and easy to install thanks to special sensor brackets.

Technical data

- 9 sizes: 6 ... 63 mm
- Max. torque at 6 bar: as standard and HD 40 Nm, with tandem vane 80 Nm
- Max. radial force at HD: 1,800 N
- Max. swivel angle: 270°
- Repetition accuracy: <0.1° dependent on the cushioning
- Max. permissible mass moment of inertia 4,800 kgm² x 10⁻⁴

Servo-pneumatic semi-rotary drive DSMI



DSMI with integrated displacement encoder

This swivel module, based on the DSM-B, has an extremely compact design, high torque and comes with an integrated rotary encoder.

The standard series has versatile mounting options as well as a large range of cushioning options.

Together with position controller CPX-CMAX and proportional directional control valve VPWP, the DSMI is a complete servo-pneumatic positioning system.

Technical data

- Size 25, 40, 63 mm
- Swivel angle 0 ... 272°
- Mass moment of inertia 0.0015 kgm² ... 0.60 kgm²
- Position sensing
- Integrated rotary encoder
- Proximity sensor

For maximum loads



DSM-HD with heavy-duty bearing

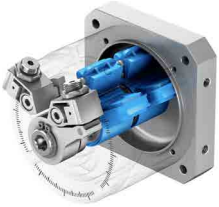
The heavy duty variant DSM-HD with preloaded, backlash-free, precise bearings is an excellent choice when very high load torques and excellent running precision are needed.

The functionality corresponds to that of the DSM-B without heavy-duty bearing.

Technical data

- Perm. axial force up to 1300 N
- Perm. radial force up to 1800 N
- Accessories for positive locking connections
- Centring sleeves ZBH

For double the torque



DSM-T / with double the torque

The variant DSM-T with tandem vane provides twice the torque, up to 80 Nm in sizes 6, 8 and 10.

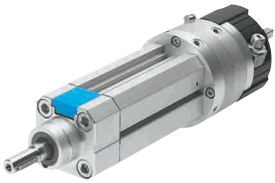
The functionality is the same as that of the DSM without tandem vanes:

- Infinitely adjustable swivel angle
- Identical interfaces
- Identical accessories

Technical data

- 9 sizes: 6 ... 63 mm
- Max. torque at 6 bar: as standard and HD 40 Nm, with tandem vane 80 Nm
- Max. radial force at HD: 1,800 N
- Max. swivel angle: 270°
- Repetition accuracy: <0.1° dependent on the cushioning
- Max. permissible mass moment of inertia 4,800 kgm² x 10⁻⁴

Swivel/linear drive unit DSL-B



DSL-B with additional stroke

The swivel/linear drive unit DSL-B combines a semi-rotary drive with a double-acting linear cylinder to create a high-performance and very cost-effective solution.

The linear stroke and rotary movement can be controlled individually and independently of each other. With its compact design, DSL-B is suitable for the smallest of installation spaces. It is perfect for simple pick & place applications and positioning tasks in assembly systems.

Flexible and reliable, powerful and precise

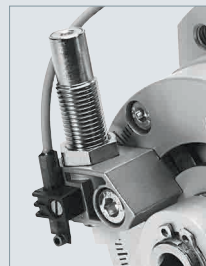
- End-position sensing of the linear and rotary movements via a proximity sensor
- Supply ports at one end for quick, clearly laid-out tubing connections
- Different mounting options

Technical data

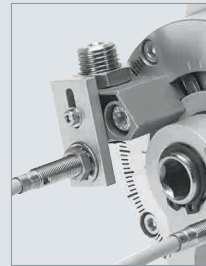
- 5 sizes
- Strokes up to 200 mm
- Swivel angle up to 270°
- Repetition accuracy up to <0.1°
- Elastic cushioning (up to 10 million switching cycles)
- Max. swivel frequency up to 2 Hz

Optimal triple cushioning

For all products with DSM components, you have the choice between shock absorber-based or elastomer-based cushioning.

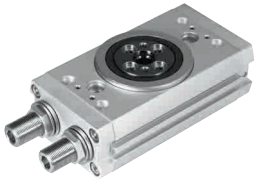


Self-adjusting shock absorber with fixed stop and proximity sensor SME-10



Elastic cushioning with fixed stop and inductive proximity sensor SIEN

Twin-piston rotary drive DRRD



DRRD

The semi-rotary drive with piston DRRD combines a high load capacity and accuracy with great economy. It is available in several sizes and provides the required torque of 1.6 to 24.1 Nm with comparatively small dimensions, making it significantly less expensive.

Cushioning

There is a choice of different types of cushioning for different loads and swivel motions:

- Elastic cushioning, with metal end position
- Shock absorbers

External cushioning

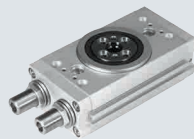
External cushioning allows the full torque to be achieved in the end positions for maximum mass moment of inertia.

Technical data

- 6 sizes: 16 ... 40 mm piston diameter*
- Torques at 6 bar: up to 24.1 Nm
- Max. perm. mass moment of inertia: 67,000 kgcm²
- Swivel angle: max. 200° freely adjustable (factory-set nominal angle: 180°)

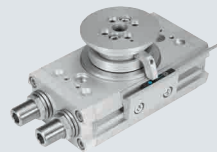
*Further sizes from 8 ... 63 for torques up to 110 Nm on request

Position sensing



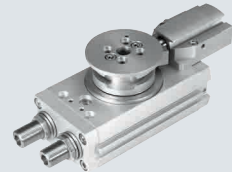
Flush-mounted to fit into the smallest installation space: internal position sensing with proximity sensors in a T-slot.

External position sensing (sensor mounting)



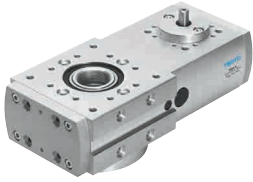
Position sensing directly at the flange shaft is possible; inductive proximity sensors SIES can be used in combination with external position sensing.

End-position locking



The mechanical lock in the end positions prevents unwanted movement when unpressurised.

Electric rotary module ERMB



ERMB

Weights of up to 15 kg can be rotated dynamically and flexibly with the freely positionable, electric rotary module ERMB. The module can be used as an axis of rotation with any rotation angle >360° or as a small, stand-alone NC rotary table. Mounting interfaces on all sides and the large hollow shaft diameter on the high-strength rotary flange make installing the module exceptionally easy.

Matching range of motors

Using servo or stepper motors simplifies the standardised controller concept and the universal software platform simplifies commissioning and activation. The ERMB's performance adapts to the requirements depending on the motor technology used.

Adaptable and reliable

Sensing module EAPS can be used to define impermissible areas. The freely adjustable index pins in the retaining ring are sensed using two inductive sensors.

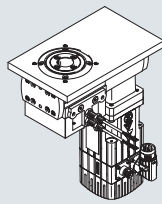
Simply stable – reduced vibration

Rotary module ERMB minimises vibrations in multi-axis systems, thereby increasing their performance thanks to uniform movements and user-defined acceleration ramps. The movements into the end positions are smooth and wear-free.

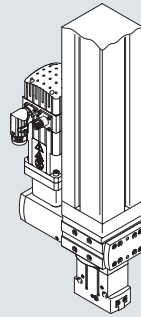
Technical data

- 3 sizes: 20, 25, 32 with a max. output speed of 300 rpm
- Repetition accuracy: ±0.03/0.05/0.08°
- Min. positioning time at swivel angle of 180°: <0.18 s

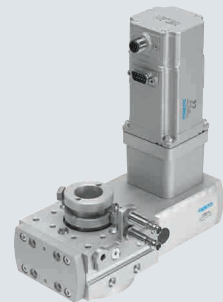
Sample applications



Application as a rotary table



Application as a rotary/lifting gripper unit with piston rod



Application with sensing module EAPS (optional with additional housing)

Highly dynamic rotary/lifting module EHMB



EHMB

This extremely compact handling unit combines rotary and linear movements, which can be positioned independently of each other. For example, loads of 1 kg

can be swivelled by 180° in only 0.25 s. The max. payload is 8 kg.

Technical data

- Max. payload: 8 kg
- Linear stroke: 100, 200 mm
- Rotation angle: infinite
- Electric or pneumatic lifting movement

Grippers

Parallel gripper DHPS



DHPS

High gripping force with compact dimensions, with an opening stroke of up to 25 mm. Load-bearing and precise T-slot guidance of the gripper jaws.

- Double-acting piston drive
- Maximum repetition accuracy
- Can be used as a double-acting and single-acting gripper
- Gripping force backup
- Compression spring for supporting the gripping forces

- Gripper jaw centring options
- Contactless end-position sensing via reliable SMx-08 sensors
- Internal fixed flow control

Technical data

- 6 sizes: 6 ... 35 mm
- Max. total gripping force (6 bar): 970 N
- Max. stroke per gripper finger: 2 ... 12.5 mm
- Repetition accuracy: ≤ 0.02 mm
- Max. operating frequency: 2 ... 4 Hz

Sturdy parallel gripper HGPT-B



HGPT-B with increased gripping force

For sturdy, powerful tasks even under difficult conditions: the HGPT-B with oval piston surface and T-slot. It has maximum torque resistance and a long service life of 10 million switching cycles.

The sturdy and precise kinematics transfer the force from linear motion into the gripper jaw movement via an inclined slotted plane and force-guided motion sequence. This synchronous movement is the result of a virtually backlash-free, plain-bearing guide with precision ground gripper jaws, the so-called T-slot.

Reliability

- Optional gripping force backup via integrated compression spring
- Up to 4 positions detected by sensors integrated flush in the housing slot
- Reliable operation in harsh environments thanks to sealing air

Force

The high-force variant has twice the force in the same installation space and half the gripper jaw stroke. Gripping force of up to 6,300 N possible.

Flexibility

- Double- or single-acting
- Internal or external gripping with just one gripper type
- Tubeless compressed air supply via optional adapter plate

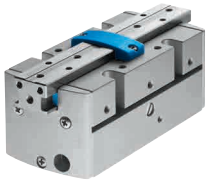
Technical data

- 8 sizes: 16 ... 80 mm
- Stroke per gripper jaw: 3 ... 25 mm or 1.5 ... 12.5 mm in the high-force variant
- Maximum gripping force: 3,100 N or 6,300 N with the high-force variant
- Repetition accuracy: $\pm 0.01/0.025$ mm
- Opening/closing times at 6 bar: 8 ... 380 ms

T-slot gripper HGPT-B with gripping force backup



Precision parallel gripper HGPP



HGPP with precision roller bearings

The key characteristic of the HGPP is its excellent gripping and repetition accuracy thanks to the backlash-free roller bearings for the gripper jaws. Another plus is its extremely long service life of 20 million switching cycles without relubrication.

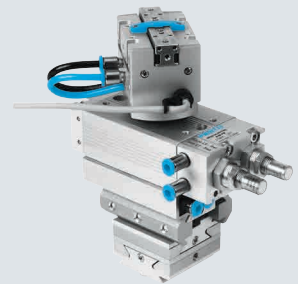
- Synchronised gripper jaw movement thanks to the double-acting piston drive using the rack and pinion principle

- Variable gripping direction, internal or external
- Gripping force backup during opening or closing
- Can be used as a single-acting gripper
- Precise sensing of various positions thanks to integrated hall sensors
- Cost-effective sensing of up to two positions by adaptable inductive sensors

Technical data

- Stroke per gripper jaw: 2 ... 12.5 mm
- Repetition accuracy: $\pm 0.01/0.02$ mm
- Gripper jaws: preloaded, backlash-free
- Operating frequency: max. 4 Hz
- Opening/closing times at 6 bar: 22 ... 170 ms

Complete solution: swivel/gripper unit for high-precision positioning



Sealed parallel gripper HGPD



HGPD with sealing

A sturdy design for high torque loads, e.g. through long gripper fingers and high process forces. It has precisely guided gripper jaws and is completely sealed for trouble-free use in extremely tough environments with dust and fluids. The gripper jaws are force-guided and thus move synchronously and also boast a long service life of 10 million switching cycles.

Reliability

- Optional gripping force backup when opening and closing
- Optional position sensing of the gripper jaws by proximity sensors, protected and integrated without protruding edges
- Optional continuous sensing of the piston position via position transmitters

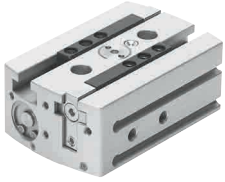
Flexibility

- Double-acting gripper for internal and external gripping
- Single-acting
- Tubeless compressed air supply via optional adapter plate
- Identical mounting surface and attachment as for the gripper HGPT-B

Technical data

- Max. gripping force: 3,920 N
- Stroke per gripper jaw: 3 ... 20 mm
- Repetition accuracy: ≤ 0.03 mm
- Operating frequency: max. 3 Hz
- Opening and closing times at 6 bar: 15 ... 400 ms

Long-stroke gripper HGPL-B



HGPL-B with long stroke

The double-acting long-stroke gripper with the highly precise and extra-long T-slot guide for the gripper jaws is ideal for high forces or large loads that need a long gripping stroke.

The adjustable opening stroke provides great flexibility because you only need one gripper type for different opening strokes. And the process is faster thanks to the optimised opening stroke. In addition, it is suitable for internal or external gripping.

Reliable operation

- The drive, using the sturdy rack and pinion principle, enables synchronous movement of both gripper jaws. Two parallel and opposing pistons move the gripper jaws directly and without loss of force
- Contactless end-position-sensing using the tried and tested SMx-10 sensors in the slot, without protruding edges

Technical data

- 4 sizes: 14 ... 63 mm
- Stroke per gripper jaw: 20 ... 150 mm
- Total stroke: 40 ... 300 mm
- Total gripping force: 130 ... 2,750 N
- Repetition accuracy: <0.03 mm
- Operating frequency: max. 1 Hz
- Opening/closing times at 6 bar: 0.1 ... 1 s

Angle gripper DHWS



DHWS

Optimised gripper jaw guide and slotted guide for angle grippers with a 40° total opening angle.

- Double-acting piston drive
- Maximum repetition accuracy
- Can be used as a double-acting and single-acting gripper
- Gripping force backup
- Compression spring for supporting the gripping forces
- Gripper jaw centring options

- Contactless end position sensing via SMx-08 sensors
- Internal fixed flow control

Technical data

- 5 sizes: 10 ... 40 mm
- Max. total gripping torque (6 bar): 1500 Ncm
- Max. opening angle per gripper finger: 20°
- Repetition accuracy: ≤0.04 mm
- Max. operating frequency: 4 Hz

Radial gripper DHRS



DHRS

Lateral gripper jaw support for high torque loads and a total opening angle of 180°.

- Double-acting piston drive
- Maximum repetition accuracy
- Can be used as a double-acting and single-acting gripper
- Gripping force backup
- Compression spring for supporting the gripping forces
- Gripper jaw centring options

- Contactless end-position sensing via reliable SMx-08 sensors
- Internal fixed flow control

Technical data

- 5 sizes: 10 ... 40 mm
- Max. total gripping torque (6 bar): 725 Ncm
- Max. opening angle per gripper finger: 90°
- Repetition accuracy: ≤ 0.01 mm
- Max. operating frequency: 2 ... 4 Hz

Radial gripper HGRT



HGRT

Sturdy and precise gripping with the radial gripper HGRT, providing a large torque for reliable motion even with longer gripper fingers. It also has a long service life of 10 million switching cycles.

Reliability

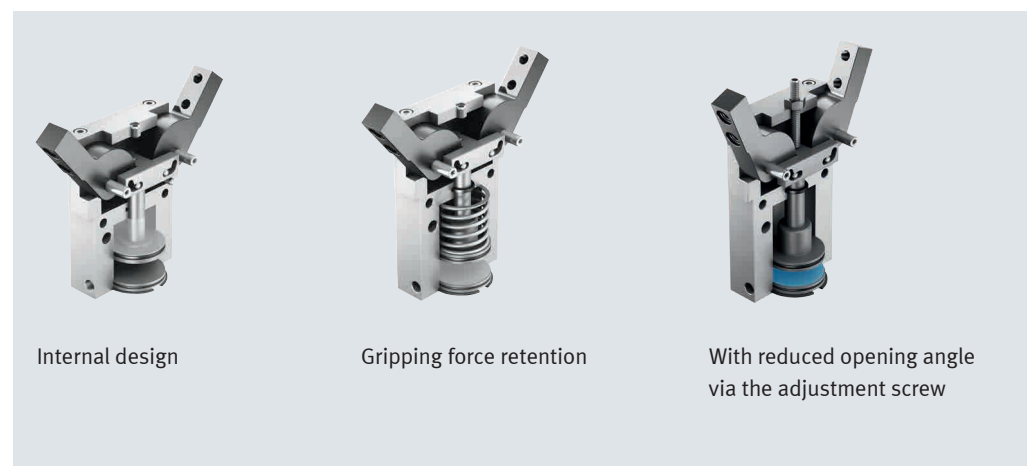
- Sealing air for use under difficult conditions, e.g. for protection against drilling emulsion or dust
- Sensing of up to two positions with sensors integrated flush or via an adapter on the outside of the housing
- Gripping force backup (external)

Flexible

- Adjusts perfectly to the application as the total opening angle is freely adjustable (max. 180°)
- A single gripper type for internal or external gripping
- Tubeless compressed air supply via optional adapter plate

Technical data

- 6 sizes: 16 ... 50 mm
- Max. total gripping torque at 6 bar: 8,400 Ncm
- Operating frequency: max. 3 Hz
- Opening and closing times at 6 bar: 200 ... 500 ms



Internal design

Gripping force retention

With reduced opening angle via the adjustment screw

Three-point gripper DHDS



DHDS

High gripping force with compact dimensions and a gripping diameter of up to 50 mm. Heavy-duty, precision T-slot guide for gripper jaws

- Double-acting piston drive
- Maximum repetition accuracy
- Can be used as a double-acting and single-acting gripper
- Gripping force backup
- Compression spring for supporting the gripping forces

- Gripper jaw centring options
- Contactless end-position sensing via reliable SMx-08 sensors
- Internal fixed flow control

Technical data

- 3 sizes: 16 ... 50 mm
- Max. total gripping force (6 bar): 840 N
- Max. stroke per gripper finger: 2.5 ... 9 mm
- Repetition accuracy: ≤ 0.04 mm
- Max. operating frequency: 4 Hz

Sturdy three-point gripper HGDT



HGDT with increased gripping force

Gripper series for central gripping

Precise and sturdy for absorbing large torques, e.g. by using long gripper fingers and large process forces. Synchronous movement of the three jaws is always guaranteed thanks to the backlash-free, plain-bearing guide with precision ground gripper jaws in the T-slot. In addition, it has a long service life of 10 million switching cycles.

Reliability

- Optional gripping force backup via integrated compression spring
- Position sensing, protected and integrated without protruding edges
- Reliable operation in harsh environments thanks to sealing air

Force

The high-force variant has twice the force in the same installation space and half the stroke – a total gripping force of up to 3,400 N, with spring-supported gripping force backup of up to 4,500 N.

Flexibility

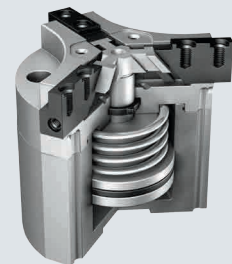
- Double-acting gripper for internal and external gripping
- Single-acting
- Tubeless compressed air supply via optional adapter plate

Technical data

- 5 sizes: 25 ... 63 mm
- Stroke per gripper jaw: 3 ... 10 mm or 1.5 ... 5 mm in the high-force variant
- Repetition accuracy: < 0.03 mm
- Operating frequency: max. 4 Hz
- Opening/closing times at 6 bar: 25 ... 300 ms

Optional position sensing with reliable sensors and flush, surface mounted integration

Synchronous movement of the gripper jaws – sturdy and precise guidance.



HGDT-F with high-force design

Sealed three-point gripper HGDD



HGDD with seal

Completely sealed gripper series

A sturdy design for high torque loads. It has precisely guided gripper jaws and is completely sealed for trouble-free use in extremely tough environments with dust and fluids. The gripper jaws are force-guided and thus move synchronously and also boast a long service life of 10 million switching cycles.

Reliability

- Optional gripping force backup, opening and closing via integrated compression spring
- Optional position sensing of the gripper jaws by proximity sensors, protected and integrated without protruding edges
- Optional continuous sensing of the piston position via position transmitters

Flexibility

- Double-acting gripper for internal and external gripping
- Single-acting
- Tubeless compressed air supply via optional adapter plate
- Identical mounting surface as for the gripper HGDT

Technical data

- 5 sizes: 35 ... 80 mm
- Max. gripping force: 2,830 N
- Stroke per gripper jaw: 4 ... 12 mm
- Repetition accuracy: ≤ 0.03 mm
- Operating frequency: max. 4 Hz
- Opening and closing times at 6 bar: 40 ... 250 ms

Bellows grippers

Bellows gripper DHEB



DHEB

For sensitive and reliable internal gripping of fragile workpieces, the single-acting bellows gripper DHEB is the product of choice.

It is extremely efficient thanks to its multifunctional use allowing a leak test to be carried out at the same time as the workpiece is being transported.

Diversity

For a wide variety of applications

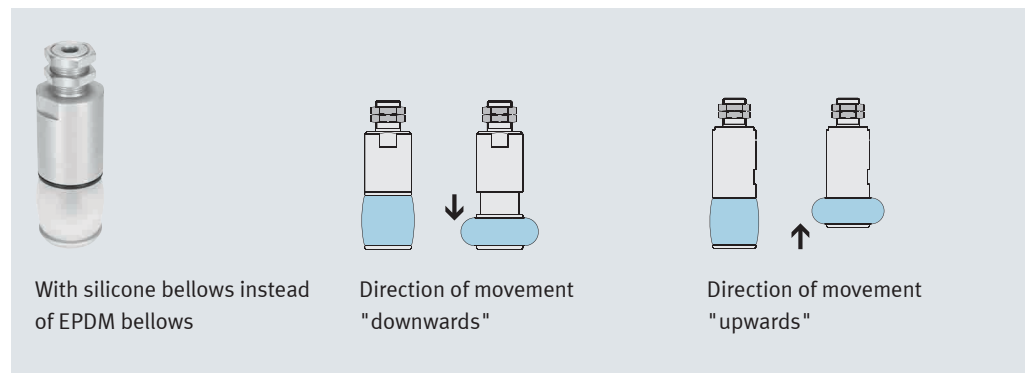
- 11 sizes, 8 ... 85 mm gripping diameter
- Upwards or downwards direction of movement of the bellows
- Different bellows materials: EPDM for higher loads or silicone for higher temperatures
- Air connection on the side or from above

Reliability

- Optimised process sequence and greater quality: gripper material and smooth motion prevent workpieces from being scratched
- Additional reliability thanks to optional sensing via proximity sensors or other sensors

Technical data

- Payload up to 5 kg
- Max. cycle frequency < 4 Hz
- Pressure range 5 to 8 bar



Applications

The bellows gripper is suitable for transporting or packaging glasses, cups, bottles, test tubes or laboratory glassware and all other types of containers such as plastic bottles. It can also be

used for handling a variety of workpieces with circular openings, such as plastic containers, covers or housing components for electronic and household appliances.

Electric grippers

Electric parallel gripper EHPS



EHPS

The electric standard gripper EHPS is the electric version of the standard grippers DHPS. The concept of the electric standard gripper is based on simplicity and low complexity – all the electronics are integrated into the gripper, which means that an external motor controller is not required. It is designed to repeatedly perform simple and standardised movements. The gripper is used to move small to medium-sized parts and when the use of pneumatics is not permitted.

A dynamic and powerful brushless direct current motor provides the compact gripper with high forces. In addition, the sturdy T-slot jaw guide means it can grip workpieces reliably and with high torque resistance. With an integrated sensor slot, the jaw position can be directly sensed. The gripping force can also be optimally adapted to the workpiece via a four-way latched switch.

Installation is easy too as the integrated electronics enable a direct connection to the controller via an M12 plug.

Technical data

- 3 sizes: 16, 20, 25
- Maximum total gripping force: 50N – 500N
- Max. stroke per gripper jaw: 10 ... 16 mm
- Repetition accuracy: 0.05 mm
- Voltage/max. current consumption: 24 V/max. 2 A

Electric gripper HGPLE



HGPLE

The gripper HGPLE is the electric version of the pneumatic long-stroke gripper HGPL – it has the same dimensions and identical interfaces. It features maximum flexibility and a long service life of 10 million strokes.

Thanks to the different gripping options, the HGPLE is ideally suited to soft or highly sensitive workpieces. These options range

from free movement of the gripper jaws in terms of position and speed through to controlled gripping force.

With its sturdy and rigid T-slot design, it reliably grips large and heavy workpieces, even with high torque resistance.

Technical data

- Recommended total gripping force can be set freely up to a max. of 600 N at medium speed
- Size 25 with max. total stroke of 80 mm, freely adjustable
- Repetition accuracy <0.05 mm
- Max. speed 65 mm/s and max. acceleration 500 mm/s²
- Gripper weight without gripper fingers: 1.7 kg

Motor controller SFC-DC

This position controller and closed-loop position controller, which can be used with or without control panel, has a high degree of protection to IP54 and can thus be installed directly on site and near the gripper. Easy activation via fieldbus (PROFIBUS, CANopen, DeviceNet®).



Motor controller SFC-DC with control panel

Gripper fingers

Gripper finger DHAS-GF



DHAS-GF

The FinRay® principle

When looking at the cross-section, the gripper's ribs and edges form a mesh-type structure. The sturdy connection of the joints produces a wave-like shape when a force is applied to them and is ideal for a positive engagement during gripping.

This motion principle, based on that of a fishtail, was the subject of a bionics study. The objective of this research project is to transfer proven solutions from nature to technological models.

The benefits for you

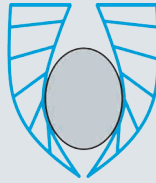
The moving part combines the principles of positive and friction-based gripping, while simultaneously providing a large contact area for contoured surfaces.

You can now have one product with two gripping principles for gentle, yet reliable gripping.

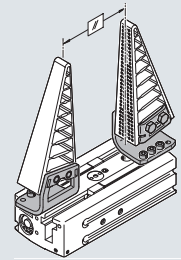
Technical data

- Ambient temperature [°C] +10 ... +50
- Corrosion resistance class CRC 2
- Free of paint-wetting impairment substances
- Free of copper, PTFE and silicone, CT compliant
- Storage temperature [°C] +10 ... +50
- RoHS compliant
- Gripping principle: frictional and positive locking

Gripper fingers fit around the workpiece contour.

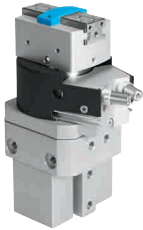


To make the most of the advantages of the blue gripper finger, it is recommended to install it on a long-stroke gripper using a mounting kit.



Swivel/gripper units

Swivel/gripper unit HGDS



HGDS

The swivel/gripper unit HGDS combines semi-rotary drive DSM-B with precision gripper HGPP into a high-performance and very cost-efficient solution. Both gripping or rotating motion can be controlled individually and independently of each other. Substantially more compact than the combination of the two separate products, HGDS is ideally

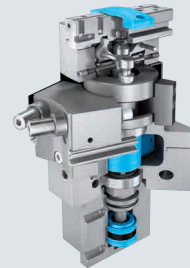
suited to small installation spaces, making it perfect for simple, small pick & place units.

It also has a clear design.

Technical data

- 3 sizes for torques up to 2.5 Nm
- Freely adjustable swivel angle up to 210°
- Repetition accuracy up to <0.02 mm
- Elastic cushioning or hydraulic shock absorbers for up to 10 million switching cycles
- Maximum swivel frequency up to 2 Hz

Internal design



Vacuum generators

Vacuum generator cartridges VN



VN

Simple and extremely flexible

For faster evacuation, greater productivity and maximum flexibility thanks to vacuum generation in a customer-specific housing. Just drill a hole in the machine and insert the vacuum generator cartridge without its housing into the hole. This decentralised solution requires minimal space and opens up a wide variety of applications.

Low energy consumption

Economical design: short tubing lengths reduce compressed air consumption, as does the low-weight and space-optimised shape. There's no more need for special vacuum valves.

Characteristics

- 5 different sizes
- High-flow and low-flow variants
- Types with large suction rate for porous workpieces
- Variants for powerful vacuum

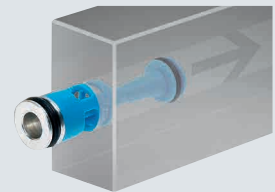
Customised system

The VN cartridge can be easily installed by drilling a hole, which makes it ideally suited for simple and space-saving use directly on the suction gripper.

Technical data

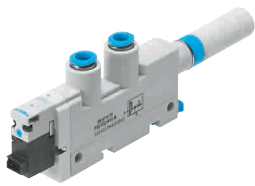
- Weights < 4 g
- Direct installation in drill hole diameter: 6, 8, 11 mm
- For non-lubricated compressed air

Different evacuation times and vacuum levels differentiated by a colour code.



Simple installation by inserting it in the through-hole.

Vacuum generators VN



VN

Decentralised vacuum + mechanical ejector pulse + electrical actuation

Reduced cycle times and reliable placing are ensured by the new vacuum generators VN with integrated mechanical ejector pulse, electrical actuation for decentralised ON/OFF vacuum generation or a combination of both.

Characteristics

- Large product range thanks to different types in the modular system
- High vacuum level up to -0.88 bar
- Can be used directly in the work space
- Straight or T-shape
- No wearing parts

Shorter cycle times = higher productivity

- Vacuum formed very quickly by direct attachment to the suction gripper
- Faster access = shorter cycle times
- Accelerated placement and maximum reliability
- Fully integrated ejector pulse and solenoid valve for vacuum ON/OFF
- Compact and sturdy
- Minimum installation and commissioning time

Technical data

- Weights 15 up to 190 g

VN nozzle in straight and T-shape, VN-P nozzle with integrated sensor

Accessories for vacuum generator

Silencer

Optimum sound absorption
VN with silencer set and quick connection for low noise levels. Convenient and easy to install.

For clean intake air
Closed silencers with large reduction of noise levels.

For dirty intake air
Open silencers, especially for use with a high suction rate. They come with push-on extensions and are maintenance-free.

Vacuum generator OVEM



OVEM

All in one

Vacuum generator OVEM features excellent reliability, safety, a simple design and very energy-efficient vacuum generation to -0.93 bar.

It expands the modular handling and assembly system, from the cost-effective basic functions through to intelligent solutions.

Short switching times

- Two built-in solenoid valves for activating the vacuum generator
- Ejector pulse via solenoid valve for fast, precise and reliable placement

Process reliable

- With vacuum sensor, including LCD display and with bar graph that is easy to read during operation

- With switching output, signals when the vacuum level has been reached
- Optional safety function for de-energised vacuum generation (valve basic setting NO)
- Prevents loss of pressure thanks to integrated check valve

Variants

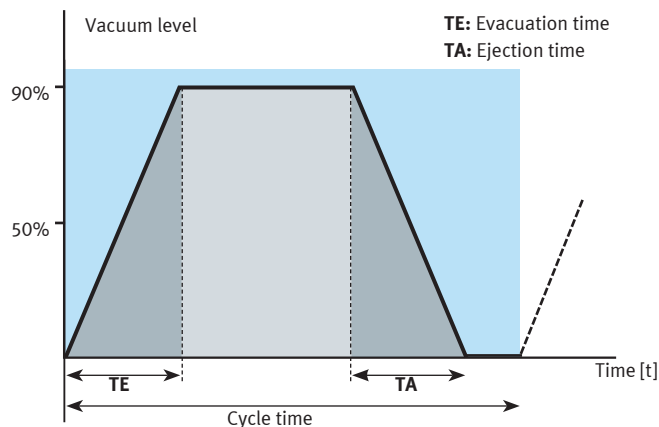
- Laval nozzle in 4 nominal widths: 0.45/0.7/0.95/1.4/2.0 mm
- Powerful vacuum or high suction rate

Easy to use and maintain

- Clearly laid out with all controls on one side
- Simple to install thanks to IP65
- Built-in filter with inspection window

Technical data

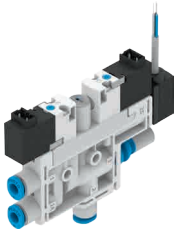
- Nominal width 0.45 ... 2.0 mm
- Push-in connector QS6, QS8
- Minimum cycle time 3.5 ms (IO-Link®)



Space-saving, combinable, economical

Condition monitoring with the vacuum generator OVEM allows the relevant times (TE, TA) within the handling cycle to be directly controlled and optimised, and includes an energy-saving function for even greater economical operation.

Vacuum generator OVEL



OVEL

Configurable

The configurable vacuum generator creates a vacuum, an adjustable ejector pulse and status monitoring signals. Thanks to its reduced weight, it can be used on a decentralised basis, e.g. directly in the gripper unit.

Short cycle times

The proximity to the vacuum suction cup means that the evacuation time setting can be very fast. This has a direct impact on the cycle times.

Technical data

- Vacuum sensor pressure range [bar] -1 ... 1 / -1 ... 0
- Analogue or digital switching output signal
- Connection type H

Suction cups

Suction cup ESG



ESG

5,000 combinations for any application

Vacuum suction grippers are a simple, low-cost and reliable solution for handling workpieces, parts, packaging, etc.

Festo offers a wide range of suction gripper designs:

- Universal suction grippers
- Flat suction grippers
- Bellows suction grippers
- Special suction grippers

Materials

- Nitrile rubber, e.g. for smooth, oily surfaces
- Anti-static nitrile rubber, e.g. in the electronics industry
- Viton®, e.g. in the glass industry
- Polyurethane, e.g. for rough surfaces

- Polyurethane, heat-resistant for higher temperatures
- Silicone, e.g. in the food sector

Criteria for selecting the material

- Suction cup's resistance to wear
- Degree of stress, e.g. for high dynamic response
- Industry sectors such as the food, electronics and automotive industries
- Properties of the workpieces, e.g. surface, weight, sensitivity
- Environment, e.g. chemically aggressive media, temperatures

Technical data

- Suction cup diameter: 2 ... 200 mm
- Connections:
 - Male thread
 - Female thread
 - Push-in connector
 - Barbed fitting
- Round suction cup:
 - Standard
 - Extra deep suction cup
 - Bellows, 1.5 convolutions
 - Bellows, 3.5 convolutions
 - Bell-shaped
- Height compensator
- Angle compensator
- Filters

Suction cup insert OASI



OASI

For when you need a completely flat surface with a powerful vacuum. The vacuum suction cup insert OASI, made of porous sintered material, makes vacuum handling of brittle, fragile, unstable or flexible workpieces gentle and reliable.

It transports workpieces such as plastic film, printed circuit boards or solar cells without

sucking them in or deforming them, even if there is a large vacuum.

It is also extremely easy to use: snap the insert into a bellows suction cup with 3.5 convolutions – and you're done!

Technical data

- Suitable for high vacuum: 0.95 ... 0 bar
- Suitable for ejector pulse: up to 5 bar
- Diameter size: 10, 20, 30, 40 and 50 mm
- Additional stop for the 20 mm diameter variant
- Pack of 5 or 10, depending on the size
- Fast and easy to retrofit

Mounted suction cup insert



Suction grippers

Suction gripper OGGB



OGGB

Transports delicate workpieces reliably, quickly and gently

This gripper with built-in vacuum generator operates on the Bernoulli principle and is virtually contactless. The workpiece floats on an air cushion and only comes into contact with the gripper at a few points. These are made of elastomer to withstand high lateral forces.

Main applications

- Solar cell and wafer transport
- Thin film transport
- Film, glass or printed circuit board transport
- Uneven metal sheets
- General: large, pliable parts such as cardboard, plastic sheets, wood veneers, textiles, carbon-fibre mats
- Separation
- Spreading out several individual parts gripped at the same time

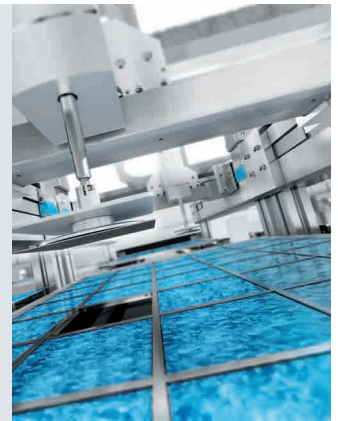
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Technical data

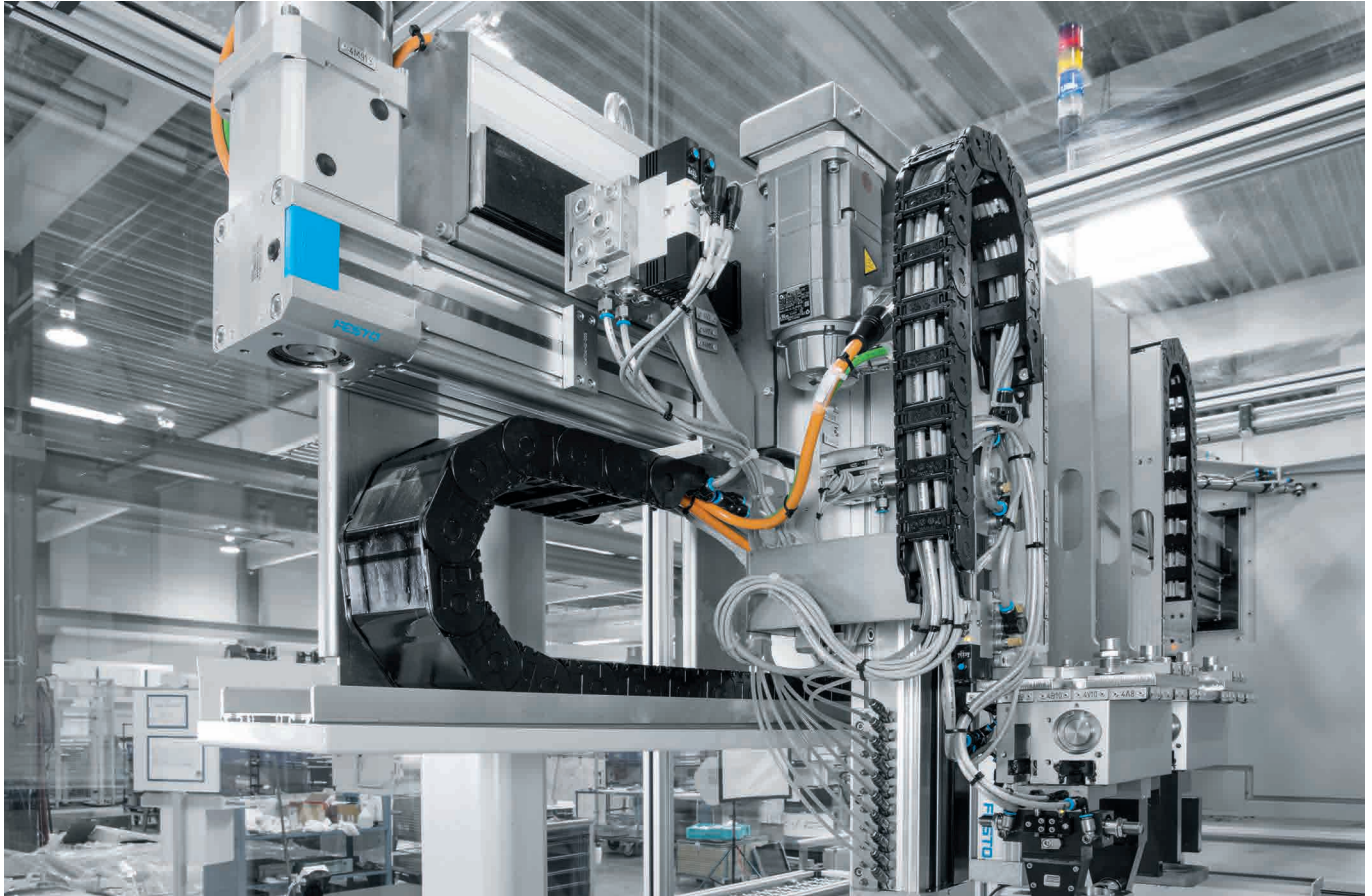
- Diameter 60, 100, 140 mm
- Holding force 10 N
- Supply pressure 0,1 ... 6 bar (optimally 1 ... 2 bar)
- Ambient temperature: 0 ... +60°C
- Volume 65 dBA
- Air consumption 110 l/min*

* At 1 bar pressure

Gentle and reliable wafer transport



Customised solutions



To ensure that every application has the right solution, Festo also offers individual gripping solutions based on your requirements, often combined with rotary and semi-rotary drives.

From simple, small-scale solutions through to complex gripping systems, we can provide you with a package that will help you save time and money. And reduce your time to market, allowing you to react more quickly to market demand.

Our specialists plan and design the ideal gripper system for your front-end unit on the basis of your requirements, using our extensive modular system of mechanical grippers and suction grippers.

When integrating a system in a machine, we always make sure that it is designed to save space.

Individual adaptations such as ejectors, multiple grippers, gripper fingers and gripper jaws complete the range.

Advantages

- Ready-to-install gripper system, customised to your individual application
- No interface problems with the handling system
- Optimised performance
- Combined with rotary function as a positioning package
- Customised solutions possible for all requirements
- Minimum space requirement
- Special gripper jaws and gripper fingers, combinations with FinRay gripper fingers
- Easy installation and mounting
- Complete CAD data for fast design
- Short lead times for planning, design and assembly
- Simplified logistics thanks to an all-in-one solution

Beyond the actual gripping process, the feeding in, the shape and weight of the workpiece and cycle times all play a role in the design of a gripper solution.

Depending on the environment, energy supply and preferences, our project experience has given us a range of options that enable us to find the optimum solution for your task.

If you would like to take advantage of these options, please contact us.

The following examples of applications provide answers to specific questions as well as to overall problem areas.

To make the overview as clear as possible, there are no details of sensors, accessories and cushioning requirements. Only the handling situation itself is described.

Example*	A	B	C	D	E	F	G	H	I	J
Description of the solution	Gripper fingers	Gripper rails	Gear mechanism	Vacuum multipoint	3 independent gripping points	Screwing in movement	Adjusting movement	Double gripping head	Vacuum long axes	Parallel kinematic system
Partial movements of a gripping process	Sample products for realising the partial movement									
Movement (x-axis)	x	x	x	x	x	x	X	DGE EGC	DGE	EXPT
Alignment (rotary/swivel)	x	x	x	x	x	X	DRRD	X	x	
Adjustment (y-axis)	x	x	x	x	x	X	DGC	X	DGE	
Plunging (z axis) + (rotation)	x	x	x	X	DGSL	DSL-...-SA EMMS-AS	X	EGC	DGE	
Gripping	HGPT	HGPL	HGPT	ESG	HGPT HGPL	HGDT	HGPT	HGPT	VADMI + ESG	DSNU + DHASGF

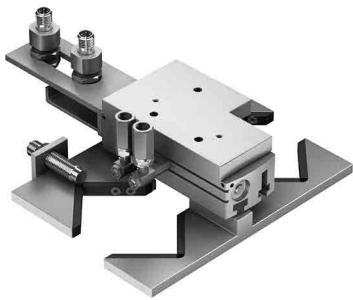
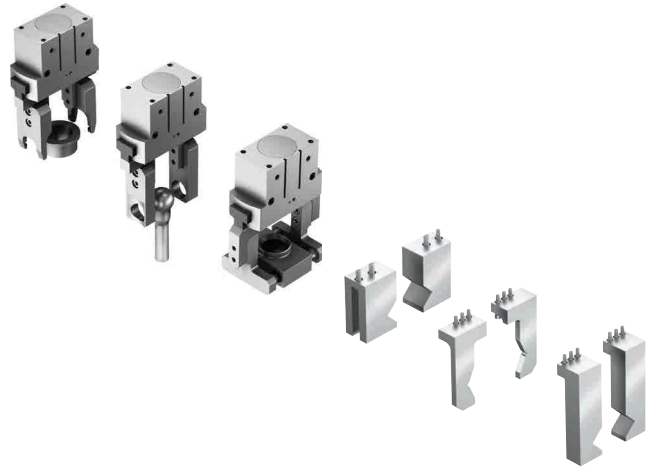
* The projects outlined here are described in more detail on the following pages. They show a selection of the customer solutions we have developed over many years.

Examples A-E

Example A

Individual gripper fingers

The shape of the gripper finger is generally tailored to the workpiece in order to meet mechanical gripping requirements. It is therefore advisable for the customer to design the gripper finger in order to ensure the best possible gripper reliability. The number of contact points, size of contact surfaces and shape of contact lines are thus parameters that can be defined for an optimum gripping process.



Example B

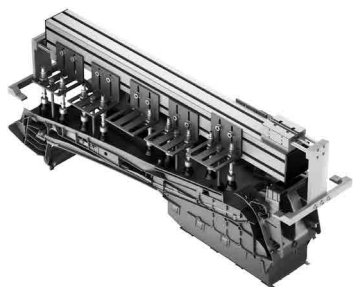
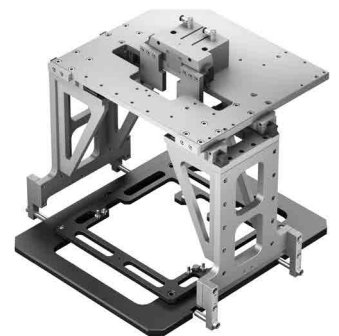
Multi-gripping of coupling housings

By using several rails one gripper can grip several objects at the same time. T-slot guides also enable protruding interfaces. With these types of rails, free-form components can also often be gripped in positions where the centre of gravity is off-centre.

Example C

Lever gripper for frame parts

By using lever systems, large objects can be gripped and safely moved with just one gripper. The support structure as well as the light materials used also help to conserve energy. Slot guides take the load of the oversized gripping mechanism.



Example D

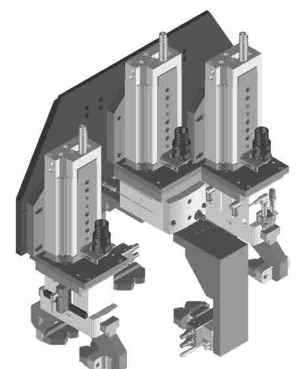
Vacuum lifting of free-form parts

When space conditions are tight or the component shape makes mechanical gripping impossible, a solution with suction cups and vacuum ejectors can be suitable. The gripping force is evenly distributed and slight in the geometries of the parts can be compensated for by the suction cup with connector.

Example E

Sheet metal parts handling

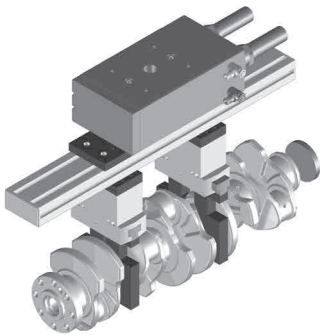
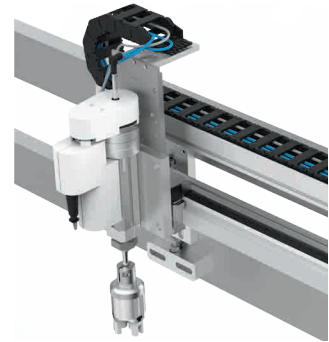
Undercuts on workpieces can lead to the gripping points being at different heights or to a slightly larger width needing to be observed on one side. This requires a differentiation in the height control at the gripping points.



Examples F-J

Example F Handling sealing caps

Functional movements like screwing on covers frequently require overlapping rotary and lifting motions. Picking up parts from outside the screwing area usually requires a shift along a horizontal axis.

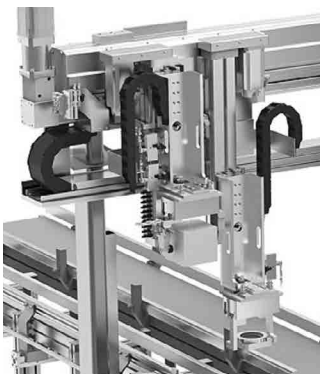
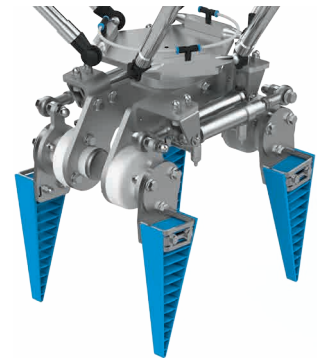


Example G Crankshaft converter

If the gripping parameters for an object change because of a different variant, for example, it is possible to make adjustments. Rotary/swivel components with appropriate cushioning are required if the movement for gripping and setting down is not identical. Slot guides with a high torque resistance offer the robustness needed for heavy loads.

Example H Parallel kinematic system for loaves of bread

The self-gripping mechanism of the flexible gripper fingers is supported by lifting mechanics. A parallel kinematic system is responsible for the movement in the space.

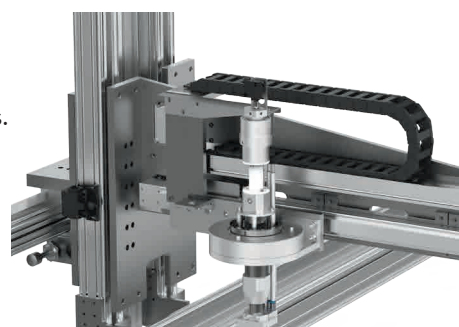


Example I Loading and unloading machine

The aim of dual grippers is to provide a horizontal stroke movement for two gripping processes at the same time. Each gripper is tailored to the task in terms of the vertical stroke and the gripper finger design.

Example J Picking unit

The lighter the design of the front-end unit, the faster the movements. Here is an example of a packaging unit with vacuum suction, capable of handling up to four packages at the same time.





Complete product range

Our complete product range includes grippers and suction cups with connectors.

→ www.festo.com/catalogue

Core product range

Our core product range includes linear and rotary components.

It offers selected products for 80% of automation applications.

They can be ordered using the part number and are particularly attractively priced.

→ www.festo.com/kernprogramm

Customer Solutions

If you cannot find any suitable products for your task in our product range,

our specialists in the Customer Solutions are always available to provide support.

→ www.festo.com/handling