

Suction grippers

FESTO



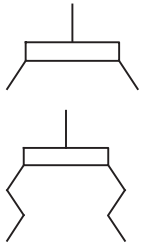
Suction grippers

Key features

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Product overview

Suction gripper and suction cup



Festo vacuum suction grippers offer outstanding functionality and quality.

An extensive range of modular suction cups in different shapes, materials and sizes, plus a wide selection of suction cup holders, angle and height compensators and filters within the

modular suction gripper system, provide users with a huge range of possible combinations for a wide variety of applications.

Suction gripper ESG

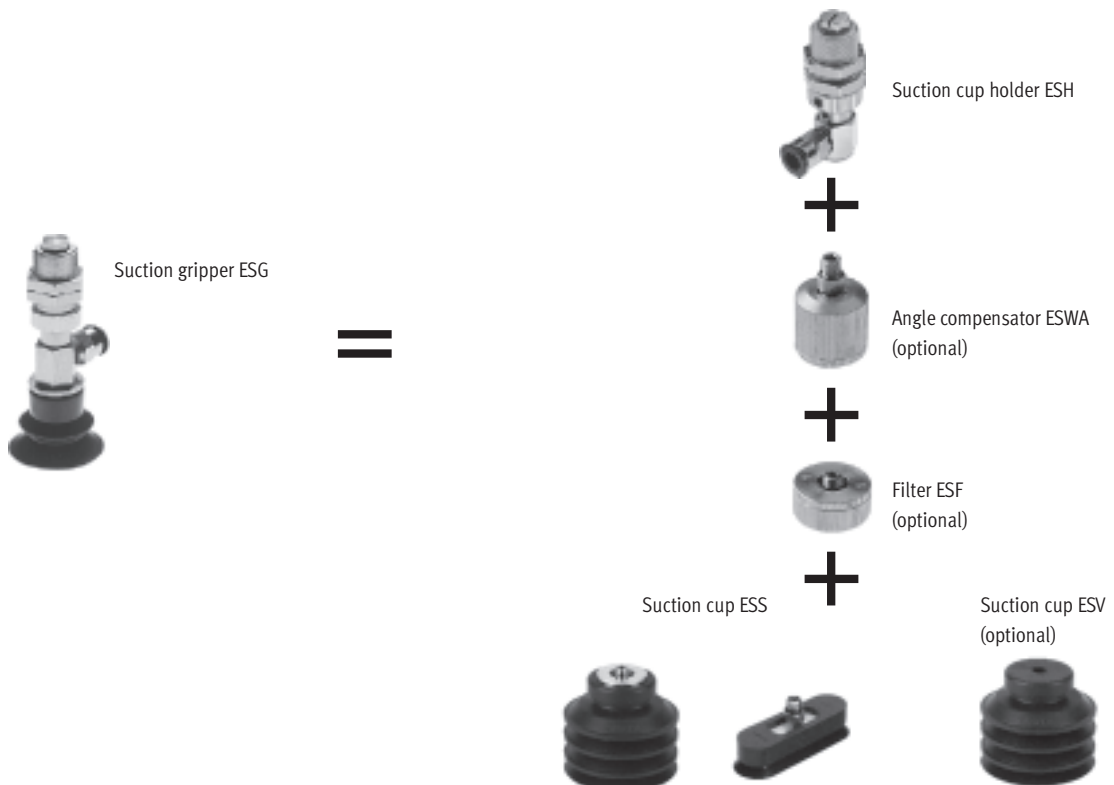
→ 6

Modular products with over 2000 variants

- The ideal solution for the transport of workpieces of different weights, surfaces and shapes
- Choose from:
 - 15 suction cup diameters
 - 5 different materials – including antistatic types
 - 5 suction cup shapes
 - Various suction cup holders
 - Optional accessories (filters and angle compensators)
- Wide range of variants
- A suitable solution for every task
- Wide range to suit applications with various temperature ranges and workpiece surfaces
- Suction cups made from silicone are approved for use in the food industry

Suction grippers as a complete solution

Suction grippers made from individual components



Suction grippers

Key features

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Suction cups VAS/VASB

Technical data → Internet: vas

Sturdy and reliable

- The ideal solution for the transport of workpieces of different weights, surfaces and shapes
- Choose from:
 - 12 suction cup diameters
 - 2 suction cup shapes: round and bellows design
 - 3 suction cup materials: nitrile rubber, polyurethane and silicone for use in a wide variety of applications
- Wide range to suit applications with various temperature ranges and workpiece surfaces
- Suction cups made from silicone are approved for use in the food industry
- All tubing connector sizes correspond to a holder size



Suction grippers

Key features

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At a glance

The Festo suction gripper range offers a wide variety of possible combinations with a modular product system containing more than 2000 variants.

Choose from:

- 2 suction cup shapes:
 - Round, 15 different diameters
 - Oval, 11 different diameters
- 6 suction cup designs
- 6 different suction cup materials
- Various suction cup holders:
 - With and without height compensators
 - With different tubing connectors: Push-in fitting, barbed fitting, or threaded
- Optional accessories: Filters and angle compensators

Even extremely small workpieces, e.g. in the electronics industry, can be accurately and gently transported. Additionally, all components included in the modular range are easily and quickly interchangeable in the event that requirements change. Suction grippers can be ordered complete, or as individual components.

Cost savings thanks to:

- Modular range
- The handy suction cup can be replaced easily (wearing part)
- Reduced warehousing
- Long service life
- Low investment costs
- Large range – including industry-related solutions

The complete solution

The suction gripper ESG comes already assembled to meet your specific requirements and is ready to use.

The suction cup shape and dimensions together form a part number. You can then expand this part number to form a personalised type code by adding your own choice of suction cup material, holder type, tubing connector and accessories.

Your benefits:

With just one part number and type code you can order your own complete suction gripper system.



The individual components

If, for instance, you have to handle a different workpiece surface finish, all you need to do is add the right suction cup.

Your benefits:

By adding individual components you can create new areas of application for your suction gripper ESG.

Suction cup holder ESH

Technical data → Internet: [esh](#)

The area of application determines which is the right suction cup holder to use.

The suction cup or accessories are attached directly to the suction cup holder.

- 6 holder sizes
- 8 holder types
- 3 tubing connectors



Suction cup with mounting ESS

Technical data → Internet: [ess](#)

The suction cup consists of the suction cup itself, plus the support plate with mounting.

Here too, the area of application of the suction gripper determines which is the right suction cup to use.

- 6 connection sizes: a tubing connector for every holder size
- 2 suction cup shapes
- 6 suction cup designs
- 6 suction cup materials



Accessories

Filter ESF

Technical data → Internet: [esf](#)

- For protecting vacuum generators from contamination or damage



Angle compensator ESWA

Technical data → Internet: [eswa](#)

- The angle compensator ensures maximum suction cup grip for workpieces with sloping surfaces.



Suction grippers

Product range overview

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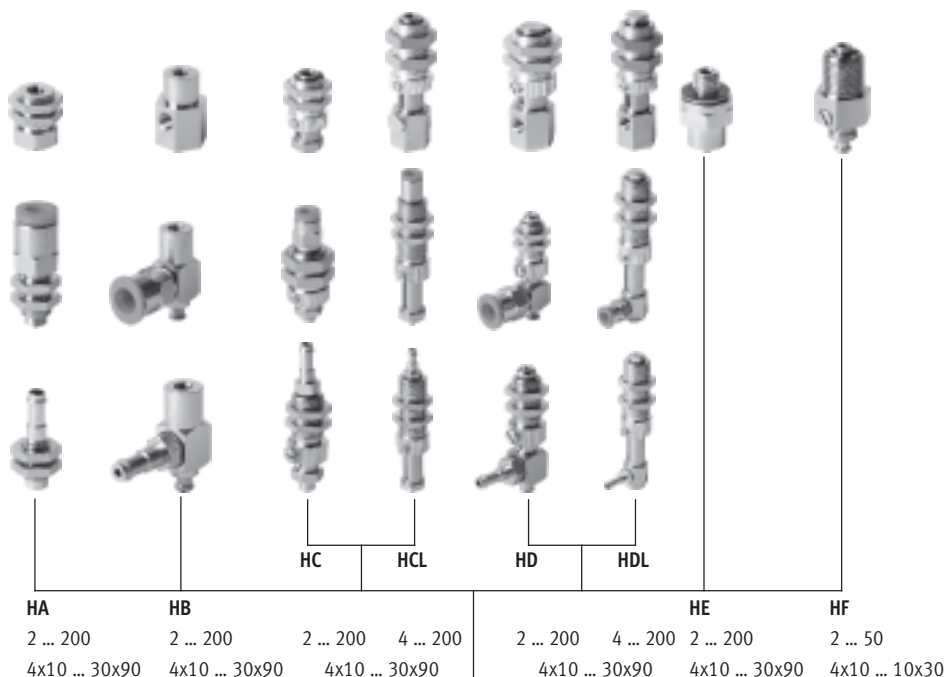
Suction cup holders

Connection with G thread
for suction cup \varnothing 60 ... 200 mm
for suction cup size 15x45 ... 30x90 mm

Push-in fitting QS
for suction cup \varnothing 2 ... 50 mm
for suction cup size 4x10 ... 10x30 mm

Barbed fitting PK
for suction cup \varnothing 2 ... 50 mm
for suction cup size 4x10 ... 10x30 mm

Holder type
for suction cup \varnothing [mm]
for suction cup size [mm]



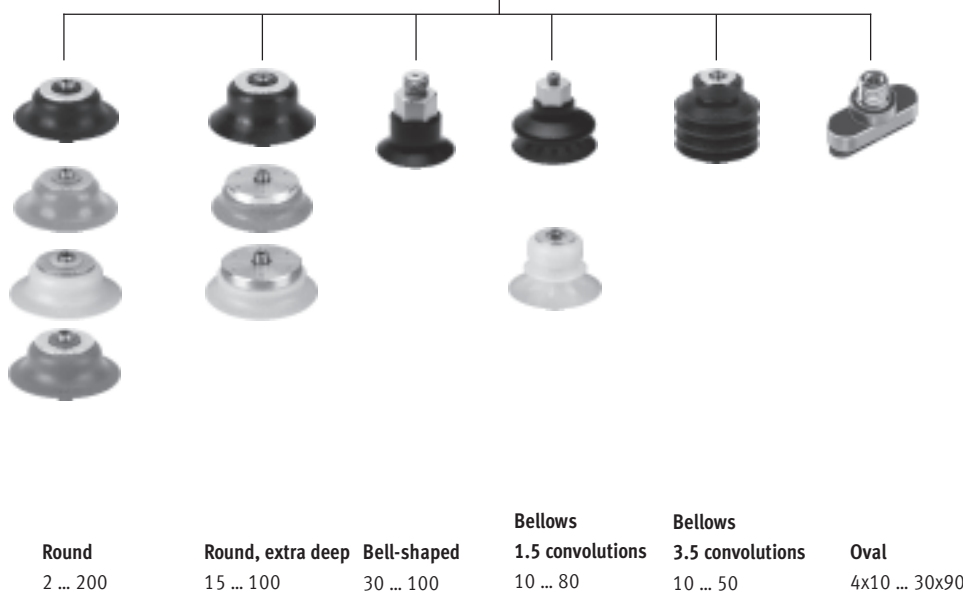
Angle compensators
for suction cup \varnothing 10 ... 100 mm
only holder sizes 3, 4 and 5

Filters
for suction cup \varnothing 10 ... 50 mm
for suction cup size 4x10 ... 30x90 mm
only holder sizes 3 and 4

Suction cups

Materials:

- Nitrile rubber (NBR)
for suction cup \varnothing 2 ... 200 mm
- Nitrile rubber (NBR)
antistatic
for suction cup \varnothing 2 ... 50 mm
- Polyurethane (PU)
for suction cup \varnothing 2 ... 200 mm
- Silicone (SI)
for suction cup \varnothing 2 ... 200 mm
- Fluoro rubber (FPM)
for suction cup \varnothing 2 ... 200 mm
- Vulkollan® (GT/BT)
for suction cup \varnothing 30 ... 100 mm

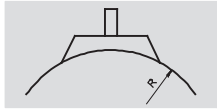


Suction grippers ESG for suction cup Ø 2 and 4

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Technical data

Function



Temperature range

–30 ... +200 °C

Suction cup type:

- Standard, round



General technical data – Suction cup						
Suction cup Ø [mm]	Suction cup connection [mm]	Effective suction cup Ø [mm]	Breakaway force at –0.7 bar [N]	Suction cup volume ²⁾ [cm ³]	Min. radius R ³⁾ of workpiece [mm]	Weight [g]
Standard, round						
2	3 ¹⁾	1.4	0.1	0.002	10	0.1
4	3 ¹⁾	3.3	0.4	0.008	10	0.1

1) Is plugged onto or into the suction cup

2) Volume to be evacuated

3) Minimum arc radius of the workpiece to be gripped

Material types – Suction cup					
Material	N	U	S	F	NA
Shore hardness	50 ±5	60 ±5	50 ±5	60 ±5	50 ±5
Colour	Black	Blue	Transparent	Grey	Black with white dot
Material	Nitrile rubber	Polyurethane	Silicone	Fluoro rubber	Nitrile rubber, antistatic
Note on materials	RoHS-compliant				
	Free of copper and PTFE				

Ambient conditions – Suction cup					
Material	N	U	S	F	NA
Ambient temperature [°C]	–10 ... +70	–20 ... +60	–30 ... +180	–10 ... +200	–10 ... +70
Corrosion resistance CRC ¹⁾	1				

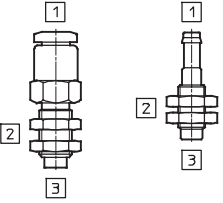
1) Corrosion resistance class 1 according to Festo standard 940 070

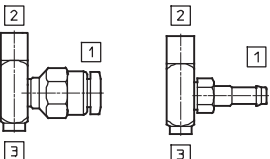
Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

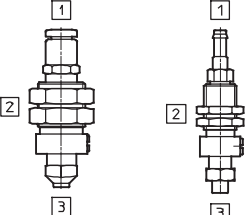
Suction grippers ESG for suction cup Ø 2 and 4

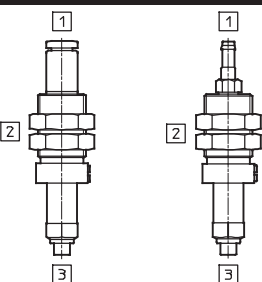
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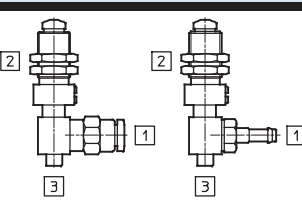
Technical data

Suction cup holder size 1		Vacuum port 1	
Holder type HA		QS4	PK-3
	Mounting thread 2	M6x0.75	M5x0.5
	Max. tightening torque [Nm]	3	2
	Suction cup connection 3 [mm]	3	3
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	6	3

Holder type HB		Vacuum port 1	
		QS4	PK-3
	Mounting thread 2	M3x0.5	M3x0.5
	Suction cup connection 3 [mm]	3	3
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	5	4

Holder type HC		Vacuum port 1	
		QS4	PK-3
	Mounting thread 2	M12x1	M8x0.75
	Max. tightening torque [Nm]	14	3.5
	Suction cup connection 3 [mm]	3	3
	Height compensation [mm]	3	3
	Max. spring force [N]	0.1	0.1
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	17	8

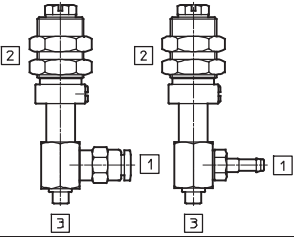
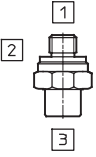
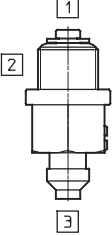
Holder type HCL		Vacuum port 1	
		QS4	PK-3
	Mounting thread 2	M12x1	M12x1
	Max. tightening torque [Nm]	14	14
	Suction cup connection 3 [mm]	3	3
	Height compensation [mm]	10	10
	Max. spring force [N]	0.1	0.1
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	20	19

Holder type HD		Vacuum port 1	
		QS4	PK-3
	Mounting thread 2	M8x0.75	M8x0.75
	Max. tightening torque [Nm]	3.5	3.5
	Suction cup connection 3 [mm]	3	3
	Height compensation [mm]	3	3
	Max. spring force [N]	0.1	0.1
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	13	11

Suction grippers ESG for suction cup Ø 2 and 4

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Technical data

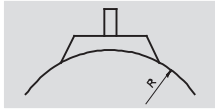
Suction cup holder size 1			Vacuum port 1	
Holder type HDL			QS4	PK-3
	Mounting thread 2		M12x1	M12x1
	Max. tightening torque [Nm]		14	14
	Suction cup connection 3	[mm]	3	3
	Height compensation [mm]		10	10
	Max. spring force [N]		0.1	0.1
	Temperature range [°C]		0 ... +60	-10 ... +60
	Materials		Steel, polyacetate, nitrile rubber	Steel
	Weight [g]		29	28
Holder type HE			Vacuum port 1	
			Direct	
	Mounting thread 2		M3x0.5	
	Max. tightening torque [Nm]		0.7	
	Suction cup connection 3	[mm]	3	
	Temperature range [°C]		-10 ... +60	
	Materials		Steel, polyacetate	
	Weight [g]		1	
Holder type HF			Vacuum port 1	
			Direct	
	Mounting thread 2		M10x1	
	Max. tightening torque [Nm]		7	
	Suction cup connection 3	[mm]	3	
	Height compensation [mm]		2.6	
	Min. spring force [N]		2	
	Max. spring force [N]		4	
	Temperature range [°C]		-10 ... +60	
	Materials		Steel, polyacetate, nitrile rubber	
	Weight [g]		14	

Suction grippers ESG for suction cup Ø 6 and 8

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Technical data

Function



Temperature range

–30 ... +200 °C

Suction cup type:

- Standard, round



General technical data – Suction cup						
Suction cup Ø [mm]	Suction cup connection [mm]	Effective suction cup Ø [mm]	Breakaway force at –0.7 bar [N]	Suction cup volume ²⁾ [cm ³]	Min. radius R ³⁾ of workpiece [mm]	Weight [g]
Standard, round						
6	4 ¹⁾	5.2	1.1	0.015	15	0.2
8	4 ¹⁾	7.2	2.3	0.030	20	0.2

1) Is plugged onto or into the suction cup

2) Volume to be evacuated

3) Minimum arc radius of the workpiece to be gripped

Material types – Suction cup					
Material	N	U	S	F	NA
Shore hardness	50 ±5	60 ±5	50 ±5	60 ±5	50 ±5
Colour	Black	Blue	Transparent	Grey	Black with white dot
Material	Nitrile rubber	Polyurethane	Silicone	Fluoro rubber	Nitrile rubber, antistatic
Note on materials	RoHS-compliant				
	Free of copper and PTFE				

Ambient conditions – Suction cup					
Material	N	U	S	F	NA
Ambient temperature [°C]	–10 ... +70	–20 ... +60	–30 ... +180	–10 ... +200	–10 ... +70
Corrosion resistance CRC ¹⁾	1				

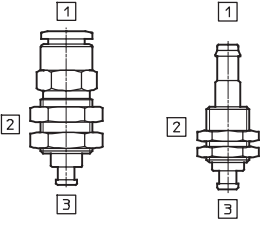
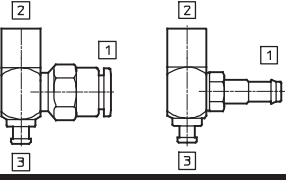
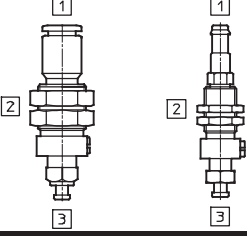
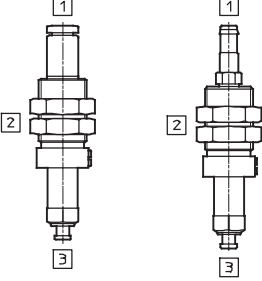
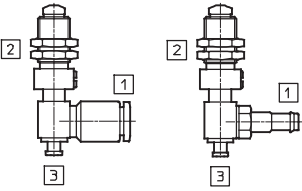
1) Corrosion resistance class 1 according to Festo standard 940 070

Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

Suction grippers ESG for suction cup Ø 6 and 8

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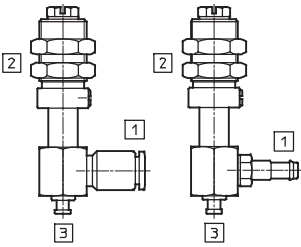
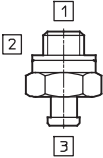
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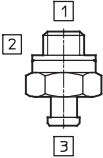
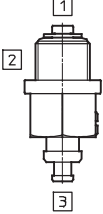
Suction cup holder size 2			Vacuum port 1	
Holder type HA			QS6	PK-4
	Mounting thread 2		M10x1	M8x0.75
	Max. tightening torque [Nm]		7	3.5
	Suction cup connection 3 [mm]		4	4
	Temperature range [°C]		0 ... +60	-10 ... +60
	Materials		Steel, polyacetate, nitrile rubber	Steel
	Weight [g]		12	7
Holder type HB			QS6	PK-4
	Mounting thread 2		M4x0.7	M4x0.7
	Suction cup connection 3 [mm]		4	4
	Temperature range [°C]		0 ... +60	-10 ... +60
	Materials		Steel, polyacetate, nitrile rubber	Steel
	Weight [g]		13	11
Holder type HC			QS6	PK-4
	Mounting thread 2		M12x1	M8x0.75
	Max. tightening torque [Nm]		14	3.5
	Suction cup connection 3 [mm]		4	4
	Height compensation [mm]		3	3
	Max. spring force [N]		0.1	0.1
	Temperature range [°C]		0 ... +60	-10 ... +60
	Materials		Steel, polyacetate, nitrile rubber	Steel
	Weight [g]		18	8
Holder type HCL			QS6	PK-4
	Mounting thread 2		M12x1	M12x1
	Max. tightening torque [Nm]		14	14
	Suction cup connection 3 [mm]		4	4
	Height compensation [mm]		10	10
	Max. spring force [N]		0.1	0.1
	Temperature range [°C]		0 ... +60	-10 ... +60
	Materials		Steel, polyacetate, nitrile rubber	Steel
	Weight [g]		20	19
Holder type HD			QS6	PK-3
	Mounting thread 2		M8x0.75	M8x0.75
	Max. tightening torque [Nm]		3.5	3.5
	Suction cup connection 3 [mm]		4	4
	Height compensation [mm]		3	3
	Max. spring force [N]		0.1	0.1
	Temperature range [°C]		0 ... +60	-10 ... +60
	Materials		Steel, polyacetate, nitrile rubber	Steel
	Weight [g]		15	12

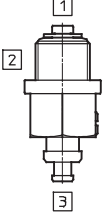
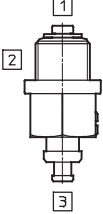
Suction grippers ESG for suction cup Ø 6 and 8

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Technical data

Suction cup holder size 2			
		Holder type HDL	
		Vacuum port 1	
		QS6	PK-3
		Mounting thread 2	M12x1
		Max. tightening torque [Nm]	14
		Suction cup connection 3 [mm]	4
		Height compensation [mm]	10
		Max. spring force [N]	0.1
		Temperature range [°C]	0 ... +60
		Materials	Steel, polyacetate, nitrile rubber
		Weight [g]	33
		Steel	

Holder type HE			
		Holder type HE	
		Vacuum port 1	
		Direct	
		Mounting thread 2	M5x0.5
		Max. tightening torque [Nm]	1.9
		Suction cup connection 3 [mm]	4
		Temperature range [°C]	-10 ... +60
		Materials	Steel, polyacetate
		Weight [g]	3
		Direct	

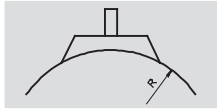
Holder type HF			
		Holder type HF	
		Vacuum port 1	
		Direct	
		Mounting thread 2	M10x1
		Max. tightening torque [Nm]	7
		Suction cup connection 3 [mm]	4
		Height compensation [mm]	2.6
		Min. spring force [N]	2
		Max. spring force [N]	4
		Temperature range [°C]	-10 ... +60
		Materials	Steel, polyacetate, nitrile rubber
		Weight [g]	14
		Direct	

Suction grippers ESG for suction cup Ø 10 and 15

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Technical data

Function



Temperature range

–30 ... +200 °C

Suction cup type:

- Standard, round
- Round, extra deep
- Bellows, round, 1.5 convolutions
- Bellows, round, 3.5 convolutions



General technical data – Suction cup							
Suction cup Ø [mm]	Suction cup connection [mm]	Effective suction cup Ø [mm]	Breakaway force at –0.7 bar [N]	Suction cup volume ¹⁾ [cm ³]	Min. radius R ²⁾ of workpiece [mm]	Max. height compensation [mm]	Weight [g]
Standard, round							
10	M4x0.7	8.3	3.9	0.050	30	–	1.5
15	M4x0.7	13.5	8.5	0.208	35	–	2
Round, extra deep							
15	M4x0.7	13.8	9.8	0.350	20	–	2
Bellows, round, 1.5 convolutions							
10	M4x0.7	7.4	4.7	0.380	20	4	2
Bellows, round, 3.5 convolutions							
10	M4x0.7	6.9	3.9	0.290	25	3.3	2

1) Volume to be evacuated

2) Minimum arc radius of the workpiece to be gripped

Material types – Suction cup					
Material	N	U	S	F	NA
Shore hardness	50 ±5	60 ±5	50 ±5	60 ±5	50 ±5
Colour	Black	Blue	Transparent	Grey	Black with white dot
Material	Nitrile rubber	Polyurethane	Silicone	Fluoro rubber	Nitrile rubber, antistatic
Note on materials	RoHS-compliant				
	Free of copper and PTFE				

Ambient conditions – Suction cup					
Material	N	U	S	F	NA
Ambient temperature [°C]	–10 ... +70	–20 ... +60	–30 ... +180	–10 ... +200	–10 ... +70
Corrosion resistance CRC ¹⁾	1				

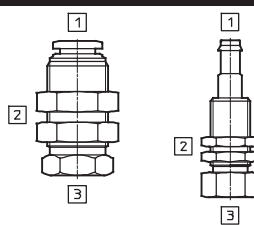
1) Corrosion resistance class 1 according to Festo standard 940 070

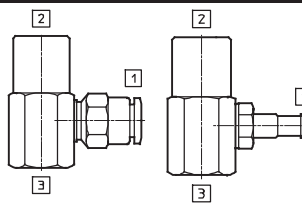
Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

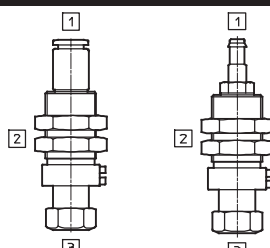
Suction grippers ESG for suction cup Ø 10 and 15

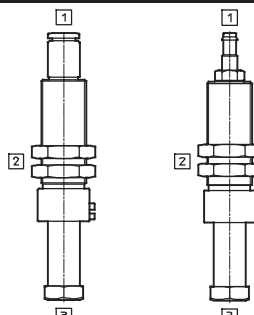
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Technical data

Suction cup holder size 3		Vacuum port 1	
Holder type HA		QS6	PK-4
	Mounting thread 2	M12x1	M8x0.75
	Max. tightening torque [Nm]	14	3.5
	Suction cup connection 3	M4x0.7	M4x0.7
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	20	10

Holder type HB		Vacuum port 1	
		QS6	PK-4
	Mounting thread 2	M6x1	M6x1
	Suction cup connection 3	M4x0.7	M4x0.7
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	29	27

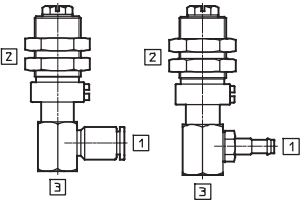
Holder type HC		Vacuum port 1	
		QS6	PK-4
	Mounting thread 2	M14x1	M14x1
	Max. tightening torque [Nm]	21	21
	Suction cup connection 3	M4x0.7	M4x0.7
	Height compensation [mm]	6	6
	Min. spring force [N]	2	2
	Max. spring force [N]	5	5
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	34	32

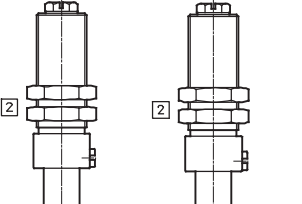
Holder type HCL		Vacuum port 1	
		QS6	PK-4
	Mounting thread 2	M14x1	M14x1
	Max. tightening torque [Nm]	21	21
	Suction cup connection 3	M4x0.7	M4x0.7
	Height compensation [mm]	20	20
	Min. spring force [N]	2	2
	Max. spring force [N]	5	5
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	34	32

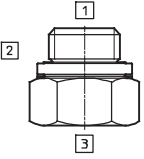
Suction grippers ESG for suction cup Ø 10 and 15

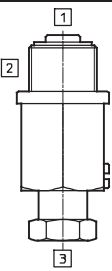
FESTO

Technical data

Suction cup holder size 3		Vacuum port 1	
Holder type HD		QS6	PK-3
	Mounting thread 2	M14x1	M14x1
	Max. tightening torque [Nm]	21	21
	Suction cup connection 3	M4x0.7	M4x0.7
	Height compensation [mm]	6	6
	Min. spring force [N]	2	2
	Max. spring force [N]	5	5
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	46	44

Holder type HDL		Vacuum port 1	
		QS6	PK-3
	Mounting thread 2	M14x1	M14x1
	Max. tightening torque [Nm]	21	21
	Suction cup connection 3	M4x0.7	M4x0.7
	Height compensation [mm]	20	20
	Min. spring force [N]	1	1
	Max. spring force [N]	3	3
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	65	63

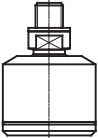
Holder type HE		Vacuum port 1	
		Direct	
	Mounting thread 2	G½	
	Max. tightening torque [Nm]	9	
	Suction cup connection 3	M4x0.7	
	Temperature range [°C]	-10 ... +60	
	Materials	Steel, polyacetate	
	Weight [g]	11	

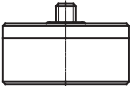
Holder type HF		Vacuum port 1	
		Direct	
	Mounting thread 2	M14x1	
	Max. tightening torque [Nm]	21	
	Suction cup connection 3	M4x0.7	
	Height compensation [mm]	6	
	Min. spring force [N]	6	
	Max. spring force [N]	12	
	Temperature range [°C]	-10 ... +60	
	Materials	Steel, polyacetate, nitrile rubber	
	Weight [g]	54	

Suction grippers ESG for suction cup Ø 10 and 15

FESTO

Technical data

Angle compensator ESWA		
Mounting thread		M4x0.7
	Design	Ball joint with ± 15° swivel angle
	Max. tightening torque [Nm]	0.4
	Temperature range [°C]	0 ... +60
	Materials	Housing: Nickel plated aluminium; Filter: Polyvinylfluoride; Seals: Nitrile rubber
	Weight [g]	9

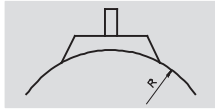
Vacuum filter ESF		
Holder size		3
	Max. flow rate [l/min]	100
	Grade of filtration [µm]	10
	Pressure range [bar]	−0.95 ... +4
	Temperature range [°C]	0 ... +60
	Materials	Housing: Nickel plated aluminium; Filter: Polyvinylfluoride; Seals: Nitrile rubber
	Weight [g]	9

Suction grippers ESG for suction cup Ø 20 ... 50

FESTO

Technical data

Function



Temperature range

–30 ... +200 °C



Suction cup type:

- Standard, round
- Round, extra deep
- Bellows, round, 1.5 convolutions
- Bellows, round, 1.5 convolutions, Vulkollan®
- Bellows, round, 3.5 convolutions
- Oval
- Bell-shaped

General technical data – Suction cup							
Suction cup Ø	Suction cup connection	Effective suction cup Ø	Breakaway force at –0.7 bar	Suction cup volume ¹⁾	Min. radius R ²⁾ of workpiece	Max. height compensation	Weight
[mm]	[mm]	[mm]	[N]	[cm ³]	[mm]	[mm]	[g]
Standard, round							
20	M6x1	17.6	16.3	0.318	60	–	6
30	M6x1	18.4	40.8	0.867	110	–	9
40	M6x1	26.5	69.6	1.566	230	–	16
50	M6x1	33.3	105.8	2.387	330	–	22
Round, extra deep							
20	M6x1	17.2	17	0.840	30	–	6
30	M6x1	20.9	37.2	2.120	50	–	9
40	M6x1	28.1	67.6	4.040	80	–	17
50	M6x1	36.9	103.6	7.900	100	–	23
Bellows, round, 1.5 convolutions							
20	M6x1	14.3	12.9	1.600	40	6.0	7
30	M6x1	20.3	26.2	4.070	80	8.0	10
40	M6x1	25.2	52.3	8.870	90	9.5	19
50	M6x1	31.8	72.6	14.230	150	11	25
Bellows, round, 1.5 convolutions, Vulkollan®							
40	M6x1	–	59	–	35	9	18
50	M6x1	–	100	–	40	10	24
Bellows, round, 3.5 convolutions							
20	M6x1	14.5	8.2	2.750	50	7.0	7
30	M6x1	20.9	20.8	9.470	80	10.5	12
40	M6x1	28.2	42.4	19.720	100	12.8	22
50	M6x1	32.8	63.4	38.920	180	17.5	32
Oval							
4x10	M6x1	0.29	2	0.064	–	–	2
4x20	M6x1	0.57	3.4	0.112	–	–	3
6x10	M6x1	0.35	2.9	0.106	–	–	2
6x20	M6x1	0.74	5.9	0.196	–	–	3
8x20	M6x1	0.89	8	0.256	–	–	3
8x30	M6x1	1.36	10.9	0.376	–	–	3
10x30	M6x1	2.23	15.2	0.350	–	–	3

1) Volume to be evacuated

2) Minimum arc radius of the workpiece to be gripped

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Suction grippers ESG for suction cup Ø 20 ... 50

FESTO

Technical data

General technical data – Suction cup							
Suction cup Ø [mm]	Suction cup connection [mm]	Effective suction cup Ø [mm]	Breakaway force at –0.7 bar [N]	Suction cup volume ¹⁾ [cm ³]	Min. radius R ²⁾ of workpiece [mm]	Max. height compensation [mm]	Weight [g]
Bell-shaped							
30	M6x1	–	36	–	26	3.5	12
40	M6x1	–	64	–	35	5.5	14
50	M6x1	–	97	–	40	8	17

1) Volume to be evacuated

2) Minimum arc radius of the workpiece to be gripped

Material types – Suction cup						
Material	N	U	S	F	NA	T
Shore hardness	50 ±5	60 ±5	50 ±5	60 ±5	50 ±5	72
Colour	Black	Blue	Transparent	Grey	Black with white dot	Reddish brown
Material	Nitrile rubber	Polyurethane	Silicone	Fluoro rubber	Nitrile rubber, antistatic	Vulkollan®
Note on materials	RoHS-compliant					
	Free of copper and PTFE					

Ambient conditions – Suction cup						
Material	N	U	S	F	NA	T
Ambient temperature [°C]	–10 ... +70	–20 ... +60	–30 ... +180	–10 ... +200	–10 ... +70	–10 ... +80
Corrosion resistance CRC ¹⁾	1					2

1) Corrosion resistance class 1 according to Festo standard 940 070

Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

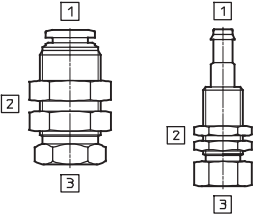
Corrosion resistance class 2 according to Festo standard 940 070

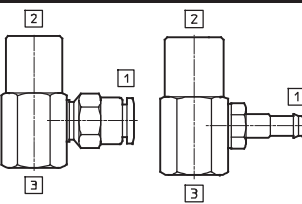
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

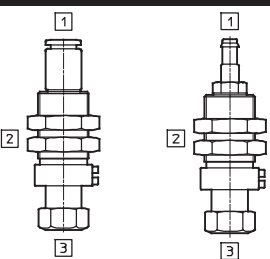
Suction grippers ESG for suction cup Ø 20 ... 50

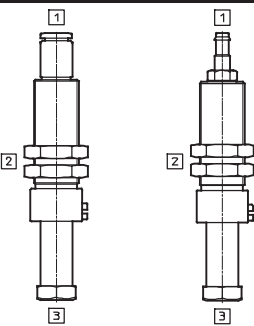
FESTO

Technical data

Suction cup holder size 4		Vacuum port 1	
Holder type HA		QS6	PK-4
	Mounting thread 2	M14x1	M12x1
	Max. tightening torque [Nm]	21	14
	Suction cup connection 3	M6x1	M6x1
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	30	23

Holder type HB		Vacuum port 1	
		QS6	PK-4
	Mounting thread 2	M6x1	M6x1
	Suction cup connection 3	M6x1	M6x1
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	27	25

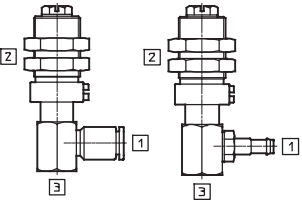
Holder type HC		Vacuum port 1	
		QS6	PK-4
	Mounting thread 2	M14x1	M14x1
	Max. tightening torque [Nm]	21	21
	Suction cup connection 3	M6x1	M6x1
	Height compensation [mm]	6	6
	Min. spring force [N]	5	5
	Max. spring force [N]	10	10
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	33	31

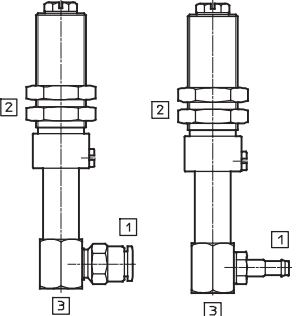
Holder type HCL		Vacuum port 1	
		QS6	PK-4
	Mounting thread 2	M14x1	M14x1
	Max. tightening torque [Nm]	21	21
	Suction cup connection 3	M6x1	M6x1
	Height compensation [mm]	20	20
	Min. spring force [N]	1	1
	Max. spring force [N]	9	9
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	Steel
	Weight [g]	47	46

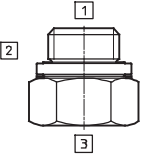
Suction grippers ESG for suction cup Ø 20 ... 50

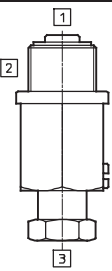
FESTO

Technical data

Suction cup holder size 4		Vacuum port 1	
Holder type HD		QS6	PK-3
	Mounting thread 2	M14x1	M14x1
	Max. tightening torque [Nm]	21	21
	Suction cup connection 3	M6x1	M6x1
	Height compensation [mm]	6	6
	Min. spring force [N]	5	5
	Max. spring force [N]	10	10
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	
	Weight [g]	45	43

Holder type HDL		Vacuum port 1	
		QS6	PK-3
	Mounting thread 2	M14x1	M14x1
	Max. tightening torque [Nm]	21	21
	Suction cup connection 3	M6x1	M6x1
	Height compensation [mm]	20	20
	Min. spring force [N]	1	1
	Max. spring force [N]	9	9
	Temperature range [°C]	0 ... +60	-10 ... +60
	Materials	Steel, polyacetate, nitrile rubber	
	Weight [g]	65	63

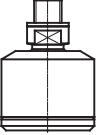
Holder type HE		Vacuum port 1	
		Direct	
	Mounting thread 2	G1/8	
	Max. tightening torque [Nm]	9	
	Suction cup connection 3	M6x1	
	Temperature range [°C]	-10 ... +60	
	Materials	Steel, polyacetate	
	Weight [g]	11	

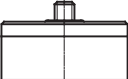
Holder type HF		Vacuum port 1	
		Direct	
	Mounting thread 2	M14x1	
	Max. tightening torque [Nm]	21	
	Suction cup connection 3	M6x1	
	Height compensation [mm]	6	
	Min. spring force [N]	6	
	Max. spring force [N]	12	
	Temperature range [°C]	-10 ... +60	
	Materials	Steel, polyacetate, nitrile rubber	
	Weight [g]	52	

Suction grippers ESG for suction cup Ø 20 ... 50

FESTO

Technical data

Angle compensator ESWA		
Mounting thread		M6x1
	Design	Ball joint with ± 15° swivel angle
	Max. tightening torque [Nm]	2.4
	Temperature range [°C]	0 ... +60
	Materials	Housing: Nickel plated aluminium; Filter: Polyvinylfluoride; Seals: Nitrile rubber
	Weight [g]	19

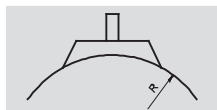
Vacuum filter ESF			
Holder size		4A	4B
	Max. flow rate [l/min]	260	270
	Grade of filtration [µm]	10	
	Pressure range [bar]	-0.95 ... +4	
	Temperature range [°C]	0 ... +60	
	Materials	Housing: Nickel plated aluminium; Filter: Polyvinylfluoride; Seals: Nitrile rubber	
	Weight [g]	19	

Suction grippers ESG for suction cup Ø 60 ... 100

FESTO

Technical data

Function



Temperature range

–30 ... +200 °C

Suction cup type:

- Standard, round
- Round, extra deep
- Bellows, round, 1.5 convolutions
- Bellows, round, 1.5 convolutions, Vulkollan®
- Oval
- Bell-shaped



General technical data – Suction cup							
Suction cup Ø [mm]	Suction cup connection [mm]	Effective suction cup Ø [mm]	Breakaway force at –0.7 bar [N]	Suction cup volume ¹⁾ [cm ³]	Min. radius R ²⁾ of workpiece [mm]	Max. height compensation [mm]	Weight [g]
Standard, round							
60	M12x1.5	42	166.1	3.953	350	–	6
80	M12x1.5	57.8	309.7	19.312	400	–	9
100	M12x1.5	75.2	503.6	29.779	460	–	22
Round, extra deep							
60	M10x1.5	40.5	162.5	19.770	120	–	48
80	M10x1.5	62.7	275	51.610	160	–	141
100	M10x1.5	78.5	440.8	84.660	200	–	228
Bellows, round, 1.5 convolutions							
80	M10x1.5	55	213.9	63.900	430	10	139
Bellows, round, 1.5 convolutions, Vulkollan®							
80	M10	–	237	–	100	10.5	84.5
Oval							
15x45	M10x1.5	4.84	32	1.570	–	–	24
20x60	M10x1.5	9.12	62.2	3.690	–	–	31
25x75	M10x1.5	14.67	92.5	6.700	–	–	47
30x90	M10x1.5	21.83	134.4	10.170	–	–	55
Bell-shaped							
60	M10	–	134	–	75	6	20
80	M10	–	245	–	100	7.5	28
100	M10	–	375	–	135	9	86.5

1) Volume to be evacuated

2) Minimum arc radius of the workpiece to be gripped

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Suction grippers ESG for suction cup Ø 60 ... 100



Technical data

Material types – Suction cup					
Material	N	U	S	F	T
Shore hardness	50 ±5	60 ±5	50 ±5	60 ±5	72
Colour	Black	Blue	Transparent	Grey	Reddish brown
Material	Nitrile rubber	Polyurethane	Silicone	Fluoro rubber	Vulkollan®
Note on materials	RoHS-compliant				
	Free of copper and PTFE				

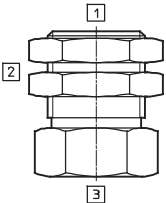
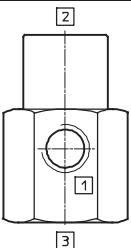
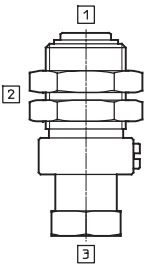
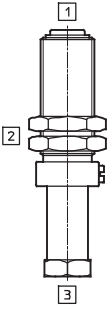
Ambient conditions – Suction cup					
Material	N	U	S	F	T
Ambient temperature [°C]	–10 ... +70	–20 ... +60	–30 ... +180	–10 ... +200	–10 ... +80
Corrosion resistance CRC ¹⁾	1				2

- 1) Corrosion resistance class 1 according to Festo standard 940 070
 Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.
 Corrosion resistance class 2 according to Festo standard 940 070
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

Suction grippers ESG for suction cup Ø 60 ... 100

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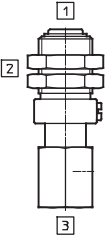
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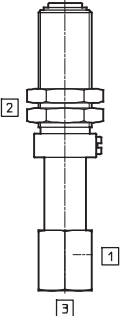
Suction cup holder size 5		
Holder type HA		Vacuum port 1
		G $\frac{1}{8}$
	Mounting thread 2	M20x1
	Max. tightening torque [Nm]	21
	Suction cup connection 3	M10x1.5
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	84
Holder type HB		
Holder type HB		Vacuum port 1
		G $\frac{1}{8}$
	Mounting thread 2	M8x1.25
	Suction cup connection 3	M10x1.5
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	91
Holder type HC		
Holder type HC		Vacuum port 1
		G $\frac{1}{8}$
	Mounting thread 2	M22x1
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M10x1.5
	Height compensation [mm]	10
	Min. spring force [N]	8
	Max. spring force [N]	18
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	112
Holder type HCL		
Holder type HCL		Vacuum port 1
		G $\frac{1}{8}$
	Mounting thread 2	M22x1
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M10x1.5
	Height compensation [mm]	30
	Min. spring force [N]	10
	Max. spring force [N]	16
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	129

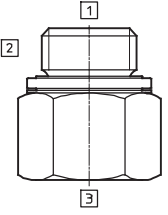
Suction grippers ESG for suction cup Ø 60 ... 100

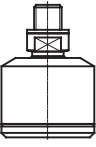
FESTO

Technical data

Suction cup holder size 5		
Holder type HD		Vacuum port 1
		G $\frac{1}{8}$
	Mounting thread 2	M22x1
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M10x1.5
	Height compensation [mm]	10
	Min. spring force [N]	8
	Max. spring force [N]	18
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	195

Holder type HDL		Vacuum port 1
		G $\frac{1}{8}$
	Mounting thread 2	M22x1
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M10x1.5
	Height compensation [mm]	30
	Min. spring force [N]	10
	Max. spring force [N]	16
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	273

Holder type HE		Vacuum port 1
		Direct
	Mounting thread 2	G $\frac{1}{4}$
	Max. tightening torque [Nm]	14
	Suction cup connection 3	M10x1.5
	Temperature range [°C]	-10 ... +60
	Materials	Steel, polyacetate
	Weight [g]	24

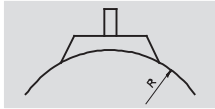
Angle compensator ESWA		
Mounting thread		M10x1.5
	Design	Ball joint with $\pm 15^\circ$ swivel angle
	Max. tightening torque [Nm]	9.4
	Temperature range [°C]	0 ... +60
	Materials	Housing: Nickel plated aluminium; Filter: Polyvinylfluoride; Seals: Nitrile rubber
	Weight [g]	57

Suction grippers ESG for suction cup Ø 150 and 200

FESTO

Technical data

Function



Suction cup type:

- Standard, round

Temperature range

–30 ... +200 °C



General technical data – Suction cup						
Suction cup Ø [mm]	Suction cup connection [mm]	Effective suction cup Ø [mm]	Breakaway force at –0.7 bar [N]	Suction cup volume ¹⁾ [cm ³]	Min. radius R ²⁾ of workpiece [mm]	Weight [g]
Standard, round						
150	M20x2	114	900	173.826	480	720
200	M20x2	151	1,610	245.454	680	1,200

1) Volume to be evacuated

2) Minimum arc radius of the workpiece to be gripped

Material types – Suction cup				
Material	N	U	S	F
Shore hardness	50 ±5	60 ±5	50 ±5	60 ±5
Colour	Black	Blue	Transparent	Grey
Material	Nitrile rubber	Polyurethane	Silicone	Fluoro rubber
Note on materials	RoHS-compliant			
	Free of copper and PTFE			

Ambient conditions – Suction cup				
Material	N	U	S	F
Ambient temperature [°C]	–10 ... +70	–20 ... +60	–30 ... +180	–10 ... +200
Corrosion resistance CRC ¹⁾	1			

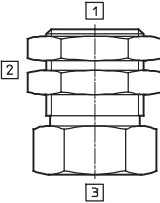
1) Corrosion resistance class 1 according to Festo standard 940 070

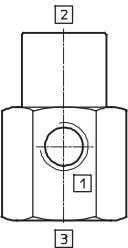
Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

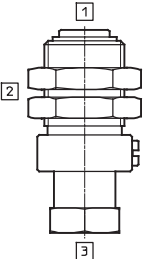
Suction grippers ESG for suction cup Ø 150 and 200

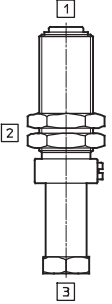
FESTO

Technical data

Suction cup holder size 6		
Holder type HA		Vacuum port 1
		G $\frac{1}{4}$
	Mounting thread 2	M24x2
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M20x2
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	200

Holder type HB		Vacuum port 1
		G $\frac{1}{4}$
	Mounting thread 2	M16x2
	Suction cup connection 3	M20x2
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	271

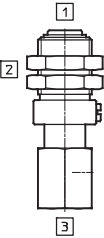
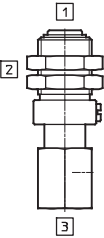
Holder type HC		Vacuum port 1
		G $\frac{1}{4}$
	Mounting thread 2	M30x2
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M20x2
	Height compensation [mm]	20
	Min. spring force [N]	12
	Max. spring force [N]	22
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	472

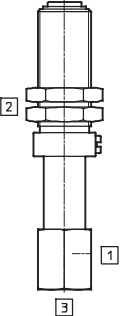
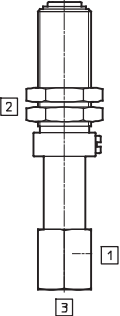
Holder type HCL		Vacuum port 1
		G $\frac{1}{4}$
	Mounting thread 2	M30x2
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M20x2
	Height compensation [mm]	40
	Min. spring force [N]	15
	Max. spring force [N]	32
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	560

Suction grippers ESG for suction cup Ø 150 and 200

FESTO

Technical data

Suction cup holder size 6		
	Holder type HD	Vacuum port 1
		G $\frac{1}{4}$
	Mounting thread 2	M30x2
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M20x2
	Height compensation [mm]	20
	Min. spring force [N]	12
	Max. spring force [N]	22
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	472

	Holder type HDL	Vacuum port 1
		G $\frac{1}{4}$
	Mounting thread 2	M30x2
	Max. tightening torque [Nm]	50
	Suction cup connection 3	M20x2
	Height compensation [mm]	40
	Min. spring force [N]	15
	Max. spring force [N]	32
	Temperature range [°C]	-10 ... +60
	Materials	Steel
	Weight [g]	560

Suction grippers ESG – Round design

Ordering data – Modular product system

FESTO

Mandatory data					
Holder size	Module No.	Gripper function	Suction cup Ø	Suction cup design/suction cup material	
1	189167 189168	ESG	2	SN, SU, SS, SF, SNA	
			4	EN, EU, ES, EF	
2	189169 189170		6	BN, BU, BS, BT	
			8	CN, CS	
3	189171 189172		10	GT	
			15		
4	189173 189174 189175 189176		20		
			30		
			40		
			50		
5	189177 189178 189179		60		
			80		
			100		
6	189180 189181		150		
			200		
	Ord. example 189167	ESG	2	SN	

Ordering table – Suction cup Ø 2 ... 50 mm														
Size	Ø 2	Ø 4	Ø 6	Ø 8	Ø 10	Ø 15	Ø 20	Ø 30	Ø 40	Ø 50	Conditio ns	Code	Enter code	
Holder size	1		2		3		4							
M	Module No.	189167	189168	189169	189170	189171	189172	189173	189174	189175	189176			
	Gripper function	Vacuum suction gripper, round design											ESG	ESG
	Suction cup Ø [mm]	2	4	6	8	10	15	20	30	40	50		-...	
	Standard suction cup	Nitrile rubber (NBR)											-SN	
		Polyurethane (PU)											-SU	
		Silicone (SI)											-SS	
		Fluoro rubber (FPM)											-SF	
		Nitrile rubber (NBR) antistatic											-SNA	
	Extra deep suction cup	–					Nitrile rubber (NBR)						-EN	
		–					Polyurethane (PU)						-EU	
		–					Silicone (SI)						-ES	
		–					Fluoro rubber (FPM)						-EF	
	Bellows, 1.5 convolutions	–				(NBR)	–	Nitrile rubber (NBR)					-BN	
		–				(PU)	–	Polyurethane (PU)					-BU	
		–				(SI)	–	Silicone (SI)					-BS	
		–				Thermoplastic							-BT	
	Bellows, 3.5 convolutions	–				(NBR)	–	Nitrile rubber (NBR)					-CN	
		–				(SI)	–	Silicone (SI)					-CS	
	Bell-shaped	–								Thermoplastic			-GT	
	Suction cup holder	Male thread, 2 nuts, connection on top											-HA	
		Female thread, connection on side											-HB	
		Male thread, 2 nuts, connection on top, short height compensator											-HC	
		–	Male thread, 2 nuts, connection on top, long height compensator										-HCL	
		Male thread, 2 nuts, connection on side, short height compensator											-HD	
		–	Male thread, 2 nuts, connection on side, long height compensator										-HDL	
		Male thread, connection on top, screw-in thread											-HE	
Male thread, connection on top, short height compensator, screw-in thread											-HF			
Connection	Push-in connector for plastic tubing										1	-QS		
	Barbed fitting connector for plastic tubing										1	-PK		
0	Angle compensator	–				Ball joint with ±30° deflection						-WA		
	Filter	–				Filter						-F		
	Suction cup insert	–				Sintered	–	Sintered			2	-ES		

1 QS, PK Not with suction cup holder HE, HF

2 ES Can only be selected in combination with CN, CS

Suction grippers ESG – Round design

FESTO

Ordering data – Modular product system

Mandatory data		Options		
Suction cup holder	Connection	Angle compensator	Filter	Suction cup insert
HA HB HC HCL HD HDL HE HF	QS PK G	WA	F	ES
- HA	- QS	-	-	-

Ordering table – Suction cup Ø 60 ... 200 mm								
Size	Ø 60	Ø 80	Ø 100	Ø 150	Ø 200	Conditio	Code	Enter
Holder size	5			6		ns		code
M Module No.	189177	189178	189179	189180	189181			
Gripper function	Vacuum suction gripper, round design						ESG	ESG
Suction cup Ø [mm]	60	80	100	150	200		-...	
Standard suction cup	Nitrile rubber (NBR)						-SN	
	Polyurethane (PU)						-SU	
	Silicone (SI)						-SS	
	Fluoro rubber (FPM)						-SF	
Extra deep suction cup	Nitrile rubber (NBR)			-			-EN	
	Polyurethane (PU)			-			-EU	
	Silicone (SI)			-			-ES	
	Fluoro rubber (FPM)			-			-EF	
Bellows, 1.5 convolutions	-	Nitrile rubber (NBR)	-				-BN	
	-	Polyurethane (PU)	-				-BU	
	-	Silicone (SI)	-				-BS	
	-	Thermoplastic	-				-BT	
Bell-shaped	Thermoplastic			-			-GT	
Suction cup holder	Male thread, 2 nuts, connection on top						-HA	
	Female thread, connection on side						-HB	
	Male thread, 2 nuts, connection on top, short height compensator						-HC	
	Male thread, 2 nuts, connection on top, long height compensator						-HCL	
	Male thread, 2 nuts, connection on side, short height compensator						-HD	
	Male thread, 2 nuts, connection on side, long height compensator						-HDL	
	Male thread, connection on top, screw-in thread			-			-HE	
	Threaded connection					3	-G	
Angle compensator	Ball joint with ±30° deflection			-			-WA	

3 Not in combination with HE

Suction grippers ESG – Oval design

Ordering data – Modular product system

FESTO

[M] Mandatory data →

Holder size	Module No.	Gripper function	Suction cup Ø	Suction cup design/suction cup material
4	189182 189183 189184 189185 189186 189187 189188	ESG	4x10 4x20 6x10 6x20 8x20 8x30 10x30	ON
5	189189 189190 189191 189192		15x45 20x60 25x75 30x90	
	Ord. example			
		ESG	-	ON

Order table – Suction cup dimensions 4x10 ... 10x30 mm										
Size (suction cup dimensions)	4x10	4x20	6x10	6x20	8x20	8x30	10x30	Condi- tions	Code	Enter code
Holder size	4									
[M] Module No.	189182	189183	189184	189185	189186	189187	189188			
Gripper function	Vacuum suction gripper, oval design								ESG	ESG
Size [mm]	4x10	4x20	6x10	6x20	8x20	8x30	10x30		~...	
Oval suction cup	Nitrile rubber (NBR)								-ON	-ON
Suction cup holder	Male thread, 2 nuts, connection on top								-HA	
	Female thread, connection on side								-HB	
	Male thread, 2 nuts, connection on top, short height compensator								-HC	
	Male thread, 2 nuts, connection on top, long height compensator								-HCL	
	Male thread, 2 nuts, connection on side, short height compensator								-HD	
	Male thread, 2 nuts, connection on side, long height compensator								-HDL	
	Male thread, connection on top, screw-in thread								-HE	
	Male thread, connection on top, short height compensator, screw-in thread								-HF	
Connection	Push-in connector for plastic tubing							1	-QS	
	Barbed fitting connector for plastic tubing							1	-PK	
[O] Filter	Filter								-F	

[1] **QS, PK** Not with suction cup holder HE, HF.

Transfer order code

ESG - - ON

Suction grippers ESG – Oval design

Ordering data – Modular product system

FESTO

M Mandatory data		O Options
Suction cup holder	Connection	Filter
HA HB HC HCL HD HDL HE HF	QS PK G	F
-		-

Order table – Suction cup dimensions 15x45 ... 30x90 mm							
Size (suction cup dimensions)	15x45	20x60	25x75	30x90	Conditio ns	Code	Enter code
Holder size	5						
M Module No.	189189	189190	189191	189192			
Gripper function	Vacuum suction gripper, oval design					ESG	ESG
Size [mm]	15x45	20x60	25x75	30x90		-...	
Oval suction cup	Nitrile rubber (NBR)					-ON	-ON
Suction cup holder	Male thread, 2 nuts, connection on top					-HA	
	Female thread, connection on side					-HB	
	Male thread, 2 nuts, connection on top, short height compensator					-HC	
	Male thread, 2 nuts, connection on top, long height compensator					-HCL	
	Male thread, 2 nuts, connection on side, short height compensator					-HD	
	Male thread, 2 nuts, connection on side, long height compensator					-HDL	
	Male thread, connection on top, screw-in thread					-HE	
						-G	
Connection	Threaded connection						

Transfer order code

-		-		-	
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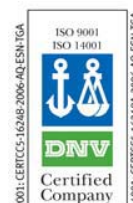
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