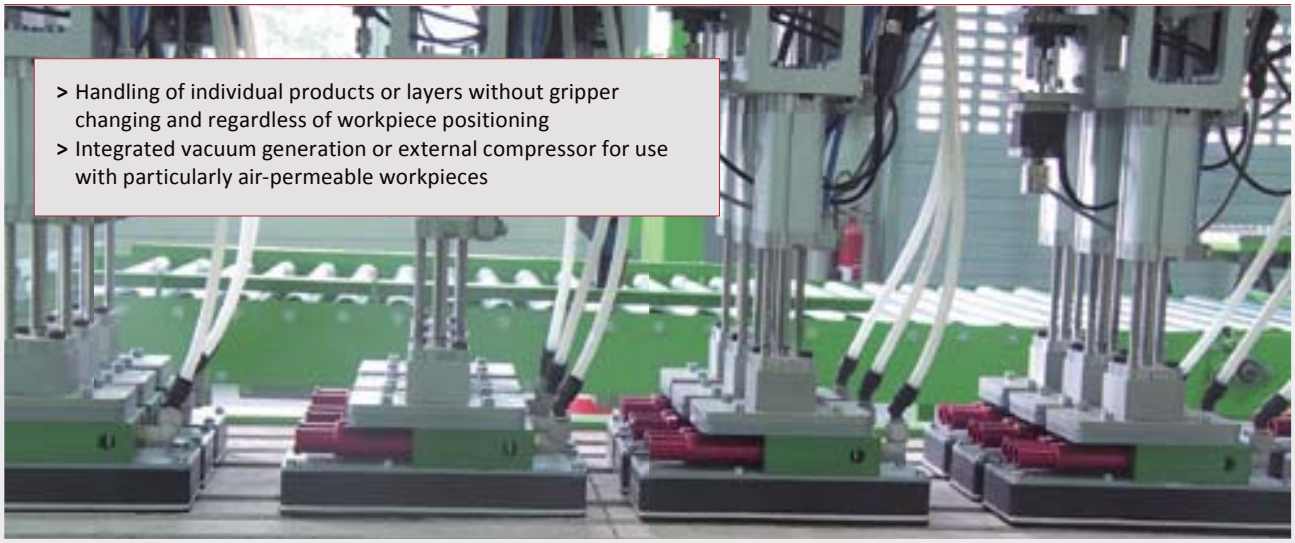
FIPA Vacuum and bag grippers



> Handling of individual products or layers without gripper changing and regardless of workpiece positioning
> Integrated vacuum generation or external compressor for use with particularly air-permeable workpieces

Vacuum grippers with closing valves - TC

> Very large flow cross-sections for long service life and high process reliability, even if exposed to dust
> Integrated valves seal uncovered suction openings without loss of gripping force
> No minimum coverage
> Swivel and tilt movements up to < 90°

> See page 240

Vacuum grippers with leakage reduction - TL

> Economical gripper solution for low-dust handling processes
> Recommended minimum coverage: 80 %
> Swivel and tilt movements up to 360°

> See page 244

Suction plates with leakage reduction - SPLT

> Reliable suction with variable product shapes
> Maintain an acceptable vacuum level by reducing leakage by means of integrated flow resistors in vacuum cups without product contact

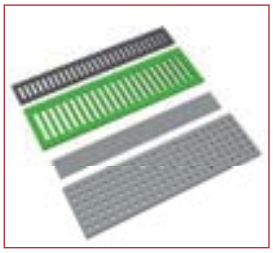
> See page 247

Bag grippers - TG

> Handling of dimensionally unstable bags and shrink wrapping
> Also suitable for other products, if vacuum cell is fully covered
> Swivel and tilt movements possible up to 360°
> External design similar to that of the TL variant

> See page 248

FIPA Vacuum and bag grippers: Accessories

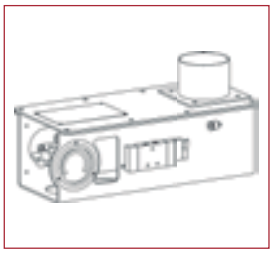


Accessories

Sealing foam for vacuum grippers

> Very good vacuum sealing and surface protection at the interface with the workpiece
> Easy mounting and quick replacement without residue
> Wide standard range
> Quick implementation of customised dimensions and hole patterns suitable for vacuum grippers of other brands

> See page 250



Pick-up and release system

> For TC vacuum grippers from 400x600 mm and external vacuum supply
> Minimises energy consumption and maximises service life
> Combination of gripper box and blower box
> Configuration depends on number of vacuum grippers used

> See page 252

Gripper / robot connection elements

> For example for vertical or 3-axis movements or the connection of multiple or longer gripper systems
> Layout depends on gripper system and robots

> See page 254

Vacuum grippers with closing valves

Strong holding force, independent of gripper coverage

MAXIMUM LIFE, MINIMUM MAINTENANCE

Product description

> Automated handling of individual products or product layers without gripper change
> Suitable for rigid products with an even or uneven surface
> Integrated valves seal unused suction openings without loss of gripping force
> Large valve openings reduce sensitivity to dirt and ensure maximum suction power
> Fast and uniform vacuum distribution ensures short cycle times and high acceleration rates
> Separate compressed air connection for blow-off function for fast product release
> Sealing foam for gentle product contact and optimum vacuum sealing - can be quickly replaced without tools and without leaving any residue

Notes

> Suitable for use with < 90° swivel and tilt movements
> No minimum coverage required
> TC200x400:
  - Gripping area is divided into zones for flexible product pick-up and/or release
  - Available for all vacuum grippers on request
> For vacuum grippers from TC400x600 with external vacuum supply, the pick-up and release system (36.900/36.901) minimises power consumption and extends system service life (see the chapter on accessories)

Ordering notes

> Ordering example vacuum generation
  - TC120x230-P20: integrated via ejectors
  - TC120x230-P20-OV: designed for external vacuum generation, e.g. via side channel blower or pump
> EPDM sealing foam, 24 mm thick, and vacuum gauge included in scope of delivery
> See chapter accessories for more information on:
  - Sealing foam program for various applications
  - Gripper/robot connection elements

Technical data

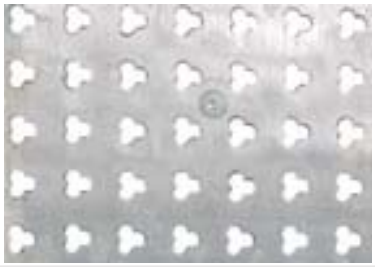
Item no.	Air consumption at 6 bar [Nl/min]	Suction power against atmosphere [Nl/min]	Number of closing valves	Final vacuum [%]	Width [mm]	Recommended suction power at 35 % vacuum level [m³/h]	Weight [kg]	Suitable sealing foam
TC120x230-P20	105	360	50	85	--	--	2.3	PPF120.230-P20 (p.250)
TC120x230-P40	105	198	15	85	--	--	2.3	PPF120.230-P40 (p.250)
TC120x400-P20	210	396	95	85	--	--	3.55	PPF120.400-P20 (p.250)
TC120x400-P40	105	198	30	85	--	--	3.55	PPF120.400-P40 (p.250)
TC200x400-P20	420	1,440	171	85	--	--	6.15	PPF200.400-P20 (p.250)
TC200x400-P40	210	720	50	85	--	--	6.15	PPF200.400-P40 (p.250)
TC600x400-P20-OV*	--	--	551	--	35	90 - 140	12	PPF-600x400-20 (p.250)
TC600x400-P28-OV*	--	--	260	--	40	90 - 140	12	PPF-600x400-28 (p.250)
TC600x400-P40-OV*	--	--	126	--	55	50 - 90	12	PPF-600x400-40 (p.250)

Technical data

Item no.	Air consumption at 6 bar [Nl/min]	Suction power against atmosphere [Nl/min]	Number of closing valves	Final vacuum [%]	Width [mm]	Recommended suction power at 35 % vacuum level [m³/h]	Weight [kg]	Suitable sealing foam
TC1300x260-P20-OV*	--	--	768	--	35	140 - 300	17	PPF-1300x260-20 (p.250)
TC1300x260-P28-OV*	--	--	360	--	40	90 - 140	17	PPF-1300x260-28 (p.250)
TC1300x260-P40-OV*	--	--	192	--	55	50 - 90	17	PPF-1300x260-40 (p.250)
TC1300x500-P20-OV*	--	--	1,536	--	35	140 - 300	32	PPF-1300x500-20 (p.250)
TC1300x500-P28-OV*	--	--	765	--	40	140 - 300	32	PPF-1300x500-28 (p.250)
TC1300x500-P40-OV*	--	--	384	--	55	140 - 300	32	PPF-1300x500-40 (p.250)

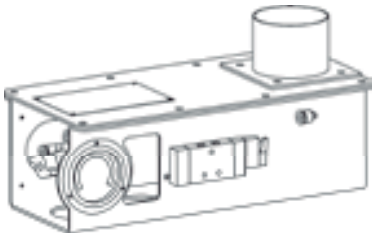
* = Depending on external vacuum supply

Large valve openings reduce sensitivity to dirt and ensure maximum suction power



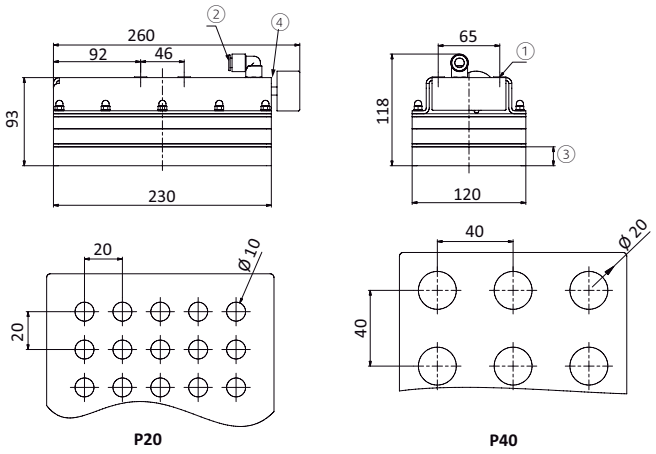
Quick and non-destructive replacement of the sealing foam

Optional gripper box 36.900 for short gripping times

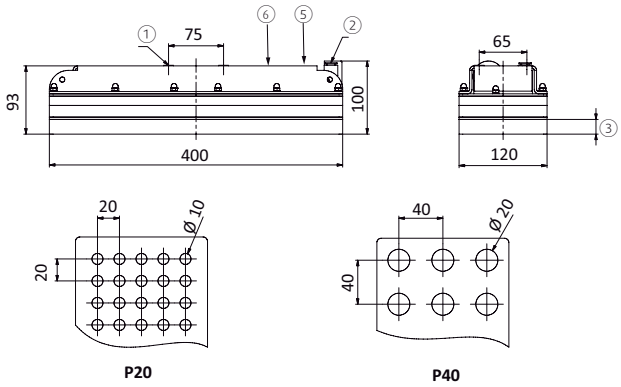


> The vacuum inside the vacuum hose starts to build up while the workpiece is approached, this reduces the gripping time
> Special valves with excellent suction power for fast evacuation or venting
> Extremely high dirt tolerance for maximum service life and high process reliability

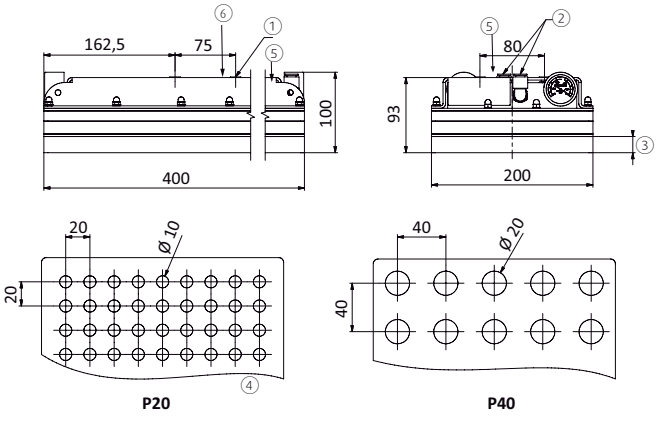
Dimensions



TC120x230-P20 | TC120x230-P40



TC120x400-P20 | TC120x400-P40

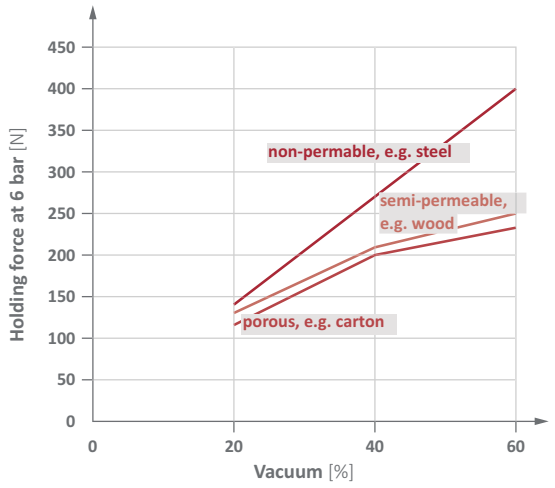


TC200x400-P20 | TC200x400-P40

① = Fixing with M6 screws ② = Compressed air connection G1/8-female with 10 mm quick-fitting ③ = 24 mm sealing foam
④ = Alternative compressed air connection G1/8-female (besides gauge) ⑤ = Alternative compressed air connection G1/8-female (at the top)
⑥ = Compressed air connection G1/8-female blow-off (at the top)

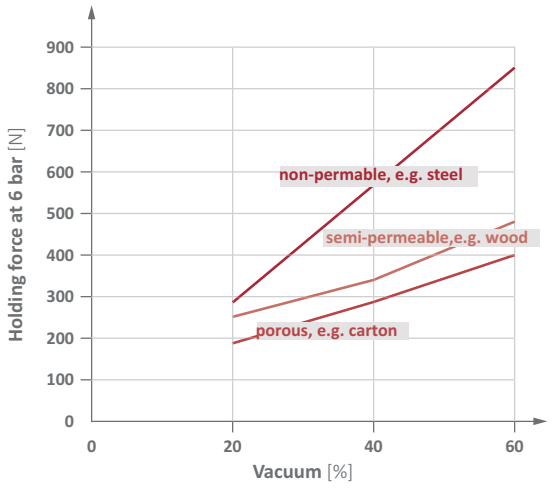
Diagrams

> Holding force against vacuum for different materials at 100 % coverage and safety factor 1.5



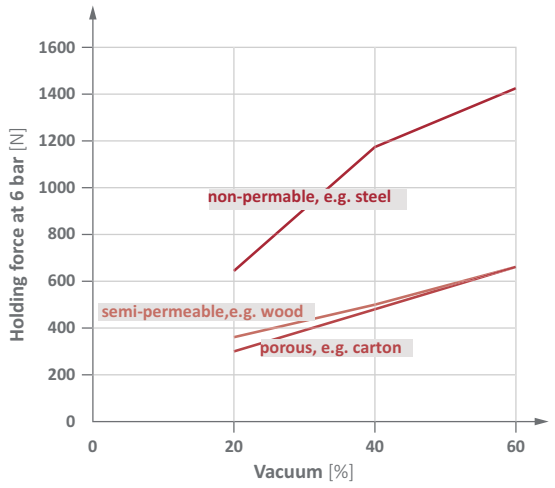
TC120x230-P20 | TC120x230-P40

> Holding force against vacuum for different materials at 100 % coverage and safety factor 1.5



TC120x400-P20 | TC120x400-P40

> Holding force against vacuum for different materials at 100 % coverage and safety factor 1.5



TC200x400-P20 | TC200x400-P40

Vacuum grippers with reduced leakage

Holding force increases with product coverage

NEW

ECONOMIC GRIPPER SOLUTIONS FOR DUST-FREE HANDLING PROCESSES

Product description

> Automated handling of individual products or product layers without gripper change
> Suitable for rigid products with an even or uneven surface
> Fast and uniform vacuum distribution ensures short cycle times and high acceleration rates
> Separate compressed air connection for blow-off function for fast product release
> Sealing foam for gentle product contact and optimum vacuum sealing - can be quickly replaced without tools and without leaving any residue

Notes

> Minimum coverage of 80 % recommended
> Suitable for use with > 90° swivel and tilt movements

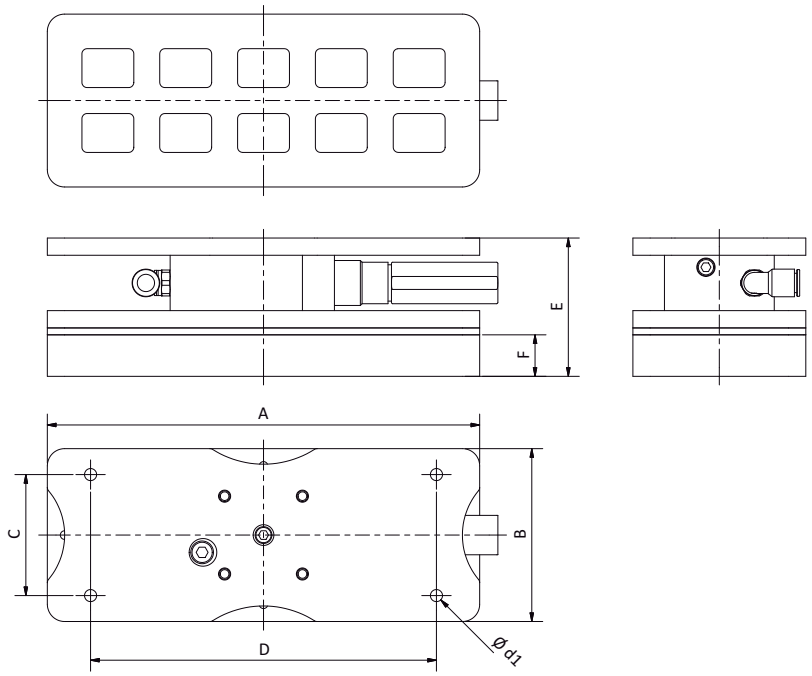
Ordering notes

> Wide range of standard grippers and quick manufacture of customised solutions
> Ordering example vacuum generation
  - TL150x300: integrated via ejectors
  - TL150x300-OV: designed for external vacuum generation, e.g. via side channel blower or pump
> Universal EPDM sealing foam, 24 mm thick (Index x24), included in scope of delivery
> Optional: EPDM sealing foam, 12 mm thick (Index x12)
> The gripping area is divided into zones for flexible product pick-up and/or release
> See chapter accessories for more information on:
  - Wide range of sealing foam for different applications
  - Gripper/robot connection elements

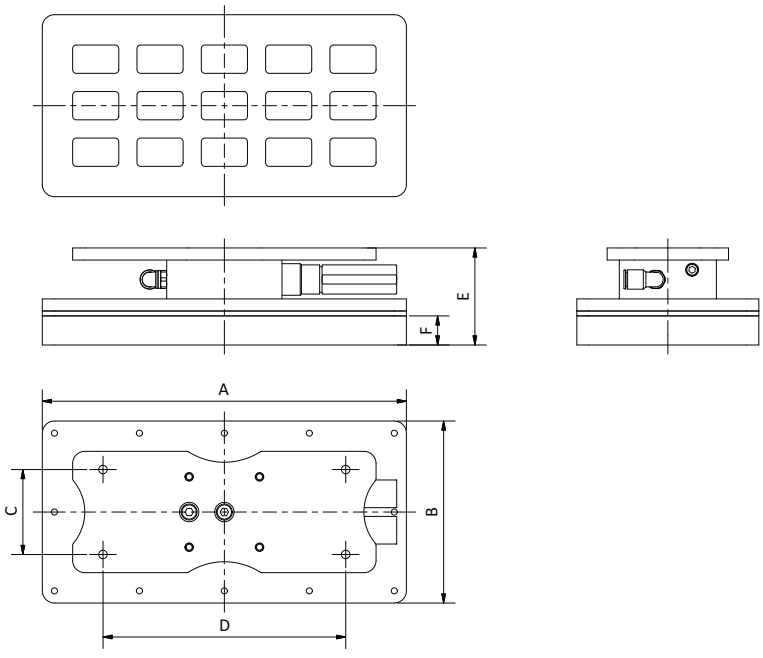
Technical data

Item no.	Air consumption at 6 bar [Nl/min]	Suction power against atmosphere [Nl/min]	Final vacuum [%]	Weight [kg]	Suitable sealing foam
TL100x250	105	198	85	1.55	PPF-TL-100x250x12 (p.250) PPF-TL-100x250x24 (p.250)
TL150x300	210	396	85	3.2	PPF-TL-150x300x12 (p.250) PPF-TL-150x300x24 (p.250)
TL200x350	210	396	85	4.2	PPF-TL-200x350x12 (p.250) PPF-TL-200x350x24 (p.250)
TL250x400	210	396	85	4.65	PPF-TL-250x400x12 (p.250) PPF-TL-250x400x24 (p.250)

Dimensions



TL100x250



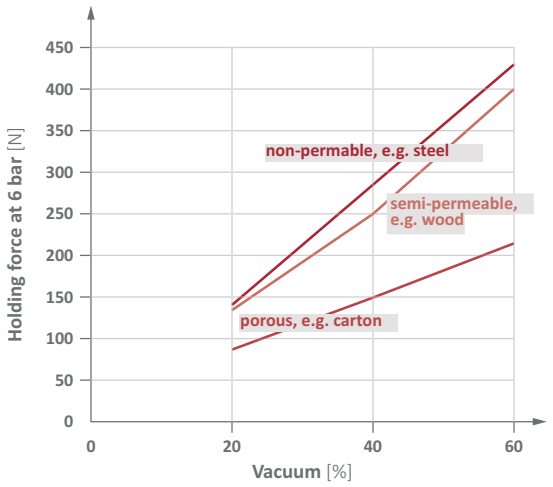
TL150x300 | TL200x350 | TL250x400

Item no.	A [mm]	B [mm]	C [mm]	D [mm]	d1 [mm]	E [mm]	F [mm]
TL100x250	250	100	70	200	7	78	24
TL150x300	300	150	70	200	7	80	24
TL200x350	350	200	70	200	7	80	24
TL250x400	400	250	70	200	7	69	24

Continued on the next page

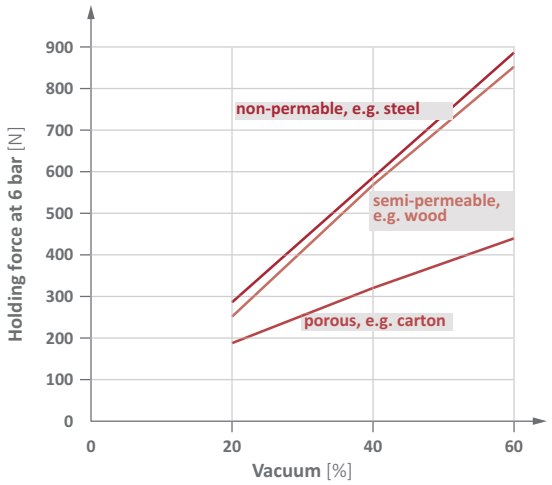
Diagrams

> Holding force against vacuum for different materials at 100 % coverage and safety factor 1.5



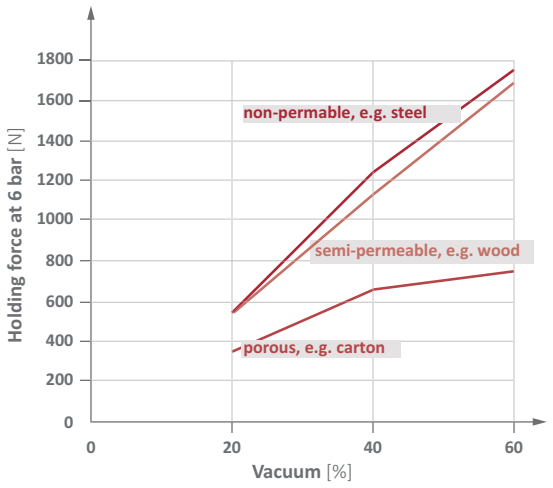
TL100x250

> Holding force against vacuum for different materials at 100 % coverage and safety factor 1.5



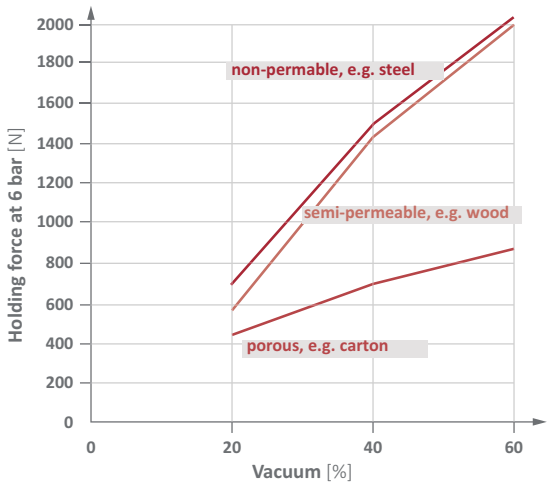
TL150x300

> Holding force against vacuum for different materials at 100 % coverage and safety factor 1.5



TL200x350

> Holding force against vacuum for different materials at 100 % coverage and safety factor 1.5



TL250x400

Low-leak suction plates - SPLT

NEW

Suction plate 67.010

Product description

> Combination of 4x4 or 6x6 bellows vacuum cups with 2.5 bellows in oil resistant NBR
> Suction plate suspended using a spring leveler with internal vacuum channel (25 mm lift)
> Off-center vacuum connection possible
> Reliable suction with variable product geometries

Notes

> Due to the flow cross-section of 0.4 mm per vacuum cup, these suction plates are not suitable for equipment with very short cycle times

Technical data

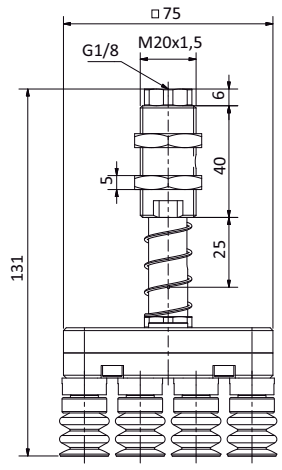
Item no.	Model	Number of vacuum cups	Lift Spring leveler [mm]	Cup lift [mm]	Gripping force * [N]	Max. leakage ** (Vacuum cups unassigned) [Nl/min]	Connection to the machine	Vacuum connection	Accessories
67.010	SPLT-4x4-25	16	25	9.5	190	24	M20x1,5-male	G1/8-female	Spare cup 20.018.125.1 Wrench socket for cup assembly 90.008
67.011	SPLT-6x6-25	36	25	9.5	426	54	M30x1,5-male	G3/8-female	Spare cup 20.018.125.1 Wrench socket for cup assembly 90.008

* = theoretical value at 60 % vacuum and a dry, smooth product surface. Figure excludes safety factor ** = at 60 % vacuum

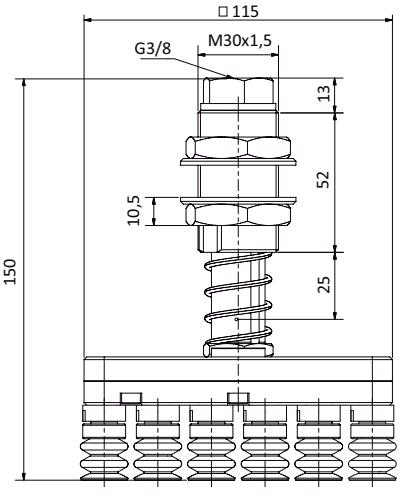
Application:

> Handling of variable product geometries or products with recesses that prevent all vacuum cups from making contact with the product surface (e.g. metal sheet in laser cutting systems)
> Integrated flow resistors reduce leakage and maintain an adequate vacuum level for the remaining vacuum cups covered by product, thus preventing products from being dropped

Dimensions



67.010



67.011

Bag grippers

Handling of non-rigid goods

MAXIMUM DURABILITY, MINIMUM MAINTENANCE

View of the suction chamber

Product description

> Handling of limp, non-rigid objects such as bags, shrink-wraps or any product that fully covers the suction chamber
> On board vacuum generation via high performance ejectors for optimum suction power
> Dust-resistant design
> Sealing foam with optimum adjustment to product surface - easy to replace
> Optional side channel blower for handling very porous goods

Notes

On request:
> Splitting of suction chamber for multi-zone picking and release
> Depth of the suction chamber can be adjusted for optimum handling of specific products (standard 40 mm)

Ordering notes

Ordering example vacuum generation
> TG150x300: integrated via ejectors
> TG150x300-OV: designed for external vacuum generation, e.g. via side channel blower or pump

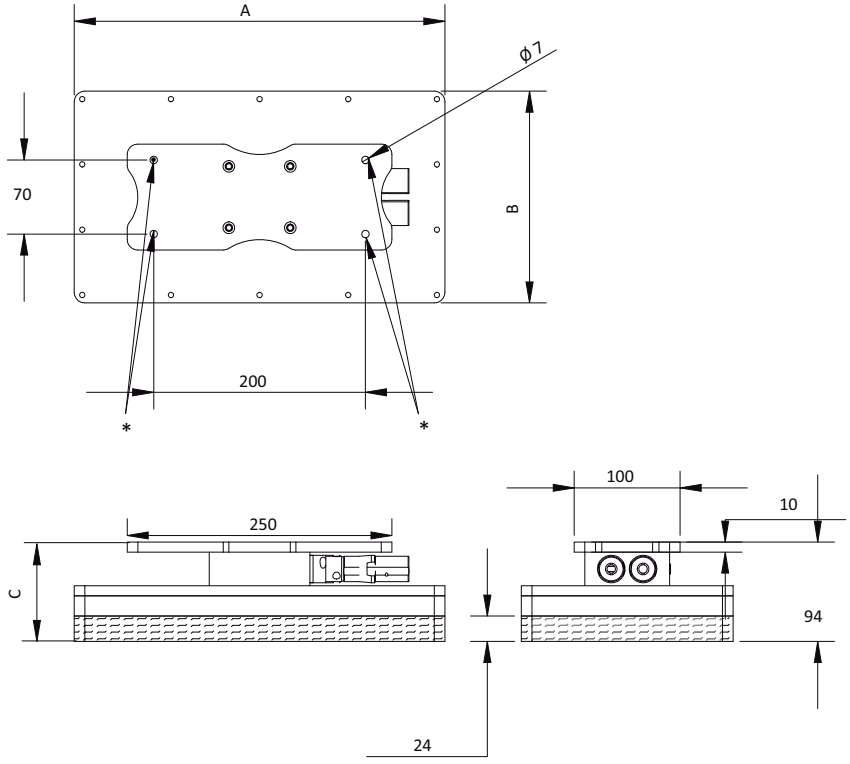
Technical data

Item no.	Air consumption at 6 bar [Nl/min]	Suction power against atmosphere [Nl/min]	Max. gripping force at 60 % vacuum (-600 mbar) safety factor 1.5 [N]			Weight [kg]	Suitable sealing foam
			Dense products (e.g. steel)	Semi-porous products (e.g. wood)	Porous products (e.g. carton boxes)		
TG100x250	105	198	280	170	70	1.5	PPF100x250
TG150x300	210	396	500	300	125	2.5	PPF150x300
TG200x350	210	396	770	470	190	3.5	PPF200x350
TG250x400	210	396	1,100	670	270	4.7	PPF250x400
TG300x500	210	396	1,670	1,000	400	6.7	PPF300x500
TG400x600	210	396	2,670	1,600	625	14.7	PPF400x600

Sealing foam

Easy replacement of sealing foam

Dimensions



* = Fixing holes for connection to gripper system

Item no.	**A** [mm]	**B** [mm]	**C** [mm]
TG100x250	100	250	62
TG150x300	150	300	62
TG200x350	200	350	62
TG250x400	250	400	93
TG300x500	300	500	93
TG400x600	400	600	93

Sealing foam for vacuum grippers

Suitable for all vacuum grippers

EASY INSTALLATION - FAST, RESIDUE-FREE REPLACEMENT!

Easy replacement of the sealing foam without tools

Product description

> Firm grip on the gripper bottom
> Quick, residue-free replacement without pre-handling or tools
> Different foams for a broad range of applications

Notes

> For information on the relevant hole patterns, see the chapter on vacuum grippers

Ordering notes

> Custom sizes and hole patterns available, quick and easy to implement
> The indicated item no. pertains to the universal sealing foam type

Technical data

Item no.	Suction area [mm]	Thickness [mm]	Material
PPF120.230-P20	120x230	24	EPDM
PPF120.230-P40	120x230	24	EPDM
PPF120.400-P20	120x400	24	EPDM
PPF120.400-P40	120x400	24	EPDM
PPF200.400-P20	200x400	24	EPDM
PPF200.400-P40	200x400	24	EPDM
PPF160.600-P20	160x600	24	EPDM
PPF160.600-P40	160x600	24	EPDM
PPF-TL-100x250x12	100x250	12	EPDM
PPF-TL-150x300x12	150x300	12	EPDM
PPF-TL-200x350x12	200x350	12	EPDM
PPF-TL-250x400x12	250x400	12	EPDM
PPF-TL-100x250x24	100x250	24	EPDM
PPF-TL-150x300x24	150x300	24	EPDM
PPF-TL-200x350x24	200x350	24	EPDM
PPF-TL-250x400x24	250x400	24	EPDM
PPF-600x400-20	600x400	24	EPDM
PPF-600x400-28	600x400	24	EPDM
PPF-600x400-40	600x400	24	EPDM
PPF-1300x260-20	1,300x260	24	EPDM
PPF-1300x260-28	1,300x260	24	EPDM
PPF-1300x260-40	1,300x260	24	EPDM
PPF-1300x500-20	1,300x500	24	EPDM
PPF-1300x500-28	1,300x500	24	EPDM
PPF-1300x500-40	1,300x500	24	EPDM

Available sealing foam and their properties

Suction mat type	Material	Properties	Example applications
Universal	EPDM	> Very soft structure > Very short reset time	> Porous workpieces such as cardboard boxes or untreated wooden pallets > Dense workpieces such as coated wooden boards > Suitable for short cycle times
Valve foam	EPDM	> Very soft structure > Very short reset time	> Handling of open glass jars (in combination with foam gripper TL) > Suitable for short cycle times
NR green	Natural rubber	> More rigid structure > Cut-resistant > Short reset time	> Building material, ceramics > Untreated wooden pallets > Wet pallets > Sharp-edged or abrasive products

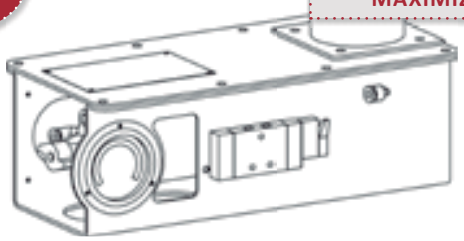
On request, the preparation of composite sealing foams is possible to combine, for example, short reset times and cut-resistance.

Pick-up and release system

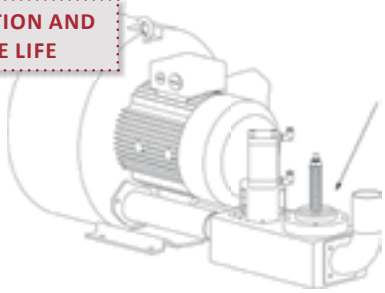
For vacuum grippers from size 400x600 mm and external vacuum supply with side channel blower

NEW

MINIMIZES ENERGY CONSUMPTION AND MAXIMIZES SYSTEM SERVICE LIFE



Pick-up box 36.900



Blower box 36.901 (shown with side channel blower)

Product description

> Combination of gripper box mounted on vacuum gripper and blower box
> One pneumatically powered cylinder each ensures a high value for the rated flow and proactive vacuum control
> This enables short gripping times and minimises blower power consumption
> In addition to reducing power consumption, automatic venting after release also ensures long service life as blower is not continously exposed to vacuum

Notes

> The number of pick-up boxes depends on the gripping system used

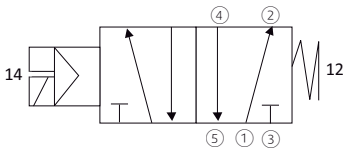
Ordering notes

Included in scope of delivery:
> 1 x aluminium housing, 5/2-way solenoid valve, pneumatically powered cylinder
> Control cable with plug, 24 VDC, 1.28 W, IP65, 2-pin, 5m length, open end

Technical data

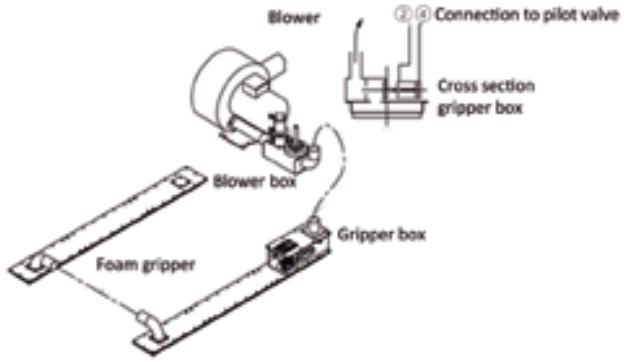
Item no.	Feed pressure [bar]	Tubing diameter vacuum connection [mm]	Operating temperature [°C]
36.900	3 - 8	60	-5 - 50
36.901	3 - 8	60	-5 - 50

Schematic of 5/2-way solenoid valve for pneumatic cylinder control

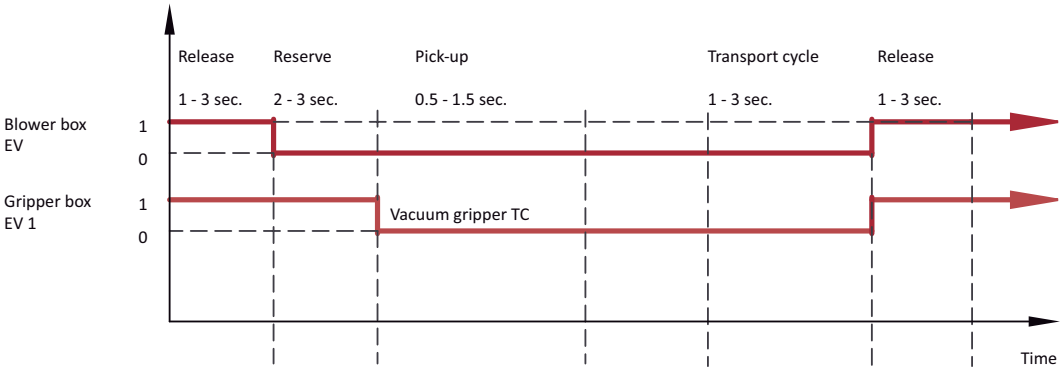


Assignment
① Compressed air inlet
② Working connection (Cylinder open)
④ Working connection (Cylinder closed)
③, ⑤ Ventilation

Diagram of pick-up and release system



Example diagram of pick-up and release system for vacuum gripper with two TC gripper heads



Process description

Vacuum build-up:
> The gripper/vacuum tubing connection is interrupted. The required vacuum is built up in the tubing during approach of gripper to workpiece.

Pick-up:
> The gripper/vacuum tubing connection is made
> The vacuum becomes operational on the gripper. This significantly reduces gripping time.

Transport cycle:
> The workpiece is securely moved by the gripper to its destination

Release:
> The gripper is connected to atmospheric pressure, thus the workpiece is quickly released
> The blower is vented with atmospheric air, which reduces power consumption and significantly increases service life as the blower is not continuously exposed to vacuum

Connection elements gripper - robot

Application specific interface to the robot

Product description

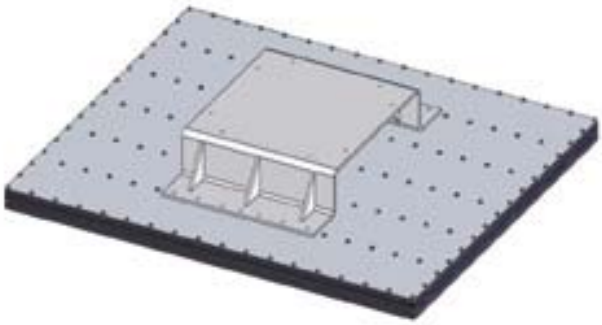
> Example A: Installation of grippers on robots without removal of the plate
> Example B: For vertical movements between robot and gripper
> Example C: For 3-axis movements between robot and gripper
> Example D: For connection of multiple or longer gripper systems, 3-axis movement

Ordering notes

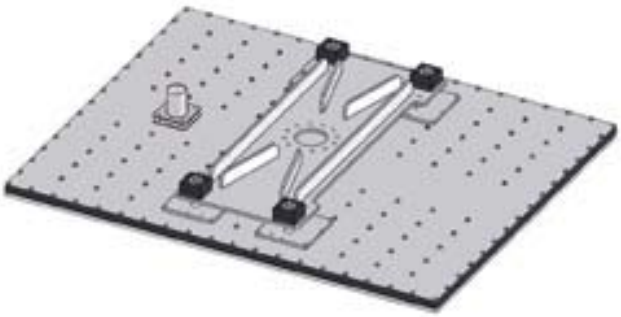
> Layout dependent on gripper system and robots used
> We will be happy to customize the interfaces for your application

Examples of application

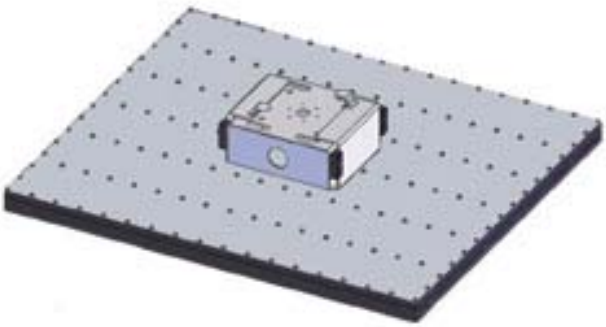
> Example A: Robot/gripper interface, raised



> Example B: Robot/gripper interface, type 1



> Example C: Robot/gripper interface, type 2



> Example D: Robot/gripper interface, type 3