TECHNOLOGY FOR VACUUM APPLICATIONS Components for pneumatic automation





SUCTION CUPS

Standard round suction cup Round suction cup Flat round suction cup Round bellows suction cup Long bellows suction cup Long bellows suction cup for bags High friction round suction cup High friction round bellows suction cup High friction oval suction cup Standard round suction cup made of polyurethane Round bellows suction cup made of polyurethane Round suction cup made of foam rubber Rectangular suction cup made of foam rubber

LEVEL COMPENSATORS

M5 standard level compensator - internal spring G1/8" standard level compensator - internal and external spring G1/4" standard level compensator - internal and external spring G3/8" anti-rotation level compensator - internal spring Cylindrical nipples for compensators Sleeves for antirotation level compensators

VACUUM GENERATORS

T06 single stage vacuum Generator T18 single stage vacuum Generator T10 single stage vacuum Generator T14 single stage vacuum Generator G1/8" single stage vacuum Generator G1/4" single stage vacuum Generator G3/8" single stage vacuum Generator G3/8" multistage vacuum Generator G3/8" multistage vacuum Generator G3/8" multistage vacuum Generator Accessories and spare parts for multifunction vacuum generator High-flow multistage vacuum generator Adjustable vacuum generator

VALVES AND SOLENOID VALVES

Shut-off valves

Shut-off valves with controlled leakage loss

Valves and solenoid valves with shutter $2/2 - G1 1/2^{"}$ and $3/2 - G3/8^{"} - G1/2^{"} - G3/4^{"} - G1^{"} - Series 700$ Valves and solenoid valves with shutter in techno-polymer $3/2 - G 1/2^{"}$ and $G 3/4^{"}$ - Series T700 Valves and solenoid valves with shutter in techno-polymer $3/2 - G 1^{"}$ - Series T771 Valves and solenoid valves with shutter - $2/2 - 3/2 - G1 1/2^{"}$ - Series N776 Electrical windings

2/2 pad valves

ACCESSORIES

Analog vacuometer Pneumatic vacuum switch Electromechanical vacuum switch Mini digital vacuum switch Digital vacuum switch Panel-mounted digital vacuum switch Digital battery vacuum gauge Digital vacuum gauge High efficiency silencers Vertical filters Line filters Suction cup supports Regulator Regulator for vacuum Proportional regulator with vacuum feedback















Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.

Introduction:

"The vacuum is an experimentally attainable state", as it is defined in physics., By vacuum, we mean a space completely void of matter, "called absolute vacuum". In practice, this state is unattainable, so when we say vacuum, we mean that the air pressure inside an environment is lower than atmospheric pressure, or when the density of the particles in the air is lower. With the expressions "Vacuum", "suction", "negative pressure", etc., we are referring to a pressure below atmospheric pressure, due to the weight of the overlying air. At sea level, this pressure is equal to 1013 mBar.

Degree of Vacuum

Depending on whether the pressure is higher or lower than atmospheric pressure, the phenomena that occur can vary considerably, and thus the means of achieving and measuring such pressure also varies. Usually we distinguish between different degrees of vacuum that are referred to by specific names as a function of the various intervals of sub-atmospheric pressure, as indicated below:

- 1) Low vacuum
- 2) Medium vacuum
- 3) High vacuum
- 4) Ultra high vacuum
- 5) Extreme high vacuum

In the industrial field, the vacuum is subdivided into three areas of application, which depend on the degree of vacuum required:

- •) Low vacuum: This term means a degree of vacuum between 0 and -20 KPa inclusive, most often used in applications where high air flow suction is required. In this industrial segment, electromechanical impeller pumps, side channel blowers, vacuum generators etc.
- •) Industrial Vacuum: this term refers to a degree of vacuum between -20 and -99 KPa inclusive. This range includes many of the applications where the vacuum is produced mainly by vacuum generators based on the Venturi principle, powered by compressed air and by vacuum pumps of the rotary vane, liquid ring, piston and hook-and-claw types, all driven by electric motors.
- •) Process Vacuum: This is a degree of vacuum higher than -99 KPa, where the main generators of this degree of vacuum are the two-stage rotary vane pumps, turbo molecular pumps, diffusion pumps, cryogenic pumps, etc., all driven by electric motor.

The highest value of vacuum reached on Earth is still far from the value of an absolute vacuum, which remains a purely theoretical matter. Even in space, so therefore in the absence of an atmosphere, there is a small presence of molecules per cubic metre. The impetus to improve vacuum technologies comes from industry and research. There is a great number of practical applications and highly disparate sectors: vacuum is used in the metallurgical, aerospace and food industries, in particle accelerators, in microelectronics, in the glass and ceramics industry, in industrial robotics, in moving and handling with suction cups, etc.

Some examples of application



Moving fragile products

- Handling eggs
- Handling glass
- Handling ceramic parts
- Handling electronic components

Robotics

- Handling auto parts for the automotive sector
- Palletisation in packaging sector
- Handling sheets of glass
- Handling slabs of marble
- Handling wood panels





Other examples of application

Vacuum packaging of food in modified atmosphere



Pick and Place

- Plastic sector
- Automotive sector
- Electronic sector
- Printing sector
- Packaging sector

Cardboard box forming

With the help of suction cups and vacuum generators, the cardboard boxes can be formed easily and quickly.

Transportation of powders and granules

With vacuum, it is possible to transport powders and granules while avoiding harm to the product and maintaining high standards of hygiene and safety.

Vacuum clamping

With the help of vacuum and proper suction cups, it is possible to clamp products such as wood, marble, glass, fibre composites, etc. onto workstations.

Evaporation and degassing

Vacuum can be used to lower the boiling point of any liquid, which considerably reduces the time needed to reach that point. In degassing applications, vacuum is used to reduce the gases present in a substance. These gases may cause bubbles which have an adverse effection the product.

Vacuum infusion

Infusion of composite materials is a production process that is becoming increasingly more popular to improve the aesthetic quality of the end product and reduce total manpower costs. The general principle of infusion is to "absorb" the resin into there and in the fabrics to be reinforced by using vacuum technology. The vacuum reduces the pressure at one end of the layers of fabric, allowing the atmosphere to push the resin through all the layers of fabric. The speed and distance at which a stack of fabric can be filled depends on the viscosity of the resin system, permeability of the layers of fabric and pressure gradient that acts on the infused resin.

Thermoforming

Vacuum can be used in the process of thermoforming plastic materials. The preheated sheet of plastic material is placed on the die via suction (vacuum), so as to conform to the relief features of the die.

Medical

Vacuum is used in a number of procedures in the medical sector, such as: dentistry and oral prosthetics, compression therapy and other hospital procedures.

Conversion table for positive pressure

	Pa (N/m²)	bar	Kg/cm ²	Torr	psi (ibf/in²)	kPa	inHg
1 Pa	1	0,00001	10.1792x10 ⁻⁶	7.50062x10 ⁻³	0.145038x10 ⁻³	0.001	0.3x10 ⁻³
1 kPa	1000	0.01	10.1792x10 ³ 1.01972	7.50062	0.145038	1	0.3
1 bar	100000	1		750.062	14.5038	100	30
1 kg/cm ²	98066.5	0.980665	1	735.559	14.2233	98.0665	29.42
1 torr	133.322	1.33322x10 ⁻³	1.35951x10 ⁻³	1	19.3368x10 ⁻³	0.133322	0.04
1 Psi	6894.76	68.9476x10 ⁻³	70.3096x10 ⁻³	51.7149	1	6.89476	2.07

Conversion table for negative pressure

	mbar	kPa	-kPa	%Vacuum	Torr	-mmHg	-inHg
Atm	1013	101.3	0	0	760	0	0
	913	91.3	10	9.9	685	75	3
	813	81.3	20	19.7	610	150	6
	713	71.3	30	29.6	535	225	9
	613	61.3	40	39.5	460	300	12
	513	51.3	50	49.3	385	375	15
	413	41.3	60	59.2	310	450	18
	313	31.3	70	69.1	235	525	21
	213	21.3	80	79	160	600	24
	113	11.3	90	89	85	675	27
Absolute vacuum	0	0	101.3	100	0	760	30

Conversion table of Flow rate per unit of time

	m³/s	m³/h	l/min	l/s	ft³/min (scfm)
1 m³/s	1	3600	60000	1000	2118.9
1 m³/h	0.28x10 ⁻³	1	16.6667	0.2778	0.5885
1 l/min	16.67x10 ^{-₄}	0.06	1	0.0167	0.035
1 l/s	1x10 ⁻³	3.6	60	1	2.1189
1 ft ³ /min (scfm)	0.472x10 ⁻³	1.6992	28.32	0.4720	1

Suction cups

Suction cups are vacuum accessories that are indispensable whenever there is a problem with lifting, clamping or handling manufactured products, sheets or other objects that are "difficult to grip" with traditional gripping means, because they lack handholds, are fragile or are easily deformable.

Correct application of suction cups ensures simple, economical and safe gripping operations, which are critical requirements for the proper execution of any automatic action.

The suction cup adheres to the surface of an object whenever the pressure surrounding it outside (atmospheric pressure) is higher than the pressure existing between the suction cup and the surface of the object.

In order to generate low pressure inside the suction cup, the latter may be connected to a vacuum pump.

The lifting force of the suction cup will depend on the degree of vacuum attained by the pump and its capacity to compensate for losses.

The suction cup is an effective, simple and economical system for handling all kinds of shapes and surfaces.

The suction cup itself can have a number of different shapes: flat, oval, conical bellows with the possibility of adding various accessories, such as filters, shut-off valves, level compensators. Any given suction cup is designed for a specific vacuum movement application.

Applications:

Gripping, handling, lifting, forming, palletising, pick & place, transferring, positioning. The materials that can be managed with suction cups are highly varied, but we can roughly categorise them as follows:

1) METALS: heavy loads, large sizes, middle frequencies, dirty surfaces.

2) PLASTIC: light loads, medium to small sizes with irregular shapes, no surface deposits.

3) WOOD: rough surface, slightly deformed, middle-weight loads, no surface deposits.





Criteria for selecting a suction cup:

Suction cups are gripping elements (or devices) that can handle many different kinds of objects; obviously their shape, weight, material, size and type of movement have a direct effect on the choice of suction cup, both in terms of shape and the material of which it is composed. Generally speaking, suction cups can have two or three types of shapes: flat, profiled and bellows (single or multiple).Flat and profiled suction cups are suitable for gripping and moving smooth, flat or slightly curved surfaces, especially in a direction perpendicular to the gripping surface, with good shear strength. For deformable, very heavy and/or superficially dirty surfaces, suction cups that have a high grip coefficient are available, obtained by using specially-shaped anchors in the gripping area. The bellows suction cups are suitable for gripping and moving irregular, cylindrical, curved surfaces. The suction cup's capacity to conform to the surface depends on the number of changes the bellows will have to make. Obviously the shear strength will be considerably less than for smooth suction cups, but the capacity for "articulated" action is highly flexible for angular grips.

The force of the suction cup is proportional to the degree of vacuum generated inside it and to the surface covered by this same suction cup. The main reference data are:

Theoretical force (Ft): Ft = surface of the suction cup x percentage of vacuum

Effective force (Fe): Fe = Ft - 50%

K Factor (Safety coefficient): This factor is used to correctly and safely size the suction cup as a function of the various applications; the K factor will differ depending on the application.

K=2: horizontal linear movement

K=4: vertical linear movement and movement along more than one axis

axis K=6: vertical movement along more than one axis (rotation)

Level of vacuum to be generated during gripping:

In practical applications no surface to be moved using vacuum is actually entirely impermeable. In cases of porous materials and surfaces that are non-regular (wood, cardboard, etc.) and smooth, some of the air will leak out in the direction of the vacuum; in this case, it is necessary to keep the vacuum flow rate high to compensate for the aforementioned leakage and maintain the grip; this is brought about with a low level of vacuum and broader diameters of the suction cups; on the other hand, if the materials are rigid and nonporous (metal, thick plastic, glass, etc.), the flow rate of the vacuum stays weak or non-existant, and so you need to raise the level of vacuum using more compact suction cups. In summary:

1) Porous materials: degree of vacuum between 35-60%

2) Nonporous materials: degree of vacuum between 55 – 80%

Determination of the suction cup diameter

After having chosen the type of suction cup and the material, you can go on to calculate the diameter of that suction cup; to do this, you need to use predefined formulas that take into account the following:

D = diameter of the suction cup in mm / K = safety factor / V = degree of vacuum (- Kpa)

n = number of suction cups in the application / m = mass to be handled (in Kg)

The formula will vary as a function of the type of suction cup (flat - profiled - bellows single or multiple). The formulas are the following:

Flat suction cup	D = 140 * m K	
Profiled suction cup	$D = 123 * \int_{m*K}^{V} \frac{V*n}{m*K}$	
Bellows suction cup	$D = 152 * \int_{m K}^{v V n}$	(two bellows 223 / three bellows 558)
	v V*n	



We can subdivide the applications with suction cups into: Horizontal, where the object is lifted and moved parallel to the plane Vertical, where the object is lifted and moved perpendicular to the plane

Due to a number of factors intrinsic to the handling system, such as friction, gravity and acceleration, the safety factor has to be implemented to prevent the object from slipping and detaching while it is being moved.

Safety factor table

K (Safety factor)	Type of handling
2	Horizontal movement
4	Vertical movement
4	Horizontal movement with Robots
6	Vertical movement with Robots

Choice of suction cup:

Pneumax suction cups are available in different shapes, each one of which can meet a number of existing application requirements; the choice of cup must be made based on the characteristics listed below:

Suction cup Flat series TP:

Suction cup to be used for moving sheets and in those applications where the lifting force is parallel to the gripping plane. Internal reinforcements improve stability and make this cup suitable for handling heavy objects.

Suction cup Bellows series TS:

Suction cup best used in particular for moving light items in those applications where the lifting force is parallel to the gripping plane. The range of the bellows makes it possible to compensate for the irregularity of the surface and height of the object. The long bellows suction cup is best used in applications where it is necessary to pick off and move light products such as: leaves of paper or pieces of cardboard, thin sheets, wood panels, etc.

Due to their greater flexibility, these can be used to compensate for errors of flatness or to grip inclined surfaces, but are not suitable for applications with vertical loads or with a high degree of vacuum.

Suction cup (Plain) Cup series TN:

Among the most common types of suction cup, used in sectors of industry where special performance is not required: Handling of objects made of plastic, wood panels, thin sheets of glass and metal, etc. Recommended for vertical movement of heavy objects.

High Grip suction cup:

Suction cup with high coefficient of friction, developed for the handling of oily surfaces, such as sheet metal in moulding processes, and also recommended for handling wet marbles and glasses, slabs and loads in general, subject to high accelerations and decelerations during movement.

Recommended for the "automotive" sector, available in various sizes and shapes: round and oval flat and round and oval bellows. Suitable for horizontal and vertical movement.

Foam rubber suction cups:

This suction cup allows for the moving and gripping of loads with coarse, very rough or uneven surfaces, such as: textured, nonslip or ribbed/corrugated sheets, and sawn, bush-hammered or flamed marble. Items made of rough concrete, garden walkway tiles and brick in general. Recommended for use with oiled surfaces and to move vertical loads.

Choice of Mix. The choice of mix to be used is made by consulting the technical tables as a function of the individual application, and after having carefully evaluated the following factors :

- Surface roughness of the load to be moved and its temperature
- Weight and dimensions of the load.
- The presence of chemical substances, oils, solvents etc. on the gripping surface.
- How labour-intensive and complex the work processes are.
- How important it is to ensure that no specks exist on the gripping surface.

Suction Cup Characteristics and Materials

Material	Temperature °C Abrasion resistance		Oil resistance	Resistance to weather/atmospheric agents
N-NBR	-20 ÷+110	Excellent	Excellent	Very good
S-Silicone	-40 ÷+200	Good	Low	Excellent
PU-Polyurethane	10 ÷ 50	Excellent	Excellent	Excellent
F-Fluorinated rubber	-10 ÷+230	Excellent	Very good	Very good

Level Compensator:

This accessory makes it possible to overcome differences in height that may be found in various applications, for example in lifting systems where the suction cups are fixed to a rigid structure or when a suction cup is used on the arm of an anthropomorphic robot or in a similar system where the items must be accurately positioned at the required height; in addition, the device makes it possible, within certain limits, to absorb pushback.

The Pneumax range is subdivided into three types:

- Compensator with external spring
- Compensator with internal spring
- Anti-rotation compensator with internal spring





Pneumatic pumps

Vacuum pumps of the pneumatic type or pneumatic vacuum generators, which operate on the Venturi principle: one or more nozzles are fed by compressed air, generating a jet of air that drags (in contact with the environment) the surrounding air and then evacuates. This "dragging" creates a depression which results in the generation of a vacuum. The big advantage of pneumatic pumps is that they can only operate when the suction cups or the application connected to them require vacuum.

Advantages:

Consumption of air (and therefore power) limited to the moment of use. Installation directly proximate to the suction cups (simplification of layout / savings). Short response times and high capacity. Flow rates for any requirement. No limit to applications. Compactness / lightness / reliability / little or no wear.

Types:

In terms of dimensions, functions and operation, we can categorise generators as one of two major types: 1) Single stage, compact and/or miniaturised, with pneumatic or electropneumatic control, for direct-contact installation with suction cup holders and suction cups.



2) Multistadio con o senza funzioni integrate, a comando pneumatico / elettropneumatico per montaggio de-localizzato e per gestione di gruppi di Suction cups.





Range:

The **PNEUMAX** range consists of single-stage and multistage equipment of various sizes and types; the single-stage generators use the Venturi effect in a single medium/high throughput nozzle and promptly generate vacuum, flow rate and suction values that are suitable for medium/light applications.

Multistage generators having more than one nozzle (ejectors) in a line, using the kinetic energy that this layout generates to ensure, based on the flow rate, limited consumption of energy and attainment of a vacuum level equal to 90%, with various suction capabilities.

Single-stage generators, very fast in switching pressure/vacuum, can also be equipped with a quick-release system for highly cyclical applications.

On the other hand, **multistage generators** can often be accessorised with integrated management and control functions, such as for example electropneumatic control for power supply and power shut-off, quick-release blowing, a regulator to measure this release and a vacuum switch, to control the degree of vacuum generated.

These latter generators can be installed as modules as well, creating actual stand-alone generation modules and decentralised vacuum management for controlling more than one gripping element

Adjustable vacuum generators conveyor

Based on the Venturi principle, these differ from the ones described further above in that they have an ejector with a much larger diameter, and are adjustable.

This feature makes it possible to change the device's flow rate and degree of vacuum without affecting the supply pressure. Their special shape and their operating principle make them suitable for suction and the transfer of powders, granules, sawdust, metal chips, liquid or dry food products, etc.; to control suction cups in the presence of large quantities of powders or liquids; these can also be used to suction smoke, coolant fog, water vapour, etc.

Suction filters

Preventing contaminants from reaching the pneumatic vacuum generator is very important for ensuring long-term and good operation.

This is why Pneumax vacuum filters are installed at the suction inlet of the pneumatic vacuum generators and/or on the pipework of the equipment.

The Pneumax product line includes vertical suction filters with flow rates ranging from 150 to 2520 I/m and threads running from G3/8" to G1".

In-line filters with flow rates ranging from 20 to 50 l/m and instant connectivity for pipes with diameters ø4, ø6 and ø8mm







Standard round suction cup



F

M5

M5

M5



Standard round suction cup, suitable for gripping and moving with vacuum, objects with flat or slightly curved surfaces, allows gripping on concave surfaces.

	Code		Lifting force i	in vertical direc	tion (N)	Lifting force i	Lifting force in parallel direction (N)			
	<pre></pre>	Volume cm ³	-20kPa	-60kPa	-90kPa	-20kPa	-60kPa	-90kPa		
	19VTN. Ø .05.004.00	0.03	0.198	0.885	1.275	0.198	0.78	1		
Sec	19VTN05.008.00	0.1	1	2.55	3.8	1	2.85	3.35		
ting for	19VTN. Ø .05.010.00	0.18	1.48	4.4	6.85	1.5	4.4	4.9		
	19VTN18.020.00	1	5.9	12.2	16	5.9	8.8	9.8		
J≣	19VTN18.030.00	2	13	25	33	7.8	9.8	11		
le	19VTN. Ø .18.040.00	5.5	20	37.5	60	13.8	22	27.5		
Tat	19VTN14.050.00	12	35.5	74	95	20	37	44		
	Material	Colour	На	urdness °Shore	Δ	Onereting temperature °C				
	NPD	block	114	55 CHOIC	~~					
	INDR	DIACK		55		-20 ÷ 110				
	Silicone	red	50				-40 ÷ 200			

Cup-style round suction cup







Typical cup-shaped suction cup, suitable for gripping and moving with vacuum, objects with flat or slightly curved surfaces, allows gripping on concave surfaces.

	Codice		Volume cm ³	Lifting force in vertic	al direction (N)	
	oouloo	·	Volume em	-60kPa	-90kPa	
	19VTC.N.05.0	006.00	0.03	0.5	0.8	
	19VTC.N.05.0	00.800	0.1	1	1.5	
	19VTC.N.05.0	010.00	0.18	1.5	2	
	19VTC.N.18.0	015.00	0.9	5	7.5	
	19VTC.N.18.0	020.00	2.5	8.5	11	
	19VTC.N.18.0	030.00	5	18	23	
	19VTC.N.18.0	040.00	12	30	35	
	19VTC.N.18.0	19VTC.N.18.050.00 15		45	60	
Material	Colour	Colour Hardness		Shore A	Operating ter	nperature °C
NBR	black	black 55			-20 ÷	110

Table of lifting forces

Table of lifting forces

G1/2"



£

19VTP. 0.14.075.00

19VTP. . 12.110.00

19VTP.

77 8 26 18 G1/4"

112 14 29 15 G1/2"

152

18 33 14

s

G1/8" S12

G1/8" S12

G1/8" S12

G1/8" S17

G1/4" S24

Flat round suction cup, suitable for gripping and moving with vacuum, objects with flat surfaces, offers good stability and minimal displacement. Recommended for applications with force parallel to grip plane, suitable for moving glass, wood, steel and plastic sheets. Internal reinforcements prevent thin objects from deforming and increase friction in applications with forces parallel to grip plane.

6

32.5 _

22.5

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22 9.5 1.5 15.5 M5

27 10.5 1.5 16.5 M5

32 11.5 1.5 17.5 M5

42 18 5 25

53

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Code ♥ = Version N =NBR / S=Silicone

19VTP. 0.18.020.00

19VTP. 0.18.025.00

19VTP. 0.18.030.00

19VTP. 0.18.040.00

19VTP. 0.14.050.00

Code	Volume cm ³	Lifting force in vertical direction (N)			Lifting force in parallel direction (N)			
N =NBR / S=Silicone	Volume em	-20kPa	-60kPa	-90kPa	-20kPa	-60kPa	-90kPa	
19VTP 18.020.00	1	6	15	18.7	5	7.95	8.45	
19VTP.	1.1	9.2	19.3	24.9	7.95	8.95	10	
19VTP 18.030.00	2	13	24.8	30.8	11	15.98	20	
19VTP.	4.8	20	40	50	15	25	29.5	
19VTP.	10	37	74	96	24	40	50	
19VTP.	20	80	201	272	60	110	140	
19VTP.	70	141	418.5	562	140	24.8	299.7	
19VTP.	160	300	845	1098	250	600	800	
Material	Colour	Hardness °Shore A			Operating temperature °C			
NBR	black	55			-20 ÷ 110			
Silicone	red	50			-40 ÷200			



Round bellows suction cup



	B B		S= ØA	
Code				

Code ♥ = Version N =NBR / S=Silicone	ØA	ØA'	В	С	D
19VTS. 05.005.15	5.6	6.2	9.2	4	16.7
19VTS. 05.010.15	11	12	16	5	25
19VTS. Ø .05.015.15	15.5	17.5	19.5	5	28.5



N =NBR / S=Silicone	2	2		•		-	5	0
19VTS18.020.15	22	24	20.5	1.5	26.5	M5	G1/8"	S12
19VTS18.030.15	34	36	31	5	38	-	G1/8"	S17
19VTS18.040.15	43	46	33	5	40	-	G1/8"	S17
19VTS. Ø .14.050.15	53	58	41	6	50	-	G1/4"	S24



Code ♥ = Version N =NBR / S=Silicone	ØA	ØA'	В	С	G
19VTS. 0.12.075.15	78	83	50	18	G1/2"
19VTS. 0.12.110.15	115	124	63	15	G1/2"
19VTS. 0.12.150.15	155	166	78	14	G1/2"

Round bellows suction cup, which, due to its shape, ensures that when in contact with the surface of the load to be lifted and in the presence of vacuum, it rapidly collapses, releasing the load of several millimetres, separately from the movements of the automation system; this rapid movement prevents the load underneath from remaining stuck to the one being lifted. For this reason, suction cups with this feature are recommended in cases where you need to pick off and move sheets of cardboard, fine sheets, wood panels, glass panes etc. and are also recommended for use on curved surfaces. This suction cup is not suitable for handling objects with lifting force parallel to the surface.

	Code	Volume cm ³	Lifting force	in vertical direc	ction (N)	
	N =NBR / S=Silico	ne	-20kPa	-60kPa	-90kPa	
	19VTS. Ø .05.005.	15 0.05	0.295	0.786	0.99	
	19VTS. Ø .05.010.	15 0.48	1.7	3.5	5.1	
	19VTS. Ø .05.015.	15 1.1	3.3	6	8.9	
	19VTS. Ø .18.020.	15 2.7	5.8	10.6	15	
	19VTS. Ø .18.030.	15 10	13	25	28	
	19VTS. Ø .18.040.	15 15	22.5	42	50.2	
	19VTS. Ø .14.050.	15 32	34	65	83	
	19VTS. Ø .12.075.	15 110	74	166.4	226	
	19VTS. Ø .12.110.	15 310	136.5	343	460.5	
	19VTS. Ø .12.150.	15 650	295	686	883	
Material	Colour	Hardness	Shore A		Operating ter	mperature °C
NBR	black	5	5		-20 ÷	- 110
Silicone	red	5	60		-40 ÷	- 200

Table of lifting forces

Vacuum components Suction cups





Table of lifting forces

Vacuum components Suction cups

High friction round suction cup



Code	D	D_1	d	G	Н	$L_{\rm G}$	S	H,
19GTN.N.14.030.00	32	30	4	G1/4M	20	12	17	2.7
19GTN.N.14.040.00	42	40	4	G1/4M	22	12	17	3.7
19GTN.N.14.050.00	52	50	6	G1/4M	28	12	22	4.7
19GTN.N.14.060.00	62.5	60	6	G1/4M	31	12	22	6
19GTN.N.14.080.00	82	80	6	G1/4M	34	12	22	7.5
19GTN.N.14.100.00	103	100	6	G1/4M	36	12	22	9.2

High friction round suction cup suitable for movement of pieces of various size and shape, reinforced internal structure ensures that lifted objects are not deformed and increases friction force in applications with force parallel to the grip plane. The innovative design of the support plane inside the suction cup ensures high coefficient of friction with the grip surface, in particular on very oily sheets or glass panes and very wet marble, thanks to this suction cup's drainage capability. This suction cup is most particularly recommended for applications of handing sheet metal parts in the "automotive" industry. This characteristic means that there is asecure and solid grip by the suction cup and consequently ensures accurate positioning of the load to be moved.

	Material	Colour	Hardness °Shore	A Ope	rating temperature °C
	19GTN.N.14.100.00	60	445	322	308
	19GTN.N.14.080.00	35	288	212	190
	19GTN.N.14.060.00	12.6	145	102	93
'	19GTN.N.14.050.00	7.5	112	90	86
	19GTN.N.14.040.00	3.5	72	54	51
	19GTN.N.14.030.00	1.6	45	35	33
			-60kPa	-60kPa	-60kPa
	Code	Volume cm ³	Lifting force in verticale (N)	Lifting force in parallelo (N)	Lateral force on oily surface (N)

High friction round bellows suction cup



Code	D	D ₁	d	G	Н	$L_{\rm G}$	S	H,
19GTS.N.14.022.15	22	20	4	G1/4M	25	12	16	5.5
19GTS.N.14.030.15	32	30	4	G1/4M	28	12	17	9.5
19GTS.N.14.040.15	42	40	4	G1/4M	28.5	12	17	10
19GTS.N.14.050.15	52	50	6	G1/4M	37	12	22	11.5
19GTS.N.14.060.15	62.5	60	6	G1/4M	41	12	22	14.5
19GTS.N.14.080.15	82	80	6	G1/4M	50.5	12	22	22.5
19GTS.N.14.100.15	102.5	100	6	G1/4M	56	12	22	25

High friction round bellows suction cup suited for movement of pieces of various size and shape and where level compensation is necessary, such as when withdrawing from loaders. Especially recommended for applications with force parallel to the grip plane. The innovative design of the support plane inside the suction cup ensures high coefficient of friction with the grip surface, in particular on very oily sheets or glass panes and very wet marble, thanks to this suction cup's drainage capability. This feature enables a secure and solid grip by the suction cup and consequently ensures accurate positioning of the load to be moved.

Code	Volume cm ³	Lifting force in verticale (N)	Lifting force in parallelo (N) 🖂	Lateral force on oily surface (N)	
		-60kPa	-60	<pa< td=""><td>-60kPa</td></pa<>	-60kPa	
19GTS.N.14.022.15	1.5	23	2	0	6.5	
19GTS.N.14.030.15	6.3	35	2	8	12	
19GTS.N.14.040.15	7.2	62	37		34	
19GTS.N.14.050.15	11.2	85	5	8	55	
19GTS.N.14.060.15	22.5	141	8	8	83	
19GTS.N.14.080.15	57	236	14	11	136	
19GTS.N.14.100.15	92	371	22	28	221	
			-	-		
Material	Colour	Hardness °Shore	A Opera		rating temperature °C	
NBR	Orange	60			-20 ÷ 110	

Table of lifting forces

Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.

Vacuum components Suction cups





 19GES.N.14.GxR.15
 108
 275
 295
 267

 Material
 Colour
 Hardness °Shore A
 Operating temperature °C

 NBR
 Orange
 60
 -20 ÷ 110



Vacuum components

Suction cups

Standard round suction cup made of polyurethane

Table of lifting forces



	ØB			
			_	G1/8M
	ØA			
Code	ØA	ØВ	С	D
19VTN.P.18.030.00	31	14	20.5	10
19VTN.P.18.040.00	41	14	24	10

Standard round suction cup made of polyurethane, suitable for gripping and moving with vacuum, objects with flat or slightly curved surfaces, allows gripping on concave surfaces. The main advantage of this suction cup is that the material it is made of--polyurethane--lasts longer than other materials, has optimum wear resistance, good flexibility and Polyurethane suction cups are mark resistant.

Code	Volume cm ³	Lifting force i	in vertical direc	tion (N)	Lifting force in parallel direction (N)				
		-20kPa	-60kPa	-90kPa	-20kPa	-60kPa	-90kPa		
19VTN.P.18.030.00	2	13	23	33	7.8	9.8	11		
19VTN.P.18.040.00	5.5	20	40	60	13.8	22	27.5		
Material	Colour	Hardness °Shore A			Operating temperature °C				
PU	yellow		40		10 ÷ 50				

Round bellows suction cup made of polyurethane





2AΤΓ

øc



Code	ØA	ØВ	ØC	D	Е	F	G	S
19VTS.P.14.030.15	19.8	32	32	28	7	13.5	G1/4" thread male	17
19VTS.P.14.040.15	19.8	32	42	29	9	13.5	G1/4" thread male	22
19VTS.P.14.050.15	25	40	51.5	37	11.5	13.5	G1/4" thread male	22

Code	ØA	ØВ	ØC	D	Е	F	G	S
19VTS.P.14.060.15	24	50	64	41.5	15	13.5	G1/4" thread male	21
19VTS.P.14.080.15	24	68	84	49.5	22.5	13.5	G1/4" thread male	21
19VTS.P.14.100.15	24	83	103	55	20.5	13.5	G1/4" thread male	22

Round bellows suction cup made of polyurethane, suited for moving pieces of various sizes and shapes and where level compensation is necessary, such as when withdrawing from loaders. The big advantage of this suction cup is that the material it is made of--polyurethane--lasts longer than other materials, has optimum wear resistance, good flexibility and optimum tensile strength. Suitable for moving--with vacuum--steel sheets, glass sheets, cardboard boxes and wood panels.

Code	Volume cm ³	Lifting force i	n vertical direc	tion (N) 📥	Lifting force	in parallel direc	tion (N) 💻
		-20kPa	-60kPa	-90kPa	-20kPa	-60kPa	-90kPa
19VTS.P.14.030.15	6	11	60.2	91	8.4	30.5	76
19VTS.P.14.040.15	7.2	17.5	93	119.8	11.3	63.8	110.8
19VTS.P.14.050.15	11	25	128.5	157.8	20.5	94	144
19VTS.P.14.060.15	22	87.3	156.2	189.2	67	125.6	165.8
19VTS.P.14.080.15	59.5	118.6	210.5	252.6	89	167.8	221.2
19VTS.P.14.100.15	103.5	149	269.5	310.4	111.8	209.8	276.5
				-			
Material	Colour	На	rdness °Shore	A	Opera	ting temperate	ure °C
PU	Blue		60		10 ÷ 50		

Table of lifting forces

Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.





	19VTS.P.38.0	70.15	108	74	165		225	
Material	Colour		Hardness °Shore A			Operating temperature °C		
PU	yellow		40				10 -	÷ 50

34

86

100

32



Round bellows suction cup made of polyurethane



	Code		Code		Code		Code		Code		Volume cm ³	Lifting force in	n vertical di	rection	(N)	
				-20kPa	-60kPa		-90kPa									
		20.25	1.18	4.5	7		10									
		19VTS.P.18.030.25		10	19		25									
	19VTS.P.14.040.25		15	15	32		50									
	19VTS.P.38.05	50.25	30	35	58		79									
	19VTS.P.38.07	70.25	75	72	125		150									
	terial Colour															
Material			Hardness °Shore A			O	perating ter	nperature °C								
PU	Green		5	55		10 ÷ 50		- 50								

Table of lifting forces

Vacuum components Suction cups

	•															
Fo	am rubber round s	uction cup														
			Code 19VTN.G.14.04 19VTN.G.14.05	ØA 0.00 40 64.00 60 22.00 88	ØA B ØC ØD ØC ØD ØC G1/4" 20 G1/4" 40 G1/4" 64	ØD E 40 10 64 10 92 11	F 15 15 15	Code	27.00	ØA E 120 G1	0A B 0C 0D B 0/4" 92	н И 127	G	F 115 G	G 3/8"	H 30
Foar mair	m rubber round suction cup ntained even after several w	is made from a specia orking cycles. Especi	al mixture called " ally suited for mo	NR", which I	nas a density with coarse o	that allows for very rough	or grippir	ng even on very ro s such as: sawn,	ough and bush-ha	d irregula ammered	ar surface I or flame	s, and a d marb	allows if	ts elastio ured, no	city to on-slip	be or
ribbe	ed/corrugated sheets, bri ommended for handling loa	ck, items made of ds with lifting force pa	rough concrete rallel to the surface	, garden v e and for th	valkway tile e movement	s, etc., and of loads with	l in gen oiled su	ieral in all case rfaces.	es wher	re traditi	ional suc	ction c	ups ca	annot b	e use	ed.
				Code	Lifting	force in ver	tical dire	ection (N)								
ces			19VT	N G 14 040	00	-	60kPa									
g for			19VT	N.G.14.064	.00		35		1							
fliftin			19VT	N.G.14.092	.00		84									
ole of			19VT	N.G.14.127	.00		172									
Tat		Material	Colour		Hardness			-								
		E a construction de la constru			naruness	°Shore A		Opera	ating te	mperatu	ure °C					
		Foam rubber "NR"	Orange		3	°Shore A		Opera	-20	÷ 80	ure °C					
		Foam rubber "NR"	Orange		3	° Shore A		Opera	-20	÷ 80	ure °C					
	Foam rubber re	Foam rubber "NR"	Orange on cup		30	° Shore A		Opera	-20	÷ 80	ure °C					
Ĩ	Foam rubber re	Foam rubber "NR"	Orange on cup	A 	B C 75 15 760 15 1	Shore A	F G 15 M12 15 M12	C c c c c c c c c c c c c c c c c c c c	-20 -20 <u>M12</u> Dde 12.SxR.	 emperatu ÷ 80 00 (0 (0 A .00 290 	A1	000 M12 C 15 1		= F 1 15	G G G1/	
Foar be m or r Notr	Foam rubber re	Foam rubber "NR" ectangular suction ectangular suction (15) (15) (15) (15) (15) (15) (15) (15)	Orange On cup On cup On cup On cup Code ORN.G.22.NxH OVRN.G.22.RxF. Special mixture cc cially suited for n of rough conc parallel to the su	A A A A A 00 107 00 135 A alled "NR", w hovement of rete, garde rface or for the Code N.G.22.NxH	a 3(a a b c a a b c c t b c c t c t b c c t c t c t c t c t c t c t c t c t thich has a dd loads with c n walkway the movemer Lifting 1.00 t	Shore A D E D E TO 11 55 11 Particular and the second s	F G 15 M12 15 M12 15 M12 15 M12 tical dire 60kPa 88	ripping even on vurfaces such as : : : : : : : : : : : : : : : : : :	-20 -20 M12 Dde 12.SxR. very roug sawn, bu ases wh	emperatu ÷ 80 00 00 (A 00 290 gh and irri ush-hammere trace	A B B 140 B 140 C C	000 M12 I15 1 urfaces, flamed suction	D E 34 1 and all marble cups	E F 1 15	G G G1/ Blastic	F + 2" ity to n-slip used.
Foarn be m Not n	Foam rubber re Foam rubber re taution of the second for the second	Foam rubber "NR" ectangular suction ectangular suction in cup is made from a nul working cycles.Espe brick, items made loads with lifting force	Orange on cup on cup	A A A A A A A O O O O O O O O O O O O O	B C 75 15 60 15 4 0 100 1	Shore A	F G 15 M12 15 M12 ows for g rough si ind in g th oiled s tical dire 60kPa 88 79	Coperative and a second	-20 -20 <u>M12</u> <u>M12</u> <u>Dde</u> 12.SxR. very roug sawn, bu ases wh	emperatu ÷ 80 00 (00 (00 00 (00 00 (00 00 (00 00 (00 00 (00 00 (00 00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (00 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 () () () () () ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ()) ())	A B D 140 A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A	00 M12 Ifaces, flamed suction	D E and all marble cups	E F 1 15	E G G G I d, noi be u	F 2"
Foar be m or r r Not r	Foam rubber re Foam rubber re recommended for handling	Foam rubber "NR" ectangular suction ectangular suction in cup is made from a in d working cycles.Espe brick, items made loads with lifting force	Orange on cup on cup Code DVRN.G.22.NxH DVRN.G.22.RxF Special mixture cc cially suited for n of rough conc parallel to the su 19VRI 19VRI 19VRI 19VRI	A A A A A 00 107 00 135 A alled "NR", w hovement of rete, garde rface or for the Code N.G.22.NxH N.G.12.SxR	B C 75 15 60 15 15 7 60 15 15 7 60 15 15 15 15 15 10 15 11 15 12 15 13 15 14 15 15 15 15 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15 10 15	Shore A	F G 15 M12 15 M1	ripping even on vurfaces such as :: eneral in all caurfaces.	-20 -20 M12 Dde 12.SxR. Very roug sawn, bu ases wh	emperatu ÷ 80 00 00 (A 00 290 gh and irr ush-ham ham ham ham ham ham ham ham ham ham	A B B D 140 C C C C C C C C C C C C C	C 15 1 urfaces, flamed suction	D E 334 11	E F 1 15	G G G G G I/ G G I/ C	F + 2" ity to n-slip used.

30

Orange

"NR"

1.12

-20 ÷ 80



2





Standard level compensator M5 - internal spring





Coue	^			L .
19P05.S.07.I	7	19	7	43
19P05.S.15.I	15	23	27	75
19P05.S.20.I	20	36	7	73

The standard level compensator M5 makes it possible to compensate for differences in height when the gripping system has to deal with objects of different heights, simplifies accurate positioning on vacuum systems, and makes it possible to position the suction cups on fragile items.

Standard level compensator G1/8" - internal and external spring







Code	А	В	L
19P18.S.10.I	10	25	54
19P18.S.20.I	20	35	74
19P18.S.30.I	30	45	94
19P18.S.50.I	50	65	134

The standard level compensator G1/8" makes it possible to compensate for differences in height when the gripping system has to deal with objects of different heights, simplifies accurate positioning on vacuum systems, and makes it possible to position the suction cups on fragile items.

Standard level compensator G1/4" - internal and external spring





Code	А	L
19P14.S.10.E	20	80
19P14.S.20.E	35	95
19P14.S.30.E	50	110
19P14.S.50.E	70	130



Code	A	В	L
19P14.S.10.I	10	25	55
19P14.S.20.I	20	35	75
19P14.S.30.I	30	45	95
19P14.S.50.I	50	65	135

The standard level compensator G1/4" makes it possible to compensate for differences in height when the gripping system has to deal with objects of different heights, simplifies accurate positioning on vacuum systems, makes it possible to position the suction cups on fragile items.

Anti-rotation level compensator G3/8" - internal spring





Code	А	В	L
19P38.N.10.I	10	28	69
19P38.N.20.I	20	39	90
19P38.N.30.I	30	50	111
19P38.N.50.I	50	70	151

The anti-rotation level compensator G3/8" makes it possible to compensate for differences in height when the gripping system has to deal with objects of different heights, simplifies accurate positioning on vacuum systems, and makes it possible to position the suction cups on fragile items. The anti-rotation design makes it possible to use oval or rectangular suction cups.

Cylindrical nipples for compensators

1 all	100	and and
E.F.	1	Parse .
077	Mi	1
Why -	600	4
	- Coll	1



Code	A	в	D	E	F	يعر
101M5M5	M5	M5	11.5	4	4	8
101M518	M5	G1/8"	14.5	6	4	14
1011818	G1/8"	G1/8"	16.5	6	6	14
1011814	G1/8"	G1/4"	19	8	6	17
1011838	G1/8"	G3/8"	20	9	6	19
1011414	G1/4"	G1/4"	21	8	8	17
1011438	G1/4"	G3/8"	22	9	8	19
1011412	G1/4"	G1/2"	23.5	10	8	24
1013838	G3/8"	G3/8"	23	9	9	19
1013812	G3/8"	G1/2"	24.5	10	9	24
1011212	G1/2"	G1/2"	25.5	10	10	24

Sleeves for antirotation level compensators



Code	Α	в	٢
10338	G3/8"	23	22

Sleeves for antirotation level compensators



Code	Α	В	C
1061838	G1/8"	G3/8"	20
1061438	G1/4"	G3/8"	23
1063812	G3/8"	G1/2"	27

2

22

22

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General details

Vacuum generators of the pneumatic type operate on the Venturi principle: one or more nozzles are fed by compressed air, generating a jet of air that drags (in contact with the environment) the surrounding air and then evacuates. This "dragging" creates a depression which results in generation of a vacuum. The big advantage of pneumatic pumps is that they can operate only when the suction cups connected to them require vacuum.

Advantages:

- 1) Consumption of air (and therefore power) limited to moments of use.
- 2) Installation directly proximate to the suction cups (simplification of layout / savings).
- 3) Short response times and high capacity.
- 4) Flow rates for any requirement.
- 5) No limit to applications.
- 6) Compactness / lightness / reliability / little or no wear.

Types:

In terms of dimensions, functions and operation, we can categorise generators as one of two major types:

1) Single stage, compact and/or miniaturised, with pneumatic or electropneumatic control, for direct-contact installation with suction cup holders and suction cups.

2) Multistage with or without integrated functions, with pneumatic or electropneumatic control, for de-localised assembly and for controlling groups of suction cups.

Range:

The **PNEUMAX** range consists of single-stage and multistage equipment of various sizes and types; the single-stage generators use the Venturi effect in a single medium/high throughput nozzle and promptly generate vacuum, flow rate and suction values that are suitable for medium/light applications. Multistage generators having more than one nozzle (ejectors) in a line, using the kinetic energy that this layout generates to ensure, based on the flow rate, limited consumption of energy and attainment of a vacuum level equal to 90%, with various suction capabilities.

Single-stage generators, very fast in switching pressure/vacuum, can also be equipped with a quick-release system for highly cyclical applications. Multistage generators can often be accessorised with integrated management and control functions, such as for example electropneumatic control for power supply and power shut-off, quick-release blowing, a regulator to measure this release, and a vacuum switch to control the degree of vacuum generated. These latter generators can be installed as modules as well, creating actual stand-alone modules for decentralised vacuum generation and management for controlling more than one gripping element.

Multistage section





3





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NEUMA

3

Single-stage generators, robust and reliable, with compact dimensions and suitable for applications that need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and can be applied in any position.

Performance characteristics Supply pressure (bar) 2 4 6 Degree of Vacuum (-kPa) 36 91 87 -Intake flow rate (I/min) 10 10 10 -Air consumption (I/min) 22 30 38 -





Vacuum components Vacuum generators

⊳3

Single stage vacuum generator T18





Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Performance characteristics Supply pressure (bar) 2 4 6 Degree of Vacuum (-kPa) 36 -87 91 -Intake flow rate (I/min) 10 10 10 Air consumption (I/min) 22 30 38 -







10 9 3 bar 8 4 bar 7 **-** 5 ba 6 5 4 3 2 1 0 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 Degree of vacuum (kPa)

Intake flow rate

8 9

Flow rate (I/min)

Technical features

3

Characteristic curves

Fluid	Unlubricated filtered air
Pressure (bar)	1 ÷ 8
Temperature (°C)	-10 ÷ +80
Weight (g)	36

PREINA

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Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Performance characteristics

- Supply pressure (bar)	2	4	6	
- Degree of Vacuum (-kPa)	55	90	88	
- Intake flow rate (I/min)	22	22	20	
- Air consumption (I/min)	51	72	91	





Single stage vacuum generator T18



Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Performance characteristics					
- Supply pressure (bar)	2	4	6		
- Degree of Vacuum (-kPa)	55	90	88		
- Intake flow rate (I/min)	22	22	20		
- Air consumption (I/min)	51	72	91		



Time (ms)











Intake flow rate

9

Flow rate (I/min)

0

0



Technical features

3

Characteristic curves

Fluid	Unlubricated filtered air
Pressure (bar)	1 ÷ 8
Temperature (°C)	-10 ÷ +80
Weight (g)	46

Single stage vacuum generator T10 Ordering code 19T10.S.13.HV.XX 74 28 2 27 Ø4.2 27.5 42.5 3 22 Φ. Pipe 10 **D3** 10

Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Performance characteristics

- Supply pressure (bar)	2	4	6
- Degree of Vacuum (-kPa)	47	92	91
- Intake flow rate (I/min)	42	42	38
- Air consumption (I/min)	86	118	145



3




Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Performance characteristics			
- Supply pressure (bar)	2	4	6
- Degree of Vacuum (-kPa)	47	92	91
- Intake flow rate (I/min)	42	42	38
- Air consumption (I/min)	86	118	145



Generatore di Vacuum monostadio M5 Ordering code 19M05.S.05.SS.00 30 22 M5 Ø3.5 (n°2) C 3 9M05.S.C6.55 Ø3.5 ŝ Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position. Performance characteristics Supply pressure (bar) 2 4 6 Degree of Vacuum (-kPa) 35 85 66 --Intake flow rate (I/min) 6 8 7 Air consumption (I/min) 2 8 11 -Degree of vacuum Air intake Air consumption -5 17.5 8.5 16.0 -15 8.0 14.5







Single stage generators, with operation based on the Venturi principle; their main feature is the presence of feed pressure and connection for the vacuum, on the same axis. This makes it possible to connect the suction cups directly to the generator or through the suction cup holder, so therefore still on the same axis with obvious advantages in terms of system layout and simplicity. The outlet connection has a female thread G 1/8", or on circumference of the T06.

Performance characteristics

3

Characteristic curves

Performance characteristics			
- Supply pressure (bar)	2	4	6
- Degree of Vacuum (-kPa)	53	82	78
- Intake flow rate (I/min)	13	14	12
- Air consumption (I/min)	11	24	36











9

Technical features

Fluid	Unlubricated filtered air
Pressure (bar)	1 ÷ 8
Temperature (°C)	-10 ÷ +80
Weight (g)	24

36

PREUMA

Single stage vacuum generator G1/8"



11

24

- Intake flow rate (I/min) -
- Air consumption (I/min) -







Single stage generators, with operation based on the Venturi principle; their main feature is the presence of feed pressure and connection for the vacuum, on the same axis. This makes it possible to connect the suction cups directly to the generator or through the suction cup holder, so therefore still on the same axis with obvious advantages in terms of system layout and simplicity. The outlet connection has a female thread G 1/8", or on circumference of the T06.

Performance characteristics

Performance characteristics			
- Supply pressure (bar)	2	4	6
- Degree of Vacuum (-kPa)	53	82	78
- Intake flow rate (I/min)	13	14	12
- Air consumption (I/min)	11	24	36



-

-

PREUMA

Single stage vacuum generator G1/4" Ordering code 19M14.S.10.SS.E0 73.5 G1/4" G1/4" Ø6.5 (n°2) G1/4" Single-stage generators derived from standard traditional single-stage generators, complete with automatic release system. The pressure supply, in addition to generating the defined vacuum through the Venturi principle, supplies a chamber which serves as a pressure accumulator. When the supply stops, through a non-return valve, the accumulated pressure will be discharged automatically through the vacuum connection, ensuring quick detachment of the gripped piece. Performance characteristics Supply pressure (bar) Degree of Vacuum (-kPa) Intake flow rate (I/min) Air consumption (I/min) Degree of vacuum Air intake Air consumption -5 -15 -25 Degree of vacuum (kPa) -35 Flow rate (I/min) Flow rate (I/min) -45 -55 -65 -75 -85 -95 5 6 Pressure (bar) Pressure (bar) Pressure (bar)



Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.

3.16





Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Derfermence characteristics

Performance characteristics			
- Supply pressure (bar)	2	4	6
- Degree of Vacuum (-kPa)	35	68	85
- Intake flow rate (I/min)	35	43	48
- Air consumption (I/min)	25	43	62





Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Performance characteristics







Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Performance characteristics			
- Supply pressure (bar)	2	4	6
- Degree of Vacuum (-kPa)	36	71	90
- Intake flow rate (I/min)	41	43	40
- Air consumption (I/min)	31	52	74









High-performance compact generator for high frequency applications; the presence of the integrated ejector ensures release capacity in the shortest possible time. The fact of it being extremely lightweight allows its application directly onto the robot gripping arms and/or mobile applications. Available with two flow rates in the same overall dimensions.





PREUMA







Single-stage generators, robust and reliable, with compact dimensions and suitable for applications which need the required degree of vacuum to be reached quickly with limited air flows. Operating on the Venturi principle, they have the vacuum connection, orthogonal to the axis of supply and outlet. They can be connected directly to the suction cups and/or suction cup holder and applied in any position.

Performance characteristics

- Supply pressure (bar)	2	4	6
- Degree of Vacuum (-kPa)	22	55	92
- Intake flow rate (I/min)	100	114	112
- Air consumption (I/min)	55	90	127





Single-stage generator with high suction capacity due to a pair of nozzles mounted in parallel; they are particularly quiet thanks to a free-flow type silencer, standard-fitted with a vacuum gauge, and allows direct connection with a vacuum switch or alternatively a solenoid valve for quick detachment via direct blowing into the vacuum connection. Suitable for decentralised connection of one or more suction cups.





Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.



Vacuum components Vacuum generators

Multistage vacuum generator G1/4" Ordering code 19M14.M.09.SS.00 79.5 41 23 Ø4.5 (n°2) 6 0 ⊜ 5 35.9 48 0 0 ⊚ 15.5 4.5 1 A 2 G1/4" Compact generators comprising a number of modules as a function of the desired performance allow high-suction capacity with low consumption and other degrees of vacuum; as a function of the modules (nozzles 2-4-6-8) used, offer exactly the right performance for the most varied of industrial applications. They ensure a low level of noise thanks to the sound-absorbent material inside of them. Performance characteristics Supply pressure (bar) 2 4 6 Degree of Vacuum (-kPa) 41 89 87 -Intake flow rate (I/min) 26 50 55 Air consumption (I/min) 19 35 47 Degree of vacuum Air intake Air consumption -15 55 60 50 55 -25 (kPa) 50 45 -35 45 40 Degree of vacuum Flow rate (I/min) Flow rate (I/min) -45 40 35 -55 35 30 25 -65 30 25 20 -75 15 20 -85 10 15 Characteristic curves -95 5 10 0 1 2 3 4 5 6 7 8 9 4 7 0 1 2 3 5 6 7 8 4 8 9 3 5 6 9 0 1 2 Pressure (bar) Pressure (bar) Pressure (bar) Intake flow rate Emptying time (1 L.) 16550 35 15050 3 ha 30 13550 4 6 4 12050 25 5 ba Flow rate (I/min) 10550 6 ba 20 Time (ms) 9050 7550 15 6050 10 4550 3050 5 1550 50 0 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 Degree of vacuum (kPa) Degree of vacuum (kPa) **Technical features** Unlubricated filtered air Fluid 1 ÷ 8 -10 ÷ +80 Pressure (bar) Temperature (°C) Weight (g) 130





Multistage vacuum generator G3/8"



Compact generators comprising a number of modules as a function of the desired performance allow high-suction capacity with low consumption and other degrees of vacuum; as a function of the modules (nozzles 2-4-6-8) used, offer exactly the right performance for the most varied of industrial applications. They ensure a low level of noise thanks to the sound-absorbent material inside of them.









General details

These generators are separate vacuum units that can control a complete vacuum gripping system. They are designed and manufactured to be installed individually, model SE, or to be assembled with intermediate modules, model ME, the latter making it possible to create a multi-position manifold with a single compressed air supply. The modular design allows the number of autonomous vacuum units to be increased as a function of requirements. They are constructed from a piece of anodised aluminium, and inside of this, the multiple ejectors are mounted and the vacuum chambers are fashioned, as well as threaded connections for supply.

The outside components are:

A solenoid pilot valve for controlling the compressed air being supplied

A solenoid pilot valve for controlling the compressed air from the bellows

A vacuum switch with display for controlling and monitoring the system

A flow regulator with setting screw for regulating the air of the bellows

An intake manifold made of aluminium for the vacuum connections with the intake filter and check valve integrated inside it, serving to keep vacuum to be used should the electrical power or compressed air stop being supplied.

By activating the supply solenoid pilot valve, the generator creates vacuum that can be used, and when the maximum preset value is reached, the vacuum switch kicks in and, through the control solenoid pilot valve, cuts off the air supply and restores it when the vacuum value drops below the minimum set value.

This modulation allows considerable savings of compressed air in addition to keeping the degree of vacuum within safety range. A second vacuum switch signal, which is separate from the first one and is adjustable, can be used to start up the cycle when the degree of vacuum reached is that needed for the application.

Once the cycle has completed, the supply solenoid pilot valve for air supply to the generator powers down and at the same time the release solenoid pilot valve powers up to quickly restore atmospheric pressure within the circuit.

This series of vacuum generators is suitable for controlling suction cup gripping systems for moving glass panes, marble slabs, ceramic slabs, plastic panels, cardboard boxes, wood panels, etc., and, given their particular shape, they lend themselves to applications in the industrial robotics sector where there is increasing demand for high-performance equipment and autonomous vacuum systems for controlling a greater number of gripping elements while keeping weight low and dimensions compact.

Vacuum components Multifunction vacuum generators



3.30





Vacuum components Multifunction vacuum generators









General details

The intermediate "ME" models are multistage and multifunction vacuum generators that are not autonomous and must be hooked up to the "SE" units to operate. They were designed to be enclosed between the cap and the base of the "SE" vacuum generator and attached to the latter via M4 screws; with the distribution manifold inside the generator, the compressed air is distributed without having to use external manifolds.

These can be ordered as individual components in the desired number and capacity, although to mount them onto the "SE" generator, a kit with a number of screws corresponding to the number of modules to be attached is necessary.

The "ME" vacuum generators comprise the same components as the "SE" generators do, except for the sealing cap; their operation and use are the same as the "SE" vacuum generator on which they are mounted.





Vacuum components Modular multifunction vacuum generators







Vacuum components Modular multifunction vacuum generators





Composition of modular vacuum systems

"SE" multifunction vacuum generators can be assembled with one or more "ME" intermediate modules, thus forming a modular vacuum system characterised by a compact shape and reduced size and weight.

With standard screw kits up to 4 vacuum units A+1C+1D can be assembled together independently but, with use of threaded bars, the manifold can be expanded to many more positions.

Below are a number of examples showing ways the manifold can be put together.





		Codici kit viti	Dimensione vite
	A+1C	RK1900/0001	M4X30
	A+2C	RK1900/0002	M4X50
lles	A+3C	RK1900/0003	M4X70
np	A+1C+1D	RK1900/0004	M4X60
b m	A+1C+2D	RK1900/0005	M4X90
p	A+2C+1D	RK1900/0006	M4X80
dai	A+3D	RK1900/0007	M4X100
an	A+2D	RK1900/0003	M4X70
st	A+1D	RK1900/0008	M4X40
ō	B+1C	RK1900/0008	M4X40
suc	B+2C	RK1900/0004	M4X60
atic	B+3C	RK1900/0006	M4X80
inê	B+1C+1D	RK1900/0003	M4X70
d m	B+1C+2D	RK1900/0007	M4X100
0	B+2C+1D	RK1900/0005	M4X90
	B+2D	RK1900/0006	M4X80
	B+1D	RK1900/0002	M4X50

The letters of the modules

correspond to purchase codes			
^	19M14.M.09.SE.ED		
A	19M14.M.12.SE.ED		
Б	19M14.M.15.SE.ED		
В	19M14.M.18.SE.ED		
<u> </u>	19M14.M.09.ME.ED		
U	19M14.M.12.ME.ED		
	19M14.M.15.SE.ED		
	19M14.M.18.SE.ED		



Vacuum components Accessories and spare parts for multifunction vacuum generators "SE" and "ME"





Digital vacuum switch			
			Ordering code
\cap			DS.30.C.C.F8.D.0
A CONTRACT OF A			
Technical features			
Working pressure range		-100.0÷100.0kPa	
Regulation pressure range		-100.0÷100.0kPa	
Maximum supported pressure		300 kPa	
Allowed fluids		Air, non-corrosive gases, non-combustible g	ases
	kPa	0.1	
	kgf/cm ²	0.001	
	bar	0.001	
Pressure calibration sensitivity	nsi	0.01	
· · · · · · · · · · · · · · · · · · ·	InHa	0.1	
	mmHq	1	
	mmH O	1	
Supply voltage	11111120	0.1 Do 10 o 04 \/DC + 10%	
Supply voltage		Da 12 a 24 VDC ± 10%	
Current consumption			
Digital output		Maximum load current: 80mA Maximum supply voltage: 30VDC Caduta di tensione : ≤1V	
Repeatability (Digital output)		± 0.2% Fondo Scala ± 1 digit	
Digital output	Type of hysteresis	fixed	
	Hysteresis	0.003 bar	
Response time		≤2,5 ms (anti-interference function: 24ms, 192ms e 768	ms selectable)
Protection from short circuit at outp	but	Present	
Display		Display with 3 1/2 digits (sampling 5 times per	r sec.)
Indicator precision		±2% F. S. ±1 digit (at ambient temperature of 25	°C ±3°C)
Indicator		LED Green (output1) LED red (output2)	
	Protection class	IP40	
	Ambient temperature	Operational: 0÷50°C, Storage: -20÷60°C (without ice o	r condensation)
	Ambient humidity	Operativa/Storage: 35 ÷ 85% (without condensation)	
Ingress protection rating	Supported voltage	1000VAC in 1-min. (between body and cable)	
	Insulation resistance	$50 M\Omega$ min. (at 500VDC, between body and c	able)
	Vibration	Total amplitude 1.5mm.,10Hz-55Hz-10Hz scanning for 1 minute, 2 hours in each direction of X, Y and Z	
Impacts/shocks		980m/s ² (100G), 3 times in each direction of X,	Y and Z
Temperature characteristics		±2% Full Scale in a range between 0~50	
Type of connection		G1/8"	
Electrical cable		Oil resistant cable	
Weight		Approximately 67g (with 2 metres of cable	э)
Output circuit wiring	scheme	DC+ (Brown)	



3.41

PREUMA

3

Multistage high flow vacuum generator G3/4" Ordering code 19T34.M.32.HF.QQ o 53 G3/4 159 193 6 G3/4 • 1/8" NPSF NPSF 1/8' 42 ⊕ ۲ ¢ (1) 45 64 22 Performance characteristics Optimum supply pressure (bar) 3.4 Supply pressure (bar) 3.4 / 6 Degree of Vacuum (-kPa) 89 / 92 -Intake flow rate (I/min) 360 / 420 Air consumption (I/min) 116 / 185 -Intake flow rate Evacuation time 3.4bar-6bar - 3.4bar-6ba 500 450 3.6 400 3.2 Characteristic curves 350 2.8 300 2.4 l/min 250 2 5 200 1.6 150 1.2 100 0.8 50 0.4 0 0 10 20 30 40 50 60 70 80 90 20 30 40 50 60 70 80 10 90 -kPa -kPa Intake flow rate (I/min) at different levels of vacuum (-kPa) Supply pressure (bar) Air consumption Degree of Vacuum (I/min) max. (-kPa) 0 10 20 30 40 50 60 70 80 90 3.4 116 360 180 115 80 43 30 22.5 15.5 7.5 1.2 92 6 185 420 240 125 100 82 65 38 12.5 3.5 89 Supply pressure (bar) Evacuation time (s/l) a diversi gradi di Vacuum (-kPa) Degree of Vacuum Air consumption (l/min) max. (-kPa) 10 20 30 40 50 60 70 80 90 0.022 0.06 0.11 0.21 0.4 0.65 0.95 1.60 4 3.4 116 92 0.018 6 185 0.05 0.08 0.18 0.25 0.40 0.62 1.55 / 89 **Technical features** Unlubricated filtered air Fluid -Max. supply pressure (bar) 7 60 ÷ 65 Noise (dBA) Temperature (°C) -20 ÷ 80 Material PPS, SS, PA, NBR -Weight (g) 675

3.42



-

Performance Charts





Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.

3.44



Multistage high flow vacuum generator G3/4" Ordering code 19T34.M.52.HF.QQ +G3/4 53 193 59 G3/4 \$ 0 1/8" NPSF NPSF 1/8 4 • ۲ -@ (1) 64 17.5 65 Performance characteristics Optimum supply pressure (bar) 3.4 3.4 / 6 Supply pressure (bar) -Degree of Vacuum (-kPa) 89 / 92 Intake flow rate (I/min) 850 / 1010 -Air consumption (I/min) 445 / 720 -Intake flow rate Evacuation time - 3.4bar - 3.4bar-6ba 6ba 1200 1.2 1080 1.08 1 Characteristic curves 0.96 960 840 0.84 720 0.72 /min 600 0.6 2 480 0.48 360 0.36 240 0.24 120 0.12 0 0 10 20 30 40 50 60 70 80 90 10 20 30 40 50 60 70 80 90 -kPa -kPa Intake flow rate (I/min) at different levels of vacuum (-kPa) Supply Degree of Vacuum Air consumption pressure (bar) (l/min) max. (-kPa) 0 10 20 30 40 50 60 70 80 90 3.4 445 850 550 430 280 145 115 85 60 28 2.2 92 6 720 1010 800 460 385 310 215 125 42 15.5 89 Evacuation time (s/l) at different levels of vacuum (-kPa) Degree of Vacuum Supply Air consumption max. (-kPa) pressure (bar) (I/min) 10 20 30 40 50 60 70 80 90 0.010 0.025 0.043 0.075 0.19 0.27 0.45 1.2 3.4 445 0.11 92 6 720 0.007 0.018 0.038 0.055 0.08 0.12 0.19 0.47 1 89 **Technical features** Unlubricated filtered air Fluid Max. supply pressure (bar) -7 60 ÷ 65 Noise (dBA) -Temperature (°C) -20 ÷ 80 Material PPS, SS, PA, NBR -Weight (g) 837

PREUMA




Multistage high flow vacuum generator G1"



Vacuum components Adjustable vacuum generators conveyor

PREUMA

Adjustable vacuum generator conveyor



Baesd on the Ventury principle, these differ from traditional ones because they have a much better ejector and are adjustable - this characteristic makes it possible to change the device's low rate and degree of vacuum without affecting the supply pressure. Their special shape and their operating principle make them suitable for suction and the transfer of powders, granules, sawdust, metal chips, liquid or dry food products, etc., to control suction cups in the presence of large quantities of powders or liquids; these can also be used to suction smoke, coolant fog, water vapour, etc.

Performance characteristics

- Supply pressure (bar)	4÷6 (Max. 7)
- Max. Degree of Vacuum (-kPa)	84
- Max. Intake flow rate (I/min)	3390
- Max. Air consumption (I/min)	2550

Supply pressure (bar)					pres	Supply ssure (/ (bar)						
				5.5							5.5		
Code	Degree of Vacuum (-kPa)	17	34	50	68	84	Code	Degree of Vacuum (-kPa)	17	34	50	68	84
19M14.S.00.SS.RG		112	169	233	276	342	19M14.S.00.SS.RG		280	240	200	162	125
19M38.S.00.SS.RG	Air consumption	176	327	485	595	825	19M38.S.00.SS.RG	Intake flow rate	846	735	620	520	395
19M12.S.00.SS.RG	(l/min)	340	625	795	940	1280	19M12.S.00.SS.RG	(l/min)	1695	1325	1130	990	650
19M34.S.00.SS.RG		650	875	1250	1790	2550	19M34.S.00.SS.RG		3390	2460	1970	1440	1130









They are special non-return valves that can close the suction line in the event of air leakage from the suction cup that is not located on the workpiece or fully adherent thereto. Designed to be applied to the suction cups, the shut-off valves - if there is no object to be lifted, if the suction grip is defective or in the presence of leakage - automatically closes off the suction, preventing the degree of vacuum in the still-gripping suction cups from dropping. These can shut off completely with characteristics described above or control leakage, where the principle of operation is the same as the abovementioned, differing from the sealing shutter in that, even when shut off entirely, it still allows a small air flow to the vacuum source. This feature allows a suction cup that has not gripped the object to be lifted to recreate the vacuum inside of it, and therefore carry out its gripping action without having to repeat the work cycle; if, on the other hand, the suction cup does not grip due to the fact that there is no object to lift, the valve will not stop the degree of vacuum from dropping on the remaining gripping suction cups, but the small percentage of loss is easily controllable and therefore recoverable.



Valves and solenoid valves with shutter for larger flow rates, for vacuum.

These are manufactured only in 3/2 and 2/2 versions, either normally closed or normally open.

Selection of the right type and connection to the pump requires some knowledge and skill.

For electrical actuation a normal M2 microsolenoid is used in the case of control via air and a special M2/V microsolenoid is used when control is via vacuum.

The ordering codes correspond to the solenoid valves with mechanisms that are "M2" or "M2/V" mounted. The windings are not included and have to be ordered separately (see summary page for electric windings).

Certified windings are also available. CRUs

Construction features	G 3/8"	G 1/2" - G 3/4"	G 1"	G 1 1/2"
Body	Aluminium	Die-cast Zamak	Aluminium	Aluminium
End caps			Aluminium	
Shutters			NBR	
Control piston			Aluminium	
Shutter mount			Stainless steel	INOX
Springs			Stainless steel	INOX
Piston gasket			NBR	

Wear and maintenance

These valves and solenoid valves have an average service life of approximately 10 - 15 million cycles under optimum conditions of usage. They do not need to be lubricated to operate well, but good filtration is recommended to prevent dirt accumulation and consequently likely malfunctioning. Ensure that the conditions of use are consistent with the indicated limits, pressure, temperature, etc. Take care to protect the discharge outlets of the valves in the presence of dirt and powder. For these products, due to the manner in which they are constructed and the particular use for which they are intended, maintenance by replacing valve parts does not have to be carried out. When necessary, basic internal cleaning can be performed, carefully removing any dirt accumulations. When the version of solenoid valves with self-supply is used, take care that it is never used to supply flow rate since in this case there would not be sufficient vacuum for actuation. This is normally found on shutter valves, since they do not have the closed centres position and insufficient actuation could cause the system to discharge from outlet 3. In this case, switch to the version with external actuation.

Connections of valves

NORMALLY CLOSED SELF-SUPPLIED

779/V.32.0.1AC	P = 1 = DISCHARGE
773/V.32.0.1AC	A = 2 = USE
771/V.32.0.1AC	R = 3 = PUMP

NORMALLY CLOSED EXTERNALLY SUPPLIED

779/V.32.0.1C 773/V.32.0.1C 771/V.32.0.1C	P = 1 = PUMP
779/V.32.11.1C 773/V.32.11.1C 771/V.32.11.1C	A = 2 = USE R = 3 = DISCHARGE

NORMALLY OPEN SELF-SUPPLIED

779/V.32.0.1AP = 1 = PUMP773/V.32.0.1AA = 2 = USE771/V.32.0.1AR = 3 = DISCHARGE

NORMALLY OPEN EXTERNALLY SUPPLIED

779/V.32.0.1A 773/V.32.0.1A 771/V.32.0.1A 779/V.32.11.1A 773/V.32.11.1A 771/V.32.11.1A P = 1 = DISCHARGE A = 2 = USE R = 3 = PUMP

4

Res	ponse	time ((ms)
	201100		

"The response time of the directional control valves or the moving parts of logic devices was measured in accordance with standard ISO 12238:2001"

Cada	Type	Response time (ms)			
Code	Type	energised	de-energised		
779/V.32.11.1C	N.C.	12	46		
779/V.32.11.1A	N.O.	13	48		
779/V.32.0.1AC.M2/V	N.C.	26	9		
779/V.32.0.1AA.M2/V	N.O.	16	11		
779/V.32.0.1C.M2	N.C.	10	35		
779/V.32.0.1A.M2	N.O.	11	36		
772/V.32.11.1C	N.C.	30	105		
772/V.32.11.1A	N.O.	17	150		
772/V.32.0.1AC.M2/V	N.C.	80	20		
772/V.32.0.1AA.M2/V	N.O.	25	20		
772/V.32.0.1C.M2	N.C.	25	95		
772/V.32.0.1A.M2	N.O.	15	140		
773/V.32.11.1C	N.C.	30	105		
773/V.32.11.1A	N.O.	17	145		
773/V.32.0.1AC.M2/V	N.C.	75	13		

Code	Tupo	Response time (ms)			
Code	Type	energised	de-energised		
773/V.32.0.1AA.M2/V	N.O.	33	22		
773/V.32.0.1C.M2	N.C.	25	95		
773/V.32.0.1A.M2	N.O.	13	140		
771/V.32.11.1C	N.C.	45	250		
771/V.32.11.1A	N.O.	18	260		
771/V.32.0.1AC.M2/V	N.C.	120	20		
771/V.32.0.1AA.M2/V	N.O.	35	40		
771/V.32.0.1C.M2	N.C.	45	250		
771/V.32.0.1A.M2	N.O.	17	325		

Series 700

Vacuum components Valves and solenoid valves with shutter 3/2 - G3/8"











Vacuum components Valves and solenoid valves with shutter 3/2 - G3/4"

Pneumatic-Spri	ing						
Ordering code 773/V.32.11. FUNCTION 1C=Normally Closed 1A=Normally Open							
Weight 990 g Minimum actuation pressure	2 bar				10		
Performance characteristics	Fluid	Temperature °C	Nominal flow passage diameter (mm)	Supply connection	Actuation connection	Flow rate (I/min) Degree of Vacuum (-kPa)	
		-5 + +70	20		Gijo	007 0 - 101	
Ordering code 773/V.32.0.9.M2 FUNCTION 1AA=Normally Open 1AC=Normally Closed Weight 1050 g	/V						
Performance	Fluid	Temperature °C	Nominal flow passage diameter (mm)	Supply connection	Actuation connection	Flow rate Degree of Vacuum (I/min) (-kPa)	
characteristics	Vacuum	-5 ÷ +50	20	G3/4"	G1/8"	667 20 ÷ 101	
Solenoid-Spring	g-Extern	al supply		Ø75			
Ordering code 773/V.32.0.@.M2 FUNCTION 1A=Normally Open 1C=Normally Closed Weight 1160 g Minimum actuation pressure	2						
Performance characteristics	Fluid	Temperature °C	Nominal flow passage diameter (mm)	Supply connection	Actuation connection	Flow rate Degree of Vacuum (I/min) (-kPa)	
01010010110103	Vacuum	-5 ÷ +50	20	G3/4"	G1/8"	667 0 ÷ 101	

Vacuum components Valves and solenoid valves with shutter 3/2 - G1"





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Series 700

Vacuum components Valves and solenoid valves with shutter 2/2 - 3/2 - G1 1/2"

Pneumatic-Spri	ng				122	160
Ordering code					G1/8"	95
776/V.22.11.1C	;				Ø10.5	
				¢		
Weight 3950 g Normally closed Minimum actuation pressure	2 bar		12 ->		· • • • •	
Performance	Fluid	Temperature °C	Nominal flow passage diameter (mm)	Supply connection	Actuation connection	Flow rate Degree of Vacuum (l/min) (-kPa)
characteristics	Vacuum	-5 ÷ +70	38	G1 1/2"	G1/8"	3000 0 ÷ 101
Solenoid-Spring	9				122	95
Ordering code			-			
776/V.22.0.1C.	3		and a			
Code SOLENOIDE S Vedi pagina riepilogo			AT MA		238	
avvolgimenti				e		
						
Weight 4450 g External supply Normally clo	osed				Ø74	160
Minimum actuation pressure	2 bar	I				
Performance	Fluid	Temperature °C	Nominal flow passage diameter (mm)	Supply connection	Actuation connection	Flow rate Degree of Vacuum (l/min) (-kPa)
characteristics	Vacuum	-5 ÷ +50	38	G1 1/2"	G1/8"	3000 0 ÷ 101
Pneumatic-Spri	ng			-	135	100
Ordering code					G1/8"	95
776/V.32.11. G					Ø10.5	
FUNCTION 1C=Normally Closed				G11/2		
1A=Normally Open				•		2A 1P
Weight 3900 g Minimum actuation pressure	2 bar	12				
Performance	Fluid	Temperature °C	Nominal flow passage diameter (mm)	Supply connection	Actuation connection	Flow rate Degree of Vacuum (l/min) (-kPa)
characteristics	Vacuum	-5 ÷ +70	38	G1 1/2"	G1/8"	3000 0 ÷ 101
Solenoid-Spring					135	95
Ordering code						
776/V.32.0. @ .@)					
FUNCTION 1C=External supply				1/2		
Normally closed 1A=External supply			à 1927)	<u>ا</u>		
Normally open Code SOLENOIDE			-			
Vedi pagina riepilogo avvolgimenti				2	Ø74	160
Weight 4500 g Minimum actuation pressure	2 bar	12			0	
Performance	Fluid	Temperature °C	Nominal flow passage diameter (mm)	Supply connection	Actuation connection	Flow rate Degree of Vacuum (l/min) (-kPa)
cnaracteristics	Vacuum	-5 ÷ +50	38	G1 1/2"	G1/8"	3000 0 ÷ 101

The new series of valves and solenoid valves with shutter G1/2" and G3/4" is a new version of the already-tested zamak version. The main feature of this version is the high-resistance thermoplastic material from which the components are moulded. This made it possible to obtain an aesthetically pleasing product with a considerably reduced weight compared to the standard version, and, most importantly, a reduction in price. There are also changes of a technical and functional nature, however, starting with the use of a rolling diaphragm in place of the traditional piston, thus eliminating friction and wear on the gasket. For versions with microsolenoid and internal or external supply, there is a fast discharge system incorporated in the operator, which reduces the response time for repositioning the valve by 60%. The mechanisms of the actuation solenoid valve are the MP with external supply and MV for self-supplied versions (they differ from the M2 and M2/V, used on zamak valves, for self-tapping fixation screws in plastic).

There are also double versions either for air or for vacuum on which, in place of the standard actuation mechanisms, there is a solenoid valve 3/2 Solenoid-Solenoid complete with 15mm 24V DC microactuators (code N331.0A).

The ordering codes correspond to the solenoid valves with mechanisms that are "MP" or "MV" mounted. The windings are not included and have to be ordered separately (see summary page for electric windings) with the exception of the dual versions which already have windings 24V DC (N331.0A).

Certified windings are also available. 🕬

Construction features

Body, operator and bottom	High resistance thermoplastic material
Gaskets and shutters	Nitrile rubber (NBR), oilproof
Piston and guide pin	Acetal resin
Springs	Stainless steel AISI 302
Diaphragm	Rubberised fabric in nitrile (NBR) compound, oilproof

Wear and maintenance

These valves and solenoid valves have an average service life of approximately 10 - 15 million cycles under optimum conditions of usage. They do not need to be lubricated to operate well, but good filtration is recommended to prevent dirt accumulation inside. Ensure that the conditions of use are consistent with the indicated limits, pressure, temperature, etc. Take care to protect the discharge outlets of the valves in the presence of dirt and powder. For these products, due to the manner in which they are constructed and the particular use for which they are intended, maintenance by replacing valve parts does not have to be carried out. When necessary, basic internal cleaning can be performed, carefully removing any dirt accumulations. When the self-supply version is used in the solenoid valves, take care that the use is never, as air flow, the same as the supply, because in this case there would not be sufficient vacuum for actuation.

This is normally found on shutter valves since they do not have the closed centres position and insufficient actuation could cause the system to discharge from outlet 3. In this case switch to the version with external actuation.

Connections of valves

Response time (ms)

Normally closed Self-supplied Normally open External supply	1 = DISCHARGE 2 = USE 3 = PUMP
Normally open Self-supplied Normally closed External supply	1 = PUMP 2 = USE 3 = DISCHARGE

"The response time of the directional control valves or the moving parts of logic devices was
measured in accordance with the standard ISO 12238:2001"

Codo	Type	Response	e time (ms)		Codo	Туре	Response time (ms)			
Code	Type	energised	de-energised		Code		energised	de-energised		
T772/V.32.11.1	N.C.	50	150		T773/V.32.11.1	N.C.	28	190		
T772/V.32.11.1	N.O.	27	195		T773/V.32.11.1	N.O.	50	150		
T772/V.32.0.1.MP	N.C.	42	135		T773/V.32.0.1.MP	N.C.	25	175		
T772/V.32.0.1.MP	N.O.	22	175		T773/V.32.0.1.MP	N.O.	40	145		
T772/VS.32.0.1.MP	N.C.	43	37		T773/VS.32.0.1.MP	N.C.	25	40		
T772/VS.32.0.1.MP	N.O.	25	42		T773/VS.32.0.1.MP	N.O.	42	38		
T772/V.32.0.1AA.MV	N.C.	55	30		T773/V.32.0.1AA.MV	N.C.	35	30		
T772/V.32.0.1AA.MV	N.O.	33	38		T773/V.32.0.1AA.MV	N.O.	32	80		



Vacuum components Valves and solenoid valves with shutter in technopolymer 3/2 - G 1/2" and G 3/4"



4.11

Vacuum

-5 ÷ +50

G1/2"

G1/8"

334

0 ÷ 101

Vacuum components Valves and solenoid valves with shutter in technopolymer 3/2 - G 1/2" and G 3/4"

Series T700



Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.

G3/4"

G1/8"

20

characteristics

Vacuum

-5 ÷ +50

4.12

0 ÷ 101

667







The new series of valves and solenoid valves with shutter G1" is a new version of the already-proven zamak version and of the version G1/2" - 3/4" series T772 and T773 made of technopolymer. For this version too, the main feature is the high-resistance thermoplastic material from which the components are moulded.

This made it possible to obtain an aesthetically pleasing product with a considerably reduced weight compared to the standard version, and, most importantly, a reduction in price.

As for the versions of 1/2" and 3/4" there were also technical and functional changes made, starting with the use of a rolling diaphragm in place of the traditional piston, thus eliminating friction and wear on the gasket.

For the versions with microsolenoids that are internally or externally supplied, a quick discharge system is available, incorporated in the operator, which reduces the valve's repositioning response times by a further 80%. The actuation solenoid valve mechanisms are the MP with external supply and MV for the self-supplied vacuum versions (they differ from the M2 and M2/V, used on zamak valves, in that there are self-tapping fixation screws in plastic). There are also double versions either for air or for vacuum on which, in place of the standard actuation mechanisms, there is mounted a solenoid valve 3/2 Solenoid-Solenoid complete with 15mm 24V DC microactuators (code N331.0A).

The ordering codes correspond to the solenoid valves with mechanisms "MP" or "MV" mounted. The windings are not included and have to be ordered separately (see summary page for electric windings) with the exception of the dual versions which already have windings 24V DC (N331.0A).

Certified windings are also available. C SU us

Construction features

Body, operator and bottom	High resistance thermoplastic material
Gaskets and shutters	Nitrile rubber (NBR), oilproof
Piston and guide pin	Acetal resin
Springs	Stainless steel AISI 302
Diaphragm	Rubberised fabric in nitrile (NBR) compound, oilproof

Wear and maintenance

These valves and solenoid valves have an average service life of approximately 10 - 15 million cycles under optimum conditions of usage. They do not need to be lubricated to operate well, but good filtration is recommended to prevent dirt accumulation inside. Ensure that the conditions of use are consistent with the indicated limits, pressure, temperature, etc. Take care to protect the discharge outlets of the valves in the presence of dirt and powder. For these products, due to the manner in which they are constructed and the particular use for which they are intended, maintenance with replacement of valve parts does not have to be carried out. When necessary, basic internal cleaning can be performed, carefully removing any dirt accumulations. When the self-supply version is used in the solenoid valves, take care that the use is never, as air flow, the same as the supply, because in this case there would not be sufficient vacuum for actuation. This is normally found on shutter valves since they do not have the closed centres position and insufficient actuation could cause the system to discharge from outlet 3. In this case switch to the version with external actuation.

Connections of valves:

Response time (ms)

Normally closed self-supplied Normally open externally supplied	1 = DISCHARGE 2 = USE 3 = PUMP
Normally open self-supplied Normally closed externally supplied	1 = PUMP 2 = USE 3 = DISCHARGE

"The response time of the directional control valves or the moving parts of logic devices was
measured in accordance with the standard ISO 12238:2001"

O a da	Turne	Response	time (ms)		
Code	туре	energised	de-energised		
T771/V.32.11.1	N.C.	55	320		
T771/V.32.11.1	N.O.	19	450		
T771/V.32.0.1.MP	N.C.	50	315		
T771/V.32.0.1.MP	N.O.	19	450		
T771/VS.32.0.1.MP	N.C.	50	50		
T771/VS.32.0.1.MP	N.O.	19	70		
T771/V.32.0.1AA.MV	N.C.	100	60		
T771/V.32.0.1AA.MV	N.O.	80	60		

4.14



Series T771

Vacuum components Valves and solenoid valves with shutter in technopolymer 3/2 - G 1"



Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.

Vacuum components Valves and solenoid valves with shutter in technopolymer 3/2 - G 1"



Bistable version					694		EV. Dual 3/2 sol./s cod. 700.32.0.0.02	ol. 24V DC 23A		3/2
N.O. Pump ir Use in	13 2		N.C. Pump in 1 Use in 2				G1/8" (Connection quick discharge)			59 1 18 124 125 125
Discharge	≥ ein 1		Discharge in 3		G1" Ø72		-	G1" 76		
		Ŋ 10 12 ₩							V	/eight 680 g
				Orderin	g code					
							(with quick	discharge)		
^	T7 Normally	71/V.32.0.1E closed / Norm	3P aally open			٨	T771/VS.3 lormally closed	3 2.0.1.BP / Normally o	pen	
Performance	Fluid	Min. actuation pressure (bar)	Temperature °C	Nominal flow pas (mr	ssage diameter n)	Suppl	y connection	Actuation connection	Flow rate (I/min)	Degree of Vacuum (-kPa)
characteristics	Vacuum	2.5	-5 ÷ +50	25	5		G1"	G1/8"	1500	0 ÷ 101



The series of valves and solenoid valves N776 of G1 1/2", developed technically and functionally out of series 776. A rolling diaphragm was introduced in place of the traditional piston, thus eliminating friction and wear on the gasket. There is an additional gasket on the piston that insulates connection 3, making it possible to have normally open versions and self-supplied versions with vacuum (not available in the previous series 776). The actuation mechanisms are the M3R (Mechanism CNOMO) with two-position manual control.

The windings are not included and have to be ordered separately (see summary page for electric windings).

Certified windings are also available. CRUs

Construction features

Body, operator and bottom:	Die-cast aluminium
Gaskets and shutters:	Nitrile rubber (NBR), oilproof,
Piston:	Acetal resin
Guide pin:	Nickel-plated steel
Springs:	Steel
Diaphragm:	Rubberised nitrile fabric (NBR), oilproof

Wear and maintenance

These valves and solenoid valves have an average service life of approximately 10 - 15 million cycles under optimum conditions of usage. They do not need to be lubricated to operate well, but good filtration is recommended to prevent dirt accumulation and consequently likely malfunctioning.

Check to make sure that the conditions of use are consistent with the indicated limits, pressure, temperature, etc. Take care to protect the discharge outlets of the valves in the presence of dirt and powder. For these products, due to the manner in which they are constructed, maintenance by replacing valve parts does not have to be carried out. When necessary, basic internal cleaning can be performed, carefully removing any dirt accumulations. When the self-supply version is used in the solenoid valves, take care that the use is never, as air flow, the same as the supply, because in this case there would not be sufficient vacuum for actuation.

This is normally found on shutter valves since they do not have the closed centres position and insufficient actuation could cause the system to discharge from outlet 3. In this case switch to the version with external actuation.

Connections of valves:

Normally closed Self-supplied Normally open External supply	1 = DISCHARGE 2 = USE 3 = PUMP
Normally open Self-supplied Normally closed External supply	1 = PUMP 2 = USE 3 = DISCHARGE









Vacuum components Valves and solenoid valves with shutter - 2/2 - 3/2 - G1 1/2"

Solenoid-Spring	9								
Ordering code	BR					110 G1/8"	158 95		
FUNCTION 1AC=Self-supplied Normally closed 1AA=Self-supplied Normally open 1=External supply Normally closed- Normally open	N776/V.32.0.@.M3R FUNCTION 1AC=Self-supplied Normally closed 1AA=Self-supplied Normally open 1=External supply Normally closed- Normally open								
Weight 3228 g Minimum actuation pressure	2 bar	12							
Performance	Fluid	Temperature °C	Nominal flow pa (m	assage diameter Im)	Supply connection	Actuation connection	Flow rate (I/min)	Degree of Vacuum (-kPa)	
characteristics	Vacuum	-5 ÷ +50	3	8	G1 1/2""	G1/8"	3000	0 ÷ 101	

Vacuum components Electric windings



Winding	Standard ver	rsion	Version C	us
(for Series 771, 772, 773, 779, T772, T773, T771 e N776)	Codes for ordering	Available voltages	Codes for ordering	Available voltages
	MB 4	12 D.C. Direct current	UMB 4	12 D.C. Direct current
	MB 5	24 D.C. Direct current	UMB 5	24 D.C. Direct current
and the second se	MB 6	48 D.C. Direct current	UMB 56	24/50-60 alternating current 50/60 Hz
		24 D.C. (2 Watt)	UMB 57	110÷120/50-60 alternating current 50/60 Hz
WE C Star	MB 9 *	(Direct current, low consumption)	UMB 58	230/50-60 alternating current 50/60 Hz
533 63	MB 17	24/50 alternating current 50 Hz		
	MB 21	48/50 alternating current 50 Hz		
Weight 52 g	MB 22	110/50 alternating current 50 Hz		
	MB 24	220/50 alternating current 50 Hz		
	MB 37	24/60 alternating current 60 Hz		
	MB 39	110/60 alternating current 60 Hz		
	MB 41	220/60 alternating current 60 Hz		
	MB 56	24/50-60 alternating current 50/60 Hz		
	MB 57	110/50-60 alternating current 50/60 Hz		
	MB 58	220/50-60 alternating current 50/60 Hz		
, , , , , , , , , , , , , , , , , , ,	MB 66 **	24/50-60 alternating current 50/60 Hz		
	MB 67 **	110/50-60 alternating current 50/60 Hz		
ع ال	MB 68 **	220/50-60 alternating current 50/60 Hz		
└╥┼╥┵┈╺╹ ╢ _╧ ╢	* Can be used ** low consump	only with mechanism M2/9 otion		
Winding (for Serie N776)				

Version Standard

	_	
Maight 110 g		



Codes for ordering	Available voltages
MC 5	24 D.C. Direct current
MC 9	24 D.C. (2 Watt) Direct current
MC 56	24/50-60 alternating current 50/60 Hz
MC 57	110/50-60 alternating current 50/60 Hz
MC 58	230/50-60 alternating current 50/60 Hz

Version c Sus

Codes for ordering	Available voltages
UMC 5	24 D.C. Direct current
UMC 56	24/50-60 alternating current 50/60 Hz
UMC 57	110÷120/50-60 alternating current 50/60 Hz
UMC 58	230/50-60 alternating current 50/60 Hz

Solenoid valve (for Series 776)



Weight 220 g



Version Standard					
Codes for ordering	Available voltages				
S 2	6 D.C. Direct current				
S 4	12 D.C. Direct current				
S 5	24 D.C. Direct current				
S 6	48 D.C. Direct current				
S 16	12/50 alternating current 50 Hz				
S 17	24/50 alternating current 50 Hz				
S 19	32/50 alternating current 50 Hz				
S 20	42/50 alternating current 50 Hz				
S 21	48/50 alternating current 50 Hz				
S 22	110/50 alternating current 50 Hz				
S 23	115/50 alternating current 50 Hz				
S 24	220/50 alternating current 50 Hz				
S 25	240/50 alternating current 50 Hz				
S 36	12/60 alternating current 60 Hz				
S 37	24/60 alternating current 60 Hz				
S 38	48/60 alternating current 60 Hz				
S 39	110/60 alternating current 60 Hz				
S 40	115/60 alternating current 60 Hz				
S 41	220/60 alternating current 60 Hz				
S 42	240/60 alternating current 60 Hz				
S 56	24/50-60 alternating current 50/60 Hz				
S 57	110/50-60 alternating current 50/60 Hz				
S 58	220/50-60 alternating current 50/60 Hz				

Version c Rus						
Codes for ordering	Available voltages					
US 4	12 D.C. Direct current					
US 5	24 D.C. Direct current					
US 56	24/50-60 alternating current 50/60 Hz					
US 57	110÷120/50-60 alternating current 50/60 Hz					
US 58	230/50-60 alternating current 50/60 Hz					

Normally closed (N.C.)



Pad valves are one of the more functional and economic solutions, given the lower costs, for intercepting fluids. The valves are composed of a bronze body, 2-way, with pneumatic control, with a compact single or double acting cylinder with connections which can be turned 360°.

Versions are available that have the gaskets in contact with the fluid, and are made of NBR, FPM or PTFE.

The liner profile allows use of magnetic sensors with codes "1500._", "RS._", "HS._", for type "A" slot

Construction features

Bottom, Piston and guide	Anodised aluminium
Head Cylinder	Anodised aluminium alloy
Spring	Galvanised harmonic steel
Pneumatic cylinder gaskets	NBR (FPM for the models that have gaskets in
	contact with fluid and made of FPM or PTFE)
Guarnizioni a contatto con il fluido	NBR, FPM, PTFE
Stelo	Chrome-plated stainless steel
Bush, Plug sleeve, Buffer nut	Brass

Functional characteristics

Pneumatic cylinder fluid	Air filtered and lubricated or unlubricated
Valve fluid	Fluid compatible with the compounds
	from which the available gaskets
	are made
Max. cylinder operating pressure (bar)	10
Max. valve operating pressure (-kPa)	101.3
Temperature °C, Nonmagnetic piston, gaskets NBR	-5 / + 70
Nonmagnetic piston, gaskets	-5 / + 150
FPM Nonmagnetic piston, gaskets PTFE	-5 / + 150
Magnetic piston, gaskets NBR, FPM, PTFE	-5 / + 70

Multistage vacuum generator G3/8"



	Non-magnetic piston Magnetic piston				ston									TEC	HNICAL E	DATA	
Attachments (N)	А	с	D	А	с	D	В	Е	F	G	н	L	М	Ρ	Actuator Ø	Valve Ø	Weight (g)
G1/4"	93.5	77.5	41	97.5	81.5	45	16	10.25	G1/8"	32.5	28.5	64	47	25	Ø40	Ø13.5	350
G3/8"	93.5	77.5	41	97.5	81.5	45	16	10.25	G1/8"	32.5	28.5	64	47	25	Ø40	Ø13.5	350
G1/2"	93.5	78	41	99.5	82	45	17.5	10.25	G1/8"	32.5	28.5	68	47	30	Ø40	Ø15	400
G 3/4"	105	83	41	113	90	48	22	11.25	G1/8"	44	40	79	70	36	Ø63	Ø20.5	850
G1"	117	89	41	125	101	53	28	11.25	G1/8"	44	40	94	70	44	Ø63	Ø25	1100
G1 1/4"	131	103	48	136	108	53	28	11.25	G1/8"	44	40	110	70	55	Ø63	Ø30	1400
G1 1/2"	154	118	57	166	130	69	36	13.75	G1/8"	56	49	120	90	60	Ø80	Ø38	2100
G2"	169	124	57	181	136	69	45	13.75	G1/8"	56	49	140	90	73	Ø80	Ø49.5	3000

2-way valves to intercept fluids, pneumatic control with a compact double or single acting cylinder with connections that can turn 360°, gaskets in contact with fluid are made of NBR, FPM or PTFE. The liner profile allows use of PNEUMAX series 1500 magnetic sensors.

Construction features

-	Bottom. Piston and guide Head = oxidised aluminium	Fluid	Air filtered and lubricated or unlubricated
-	Cylinder = anodised aluminium alloy	Max. operating pressure (-kPa)	101
-	Spring = galvanised harmonic steel	Min. operating pressure single action (cylinder)	5 bar
-	Gaskets = NBR, FPM, PTFE	Min. operating pressure double action (cylinder)	5 bar
2	Bush plug sleeve huffer put = Brass	Temperature °C (Non-magnetic piston, NBR gaskets)	-5 / + 70
	Bach, plag bloove, ballet hat - Blabb	Temperature °C (Non-magnetic piston, FPM gaskets)	-5 / + 150
		Temperature °C (Non-magnetic piston, PTFE gaskets)	-5 / + 150
		Temperature °C (Magnetic piston, NBR, FPM or PTFE gaskets)	-5 / + 70









Analog vacuometer Ordering code 17070.A.D Ch.14 <u>ه</u> 039 Ξ 10_ 25 43 **Technical features** Fluid Unlubricated filtered air Scale (-kPa) 0 ÷ 100 Temperature (°C) -10 ÷ 80 Weight (g) 56 Pneumatic vacuum switch Pipe Ø4 17 60 Φ 35 12x 2 acuum input/ NPTF1/8 (G1/8) Vacuum switch whose function is, depending on the model, to turn a pneumatic signal on or off when a certain vacuum level is reached. The pressure differential that exists between the maximum value set and the restoration value cannot be adjusted. Especially recommended for the control of vacuum generators with a view to save energy. Function Settable Code 19TR4.C 19TR4.A N.C. (Normally closed) N.O. (Normally open) Type of contact N.C. 1.5 ~ 8 Pressure (bar) (Normally 15 ~ 95 closed) Actuation threshold can be set (-kPa) 10 ~ 95 Hysteresis (kPa) 12 3 -10 ~ +60°C N.O. Temperature (°C) (Normally 44 Weight (g) P open) NPTF1/8 G1/8 Connections for vacuum Electromechanical vacuum switch Ordering code 19VCE.0.C1 G1/8' Ø3.5 (n. 2 through) 2 35 đ 4 24 Cable PVC I = 500 Correspondence colours and mounted microswitch on support 3x0.25 mm2 30 Black = Common Blue = N.C. Grey = N.O. Vacuum switch whose function is to turn an electrical signal on or off when a certain vacuum level is reached. The pressure differential that exists between the maximum value set and the restoration value cannot be adjusted. Recommended for all cases where it is necessary to obtain an electrical signal once a certain level of vacuum is reached to start a work cycle, for control of the already attained grip by the suction cups or for reasons of safety, etc. **Technical features** Fluid Vacuum 2A - 250 VAC Flow rate Regulation (-kPa) 20 ÷ 90 -5 ÷ 70 Temperature (°C) IP 67 Protection class

62,5

Mini digital vacuum switc	:h								
			Ordering code						
			DS.10.V.B.@.@.@						
	- D+		CONNECTION						
	V L L		F4=Male M5x0,8						
Constant of the second		◄ 150 ►	R4=Plug-in connection Ø4						
			CABLE LENGTH						
			A=150 mm						
			E=3000 mm						
	12		OPTIONS						
	5		 0=Without connector 						
52555 ST055			• I = With connector M8						
		Hexagon 8 mm	male 3 Pin						
7	· · · ·								
	35								
	ţ								
Technical features									
Working pressure range		0÷-100.0kPa							
Regulation pressure range		0÷-100.0kPa							
Maximum supported pressure		600 kPa							
Allowed fluids		Air, non-corrosive gases, non-combu	stible gases						
Supply voltage		Da 12 a 30 VDC ±10%							
Current consumption		≤ 10mA							
		PNP N.O. 1 outputs							
Digital output		Maximum load current: 80n	nA						
		Maximum supply voltage: 30	VDC						
		Voltage drop: ≤0.8V							
Repeatability (Digital output)		± 1% Full Scale							
Digital output	Type of hysteresis	fixed							
	Hysteresis	3% Full Scale max.							
Response time		1ms							
Protection from short circuit at output	ut	Present							
Method of setting threshold		Adjustable, trimmer							
Indicator		LED red (output)							
	Protection class	lp40							
	Ambient temperature	Operational: 0÷60°C, Storage: -20÷70°C (witho	Operational: $0 \div 60^{\circ}$ C, Storage: $-20 \div 70^{\circ}$ C (without ice or condensation)						
Ingress protection rating	Ambient humidity	Operational/Storage: 35 + 85% (without	condensation)						
	Vibration	Total amplitude 1.5mm.,10Hz-55Hz-10Hz scanning for 1 minute.	Total amplitude 1.5mm. 10Hz-55Hz-10Hz scanning for 1 minute, 2 hours in each direction of X. Y and Z						
	Impacts/shocks	980m/s ² (100G), 3 times in each direction	on of X, Y and Z						
Temperature characteristics		±2% Full Scale in a range betwee	n 0÷50°C						
Type of connection		Male M5x0.8. Plug-in connection Ø4							
Electrical cable		Oilproof cable, 3 fili (0 18mm ²) (Oilproof cable 3 fili (0 18mm ³) Ø2 6mm						
Weight		Approximately 50 g (with 3 metres of cable)							
Outrant alwayshing it is a	- h								
Output circuit wiring s	cneme								





5.4



Digital vacuum switch

			Ordering code					
	12.5	55 300	DS.30.C.C.F8.					
			CABLE LENGTH B=300 mm D=2000 mm OPTIONS 0=Without connector 1=With connector M8					
HI H			male 4 Pin					
00								
Technical features								
Working pressure range		-100.0÷100.0kPa						
Regulation pressure range		-100.0÷100.0kPa						
Maximum supported pressure		300 kPa						
Allowed fluids		Air, non-corrosive gases, non-combustible	gases					
	kPa	0.1						
	kgf/cm ²	0.001						
	bar	0.001						
Pressure calibration sensitivity	psi	0.01						
	InHa	0.1						
	mmHq							
	mmH_Q	0.1						
Supply voltage								
		Da 12 a 24 VDC ± 10%						
Current consumption		≤ 60MA						
		PNP N.A. 2 outputs						
Digital output		Maximum load current: 80mA						
		Maximum supply voltage: 30VDC						
		Voltage drop: ≤1V						
Repeatability (Digital output)		± 0.2% Full Scale ± 1 digit						
Digital output	Type of hysteresis	fixed						
	Hysteresis	0.003 bar						
Response time		≤2,5 ms (anti-interference function: 24ms, 192ms e 76	8 ms selectable)					
Protection from short circuit at output	đ.	Present						
Display		Display with 3 1/2 digits (sampling 5 times pe	er sec.)					
Indicator precision		$\pm 2\%$ F. S. ± 1 digit (at ambient temperature of 2	5°C ±3°C)					
Indicator		LED Green (output1) LED red (output2)					
	Protection class	IP40						
	Ambient temperature	Operational: 0÷50°C, Storage: -20~60°C (without ice	or condensation)					
	Ambient humidity	Operation/Storage: 35÷85% (without conder	isation)					
Ingress protection rating	Supported voltage	1000VAC in 1-min, (between body and cable)						
	Insulation resistance	50MO min (at 500VDC, between body and cable)						
	Vibration	Total amplitude 1.5mm., 10Hz-55Hz-10Hz scanning for 1 minute. 2 hou	rs in each direction of X. Y and Z					
	Impacts/shocks	980m/s ² (100G) 3 times in each direction of X	Y and Z					
Temperature characteristics		+2% Full Scale in a range between 0.55	0°C					
			~ ~					
Flectrical cable		Oil resistant cable						
Woight		Ull resistant cable						
	•	Approximately of g (with 2 metres of cat						
Output circuit wiring se	cheme	DC+ (Brown)						



Components for Accessories



Overall dimensions and technical information are provided solely for informative purposes and may be modified without notice.

5.6

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Digital battery vacuum gauge Ordering code DS.60.V.I.F1.F.0 HEUMAX 0 ი .6 15.5 37 22.5 30 21.8 0 g \bigcirc Hexagonal: 12 **Technical features** Working pressure range 0 ÷ -100.0kPa Regulation pressure range 0 ÷ -100.0kPa Maximum supported pressure 300 kPa Allowed fluids Air, non-corrosive gases, non-combustible gases kPa 0.1 bar 0.01 Pressure calibration sensitivity psi 0.1 mmHg 1 Battery CR 2032 lithium Backlight Not present Battery life 3 years (5 powerups a day) Indication of battery level Present Battery replaceable Yes Display powerup time Goes off after 60 seconds Sampling frequency 2 Hz (2 times per second) Repeatability \pm 1% F. S. \pm 1 digit Display a 3 1/2 cifre Display $\pm 2\%$ F. S. ± 1 digit (at ambient temperature of 25°C ± 3 °C) Indicator precision Ip65 (only with connected air pipe) Protection class Ambient temperature Operational: $0 \div 50^{\circ}$ C, Storage: -10 $\div 60^{\circ}$ C (without ice or condensation) Ingress protection rating Ambient humidity Operational/Storage 35÷85% (without condensation) Vibration Total amplitude 1.5mm or 10G,10Hz-55Hz-10Hz scanning for 1 minute, 2 hours in each direction of X, Y Impacts/shocks 100m/s² (10G), 3 times in each direction of X, Y and Z Temperature characteristics $\pm 2\%$ Full Scale in a range between $0 \div 50^{\circ}C$ Type of connection G1/8" Weight Approximately 40 g Accessories **Fastening bracket** Panel mount adapter 33 30.2 Ħ 45 Ordering code Ordering code 13 DS.BT5 DS.PAC **Fastening bracket** Panel mount adapter with screen protection 33 30.2 Ħ Ordering code Ordering code 20 29.5 . DS.BT6 DS.PAD

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Components for Accessories



5.8



High efficiency silencers



The use of sound-absorbing material enclosed in appropriate aluminium containers made it possible to create this range of silencers which significantly lower air noisein the vacuum generator discharge stage

Noise reduction: between -13 and -20 dBA Working temperature: from -20 to +100 °C

Vertical filters



Preventing contaminants from reaching the vacuum generator is critical for maintaining its proper operation. Filters of this series have this function, manufactured in a simple way, have threaded connections for installation and a bowl that can be easily taken off to allow fast cleaning of the internal filter cartridge. The various models of filter cover a flow rate range running from 150 to 2520 l/m, Degree of filtration :10 micron, Working temperature:-20/80 °C, Working pressure:-100/0 kPa.

Line filters





Code	Description	Α	В	С	D	Е	ØF	ØG	ØН	I	J	К	ØL	Weight (g)
19F04.L.01	Pipe Ø4 - 20 l/min	53.2	9.1	30	14.1	10	18	11.6	19.5	23	20	29	4	14
19F06.L.01	Pipe Ø6 - 20 l/min	53.2	9.1	30	14.1	10	18	11.6	19.5	23	20	29	6	13
19F06.L.02	Pipe Ø6 - 50 l/min	67	15.5	34	17.5	14	22	15.6	23.1	27	24	35	6	26
19F08.L.02	Pipe Ø8 - 50 l/min	67	15.5	34	17.5	14	22	15.6	23.1	27	24	35	8	24

Filter elements

Code	Description
RK1900/0020	Filter element for 19F04.L.01 and 19F06.L.01
RK1900/0021	Filter element for 19F06.L.02 and 19F08.L.02

Line filters can handle very fine powders and contaminants without interfering with the intake flow rate. Thanks to the small dimensions they can be installed directly on the suction cups or on the vacuum pipework, and since they have automatic connections, wiring operations are facilitated. Degree of filtration:10 micron, Working temperature:0-60 °C, Working pressure:-100/0 kPa.

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Components for Accessories



5.10





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Modern industrial applications demand increasingly higher performance out of pneumatic components. In the specific case of a pneumatic cylinder, it has to act on parameters that determine the force generated and the speed at which the valve stem moves. The same holds true for a rotary actuator where we do not speak of force but rather the application of torque.

These parameters often have to be modified dynamically during operation of the the machine on which they are installed. Traditional solutions that make use of the pneumatic logic associated with use of valves supplied at different pressures often need to be large in size. It was from this requirement that the alternative solution of using a regulator came about, since it can change the pressure value over time. This type of regulator is called an electronically controlled proportional regulator. There are 3 sizes with flow rates of 7; 1,100; and 4,000 NI/min. The model that manages the positive pressure controling a vacuum generator was then added to this range.

Field of application

Fields of application for proportional regulators are any where it is necessary to dynamically control the force of an actuator, variation of pressure or degree of vacuum. Some examples: locking systems, painting systems, tensioning systems, packaging machinery, pneumatic control braking systems, force control for welding clamps, thickness compensating systems, balancing systems, laser cutting, pressure transducers to control modulating valves, test benches for testing systems, controlling the force of air gauges in sanding systems, management of force exerted by suction cups in handling applications.

Product description

The pneumatic connections of the regulator require the aperture for supply and discharge to be on one side and the aperture for use on the opposite side. On the other two remaining sides there are apertures of G1/8" that are plugged up with removable plugs, however it is possible to connect a pressure gauge through them or use the connections as outputs. On the side where the service connection is, there is an M5 aperture where you can connect the return vacuum signal (to the pressure transducer). This option makes it possible to pick up the signal from a remote point rather than directly from the service connection. In the upper part of tregulators there are control solenoid valves, the pressure sensor and the electronics forcontrol. The part for electronically controlling the regulators is the same for all the 3 sizes. The new range of proportional regulators is supplied as standard with all the functionality initially considered only as optional; the only selections necessary in the ordering phase are thus related to the type of signal for control of voltage(T) or current (C) and the range of working pressures.

CLOSED LOOP scheme (internal control circuit)

The proportional regulator is defined as CLOSED LOOP because a pressure transducer in the circuit transmits a continuous analog signal to the microprocessor that compares the reference value with the one that is detected and behaves accordingly, supplying the control solenoid valves in the correct way.



Functional diagram




С	characteristics				
	Fluid		5 micron filtered and dehumidified air		
	Input minimum pressure		As a function of the type of vacuum generator		
	Input max pressure		10 bar		
	Output pressure		Ordering code	Ordering code0009Pressure value0 ÷ 9 bar	
			Pressure value		
	Nominal flow rate from 1 to 2 (6 bar Δp 1 bar)		Size 0	Size 1	Size 3
atic			7 NI /min	1.100 NI /min	4.000 NI/min
Pneum	Discharge flow rate (at 6 bar with overpressure of 1 bar)		7 NI /min	1.300 NI /min	4.500 NI/min
	Air consumption		< 1 NI/min	< 1 NI/min	< 1 NI/min
	Supply connection		M5	G 1/4"	G 1/2"
	Service connection		M5	G 1/4"	G 1/2"
	Discharge connection		Ø1.8	G 1/8"	G 3/8"
	Maximum tightening torque for connections		3 Nm	15 Nm	15 Nm
	Supply voltage		24VDC ± 10% (stabilised with ripple <1%)		
	Current consumption in standby		55mA		
	Current consumption with actuated EV		145mA		
	Reference signal	Voltage	*0 ÷ 10 V *0 ÷ 5 V *1 ÷ 5 V		
Electric		Current	*4 ÷ 20 mA *0 ÷ 20 mA		
	Input impedance	Voltage	10ΚΩ		
		Current	250Ω		
	Analog output Voltage		*0 ÷ 10V *0 ÷ 5V		
	Analog output Current		*4 ÷ 20mA *0 ÷ 20mA		
	Digital inputs		24VDC ±10%		
	Digital outputs		24 VDC PNP (max current 50 mA)		
	Connector		D-sub 15 poles		
	Linearity		< ± 0.3 % F.S.		
	Hysteresis		<0.3 % F.S.		
:=	Repeatability		< ± 0.3 % F.S.		
lon	Sensitivity		< ± 0.3 % F.S.		
izur	Mounting position		Any		
Ē	Protection class		IP65 (with proper nut mounted)		
	Ambient temperature (°C)		-5° ÷ 50°C / 23° ÷ 122°F		
	Body		Anodised aluminium		
	Shutters		Brass with vulcanised NBR		
	Diaphragm		Rubberised fabric		
tive	Sealing gaskets		NBR		
trut	Cover electrical part		Technopolvmer		
Sos	Springs		AISI 302		
	Weight		Size 0	Size 1	Size 3
			100 Y	300 Y	000 Y

* Can be selected using keyboard or with RS-232

5





Fastening option

In addition to the possibility of fastening it directly to the wall using the M4 apertures present on the body, there is also the option of using the fastening bracket code 170M5 as can be seen in the figures shown below.





SIZE 0











SIZE 3

Installation/ Operation

PNEUMATIC CONNECTION

Pneumatic connection can be made through the threaded apertures M5 (for Size 0 regulators), G 1/4" (for Size 1 regulators) and G 1/2" (for Size 3 regulators) present on the body.

Before making the connections, it is recommended that any contaminants present in the connection pipes be eliminated in order to prevent powders or chips from ending up inside the unit. It is also recommended that the circuit is supplied with a pressure no greater than 10 bar and that the compressed air is dry (too much condensation may cause malfunction of the equipment) and filtered at 5 microns. The minimum supply pressure required depends on the characteristics of the vacuum generator.

By putting a silencer in the discharge path it is possible to change the response time of the unit; periodically check to make sure that the silencer has not become dirty, and, if it is dirty, replace it.

ELECTRICAL CONNECTION



The electrical connection can be created using a female SUB-D 15 poles Put the electrical connections together in accordance with the diagram shown in the figure at bottom. Attention: WRONG CONNECTIONS MAY DAMAGE THE DEVICE

NOTES ON OPERATION

If the electricity supply is cut off, the output pressure will be kept at the set value. However, maintenance of this exact value is not guaranteed given the fact that the solenoid valve cannot be actuated.

To discharge the circuit downstream, clear the reference, make sure the display shows a pressure value equal to zero, and then cut off the electrical power supply.

A version of the device is available as an option that discharges the circuit downstream right at the time the electricity is cut off (final letter A in the ordering code). If the air supply is stopped and the power supply is maintained, you may hear a humming noise being generated due to the solenoids; it is possible to activate an operating parameter (P18) that allows the regulator to be protected any time the pressure is not reached within 4 seconds after the moment the reference signal is sent. In this case, the system will intervene by interrupting control of the solenoid valves. Every 20 seconds the unit will start the restoration procedure until standard operating conditions are reintegrated.

REGULATOR CONNECTOR VIEWED FROM ABOVE



* No cable

5300.F15.90.05 : Connector 90° + Cable 5 metres





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