

VACUUM AND PRESSURE GAUGES

The measurement method of our vacuum gauges is based on the principle of the Bourdon spring (Eugène Bourdon, France, 1808–1884).

It is made using section tubes in special copper alloy, one end is welded to the threaded pin of the vacuum-pressure gauge, thus forming a single body with it, while the other closed end is free

As the vacuum or the pressure inside increases, it tends to shift from the initial position (Bourdon effect).

The movement of the free end of the spring determines the vacuum-pressure measurement.

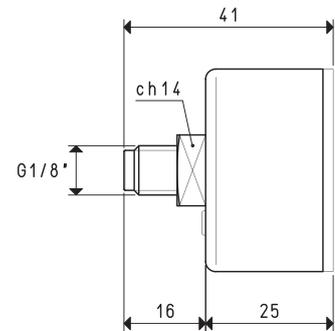
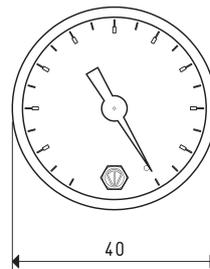
In order to allow an easier reading, this movement is amplified by means of a connection lever and transmitted to the pointer.

All is enclosed in a sturdy metal casing which contains the dial and the pointer, that can be seen through a glass.

They are available in various versions, with coaxial or radial connectors, with built-in or external flange, dry or glycerine filled.

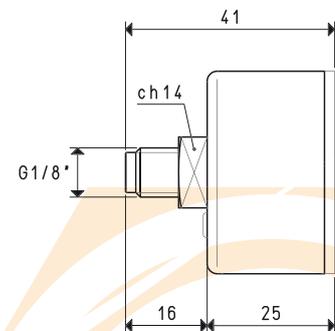
Except for vacuum gauges with diameter \varnothing 40 mm, all the other models have a double scale dial.

All the vacuum and pressure gauges we will describe in these pages are made in compliance with all the safety standards and measurement units in force in the European Union.



VACUUM GAUGE

Art.	Scale Kpa	Double Scale	Scale error allowed	Operating temperature	Notes	Weight g
09 03 15	0 ÷ -100	--	2.5%	-10 °C ÷ +50 °C	dry	52



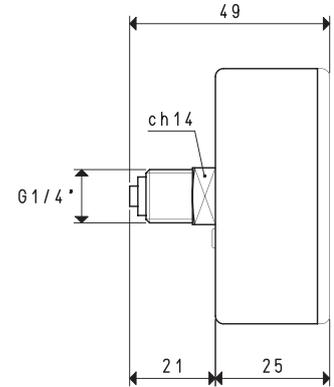
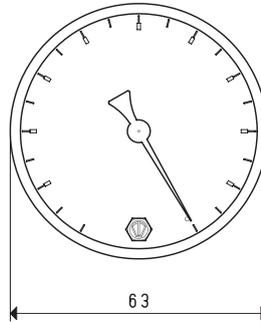
PRESSURE GAUGES

Art.	Scale bar (g)	Double Scale	Scale error allowed	Operating temperature	Notes	Weight g
09 03 20	0 ÷ 1.6	0 ÷ 23 psi	2.5%	-10 °C ÷ +50 °C	dry	54
09 03 25	0 ÷ 10	0 ÷ 1.0 MPa	2.5%	-10 °C ÷ +50 °C	dry	54

Conversion ratio: inch = $\frac{\text{mm}}{25.4}$; pounds = $\frac{\text{g}}{453.6}$ = $\frac{\text{Kg}}{0.4536}$

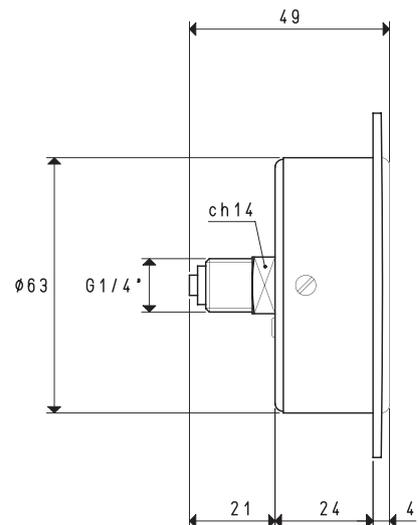
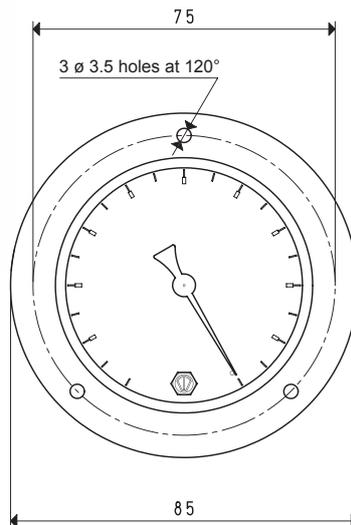
GAS-NPT thread adapters available at page 1.117

VACUUM GAUGES



VACUUM GAUGE

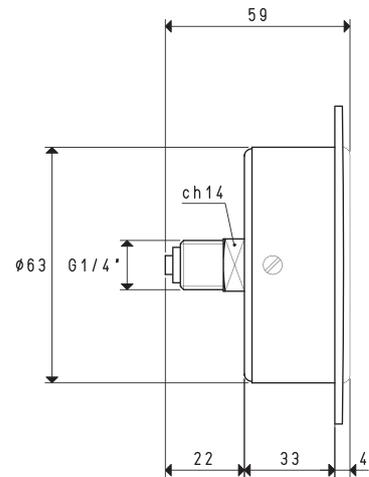
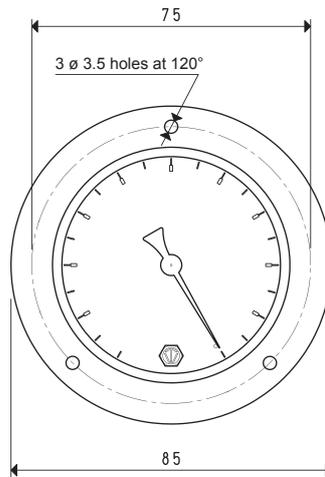
Art.	Scale mbar	Double Scale KPa	Scale error allowed	Operating temperature	Notes	Weight g
09 03 10	0 ÷ -1000	0 ÷ -100	2.5%	-10 °C ÷ +50 °C	dry	134



VACUUM GAUGE

Art.	Scale mbar	Double Scale Kpa	Scale error allowed	Operating temperature	Notes	Weight g
09 01 10	0 ÷ -1000	0 ÷ -100	2.5%	-10 °C ÷ +50 °C	dry	162

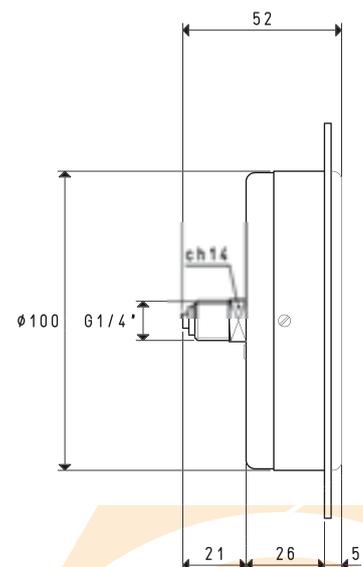
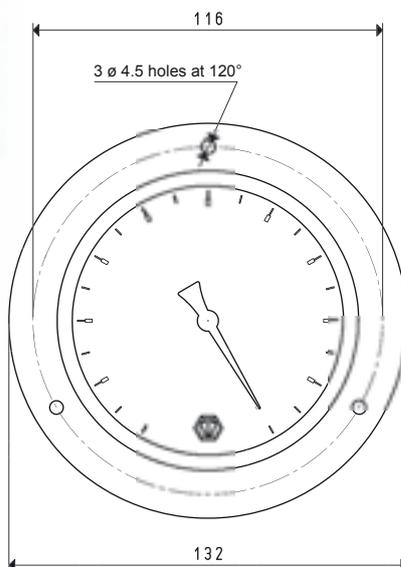
3D drawings available at www.vuototecnica.net



3

VACUUM GAUGE

Art.	Scale mbar	Double Scale KPa	Scale error allowed	Operating temperature	Notes	Weight g
09 01 16	0 ÷ -1000	0 ÷ -100	1.6%	-10 °C ÷ +50 °C	glycerine bath	348



VACUUM GAUGE

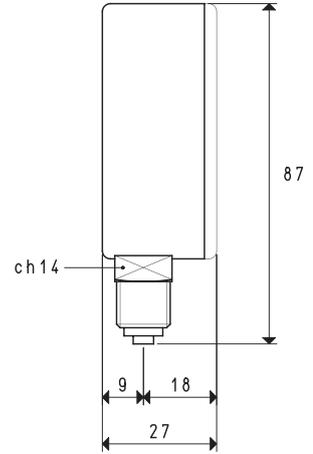
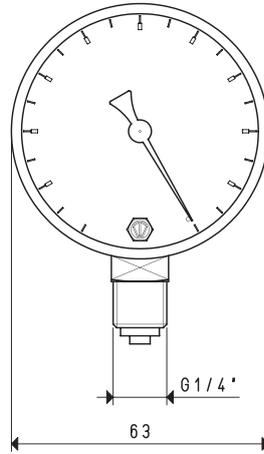
Art.	Scale mbar	Double Scale KPa	Scale error allowed	Operating temperature	Notes	Weight g
09 02 10	0 ÷ -1000	0 ÷ -100	1%	-10 °C ÷ +50 °C	dry	346

3D drawings available at www.vuototecnica.net

Conversion ratio: inch = $\frac{mm}{25.4}$; pounds = $\frac{g}{453.6} = \frac{Kg}{0.4536}$

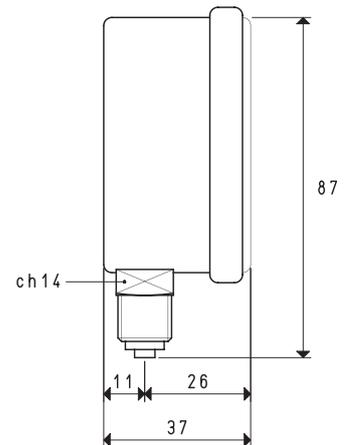
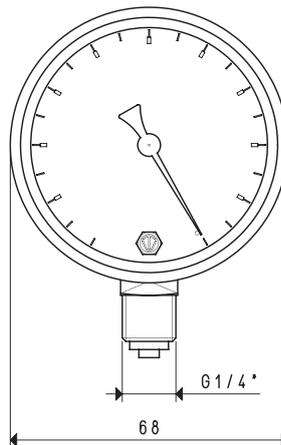
GAS-NPT thread adapters available at page 1.117

VACUUM GAUGES



VACUUM GAUGE

Art.	Scale mbar	Double Scale KPa	Scale error allowed	Operating temperature	Notes	Weight g
09 05 10	0 ÷ -1000	0 ÷ -100	2.5%	-10 °C ÷ +50 °C	dry	136



VACUUM GAUGE

Art.	Scale mbar	Double Scale KPa	Scale error allowed	Operating temperature	Notes	Weight g
09 05 16	0 ÷ -1000	0 ÷ -100	1.6%	-10 °C ÷ +50 °C	glycerine bath	218

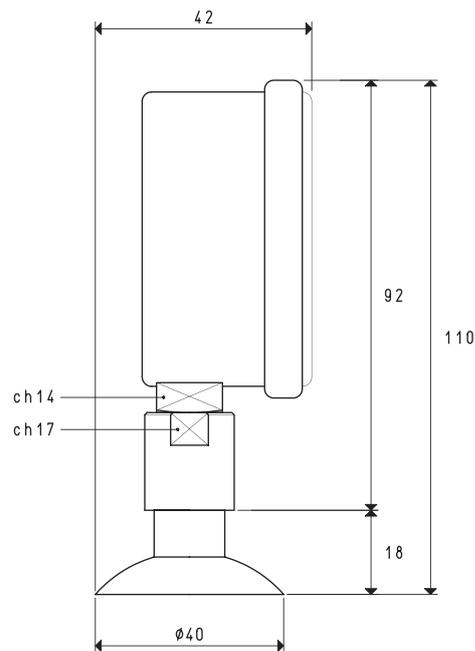
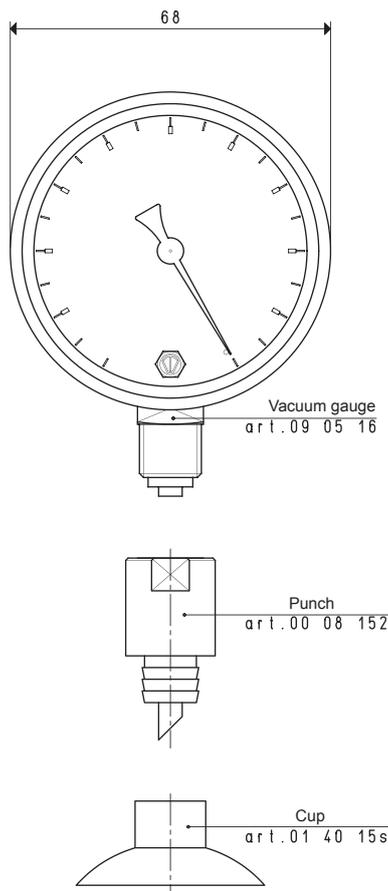
3D drawings available at www.vuototecnica.net

VACUUM GAUGE WITH STEEL PUNCH

This vacuum gauge has been designed to allow the immediate detection of the vacuum level inside tin cans and food containers in general.

The glycerine bath vacuum gauge art. 09 05 16 used for this application (features described in the previous page), is provided with a hardened steel punch to easily perforate the containers and with a vacuum cup in silicon compound to guarantee vacuum seal after perforation.

It is available in the standard version (which is the one shown in this page), but can be provided in other versions upon request.

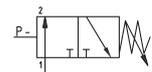
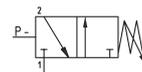
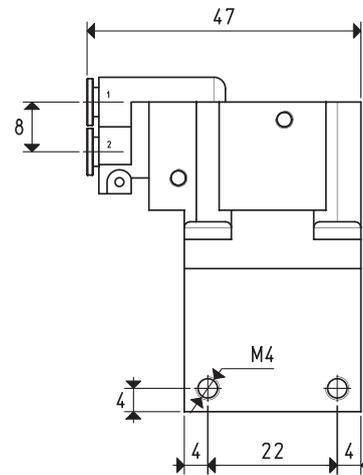
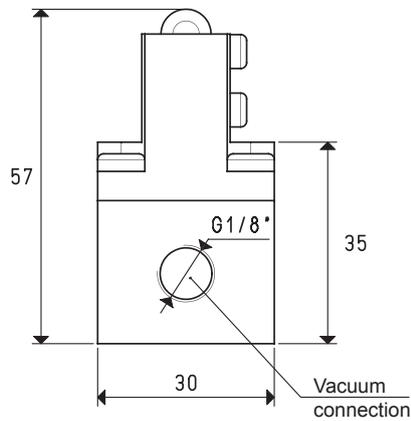
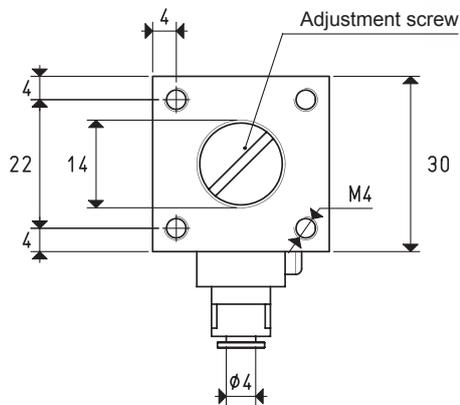


Art.	Scale mbar	Double Scale KPa	Scale error allowed	Operating temperature	Notes	Weight g
09 05 99	0 ÷ -1000	0 ÷ -100	1.6%	-10 °C ÷ +50 °C	glycerine bath	250

Conversion ratio: inch = $\frac{\text{mm}}{25.4}$; pounds = $\frac{\text{g}}{453.6}$ = $\frac{\text{Kg}}{0.4536}$

MINI PNEUMATIC VACUUM SWITCH

These vacuum switches feature reduced overall dimensions and, according to the model, they give or remove a pneumatic signal when a certain adjustable vacuum level is reached. The pressure differential between the set maximum value and the value of reset of the rest signal is not adjustable. They are particularly suited for controlling vacuum generators and for activating pneumatic valves.



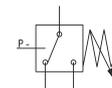
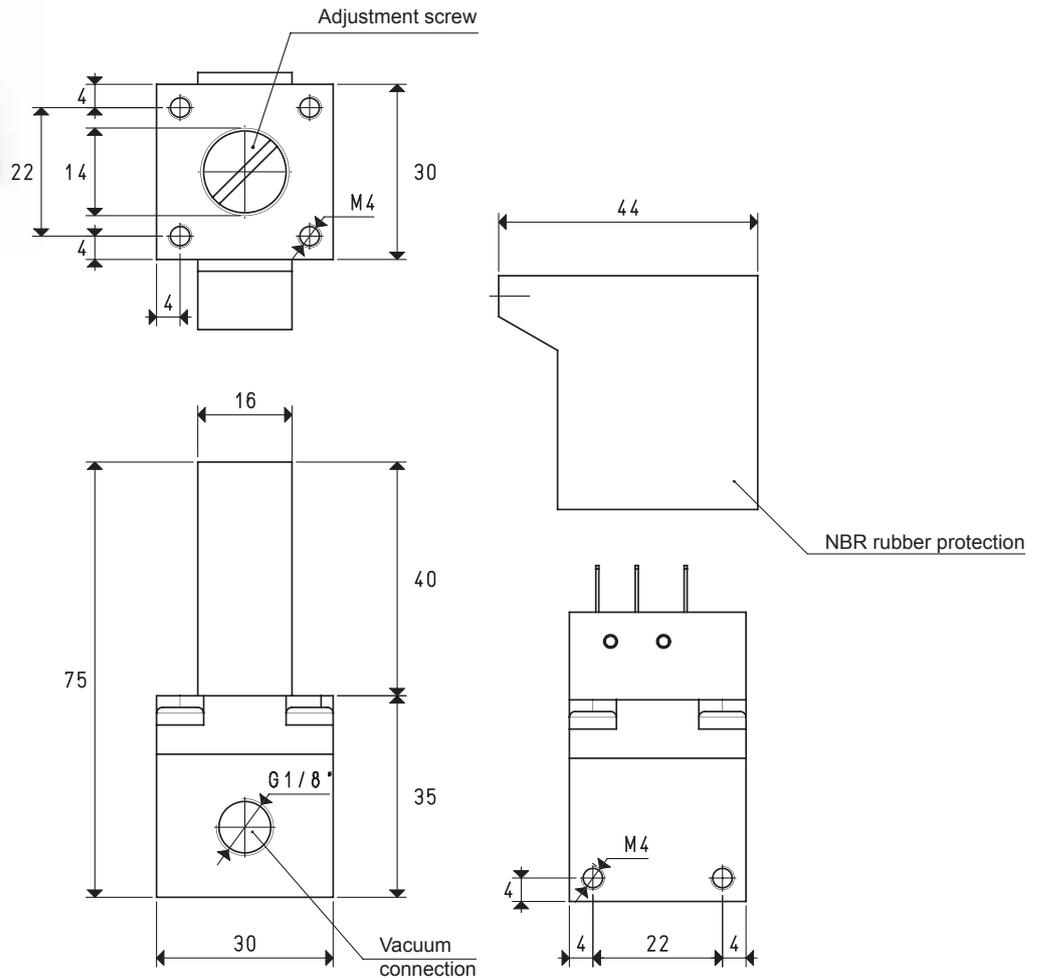
Art.		12 01 30	12 02 30
Adjustment range	mbar abs.	930 ÷ 50	900 ÷ 40
Fixed differential	mbar	70	100
Repeatability	mbar	±5	±5
Idle signal		NC	NO
Supply pressure	bar (g)	2 ÷ 8	2 ÷ 8
Pneumatic microvalve	art.	00 12 17	00 12 18
Max. capacity of the 6 bar (g) microvalve	NI / s	1.2	1.2
Working temperature	°C	-10 ÷ +60	-10 ÷ +60
Weight	g	104	102

MINI ELECTROMECHANICAL VACUUM SWITCHES



These vacuum switches feature reduced overall dimensions and give an electric signal when a certain adjustable vacuum level is reached. The pressure differential existing between the set maximum value and the value of reset of the rest signal is $50 \div 60$ mbar and it is not adjustable.

They are particularly suited when an electrical signal is needed when a certain vacuum level is reached, for safety, for starting a cycle, for checking the cup grip, etc.



Art.	12 02 10	
Adjustment range	mbar abs.	930 ÷ 10
Fixed differential	mbar	50 ÷ 60
Repeatability	mbar	±1.5
Microswitch	art.	00 12 12
Contacts		one change-over
Contact capacity	A	3 a 250 V in A.C.
Electrical connections		110-type fast-on terminals
Working temperature	°C	-25 ÷ +80
Protection		IP 55
Weight	g	102

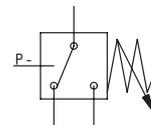
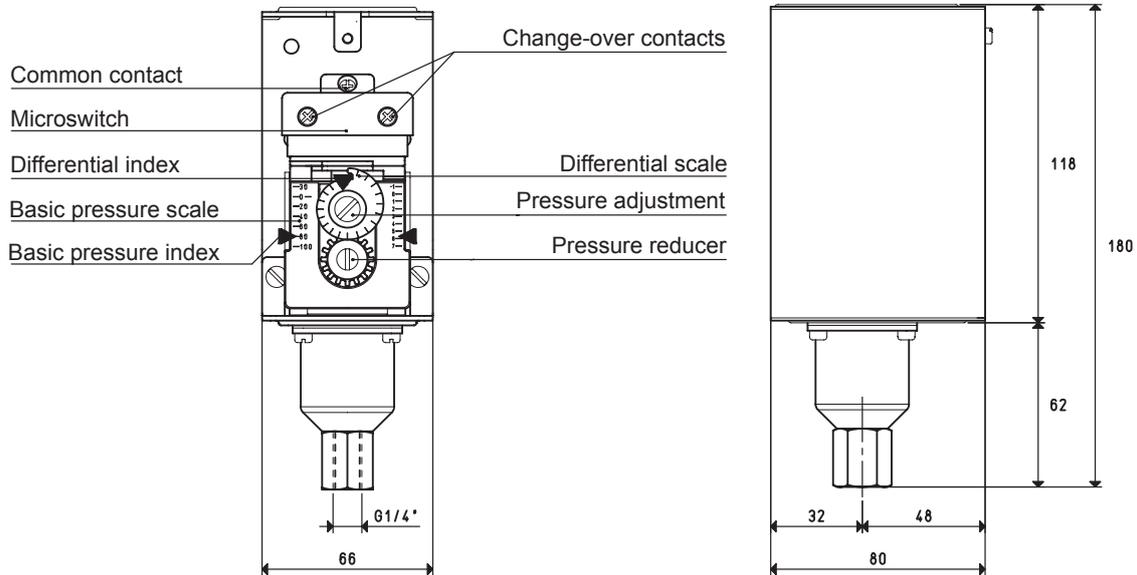
ELECTROMECHANICAL VACUUM - PRESSURE SWITCHES

The vacuum - pressure switches of the 836 series are compact, sturdy and accurate units that can be adapted to many applications. The feature of the control is a quick tripping precision microswitch, equipped with silver contacts. Normal industrial vibrations have no effect on the efficient opening and closing of the contacts.

The particular linear construction, relatively friction free, assures a precise and reliable operation independent of the pressure switch mounting angle.

The "Long Life" bellows with which they are equipped, are made of copper alloy and can be used for air, water, oil, liquid, vapour and gas circuits, provided that all these agents are not corrosive.

These devices are included in the U.L. lists and approved by C.S.A.



Art.		836 - C6A	836 - C2A
Adjustment range	bar abs.	0 ÷ 8	0 ÷ 1.7
Adjustable differential	mbar	from 133 to 1200	from 26 to 280
Max. line pressure	bar abs.	21	4.5
Repeatability	measuring range %	±0.5	±0.5
Contacts		one change-over	
Contact features		unipolar with double interruption	
		125 VA with ac from 24 to 600 Volts	
		57.5 VA with ac from 115 to 230 Volts	
		Rated current for non inductive loads	
Contact capacity	A	5 a 240 V in A.C.	
	A	3 a 600 V in A.C.	
Electrical connections		with terminals	
Working temperature	°C	-25 ÷ +70	
Protection		IP 54	
Weight	Kg	0.984	1.130

3D drawings available at www.vuototecnica.net

MICRO DIGITAL VACUUM SWITCHES

These small devices, if accurately calibrated and compensated for temperatures, are able to give very precise digital signals to the maximum measuring value.

The commutation point, which is within the scale value, can be easily programmed by means of an adjustment screw located on the upper part of the device. A red LED near the screw indicates the digital output signal commutation status.

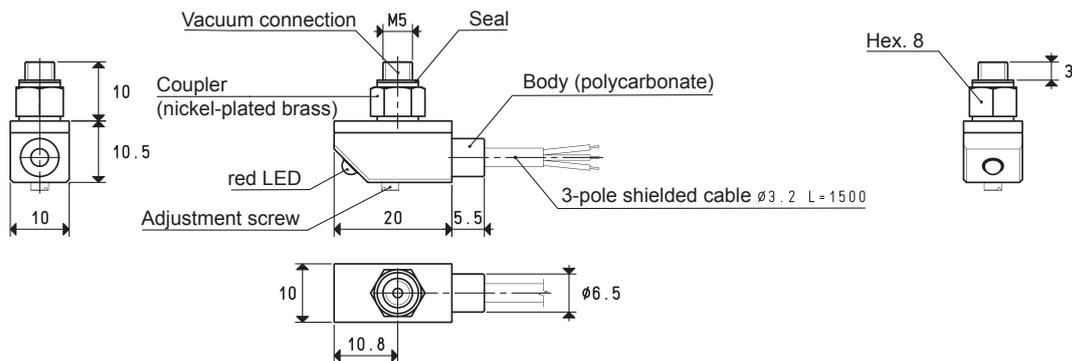
The pressure differential (hysteresis) between the set maximum value and the value of reset of the rest signal is 2% of the set value and cannot be adjusted.

They are composed of a polycarbonate enclosure, which includes the sensor and the electric circuit, and of a coupler or a small aluminium manifold with the vacuum connections.

Art. 12 05 10 can also be rotated freely to place the display in the desired position, without having to unscrew it from the vacuum connection. The vacuum connection can be carried out via male or female M5 connectors, while the electrical connection is made via a three-connector cable which they are equipped with. Mini digital vacuum switches are suited for controlling dry air and non-corrosive gasses and they are recommended in all those cases that require a signal when a certain vacuum level is reached, for safety, for starting a cycle, for checking the cup grip, etc.

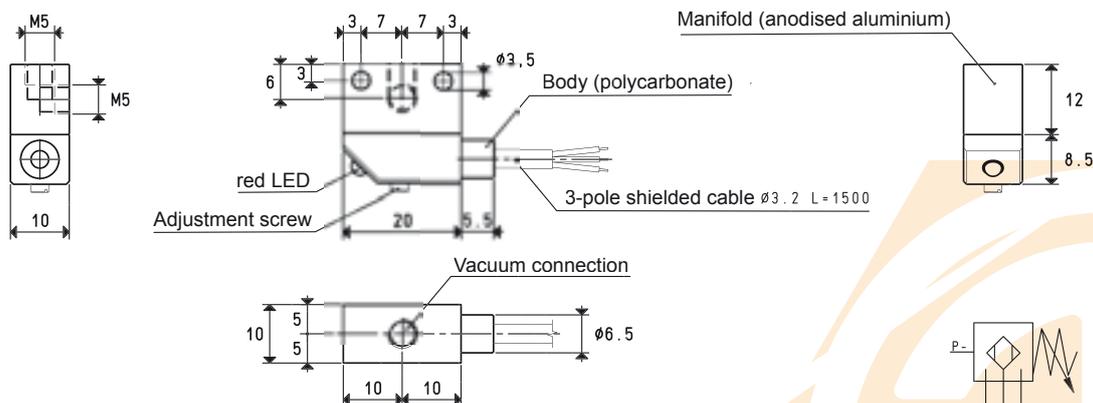


Art. 12 05 10



Cable colour	Connection
brown	positive pole \oplus
black	output signal
blue	negative pole \ominus

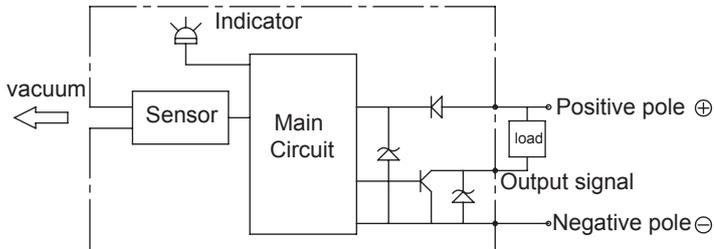
Art. 12 05 11



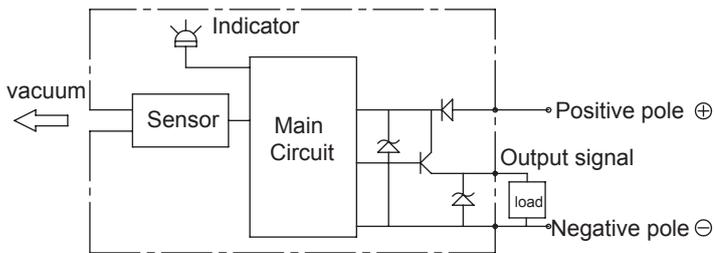
MICRO DIGITAL VACUUM SWITCHES

INTERNAL ELECTRIC DIAGRAMS

- NPN on

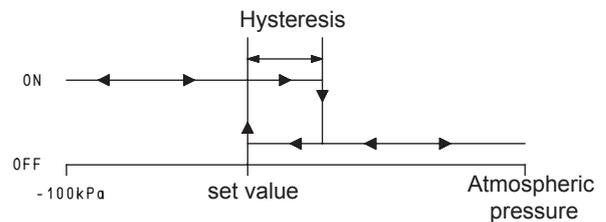


- PNP on



OUTPUT CONTACT DIAGRAM

The LED lights up at the preset pressure and turns off at the preset pressure minus the hysteresis



Electrical features and specifications	Art. 12 05 10 P	Art. 12 05 10 N
	Art. 12 05 11 P	Art. 12 05 11 N
Adjustment range	da 0 a -100 kPa	
maximum overpressure	200 kPa	
Operating voltage	10.8 ÷ 30 VDC (Protection against polarity reversal)	
Electrical absorption	≤20 mA	
Commutation outputs	1 digital PNP, NO	1 digital NPN, NO
Reaction time	80 mA maximum	
Commutation frequency	≤1 ms	
Hysteresis	1000Hz	
Repeatability	Not adjustable, 2% of the set maximum value	
Commutation indicator	±2% of the measuring range	
Insulation resistance	Red LED	
Proof voltage	100 MΩ	
Protection class	500 VAC, 1 min	
Working environment conditions	IP 40	
Installation position	Any	
Controlable fluids	Dry air and non-corrosive gasses	
Operating temperature	-10 ÷ +60 °C	
Storage temperature	-20 ÷ +70 °C	
Emitted interference	In compliance with EN 55011, Group 1, Class B	
Interference immunity	In compliance with EN 61326 - 1	
Mechanical features and specifications		
Container material	Polycarbonate PC	
Connection material	Nickel-plated brass and aluminium	
Weight (without cable)	Approx. 5g	
Electrical connection	1.5 m long three-conductor cable	
Connection to fluid	M5 male or female thread	

ANALOG VACUUM SWITCHES



These compact and extremely light switches come enclosed in a sturdy ABS casing; these features allow their installation on the machine and close to the application. If accurately calibrated, these analog switches provide very precise measurements values. The adjustment range is from 0 to -1 bar (g) and can be interfaced with external logics via an analog output from 1 to 5 Volts and a digital PNP output, configurable via Teach-In.

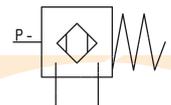
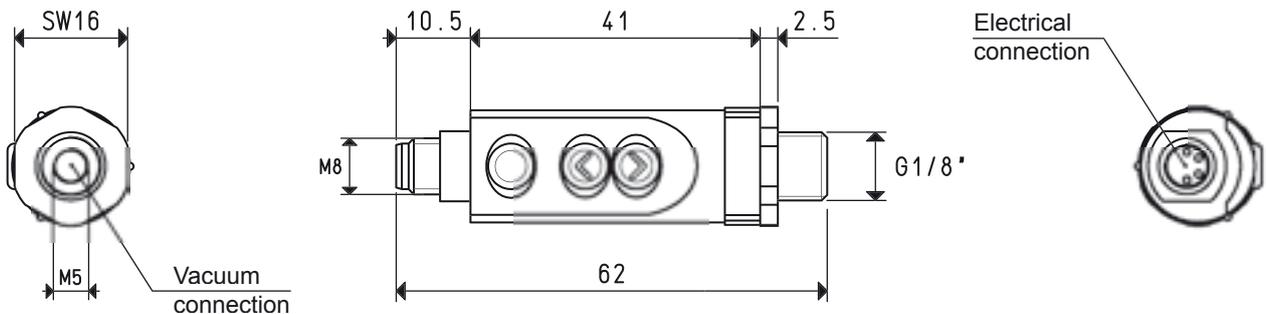
The commutation point, as well as the hysteresis from 0 to 100% of the set value, can be easily programmed via push buttons located on the control panel; the two two-colour LEDs on the control panel signal the commutation status and the error code, if any.

These devices can be rotated freely to place the display in the desired position, without having to unscrew them from the vacuum connection.

The vacuum connection is dual threaded: male G 1/8" or female M5. The electrical connection is an M8 4-pin threaded plug and upon request the connection cable is available in PUR, with an axial or radial connector.

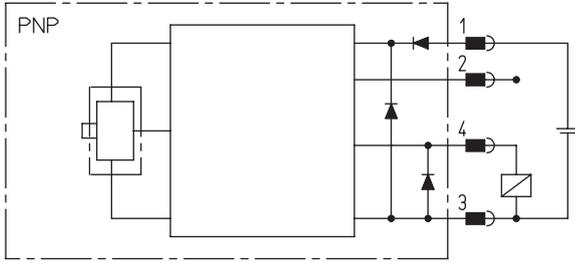
These vacuum switches are suited for measuring and controlling dry air and non-corrosive gasses. They are recommended in all those cases that require a measurement and commutation to be installed on safety or energy-saving devices, on systems for optimising the work cycle time and in circuit vacuum level adjustment circuits.

3



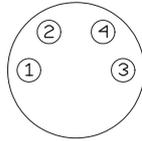
ANALOG VACUUM SWITCHES

ELECTRIC DIAGRAM



Connections

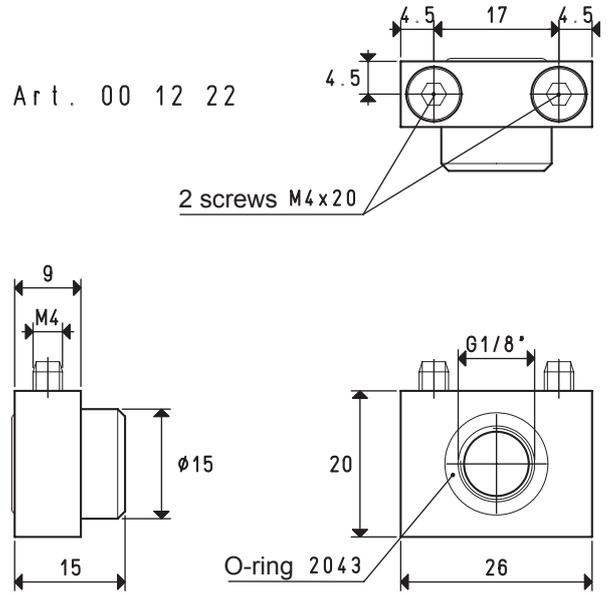
- 1 . V +
- 2 . analog output
- 3 . V -
- 4 . commutation output



Cable colour
 Pin1 = brown
 Pin2 = white
 Pin3 = blue
 Pin4 = black

WALL-FIXING KIT

Art. 00 12 22



Electrical features and specifications

Art. 12 07 10

Adjustment range	from 0 to -1 bar (g)
maximum overpressure	5 bar (g)
Operating voltage	10.8 ÷ 30 VDC (Protection against polarity reversal)
Electrical absorption	≤30 mA
Commutation output	1 digital PNP, NO or NC, max. commutation power 125 mA
Analog output	1 ÷ 5 V; load impedance ≥500 Ω
Output tolerance	±1%
Offset	1 V ÷ 0.1 Volt
Reaction time	≤2.5 ms
Commutation frequency	400Hz
Hysteresis	Adjustable from 0 to 100% of the set maximum value
Repeatability	±0.2% of the measuring range
Error code signal	via two-colour LEDs
Insulation resistance	100 MΩ a 500 VDC
Proof voltage	1000 VDC, 1 min
Protection class	IP 65

Working environment conditions

Installation position	Any
Measurable fluids	Non-corrosive gasses and dry air
Operating temperature	0 ÷ +50 °C
Storage temperature	-20 ÷ +80 °C
Emitted interference	In compliance with DIN EN 50081 - 1
Interference immunity	In compliance with DIN EN 50082 - 2

Mechanical features and specifications

Container material	ABS/PC plastic
Connection material	Nickel-plated brass
Weight	19 g
Electrical connection	M8-4 pin plug
Connection to fluid	Male G1/8", female M5 threads

Accessories

Electrical connection cable	With axial connector, mt. 5 - PUR M8 x 1x 0.25 mm	- Art. 00 12 20
Electrical connection cable	With radial connector, mt. 5 - PUR M8 x 1x 0.25 mm	- Art. 00 12 21
Wall-mounting kit	Support with O-ring and screws	- Art. 00 12 22

DIGITAL VACUUM AND PRESSURE SWITCHES

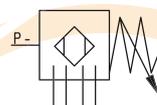
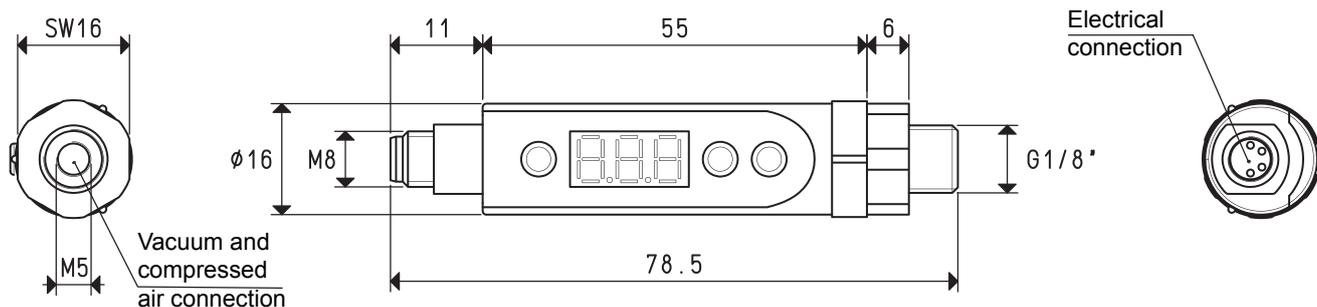
These compact and extremely light digital vacuum and pressure switches are enclosed in a sturdy ABS casing. These features allow installation on the machine and close to the application.

These digital switches, accurately calibrated and compensated for temperatures, is able to give very precise measurements values. The measured values are shown on the display, making the vacuum gauge redundant. The two LEDs, one red and one green, built-in the control panel, indicate the commutation status of the two digital output signals.

The two commutation outputs are completely independent. The switch point between the scale values as well as the hysteresis from 0 to 100% of the set up value can be easily programmed via the push buttons on the control panel.

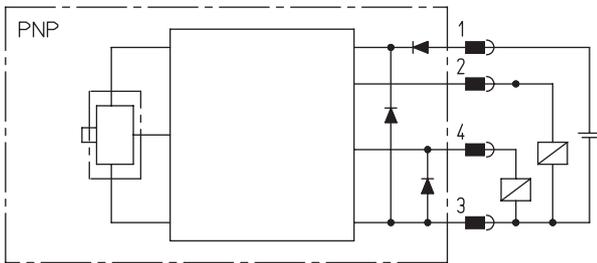
Other additional functions can be configured, such as the comparison between two values, NO and NC contacts, choice of the measurement unit, locking the programmed values and functions, display reversal, etc. These devices can be rotated freely to place the display in the desired position, without having to unscrew them from the vacuum connection.

The vacuum or the pressure connections can be carried out via a dual male G 1/8" or female M5 thread. The electrical connection is carried out via M8-4 pin threaded plug and upon request the connection cable is available in PUR, with an axial or radial connector. These switches are suited for measuring and controlling dry air and non-corrosive gasses. They are recommended in all those cases that require a signal when a certain vacuum level is reached set for safety, for starting a cycle, for checking the cup grip, etc. Moreover, the hysteresis function allows managing the vacuum generator compressed air supply, allowing considerable energy saving.



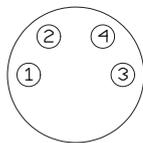
DIGITAL VACUUM AND PRESSURE SWITCHES

ELECTRIC DIAGRAM



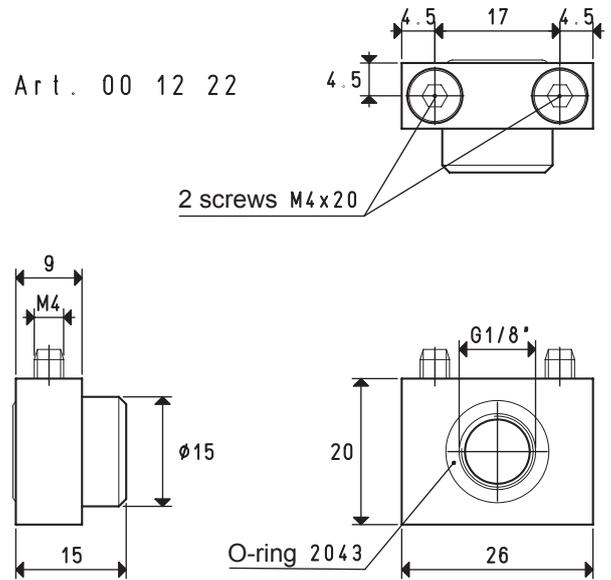
Connections

- 1 . V +
- 2 . commutation output 2
- 3 . V -
- 4 . commutation output 1



Cable colour
 Pin1 = brown
 Pin2 = white
 Pin3 = blue
 Pin4 = black

WALL-FIXING KIT



Electrical features and specifications	Art. 12 10 10 Vacuum switch	Art. 12 25 11 Pressure switch
Adjustment range	from 0 to -1 bar (g)	from 0 to 10 bar (g)
maximum overpressure	5 bar (g)	16 bar (g)
Minimum detected values	0.01 bar (g) 1 kPa 1 mmHg 0.1 InHg	0.01 bar (g) -- -- --
Operating voltage	10.8 ÷ 30 VDC (Protection against polarity reversal)	
Electrical absorption	≤35 mA	
Commutation output	2 digital PNP,NO or NC,max commutation power 125 mA	
Display tolerance	≤ ±1% F.S.	
Reaction time	≤2.5 ms	
Commutation frequency	400Hz	
Hysteresis	Adjustable from 0 to 100% of the set maximum value	
Repeatability	±0.2% of the measuring range	
Display	3-digit, 7-segment LED	
Insulation resistance	100 MΩ a 500 VDC	
Proof voltage	1000 VDC, 1 min	
Protection class	IP 65	
Working environment conditions		
Installation position	Any	
Measurable fluids	Non-corrosive gasses and dry air	
Operating temperature	0 ÷ +50 °C	
Storage temperature	-20 ÷ +80 °C	
Emitted interference	In compliance with DIN EN 50081 - 1	
Interference immunity	In compliance with DIN EN 50082 - 2	
Mechanical features and specifications		
Container material	ABS/PC plastic	
Connection material	Nickel-plated brass	
Weight	20 g	
Electrical connection	M8-4 pin plug	
Connection to fluid	Male G1/8", female M5 threads	
Accessories		
Electrical connection cable	With axial connector, mt. 5 - PUR M8 x 1x 0.25 mm	- Art. 00 12 20
Electrical connection cable	With radial connector, mt. 5 - PUR M8 x 1x 0.25 mm	- Art. 00 12 21
Wall-mounting kit	Support with O-ring and screws	- Art. 00 12 22

3D drawings available at www.vuototecnica.net

VACUUM REGULATORS



Vacuum regulators are used to adjust the pre-set vacuum level, keeping it constant (secondary vacuum), regardless of the capacity and the oscillations of the network vacuum level (primary vacuum).

Their operation is with a membrane-piston and they exploit the pressure differential between the secondary vacuum and the atmospheric pressure. Unlike the vacuum adjusting valves, regulators do not introduce air into the circuit, thus producing more gripping points with different vacuum values, from only one vacuum source.

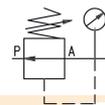
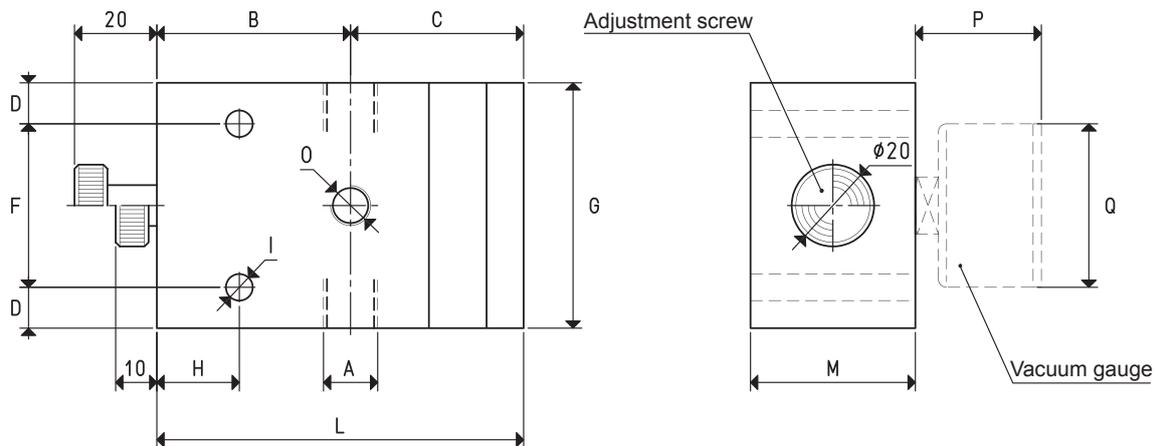
The vacuum level is adjusted by rotating the special reeded screw clockwise to increase it, and anti-clockwise to reduce it.

Technical features

- Operation: membrane-piston regulator.
- Adjustable operating pressure: from 800 to 1 mbar abs.
- Capacity: from 2 to 160 cum/h.
- Room temperature: from -10 to +80 °C.
- Installation position: any.

Use

Vacuum regulators are mainly used on centralised plants where, regardless of the plant vacuum level, each grip can be adjusted within that value. Moreover, they are necessary whenever the working vacuum must be lower than the primary vacuum.



Art.	A Ø	Max. capacity cum/h	B	C	D	F	G	H	I Ø	L	M	O Ø	P	Q Ø	Art. pressure gauge	Weight Kg
11 01 10	G1/4"	6	47	42.0	10	40	60	20	6.5	89.0	40	G1/8"	30	40	09 03 15	0.60
11 02 10	G3/8"	10	47	42.0	10	40	60	20	6.5	89.0	40	G1/8"	30	40	09 03 15	0.58
11 03 10	G1/2"	20	53	52.0	15	55	85	25	8.5	105.0	50	G1/4"	36	63	09 03 10	1.15
11 04 10	G3/4"	40	55	55.5	15	70	100	30	8.5	110.5	50	G1/4"	36	63	09 03 10	1.39
11 05 10	G1"	80	60	58.0	15	90	120	30	8.5	118.0	60	G1/4"	36	63	09 03 10	2.08
11 06 10	G1" 1/2	160	54	77.5	15	130	160	20	8.5	131.5	99	G1/4"	36	63	09 03 10	5.49

Note: Pressure gauges are not integral part of the regulators, therefore, they must be ordered separately.

$$\text{Conversion ratio: inch} = \frac{\text{mm}}{25.4}; \text{ pounds} = \frac{\text{g}}{453.6} = \frac{\text{Kg}}{0.4536}$$

GAS-NPT thread adapters available at page 1.117

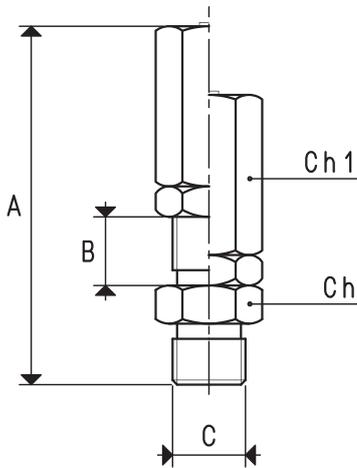
VACUUM ADJUSTMENT VALVES

When these valves reach a certain precalibrated vacuum degree, they introduce atmospheric air into the circuit to prevent the increase of the set value and to keep it constant.

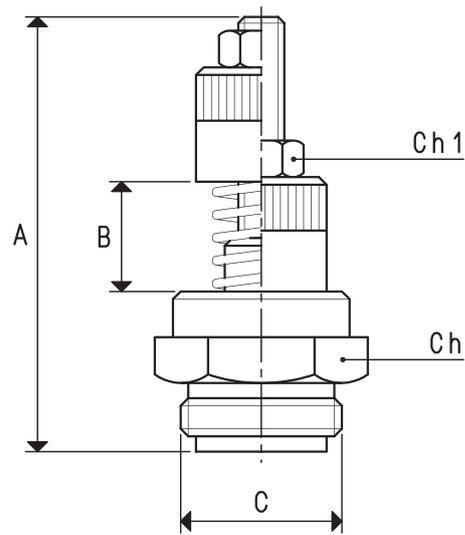
They can be used as regulators only on circuits having only one vacuum pump and only one use (or more uses but all working at the same vacuum degree)

In most cases they are used as safety valves on non-commissioned tanks or containers at high vacuum levels and on vacuum cup lifting systems.

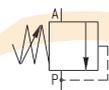
The vacuum level is adjusted by rotating the knurled bush in both directions. The fine thread with which the valve is provided ensures a very accurate calibration.



Art. 04 01 10



Art. 04 02 10
04 03 10
04 04 10



Art.	Vacuum adj. mbar abs.	A	B	C Ø	Ch	Ch1	Max. capacity cum/h	Weight g
04 01 10	670 ÷ 1	45	6.5	G1/8"	12	12	4	30
04 02 10	670 ÷ 1	57	15.0	G1/2"	24	10	20	78
04 03 10	670 ÷ 1	60	12.0	G3/4"	30	17	40	150
04 04 10	670 ÷ 1	65	12.0	G1"	35	17	70	210

Conversion ratio: inch = $\frac{\text{mm}}{25.4}$; pounds = $\frac{\text{g}}{453.6} = \frac{\text{Kg}}{0.4536}$

GAS-NPT thread adapters available at page 1.117