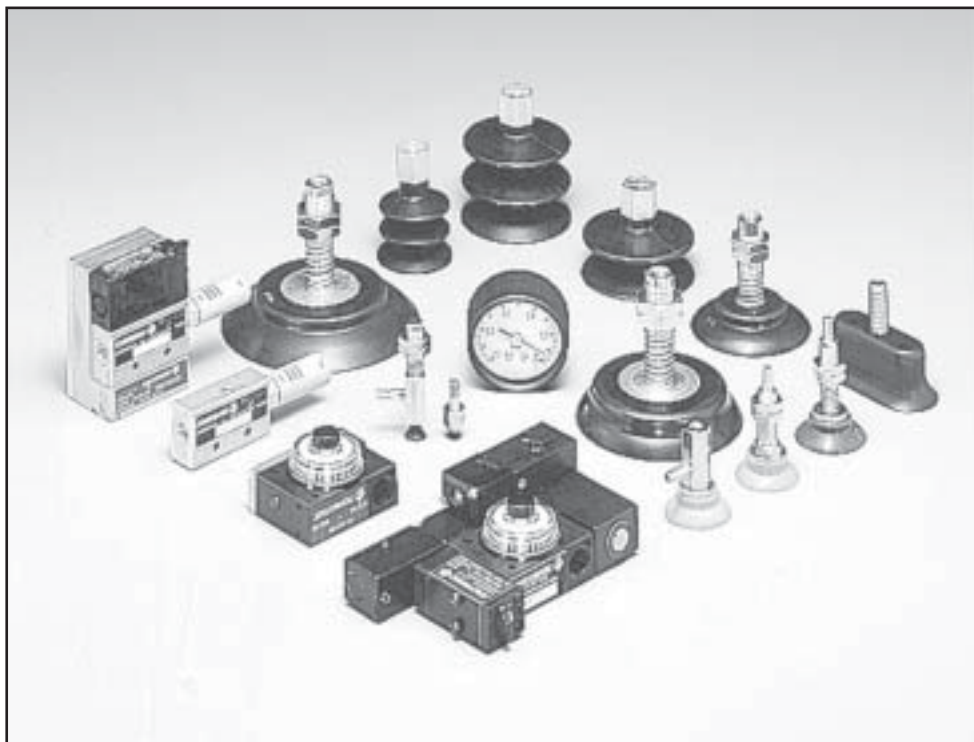


VACUUM LIFTING EQUIPMENT

Summary



Products	Series	Page
General presentation		P900-03
Spare parts	978	P900-02
Complementary elements for pressure supply		P900-02
Single nozzle vacuum generator	367	P900-06
Two-stage vacuum generator	367	P900-09
Selecting a vacuum generator	367	P900-21
Flat suction cups	367	P900-22
Bellow suction cups	367	P900-24
Oblong suction cups	367	P900-25
Selecting suction cups	367	P900-26
Vacuum switch	346	P900-27

SPARE PARTS

VACUUM GENERATOR SINGLE NOZZLE

- Silencer : **978 01 495**
- Vacuum breaking valve : **978 01 496**

TWO-STAGE VACUUM GENERATOR

- Silencer : **978 01 499**
- Non-return valve (for vacuum breaking valve) : **978 01 500**

VACUUM FILTER - Filter element : **978 01 501** (for single nozzle and two stage)

SUCTION CUPS - No spare parts. If necessary, the whole cup must be replaced (code : see correspondent pages).

COMPLEMENTARY ELEMENTS FOR PRESSURE SUPPLY

The vacuum generator is switched on and off by means of a pressure supply component, located before the generator. As opposed to the monostable solenoid valve, the bistable solenoid spool valve allows the vacuum generator to work in case of power cut. JOUCOMATIC can supply a wide choice of solenoid valves, solenoid spool valves and air treatment components (see here after).

SOLENOID VALVE (for generator single nozzle)

Solenoid valve 2/2 NC tapped G 1/8 series 106 (or 3/2 NC series 107, see P507)

Ø 1.5mm code **106 00 058**

Ø 2.5mm code **106 00 003**

Voltages : ~ 24V - 115V - 230V, 50Hz
: = 24V

Power : 4 W, with coil size 22 (2.5W on request)

Electrical connection : plug rotatable CM8 (Pg 9P)

Manual override screwdriver, hold type

Other available solenoid valves : series 106 G 1/4

series 107 (3/2) G 1/8 - G 1/4

series 115 (2/2-3/2) G 1/4

Subbases mounted valves conforming to CNOMO/AFNOR

series 189 /190 or 192



SOLENOID SPOOL VALVE

Bistable solenoid spool valve : tapped G 1/8 series 520 or G 1/4 series 521
mounted series 540 (Ø4 mm)
or series 541 ISO 1 (Ø6 mm)

Complementary information : see chapter 5



FILTER - REGULATOR

Filter or filter-regulator tapped G 1/8 to G 1/2 to supply one or more vacuum generators, available with a 5 or 25 µm filtering performance, with or without pressure gauge.

Series 342 type : MODULAIR 107, G 1/8 - G 1/4 (5 or 25µm)

MODULAIR 112, G 1/4 - G 3/8 - G 1/2 (5 or 25µm)

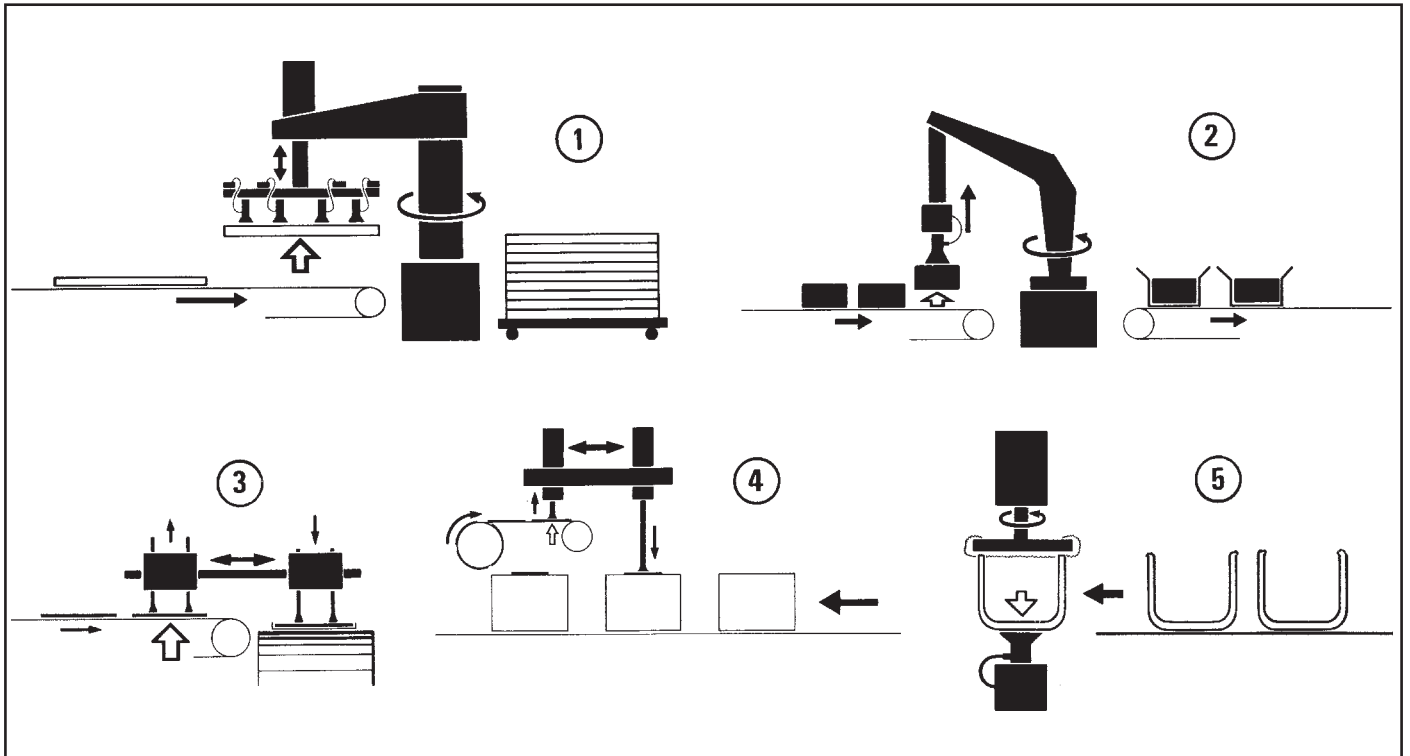
Complementary information : see P710

PRODUCT RANGE FOR VACUUM LIFTING

GENERAL

Easy to operate and simple to install, vacuum lifting equipments are widely used for workpiece handling. This technique uses the "Venturi" principle to generate vacuum from a compressed air supply. These products are of modular construction to meet the needs of vacuum supply and control, and are used to automate handling and transfer in the following industrial activities :

- Robot handling (1)
- Magazine feed for machine and press tools (5)
- Packaging machine(2)
- Automatised handling of electronical and mechanical components (3)
- Labelling machines (4)
- Paper handling, etc...



PRODUCT RANGE

The JOUCOMATIC product range includes :

- A modular vacuum generator with Venturi effect **single nozzle** (3 nozzle diameters available)
- A modular vacuum generator with Venturi effect **two-stage nozzle** (2 nozzle diameters available)
- Several adjustable accessories
- A wide range of vacuum cups : flat, bellow and oblong types
- Several vacuum switches and gauges
- Solenoid valves for system control and pressure supply
- Filtration equipment



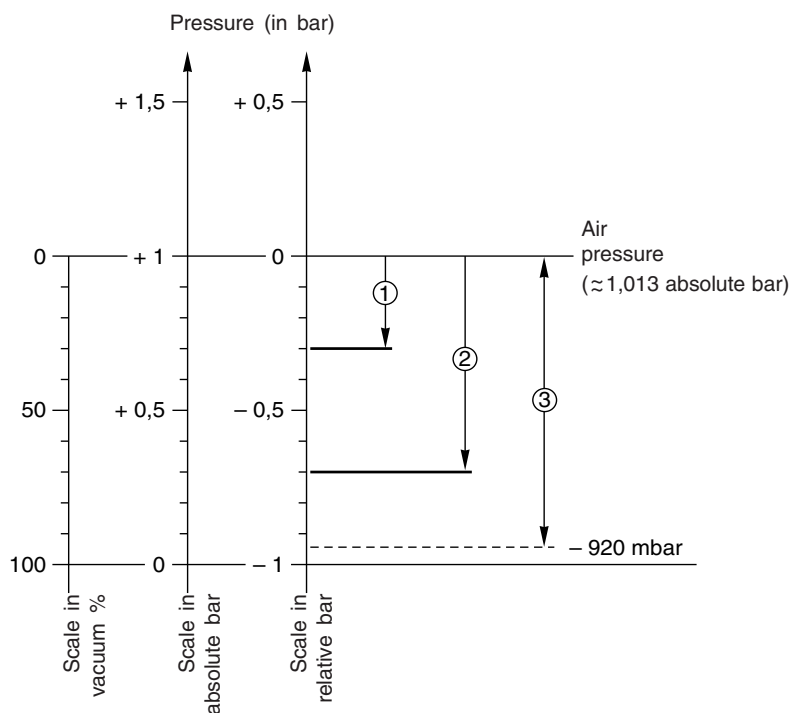
DEFINITION OF VACUUM

DEFINITION

Vacuum is generated by a gas whose molecular density is lower than the ambient density : consequently its pressure is lower than the air pressure.

For reasons of clarity, the level of vacuum must be accurately defined :

- Vacuum level in relative value (as compared to air pressure).
- Vacuum level in absolute value (as compared to the zero scale mark).



- ① Vacuum level :
 - - 300 relative mbar (or - 0,3 relative bar)
 - or
 - + 700 absolute mbar (or + 0,7 absolute bar)
- ② Vacuum level :
 - - 700 relative mbar (or - 0,7 relative bar)
 - or
 - + 300 absolute mbar (or + 0,3 absolute bar)
- ③ Pressure range of Joucomatic products designed for vacuum lifting (from 0 to - 920 relative mbar).

UNIT

Millibar (mbar) is the current unit of vacuum.

The diagram below converts other units into mbar and gives equivalent values.

Unit conversion	Vacuum (in mbar)	Absolute pressure (in mbar)	Vacuum (in %)	Vacuum (in kPa)	Vacuum (in mmHg)	Vacuum (in torr)
	0	1000	0	0	0	0
	- 100	900	10	- 10	- 75	- 75
	- 133	867	13,3	- 13,3	- 100	- 100
	- 200	800	20	- 20	- 150	- 150
1 Pa = 0,01 mbar	- 267	733	26,7	- 26,7	- 200	- 200
1 kPa = 10 mbar	- 300	700	30	- 30	- 225	- 225
1 torr = 1,333 mbar	- 400	600	40	- 40	- 300	- 300
1 mmHg = 1,333 mbar	- 500	500	50	- 50	- 375	- 375
1 mmH ₂ O = 0,098 mbar	- 533	467	53,3	- 53,3	- 400	- 400
	- 600	400	60	- 60	- 450	- 450
	- 667	333	66,7	- 66,7	- 500	- 500
	- 700	300	70	- 70	- 525	- 525
1 PSI = 69 mbar	- 800	200	80	- 80	- 600	- 600
	- 900	100	90	- 90	- 675	- 675
	- 920	80	92	- 92	- 690	- 690

TYPES OF VACUUM

- Medium vacuum : 1013 to 10 absolute mbar
- Rough vacuum : 10 to 10⁻³ absolute mbar
- Secondary vacuum : 10⁻³ to 10⁻⁶ absolute mbar
- Molecular vacuum : 10⁻⁶ to 10⁻⁹ absolute mbar
- Ultrahigh vacuum : < 10⁻⁹ absolute mbar

APPLICATIONS

The force generated by the differential pressure (Absolute air pressure* - Absolute vacuum pressure) is used for lifting or handling workpieces.

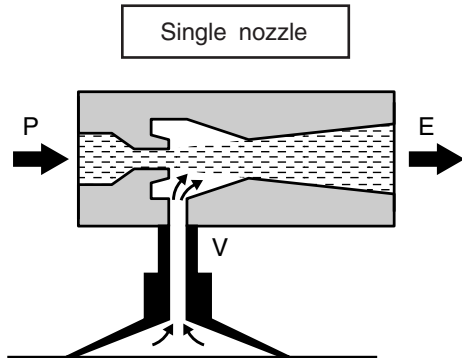
* Air pressure lowers when altitude raises (Air pressure at an altitude of 5000 metres ≈ 550 absolute mbar), take this into account when selecting pads.

VACUUM GENERATORS

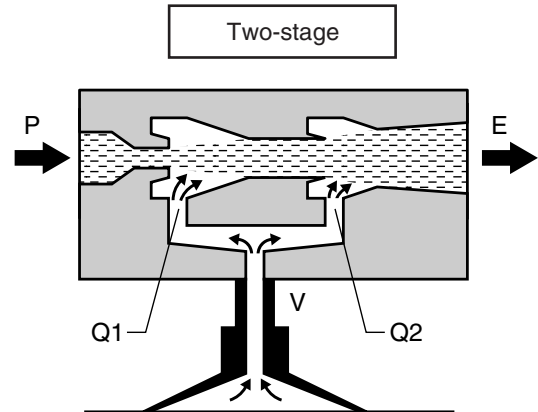
OPERATING PRINCIPLE

Vacuum is very useful in automation processes, particularly in lifting and handling workpieces. Among vacuum technics, vacuum generators with Venturi effect offer many advantages : easy to use, with no wearing parts (no mobile components) and of compact overall dimensions, they are also lightweight, thus allowing direct mounting on components of robotized systems. Wiring is reduced thus allowing better response times. The Venturi effect allows to generate a vacuum of about -920 mbar from a single pressure supply ranging from 2 to 6 bar.

This range of equipments includes 2 models : single nozzle and two-stage Venturi vacuum generators.



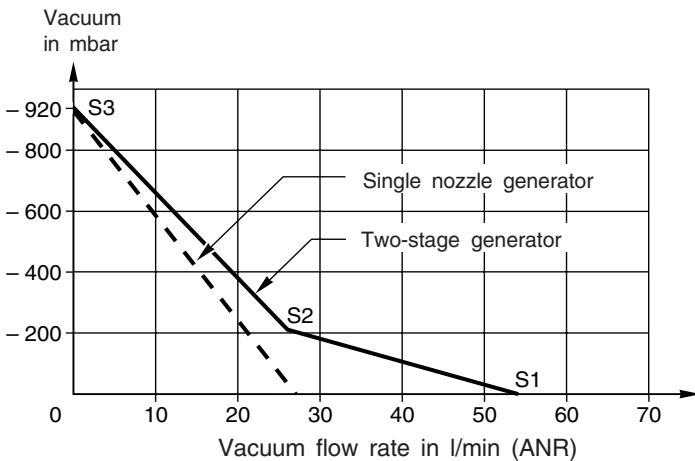
Through the Venturi nozzle, the pressurized air (P) induces a suction effect (V), thus generating vacuum in the lifting circuit (-920 mbar from 5 bar of pressure supply). Air is released through an exhaust silencer located in (E).



Similar to the single nozzle model, this generator includes 2 vacuum start systems allowing higher vacuum speed rates ($Q1 + Q2$). Thanks to this high / low speed rate characteristic, this generator allows shorter delays on starting vacuum ; it is recommended for oversized installations.

VACUUM / PRESSURE RATIO

(Comparison between single nozzle and two-stage vacuum generators).



Two-stage vacuum generator

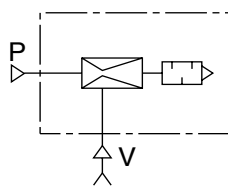
- S1 : Vacuum start
- S1 to S2 : The two-stage vacuum generator generates high speed rate vacuum
- S2 : When the vacuum level reaches about -200 mbar, the vacuum generator automatically starts vacuum quickly down to -920 mbar (S3) by plugging Q2.

NOTE : Other characteristics are presented in pages P900-6 and P900-9.

MODULAR COMPONENTS

These modular vacuum generators (I) can be easily fitted to automation systems, integrating different accessories such as : solenoid valves (II), air or solenoid-air direct breaking valves (V), adjustable pressure switches (IV), non-return valve, etc...

Standard model



Full version

