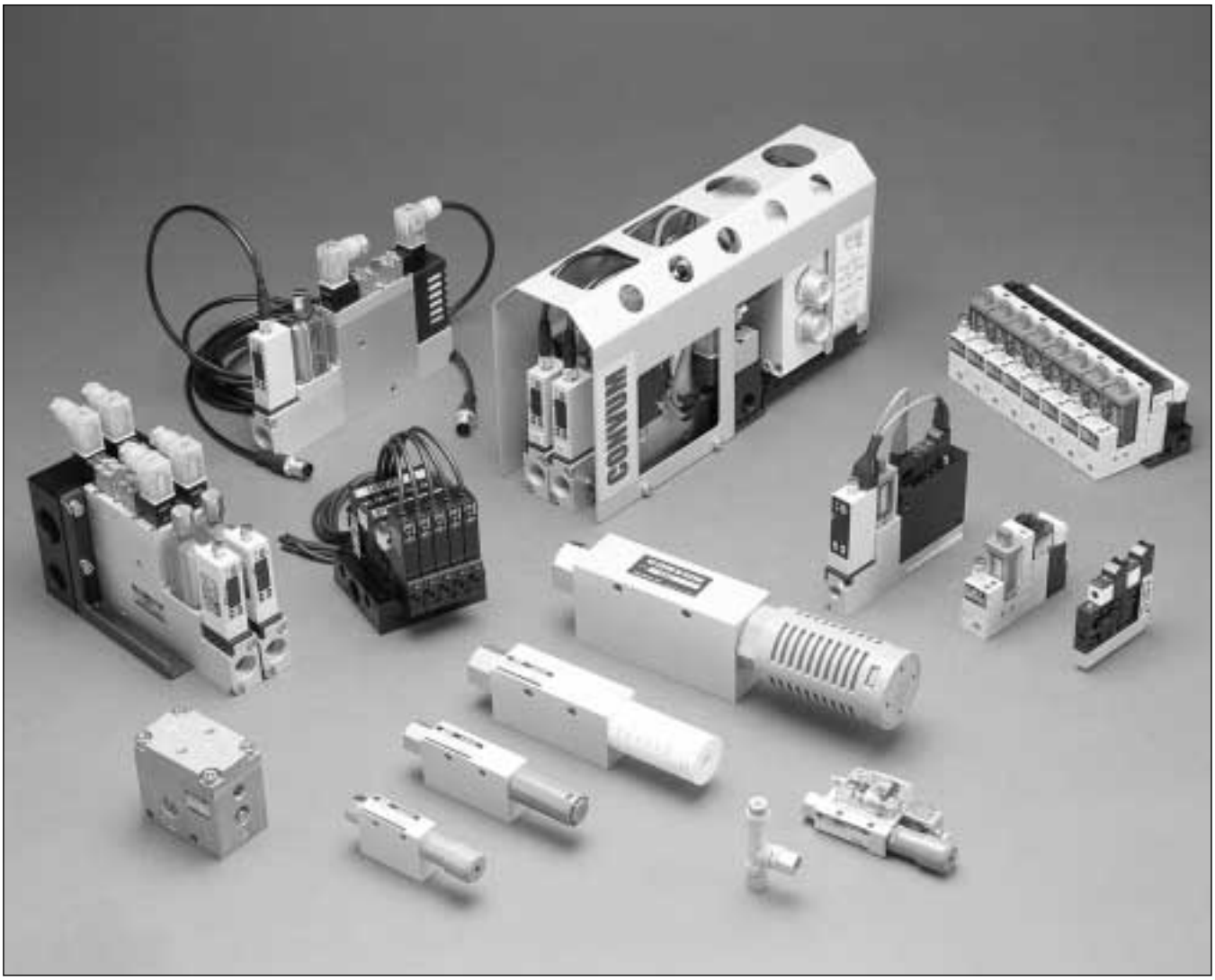
Vacuum Generators

Section B



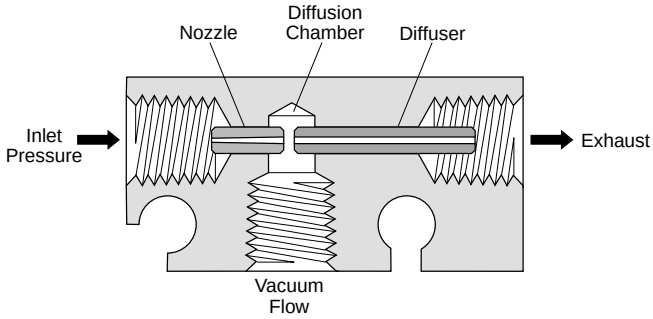
Convum

Principle of Venturi Vacuum

A vacuum generator is a single stage venturi that creates high vacuum with fast response using compressed air.

The ability to control this performance renders this technology as an excellent solution for factory automation.

In principle, compressed air is throttled as the air exits the nozzle and is discharged into the diffuser. This increased velocity of air lowers the pressure in the diffusion chamber. The volume of air within the closed vacuum system flows into the low pressure area of the diffusion chamber and is exhausted thru the diffuser. This effect increases the vacuum level and evacuates most of the air within the closed vacuum system at supersonic speeds.



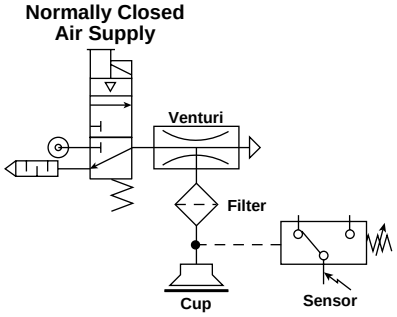
Additional Advantages to Venturi Generators

- No Moving Components
- Low Maintenance
- Long Life
- Responsive
- Physically Small
- Cost Effective

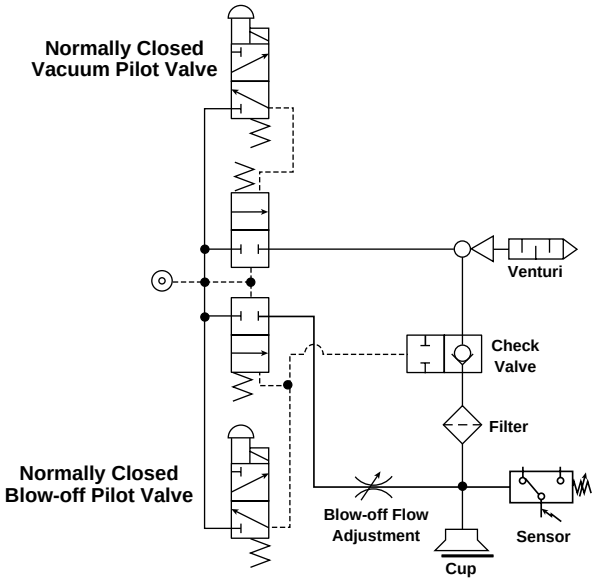
Applying the Venturi Generator

There are two basic approaches when designing a vacuum system with venturi generators.

1. Design a system with basic venturi generators and individual components to support the vacuum circuit.



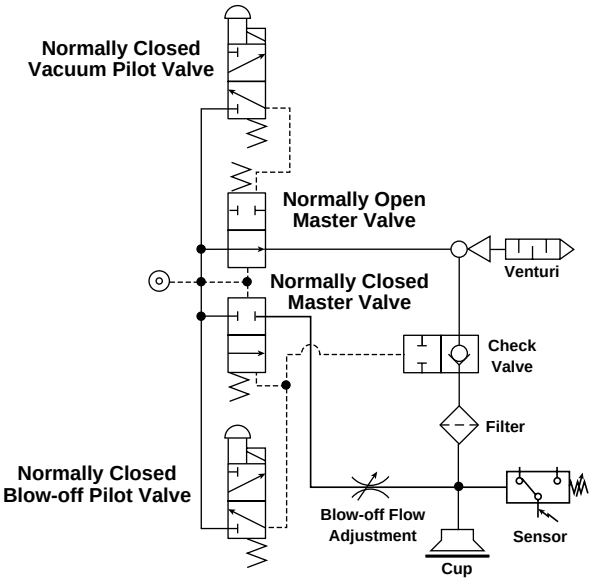
2. Design a system with all of the supporting components integrated into the venturi generator.



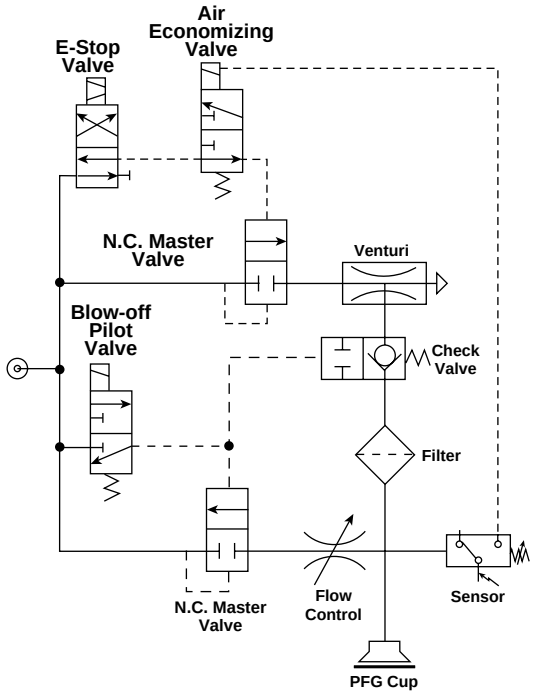
There are several advantages to an integrated venturi system. The response time of the vacuum and blow-off functions are greatly reduced compared to basic venturi generators, the installation time is also reduced which makes this a cost effective system and the compact size allows the integrated unit to be close to the suction cup.

Venturi Generator with Safety Circuits

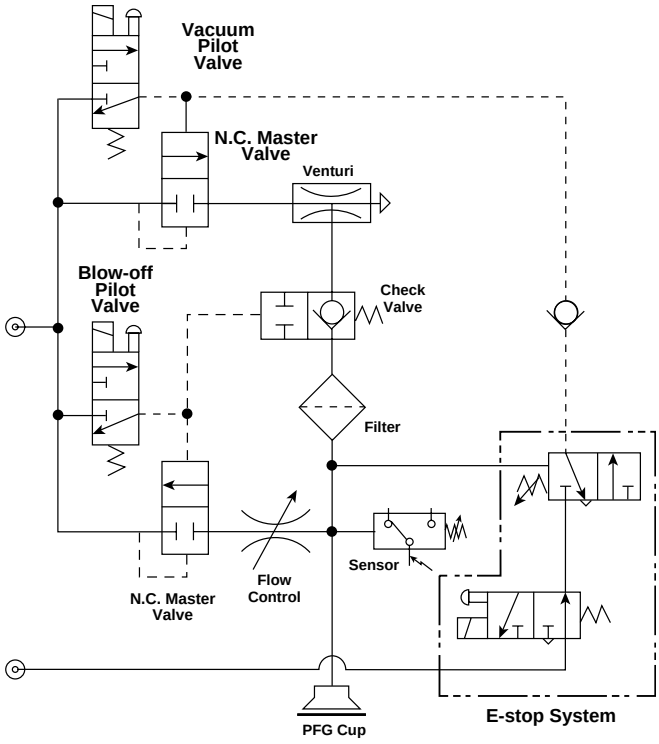
When designing a vacuum system that requires a Normally Open circuit or E-Stop circuits to avoid any hazard during a power failure, consider the circuits below and on the following page.



Valve Controlled E-Stop Circuit

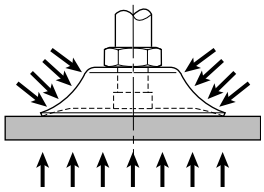


Vacuum Controlled E-Stop Circuit



The Venturi with a Closed System

First, let us understand how a venturi performs with a closed system. A closed vacuum system has a volume of air within all the components between the vacuum port of the venturi and the suction cup. The venturi's ability to evacuate this volume of air when the suction cup forms a seal on the surface, creates the pressure differential required to force the suction cup onto the product.



The evacuated air creates a lower air pressure within the closed vacuum system, causing the atmospheric pressure to apply a uniform force on the surface of the cup. This holding force is proportional to the difference in pressures and area of the suction cup.

Selecting the Appropriate Supply Valve

If a basic venturi generator is selected, correct sizing of the air supply valve and supply line are critical to the performance of the unit.

Nozzle Diameter	Minimum Tube I.D. [mm]	Flow [Cv]
0,5 mm	4	0,16
1,0 mm	4	0,16
1,5 mm	6	0,379
2,0 mm	8	0,65
2,5 mm	8	0,95
3,0 mm	10	1,35

If pressure drops occur due to other pneumatic components or a manifold venturi system, it may be necessary to increase the valve and / or supply line tubing I.D.

Selecting the Nozzle Diameter with Reference to Suction Cup Diameter

As a general guide, for most non-porous vacuum applications, the nozzle diameter can be selected based on the suction cup diameter previously determined in Section A.

Nozzle Diameter	Maximum Suction Cup Diameter [mm]
0,5 mm	20
1,0 mm	50
1,5 mm	60
2,0 mm	120
2,5 mm	150
3,0 mm	200

Designing a system with a single suction cup dedicated to a single vacuum generator is ideal, however, it may not always be practical. It is recommended that the sum of the areas of multiple cups dedicated to a single venturi do not exceed the area of the diameter of the single suction cups shown above.

Calculating the Response Time of Vacuum Generators

With minimal leakage in a closed system, most vacuum sources can achieve adequate vacuum levels to sufficiently transfer product. The response time is the time required to evacuate the air out of a closed vacuum system. This is important to the operation of the system, which will vary by the generator nozzle diameter and the total volume of air to be evacuated from the system. The response time (RT) calculation below is derived from actual test data relative to the rated vacuum flow rates of the Convum generators. Therefore, calculations must be in metric units of measure. Charts with metric conversions are provided on page 7.

$$RT = (V_D / C)^{1/a}$$

RT(sec) = time for attaining vacuum (vacuum response time)

C = constant relative to vacuum degree

a = index relative to different types of the CONVUM

V_D = Volume of air to be displaced in liters

$V_D = 0{,}780 \times ID^2\ (mm) \times L(m) / 1000 + P_V\ (n)$

P_V = Pad volume in liters n = Number of pads

Nozzle Ø	Vac, Flow [l / min]	C		a
		55% Vacuum	90% Vacuum	
05HS	6		0,03	1,02
05LS	9	0,11		1,06
07HS	11		0,06	1,02
07LS	19	0,31		1,02
09HS	15		0,07	1,09
09LS	21	0,37		1,09
10HS	27		0,12	1,09
10LS	36	0,25		1,09
15HS	63		0,25	1,00
15LS	95	0,74		1,09
20HS	110		0,62	1,09
20LS	165	1,00		1,09
25HS	160		0,69	1,00
25LS	250	3,27		1,00
30AHS	225		0,97	1,00
30ALS	350	4,88		1,00

EXAMPLE: Calculate the response time of a Convum generator with a specific nozzle diameter and specific volume of air (V_D) to be displaced from the vacuum system.

25HS Nozzle Diameter = 2,5 mm, Vacuum Flow 160 l/min, 90% Vacuum

Tube ID = 10 mm, Tube Length = 3 m, Pad = PBG-150 mm = 0,26 L

"C" value of 25HS = 0,69 (Constant derived from tests)

"a" value of 25HS = 1 (Constant derived from tests)

$P_V = 0{,}26$ l n = 1

$V_D = 0{,}780 \times (10\ mm)^2 \times (3\ meters / 1000) + 0{,}26\ (1) = 0{,}494$ l

$RT = (0{,}494/0{,}69)^{(1/1)} = 0{,}71$ sec.

Therefore, it would require 0,71 seconds to evacuate 0,26 liters of air to a vacuum level of 0,92 bar.

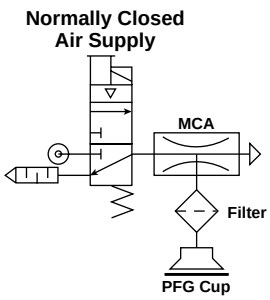
MCA

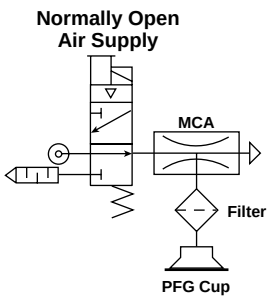
Features

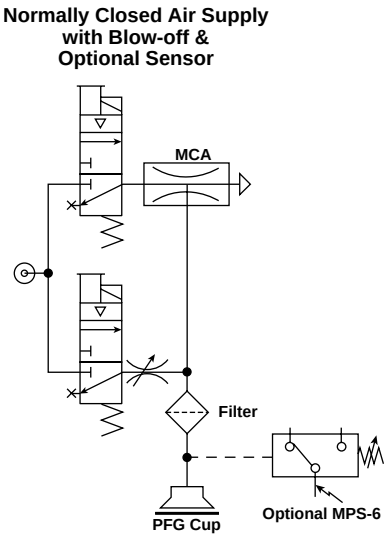
- **Very Compact and Lightweight**
- **One-Touch Fittings for Threaded Connection**
- **Mount Directly to Level Compensators**
- **Short Response Time When Locating Near Cups**
- **Vacuum Flow Rates from 6 to 36 l/min**

Characteristics

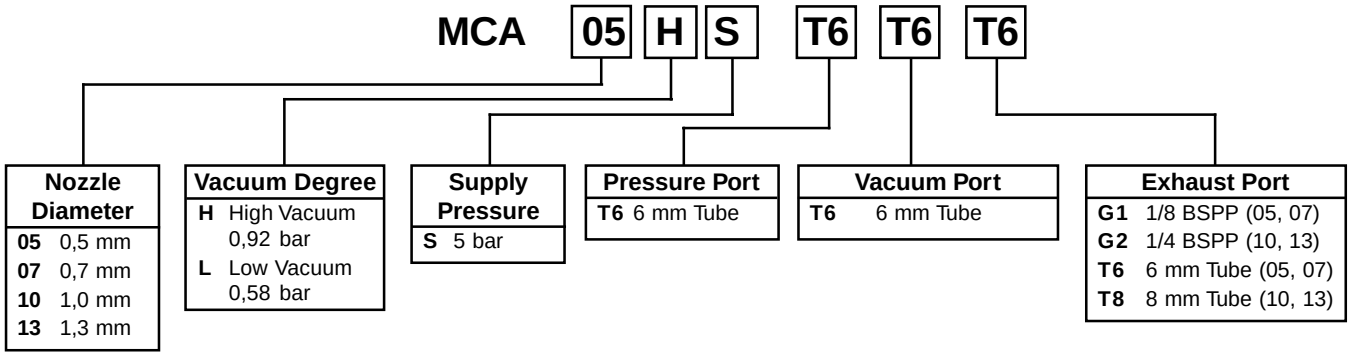
The MCA is the size of a normal push-lock tube fitting. It can be located in very restrictive areas close to the pick-and-place application to reduce the response time. The durable resin body makes the unit lightweight and friendly to end-of-arm tooling. The connections are easily interchangeable to accommodate tube fittings or female threads.







Model Number Index



B

Specifications

Media	Non-Lubricated Air, Non-Corrosive Gases
Operating Pressure	1 to 8 bar
Operating Temperature	0 to 50 °C
Material	Polycarbonate, Aluminium Fittings

Performance

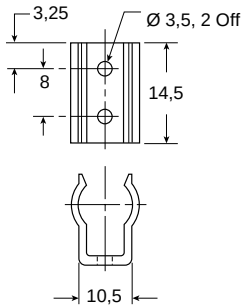
Item	Nozzle Diameter [mm]	Vacuum Degree at 5 bar [%]	Vacuum Flow [l/min]	Air Consumption [l/min]	Weight [g]
MCA05HS* MCA05LS*	0,5	88 55	5,5 11	13	17
MCA07HS* MCA07LS*	0,7	88 55	12 20	23	23
MCA10HS* MCA10LS*	1,0	88 55	24 38	47	23
MCA13HS*	1,3	88	36	79	23

Evacuation Time

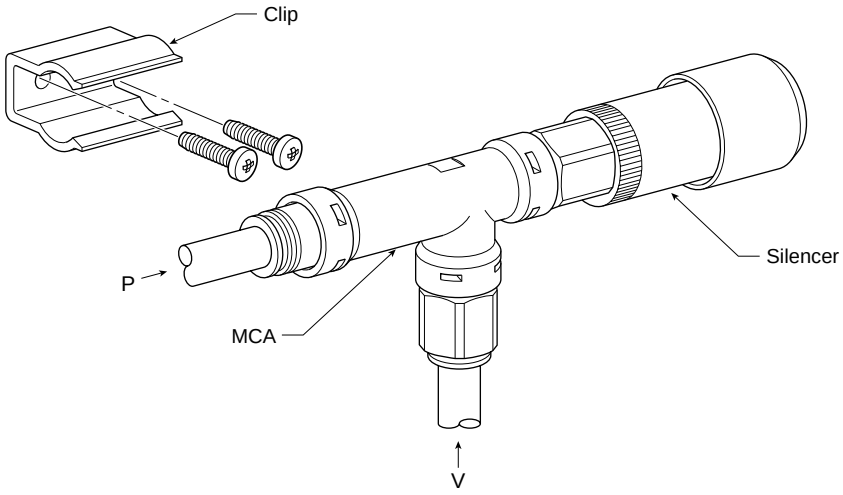
Series / Nozzle Diameter	Air Supply Pressure	Air Consumption	Evacuation Time in sec / liter to reach different Vacuum Levels [%]								
	[bar]	[l/min]	10	20	30	40	50	60	70	80	90
MCA-05HS	5	13	0,74	1,71	2,90	4,44	6,44	8,84	12,50	17,50	—
MCA-05LS	5	13	0,43	0,95	1,61	2,55	4,12	6,81	—	—	—
MCA-07HS	5	23	0,34	0,75	1,25	1,98	3,10	4,62	6,45	9,29	—
MCA-07LS	5	23	0,20	0,44	0,76	1,25	2,63	—	—	—	—
MCA-10HS	5	47	0,18	0,39	0,65	1,00	1,45	2,06	2,94	4,36	—
MCA-10LS	5	47	0,11	0,22	0,38	0,67	1,21	2,87	—	—	—
MCA-13HS	5	79	0,13	0,26	0,44	0,69	1,01	1,41	2,07	3,69	—

Replacement Components

Item	Model Number	Generator
Silencer	MSS-01	MCA05HS/LS MCA07HS/LS
Silencer	MSM-01	MCA10HS/LS MCA13HS
Bracket	MCA-B	MCA05, 07, 10, 13



MCA-B



Installation

Install clip and secure MCA unit. Silencers are not included with the MCA generator series. Silencers or exhaust mufflers must be ordered separately and properly installed to manage the exhaust created by the venturi. If a tube connector is selected for the exhaust port option, plumb the exhaust to an appropriate collector.

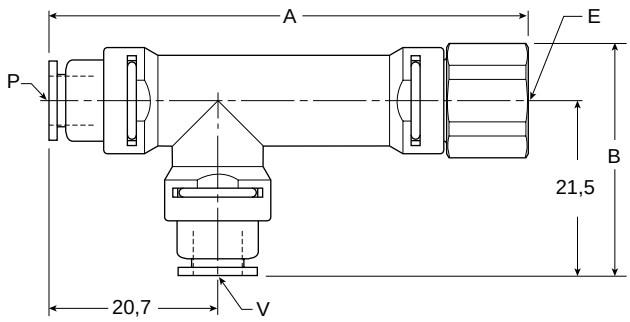
Cautions

Do not operate MCA generators outside the temperature range and pressures listed in the specifications section of this catalog.

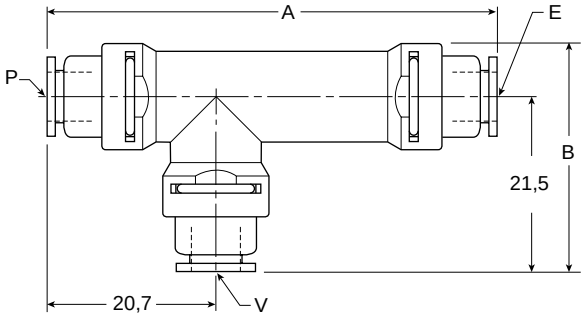
All normally closed valve supply circuits will interrupt the air supply to the venturi during a power failure or E-Stop condition. As a result, the product being transferred may be dropped, possibly creating a hazard to the surrounding environment. To avoid hazardous situations during a power loss or E-Stop condition, consider a normally open valve supply circuit or an E-Stop system.

It is always recommended to dedicate one suction cup to a single MCA generator for the best response and maximize the vacuum level per individual cup. If more than one cup is used per generator, the vacuum level of the pick-and-place system may drop to an unsafe level if one of the pads separates from the product.

Dimensions



MCA**T6T6G1/G2**



MCA**T6T6T6/T8**

Item	A	B	P (Pressure Port)	V (Vacuum Port)	E (Exhaust Port)
MCA05HS/LST6T6T6	55,2	28	One-touch Ø 6mm	One-touch Ø 6mm	One-touch Ø 6mm
MCA05HS/LST6T6G1	55,2	28	One-touch Ø 6mm	One-touch Ø 6mm	1/8" BSPP Female
MCA07HS/LST6T6T6	55,2	28	One-touch Ø 6mm	One-touch Ø 6mm	One-touch Ø 6mm
MCA07HS/LST6T6G1	55,2	28	One-touch Ø 6mm	One-touch Ø 6mm	1/8" BSPP Female
MCA10HS/LST6T6T8	70	29,5	One-touch Ø 6mm	One-touch Ø 6mm	One-touch Ø 8mm
MCA10HS/LST6T6G2	70	29,5	One-touch Ø 6mm	One-touch Ø 6mm	1/4" BSPP Female
MCA13HST6T6T8	70	29,5	One-touch Ø 6mm	One-touch Ø 6mm	One-touch Ø 8mm
MCA13HST6T6G2	70	29,5	One-touch Ø 6mm	One-touch Ø 6mm	1/4" BSPP Female

Millimeter

CV

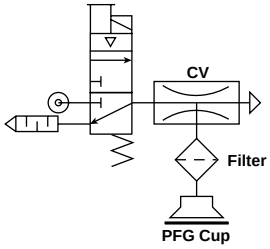
Features

- **Durable and Long Life**
- **Anodized Aluminium Body**
- **Vacuum Levels - 0,58 or - 0,92 bar**
- **Vacuum Flow Rates from 6 to 350 l/min**
- **303 SS and PTFE Materials Available**

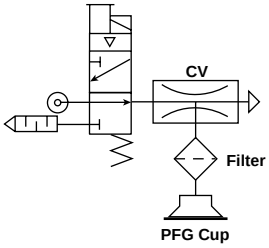
Characteristics

The CV is CONVUM's original and most popular venturi. The basic CV unit is applicable to almost any application. The Aluminium / brass nozzle construction is durable and virtually maintenance free over the long life of the unit.

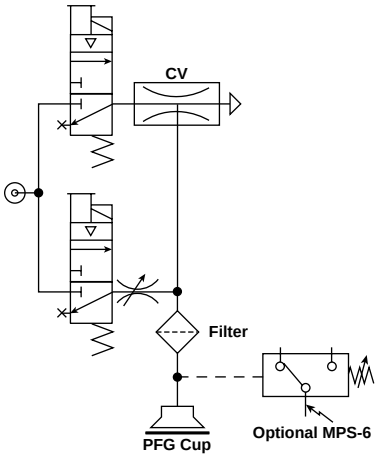
Normally Closed Air Supply



Normally Open Air Supply



Normally Closed Air Supply with Blow-off & Optional Sensor



Model Number Index

CV **05** **H** **S** **—** **—** **G**

Nozzle Diameter	
05	0,5 mm
10	1,0 mm
15	1,5 mm
20	2,0 mm
25	2,5 mm
30A	3,0 mm

Vacuum Degree	
H	High Vacuum 90%
L	Low Vacuum 57%

Supply Pressure	
S	5 bar

Body Material	
Blank	Aluminium
S3	303SS
T	PTFE

Nozzle Material	
Blank	Nickle Plated Brass
S3	303SS
T	PTFE

B

Specifications

Media	Non-Lubricated Air, Non-Corrosive Gases
Operating Pressure	1 to 8 bar
Operating Temperature	0 to 50 °C
Material	**Body:** Aluminium, 303 Stainless, or PFTE **Nozzle:** Nickel plated brass, 303 Stainless, PFTE

Performance

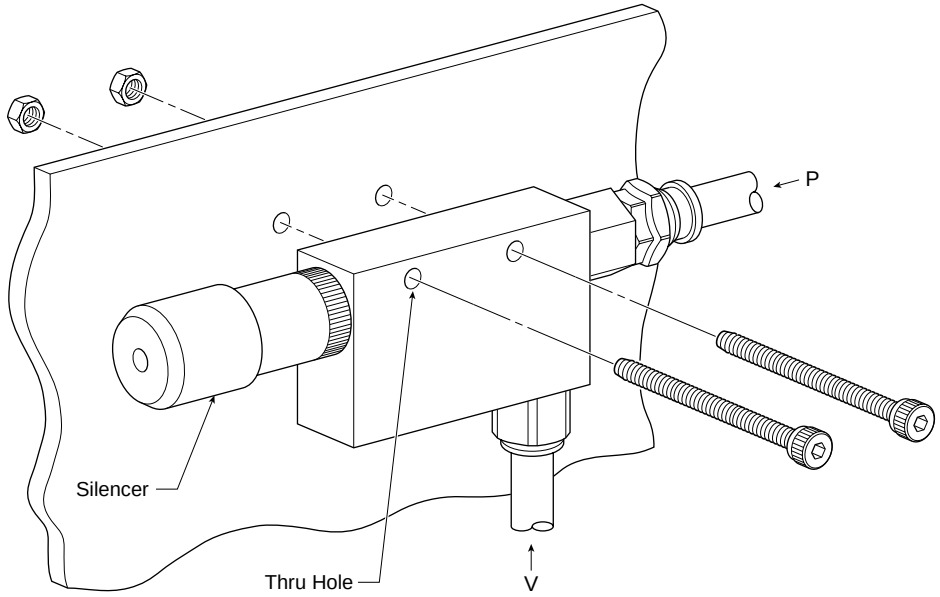
Item	Nozzle Diameter [mm]	Vacuum Degree at 5 bar [%]	Vacuum Flow [l/min]	Air Consumption [l/min]	Weight [g]
CV05HSG CV05LSG	0,5	86 57	6 9	13	80
CV10HSG CV10LSG	1,0	92 57	27 36	44	80
CV15HSG CV15LSG	1,5	92 57	63 95	100	140
CV20HSG CV20LSG	2,0	92 57	110 165	180	350
CV25HSG CV25LSG	2,5	92 57	160 250	265	728
CV30AHSG CV30ALSG	3,0	92 57	225 350	385	847

Evacuation Time

Series / Nozzle Diameter	Air Supply Pressure	Air Consumption	Evacuation Time in sec / liter to reach different Vacuum Levels [%]								
	[bar]	[l/min]	10	20	30	40	50	60	70	80	90
CV-05HS	5	13	0,86	2,03	3,59	5,68	8,18	10,80	15,33	21,16	—
CV-05LS	5	13	0,39	0,83	1,41	2,28	3,90	—	—	—	—
CV-10HS	5	44	0,17	0,35	0,58	0,88	1,27	1,82	2,74	4,16	8,00
CV-10LS	5	44	0,13	0,27	0,46	0,72	1,17	—	—	—	—
CV-15HS	5	100	0,09	0,17	0,26	0,39	0,55	0,78	1,13	1,65	3,97
CV-15LS	5	100	0,07	0,11	0,18	0,27	0,43	—	—	—	—
CV-20HS	5	180	0,06	0,10	0,16	0,23	0,32	0,46	0,67	0,97	2,15
CV-20LS	5	180	0,05	0,09	0,13	0,21	0,40	—	—	—	—
CV-25HS	5	265	0,05	0,08	0,12	0,16	0,23	0,32	0,46	0,67	1,25
CV-25LS	5	265	0,04	0,07	0,09	0,13	0,20	—	—	—	—
CV-30AHS	5	385	0,04	0,07	0,10	0,13	0,17	0,24	0,34	0,59	1,03
CV-30ALS	5	385	0,04	0,06	0,09	0,12	0,18	—	—	—	—

Replacement Components

Item	Model Number	Generator
Silencer	MSS-01	CV05HS/LSG CV10HS/LSG
Silencer	MSM-01	CV15HS/LSG
Silencer	MSL-02	CV20HS/LSG
Silencer	MS6-01	CV25HS/LSG CV30AHS/LSG



Installation

Secure CV unit. Silencers are included with the CV generator series. If a tube connector is selected by the user for the exhaust port as opposed to the silencer, plumb the exhaust to an appropriate collector.

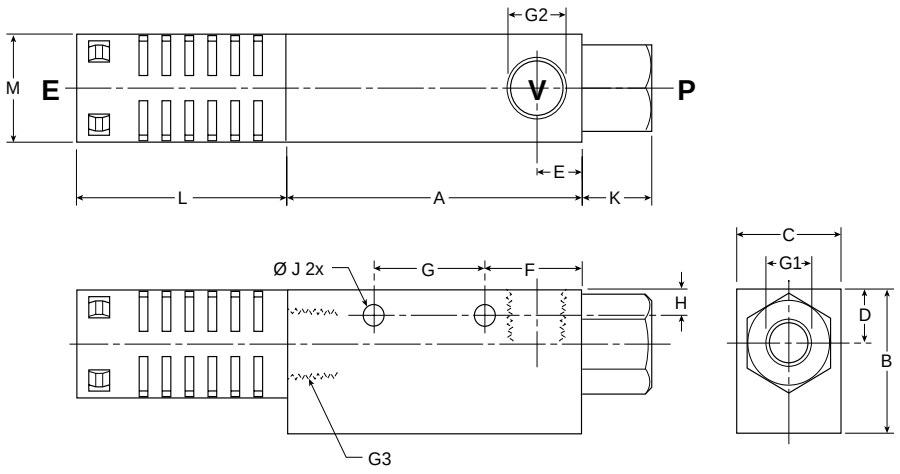
Cautions

Do not operate CV generators outside the temperature range and pressures listed in the specifications section of this catalog.

All normally closed valve supply circuits will interrupt the air supply to the venturi during a power failure or E-Stop condition. As a result, the product being transferred may be dropped, possibly creating a hazard to the surrounding environment. To avoid hazardous situations during a power loss or E-Stop condition, consider a normally open valve supply circuit or an E-Stop system.

It is always recommended to dedicate one suction cup to a single CV generator for the best response and maximize the vacuum level per individual cup. If more than one cup is used per generator, the vacuum level of the pick-and-place system may drop to an unsafe level if one of the pads separates from the product.

Dimensions



Note: Stainless Steel and PTFE CV units do not include silencer.

Item	A	B	C	D	E	F	G	H	J	K	L	M	G1	G2	G3
CV05HS/LSG	45	33	16	10	8	14	20	4,5	4,2	10	36	18,5	1/8 BSPP	1/8 BSPP	1/8 BSPP
CV10HS/LSG	45	33	16	10	8	14	20	4,5	4,2	10	36	18,5	1/8 BSPP	1/8 BSPP	1/8 BSPP
CV15HS/LSG	63	35	20	11	10	20	25	5	4,5	15	45,5	20	14 BSPP	1/4 BSPP	1/4 BSPP
CV20HS/LSG	85	40	30	15	13	28	32	7	6	20	60,5	30	1/4 BSPP	3/8 BSPP	1/2 BSPP
CV25HS/LSG	100	60	40	20	16	20	50	5,5	6	17	96	40	3/8 BSPP	1/2 BSPP	3/4 BSPP
CV30AHS/ALSG	118	60	40	20	20	33	50	5,5	6	20	96	40	1/2 BSPP	3/4 BSPP	3/4 BSPP

Millimeter

CV-CK

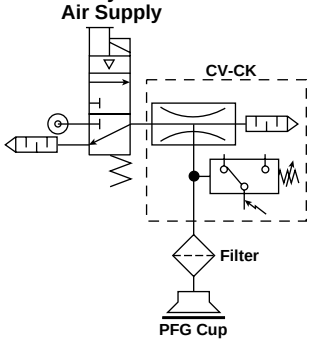
Features

- **Adjustable Switch Between - 0,20 and - 0,53 bar**
- **Standard Anodized Aluminium Body**
- **Vacuum Levels - 0,58 or - 0,92 bar**
- **Vacuum Flow Rates from 6 to 165 l/min**

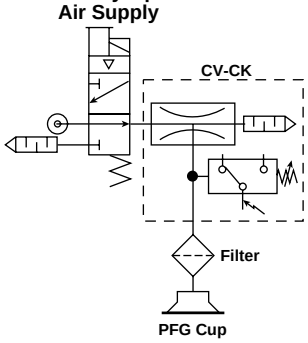
Characteristics

The CV-CK Series venturi is supplied with an adjustable open contact switch for vacuum confirmation. The switch point ranges between 0,20 and 0,53 bar with a hysteresis of 0,03 to 0,13 bar. The mechanical switch option is a cost effective method to confirm part presence.

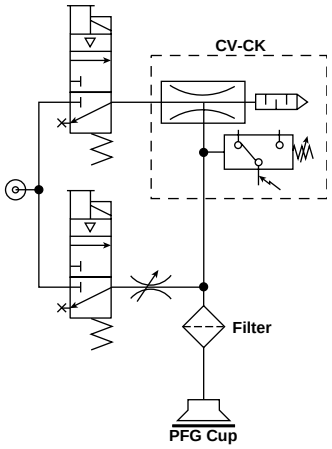
Normally Closed Air Supply



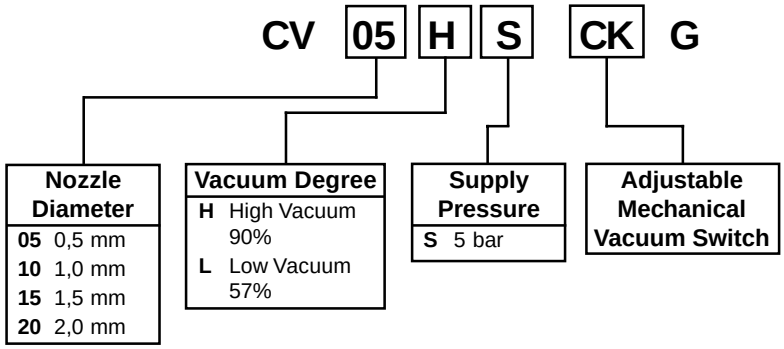
Normally Open Air Supply



Normally Closed Air Supply with Blow-off & Sensor



Model Number Index



Includes exhaust port silencer.

B

Specifications

Media	Non-Lubricated Compressed Air, Non-Corrosive Gases
Operating Pressure	1 to 8 bar
Operating Temperature	0 to 60 °C
Material	**Body:** Aluminium **Nozzle:** Nickel Plated Brass
Setting Range	0,20 to 0,53 bar
Accuracy	± 0,05 bar
Hysteresis	0,04 to 0,13 bar
Air Circuit	Normally Open
Switch Output	AC125V: 5A, AC250V: 3A, DC250V: 0.2A

Performance

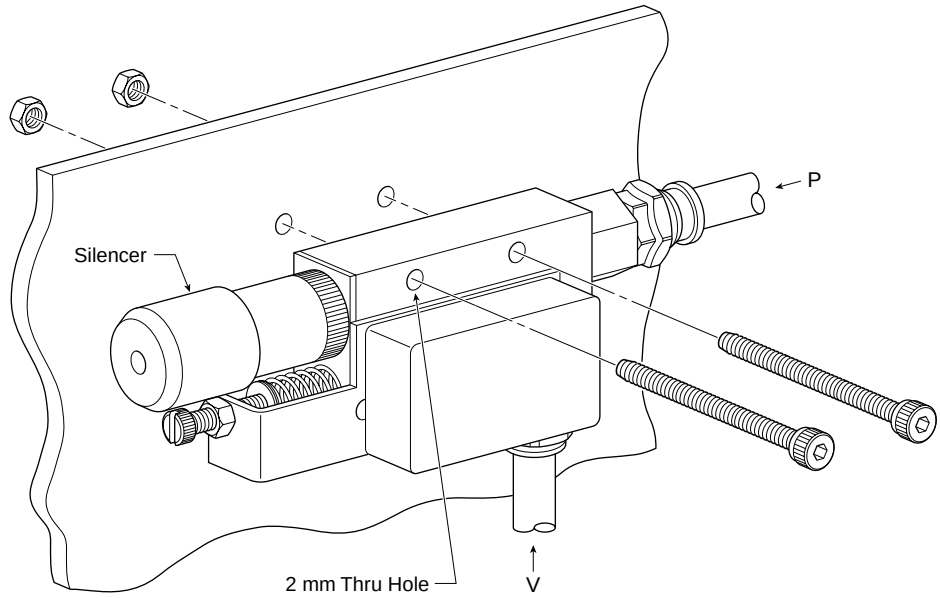
Item	Nozzle Diameter [mm]	Vacuum Degree at 5 bar [%]	Vacuum Flow [l/min]	Air Consumption [l/min]	Weight [g]
CV05HSCKG CV05LSCKG	0,5	86 57	6 9,	13	119
CV10HSCKG CV10LSCKG	1,0	92 57	27 36	44	119
CV15HSCKG CV15LSCKG	1,5	92 57	63 95	100	190
CV20HSCKG CV20LSCKG	2,0	92 57	110 165	180	458

Evacuation Time

Series / Nozzle Diameter	Air Supply Pressure	Air Consumption	Evacuation Time in sec / liter to reach different Vacuum Levels [%]								
	[bar]	[l/min]	10	20	30	40	50	60	70	80	90
CV-05HS	5	13	0,86	2,03	3,59	5,68	8,18	10,80	15,33	21,16	—
CV-05LS	5	13	0,39	0,83	1,41	2,28	3,90	—	—	—	—
CV-10HS	5	44	0,17	0,35	0,58	0,88	1,27	1,82	2,74	4,16	8,00
CV-10LS	5	44	0,13	0,27	0,46	0,72	1,17	—	—	—	—
CV-15HS	5	100	0,09	0,17	0,26	0,39	0,55	0,78	1,13	1,65	3,97
CV-15LS	5	100	0,07	0,11	0,18	0,27	0,43	—	—	—	—
CV-20HS	5	180	0,06	0,10	0,16	0,23	0,32	0,46	0,67	0,97	2,15
CV-20LS	5	180	0,05	0,09	0,13	0,21	0,40	—	—	—	—

Replacement Components

Item	Model Number	Generator
Silencer	MSS-01	CV05HS/LSCKG CV10HS/LSCKG
Silencer	MSM-01	CV15HS/LSCKG
Silencer	MSL-02	CV20HS/LSCKG
Mechanical Switch	CV-CK-SWITCH	CV05 thru 20



Installation

Install clip and secure CV-CK unit. Silencers are included with the CV-CK generator series. If a tube connector is selected for the exhaust port option, plumb the exhaust to an appropriate collector.

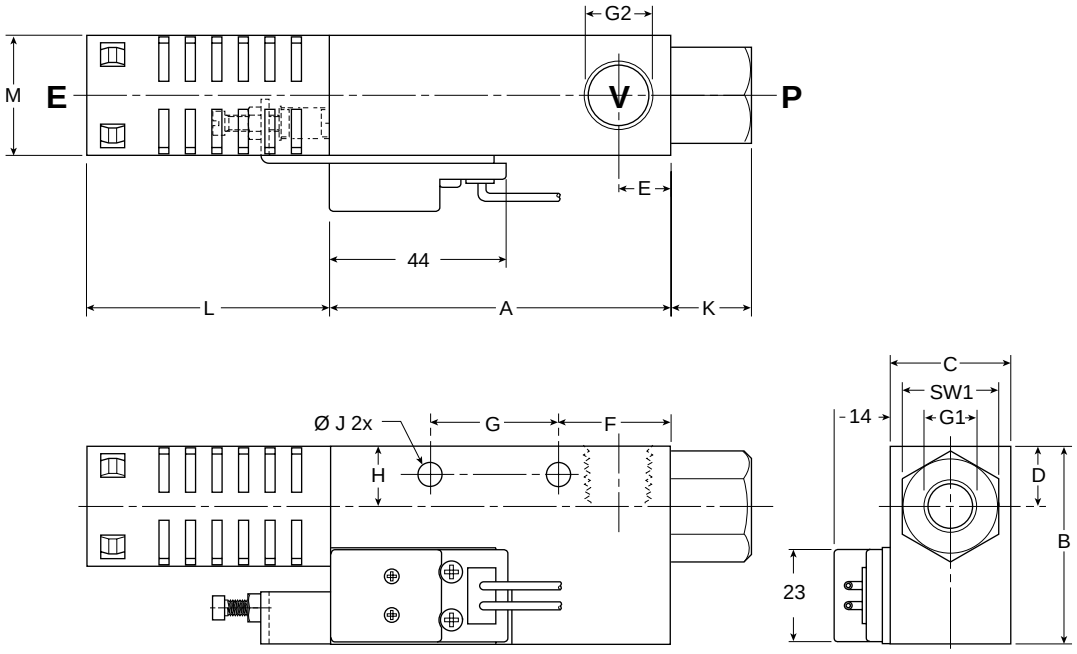
Cautions

Do not operate CV-CK generators outside the temperature range and pressures listed in the specifications section of this catalog.

All normally closed valve supply circuits will interrupt the air supply to the venturi during a power failure or E-Stop condition. As a result, the product being transferred may be dropped, possibly creating a hazard to the surrounding environment. To avoid hazardous situations during a power loss or E-Stop condition, consider a normally open valve supply circuit or an E-Stop system.

It is always recommended to dedicate one suction cup to a single CV-CK generator for the best response and maximize the vacuum level per individual cup. If more than one cup is used per generator, the vacuum level of the pick-and-place system may drop to an unsafe level if one of the pads separates from the product.

Dimensions



Item	A	B	C	D	E	F	G	H	J	K	L	M	G1	G2	SW1
CV05HS/LSCKG	45	33	16	10	8	14	20	4,5	4,2	10	36	18,5	BSPP 1/8	BSPP 1/8	14
CV10HS/LSCKG	45	33	16	10	8	14	20	4,5	4,2	10	36	18,5	BSPP 1/8	BSPP 1/8	14
CV15HS/LSCKG	63	35	20	11	10	20	25	5	4,5	15	45,5	20	BSPP 1/4	BSPP 1/4	17
CV20HS/LSCKG	85	40	30	15	13	28	32	7	6	20	60,5	30	BSPP 1/4	BSPP 3/8	24

Millimeter

CV-VR

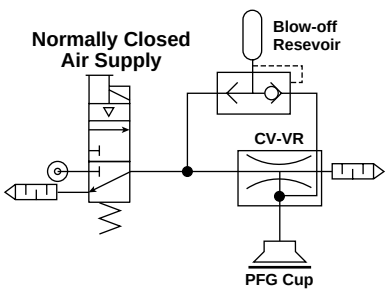
Features

- **Auto Blow-off After Vacuum Cycle**
- **Rugged Aluminium Die Cast Construction**
- **Porting for Vacuum Sensor**
- **Porting for Additional Blow-off Flow Rate**
- **All Mechanical and Pneumatic**
- **Vacuum Flow Rate 60 l/min**

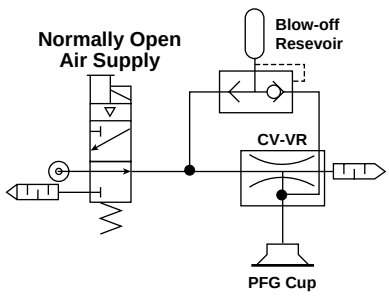
Characteristics

The CV-VR series venturi is perfect for applications that may require automatic blow-off capabilities for a totally pneumatic circuit; such as end of arm tooling or packaging applications. The CV-VR has a built-in reservoir that accumulates the blow-off release during the vacuum cycle. The blow-off release is immediate and automatic when the vacuum operation is discontinued.

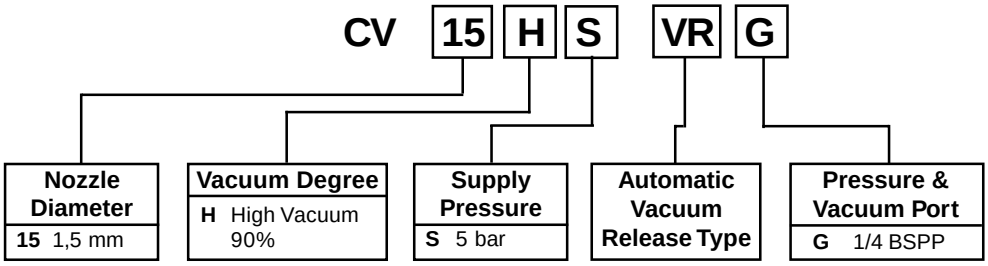
Energize the Normally Closed valve to initiate vacuum. When De-energized, accumulated blow-off pressure automatically releases the product.



Energize the Normally Open valve to Deactivate vacuum. When Energized, accumulated blow-off pressure automatically releases the product.



Model Number Index



B

Specifications

Media	Non-Lubricated Compressed Air, Non-Corrosive Gases
Operating Pressure	1 to 8 bar
Operating Temperature	0 to 50 °C
Material	**Body:** Die-Cast Aluminium **Packing:** NBR

Performance

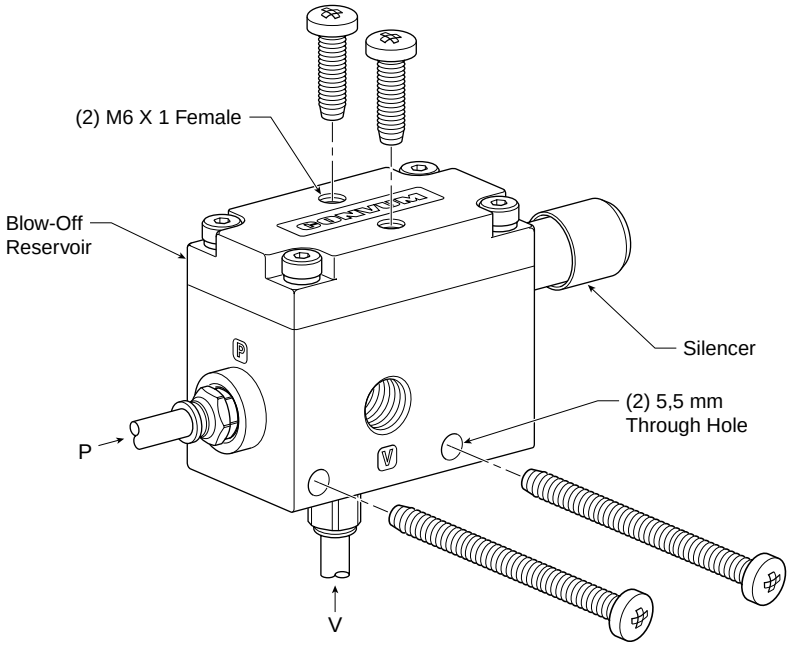
Item	Nozzle Diameter [mm]	Blow-off Time (s) 30cc Max.	Vacuum Degree at 5 bar	Vacuum Flow [l/min]	Air Consumption [l/min]	Weight [g]
CV15HSVRG	1,5	0,20	0,92	63	100	253

Evacuation Time

Series / Nozzle Diameter	Air Supply Pressure	Air Consumption	Evacuation Time in sec / liter to reach different Vacuum Levels [%]								
	[bar]	[l/min]	10	20	30	40	50	60	70	80	90
CV-15HS	5	100	0,09	0,17	0,26	0,39	0,55	0,78	1,13	1,65	3,97

Accessories

Item	Model Number	Generator
Silencer	MSM-01	CV15HSVRG



Installation

Secure the CV-VR unit. Silencers are not included with the CV-VR generator series. Silencers or exhaust mufflers must be ordered separately and properly installed to manage the exhaust created by the venturi. If a tube connector is selected for the exhaust port option, plumb the exhaust to an appropriate collector.

Cautions

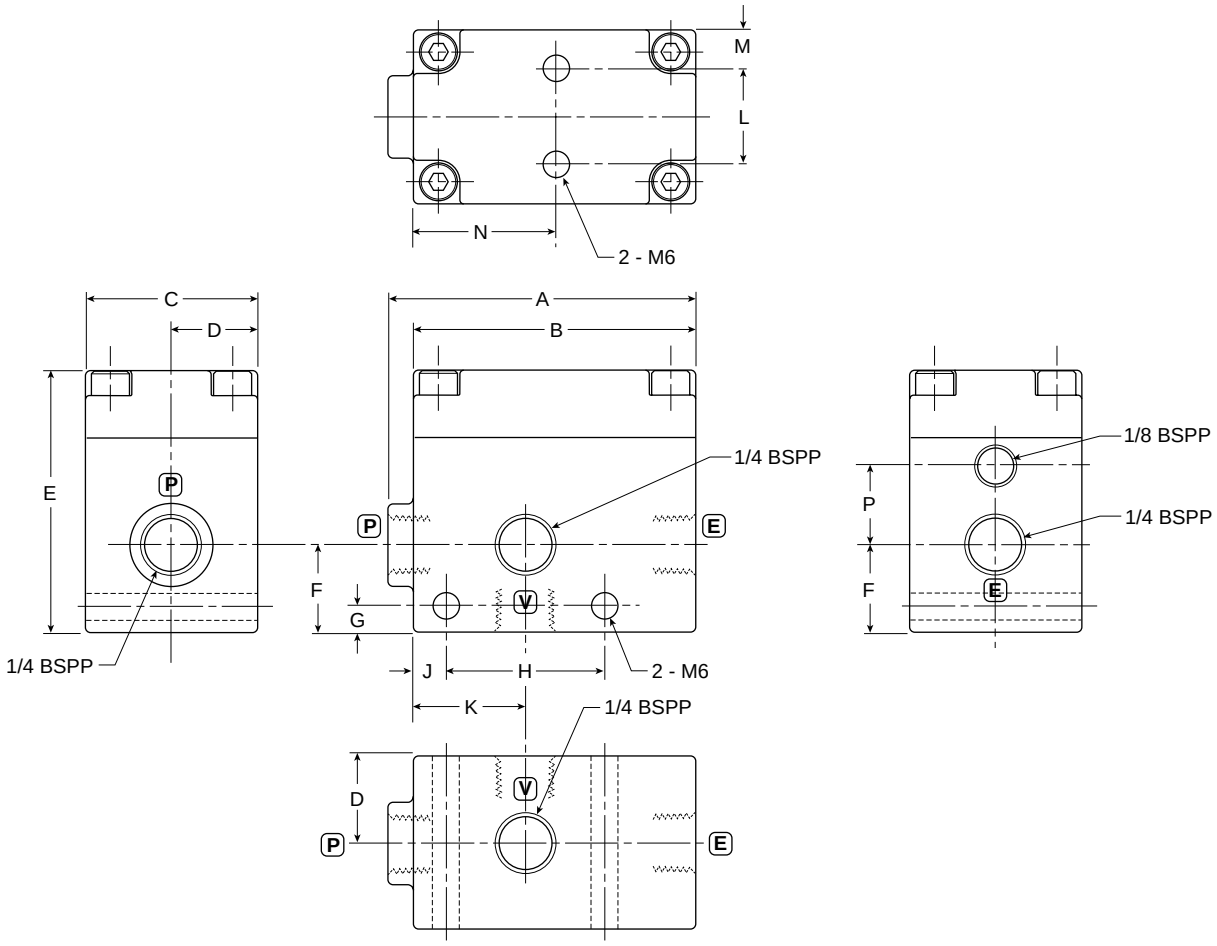
Do not operate CV-VR generators outside the temperature range and pressures listed in the specifications section of this catalog.

All normally closed valve supply circuits will interrupt the air supply to the venturi during a power failure or E-Stop condition. As a result, the product being transferred may be dropped, possibly creating a hazard to the surrounding environment. To avoid hazardous situations during a power loss or E-Stop condition, consider a normally open valve supply circuit or an E-Stop system.

It is always recommended to dedicate one suction cup to a single CV-CR generator for the best response and maximize the vacuum level per individual cup. If more than one cup is used per generator, the vacuum level of the pick-and-place system may drop to an unsafe level if one of the pads separates from the product.

B

Dimensions



Item	A	B	C	D	E	F	G	H	J	K	L	M	N	P
CV15HSVRG	70	64	40	20	60	20	6	36	7	25	22	9	32	17,5

Millimeter

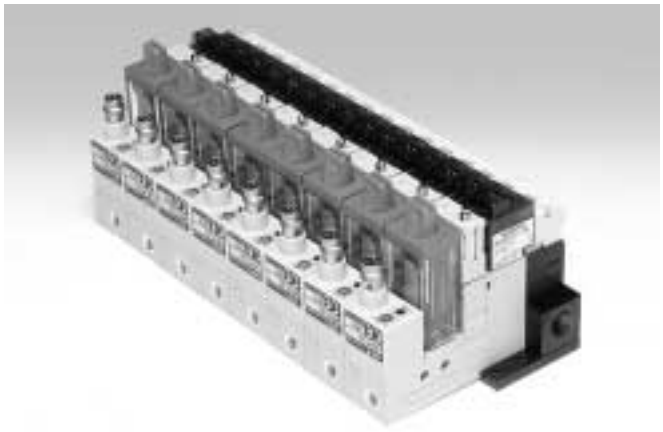
MC2

Features

- **Vacuum Generating Pilot Valve**
- **Vacuum Blow-off Pilot Valve**
- **Vacuum Sensor - Filter - Silencer Available**
- **Regulating Blow-off Adjustment**
- **Manifold System**
- **Short Cycle Times for High Speed Pick and Place**
- **Vacuum Flow Rates from 6 to 20 l/min**

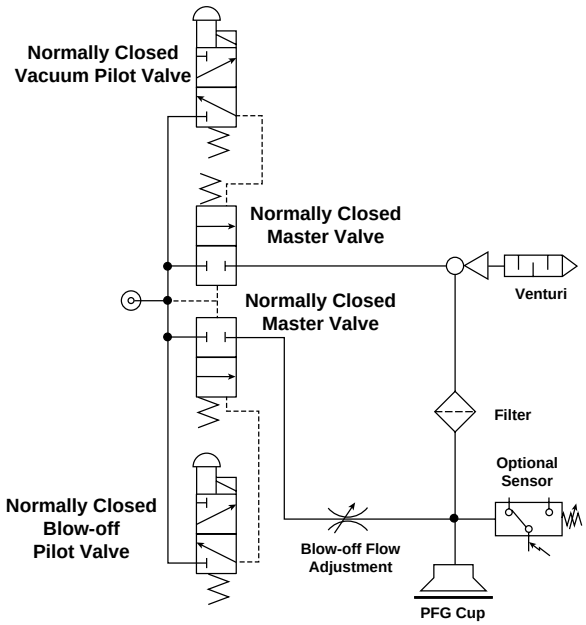
Characteristics

The MC2 is a complete package for factory automation. The MC2 has integrated vacuum generating and blow-off release pilot valves to minimize the response time to achieve vacuum. The small foot print and lightweight body allows the unit to be located close to the suction cup for maximum performance. The MC2 has additional features; regulating blow-off needle, 37 micron mesh filter, and a sensor platform for vacuum confirmation. The MC2 can be assembled into a maximum 8 station manifold. The unit can be ordered normally open or normally closed.



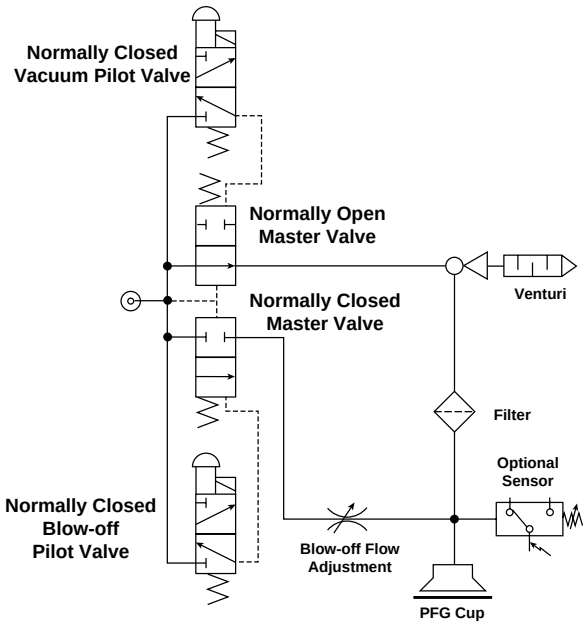
Normally Closed Vacuum Circuit

The Vacuum Pilot is Energized to Activate Vacuum

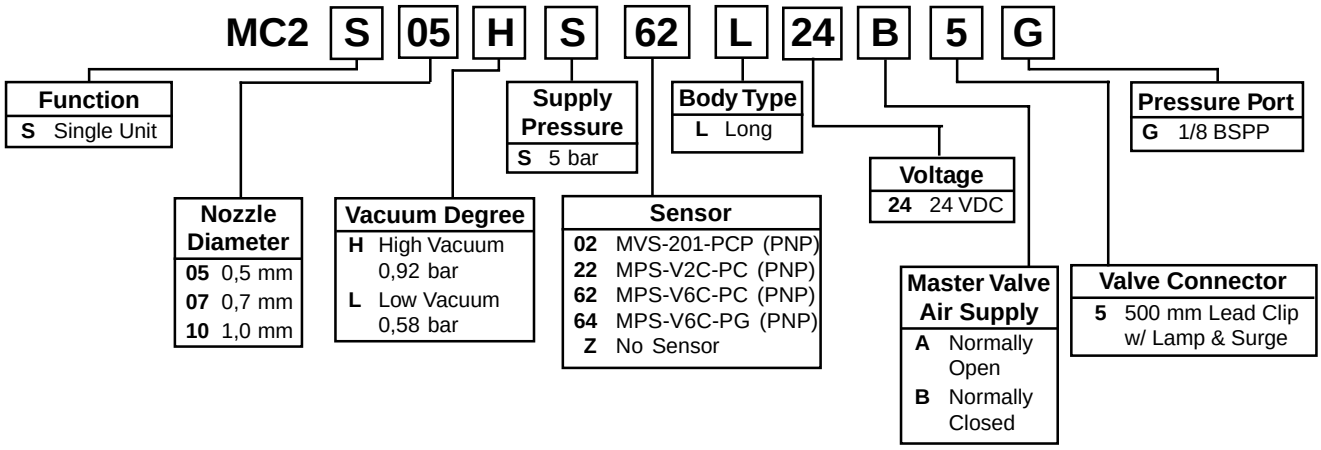


Normally Open Vacuum Circuit

The Vacuum Pilot is Energized to Deactivate Vacuum



Model Number Index



B

Specifications

Media	Non-Lubricated Compressed Air, Non-Corrosive Gases
Operating Pressure	1 to 6 bar
Optimum Operating Pressure	5 bar
Humidity	35 to 85%
Pressure Port	**G:** 1/8 BSPP Female
Vacuum Port	M5 Female
Operating Temperature	5 to 50 °C
Material	Aluminium, Polyamide, NBR

Vacuum Generating and Blow-off Release Pilot

Type of Control Valve	Pilot Valve
Manual Operation	Non-Locking Manual Override
Electrical Connection	Clip Type Connector with LED and Surge Protection
Power Supply	24 VDC ±10%
Power Consumption	0,6 W (0,7 W for Lamp Surge Killer Type)
Pressure Range	1 to 6 bar
Pilot Valve Air Supply	Normally Closed

Performance

Item	Nozzle Diameter [mm]	Vacuum Degree at 5 bar [%]	Vacuum Flow [l/min]	Air Consumption [l/min]	Weight [g]
05HS	0,5	86	6	10	117
05LS	0,5	53	10	10	117
07HS	0,7	86	11	22,5	117
07LS	0,7	53	21	22,5	117
10HS	1,0	86	20	44	117

Evacuation Time

Series / Nozzle Diameter	Air Supply Pressure	Air Consumption	Evacuation Time in sec / liter to reach different Vacuum Levels [%]								
	[bar]	[l/min]	10	20	30	40	50	60	70	80	90
MC2-05HS	5	10	0,64	1,46	2,48	3,81	5,48	7,56	10,50	15,00	—
MC2-05LS	5	10	0,35	0,82	1,42	2,32	4,36	—	—	—	—
MC2-07HS	5	22,5	0,39	0,89	1,50	2,35	3,41	4,80	6,63	9,75	—
MC2-07LS	5	22,5	0,26	0,63	1,13	2,00	3,80	—	—	—	—
MC2-10HS	5	44	0,19	0,43	0,72	1,14	1,84	3,01	4,25	6,51	—

MC2 with MPS-6 Series

The “V6” sensor has one normally open and one normally closed NPN or PNP output available for vacuum confirmation. The MPS-6 sensor is a cost effective performer with an output response time less than 1 msec. and a nice adjustable 220 degree output range.

The “V6” sensor is available with an M8, 4-Pin or grommeted (2M) electrical connector. The mating M8, 4-Pin cable is not included with the MPS-6 Sensor and must be ordered separately. See MC2 Accessories for cable options.

MC2 with MPS-2 Series

The “V2” sensor has 2 independent NPN or PNP outputs available for vacuum confirmation. Typical response times for the outputs with an average circuit is less than 50 msec. The output response time of this sensor is less than 2 msec.

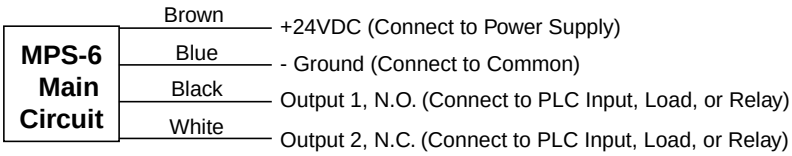
The “V2” sensor is available with an M8, 4-Pin or grommeted (2M) electrical connector. The mating M8, 4-Pin cable is not included with the MPS-2 Sensor and must be ordered separately. See MC2 Accessories for cable options.

MC2 with MVS-201 Series

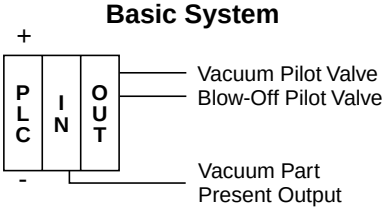
The “201” sensor has one output NPN or PNP for vacuum confirmation and a control output that interfaces directly with the blow-off release pilot valve. With programmable time control features and a special chip driver, the sensor automatically activates the blow-off release when the vacuum signal from the PLC is discontinued. This eliminates a PLC output to activate the blow-off release. This new technology reduces PLC output requirements by 50% and reduces installation to a simple 4 wire system. The output response of the sensor is less than 2 msec.

The “201” sensor is available with an M8, 4-Pin electrical connector. The MC2-201 valve cable and the mating M8, 4-Pin cable are not included with the MVS-201 Sensor and must be ordered separately. See MC2 Accessories for cable options.

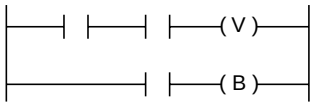
MC2 with MPS-6 Series



Basic System

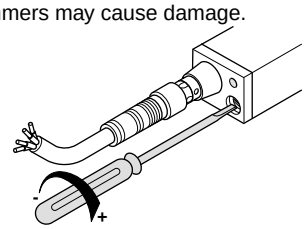


Vacuum System Programming



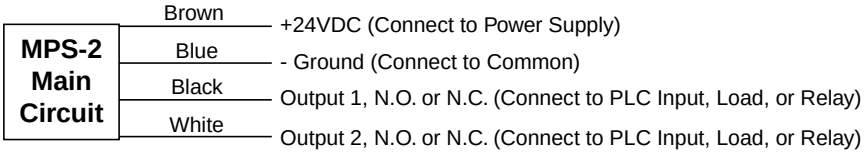
Output Adjustment

Rotate the potentiometer trimmer to increase or decrease pressure switch point output. Excessive force or exceding the limits of the trimmers may cause damage.

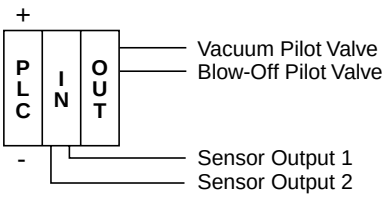


B

MC2 with MPS-2 Series

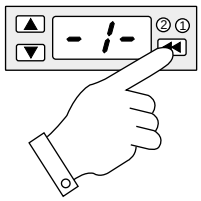


Basic System

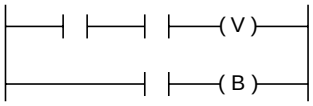


Output Adjustment

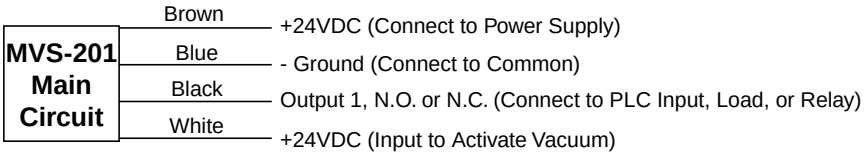
Sensor functions and outputs are programmed by touch panel.



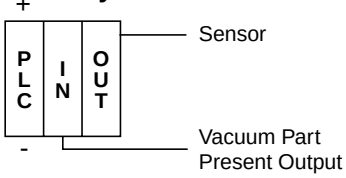
Vacuum System Programming



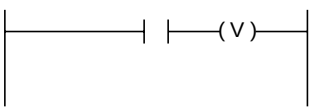
MC2 with MVS-201 Series



Basic System with 201 Sensor

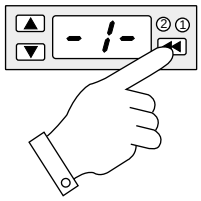


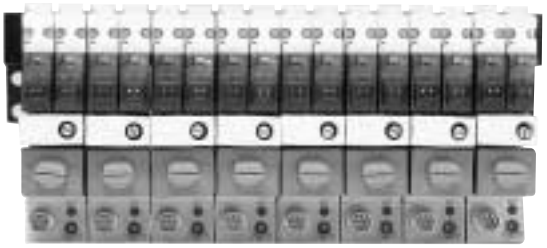
Vacuum System Programming

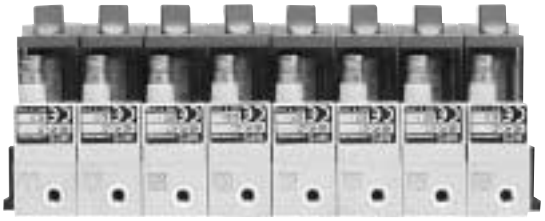


Output Adjustment

Sensor functions and outputs are programmed by touch panel.







Station 1 Station 2 Station 3 Station 4 Station 5 Station 6 Station 7 Station 8

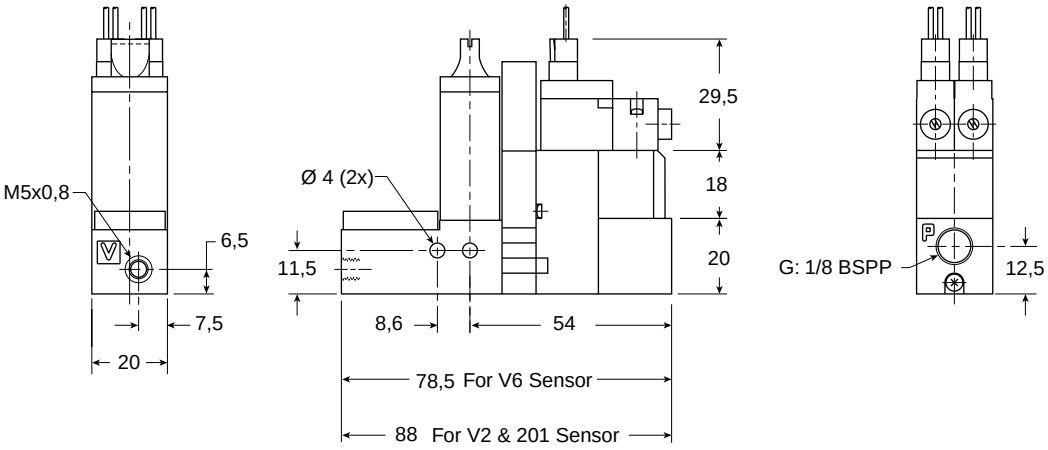
Manifold Part Number

MC2 - M 2 G

Stations
2
3
4
5
6
7
8

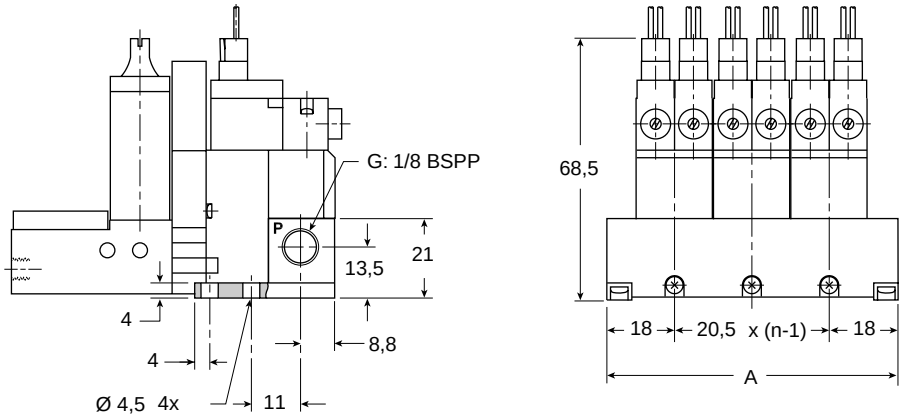
Port Size
G 1/8 BSPP

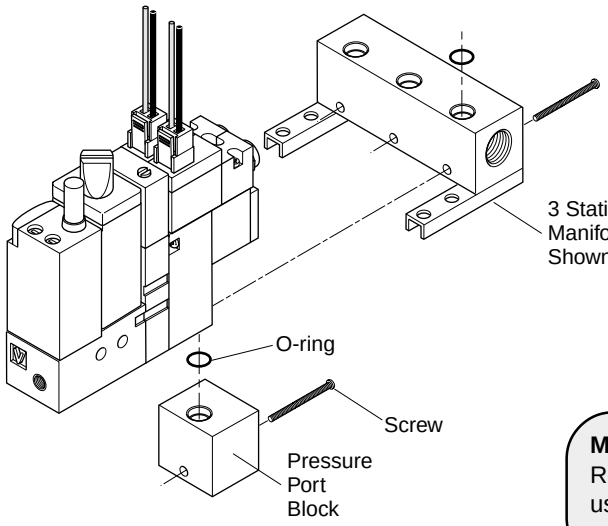
Generator



Manifold

3-Station Manifold Shown





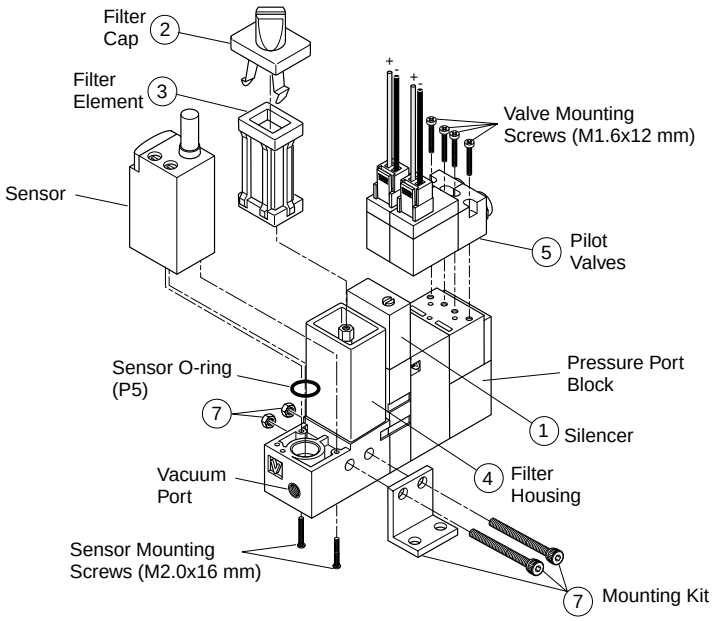
Manifold Assembly
Remove Pressure Port Block and use existing O-ring and Screw to secure the MC2 unit to the Manifold.

n	2	3	4	5	6	7	8
A	56,5	77	97,5	118	138,5	159	179,5

Millimeter
n = Number of Stations

Replacement Components

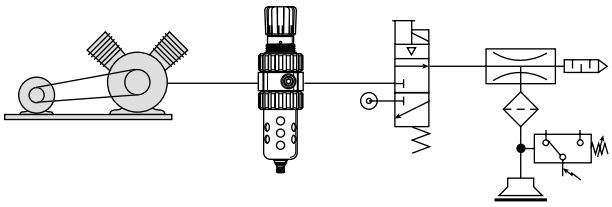
Item	Part Number	Description
1	MC2-S	Silencer
2, 3, 4	MC2-F	Filter Kit
3	MC2-E	Filter Element
5	MC2-24B	N.C. Pilot Valve
7	MC2-B	Mounting Kit



Cautions

Do not use or expose the MC2 with fluids or corrosive gases. Vacuum Venturi's are designed to be used with non-lubricated, non-corrosive, compressed air.

Do not operate MC2 generators outside the temperature range and pressures listed in the specifications section of this catalog. Regulate the compressed air to 4,8 bar and filtrate with a maximum 40 micron filter. Non-lubricated compressed air will maintain the life and vacuum level of the generator.



All normally closed vacuum circuits will interrupt the air supply to the venturi during a power failure or E-Stop condition. As a result, the product being transferred may be dropped, possibly creating a hazard to the surrounding environment. To avoid hazardous situations during a power loss or E-Stop condition, consider a normally open vacuum circuit.

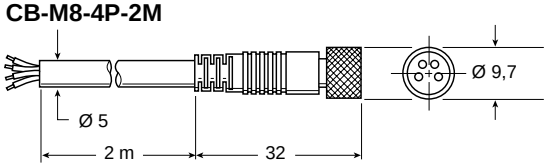
Check the insulation of all lead wires after installation to avoid shorts. Properly secure all lead wires to avoid stress or repeated movement that may fray lead wires.

Some electrical components are diode or zener diode protected. When installing solenoids and sensors, check the polarity of the component before applying power. Apply the appropriate voltage to the solenoids and sensors. Inappropriate voltage, shorts, or surges may damage the circuitry.

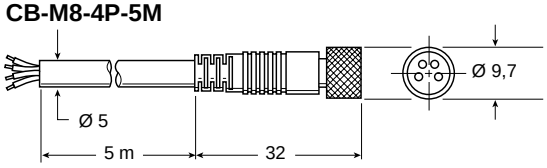
Accessories

Sensor Cables

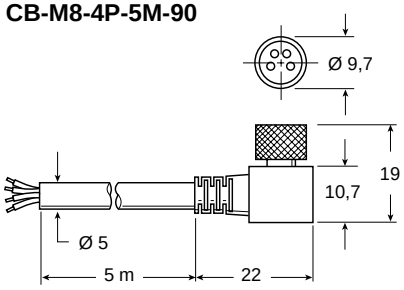
CB-M8-4P-2M



CB-M8-4P-5M



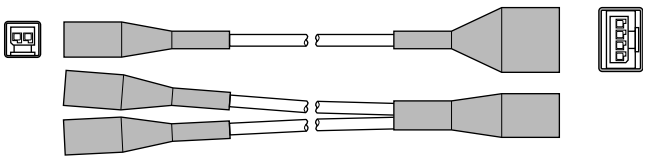
CB-M8-4P-5M-90



Valve Cable

(Connects Sensor to Vacuum & Blow-off Release Pilot Valves)

MC2-C201G



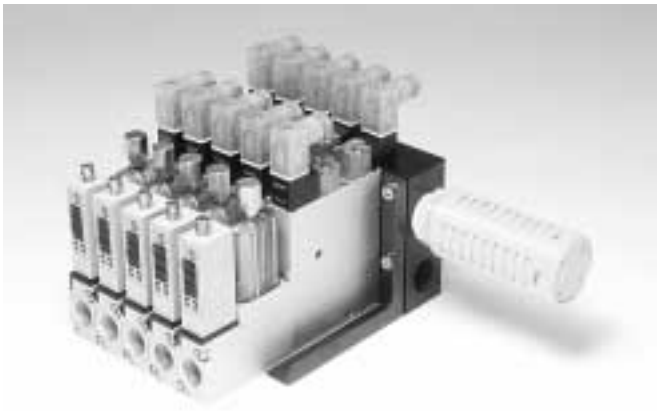
CVK

Features

- **Vacuum Generating Pilot Valve**
- **Vacuum Release Pilot Valve Option**
- **Vacuum Sensor - Filter - Silencer Available**
- **Regulating Blow-off**
- **Check Valve Option**
- **Air-Economizing Controls**
- **Manifold System**
- **Vacuum Flow Rates from 60 to 130 l/min**

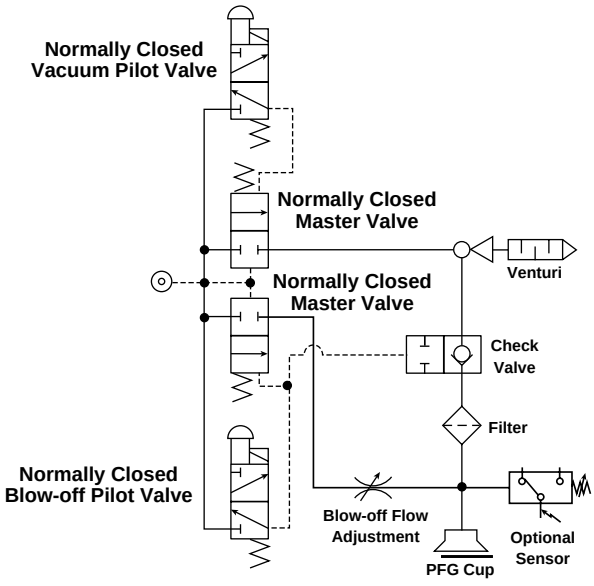
Characteristics

The CVK Series vacuum generator provides a complete solution for factory automation. The CVK is perfect for non-porous applications such as material handling, critical applications involving glass, or general transfer applications. The CVK has integrated vacuum pilot and blow-off release pilot valves to minimize response times. The CVK has additional features; regulating blow-off needle, 130 micron filter, optional check valve, and a sensor platform for vacuum confirmation. The CVK can be assembled into a maximum 5 station manifold. The unit can be ordered normally open or normally closed.



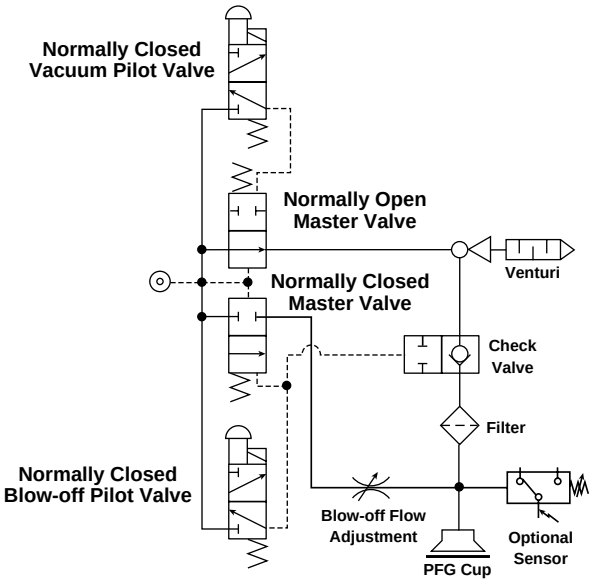
Normally Closed Vacuum Circuit

The Vacuum Pilot is Energized to Activate Vacuum

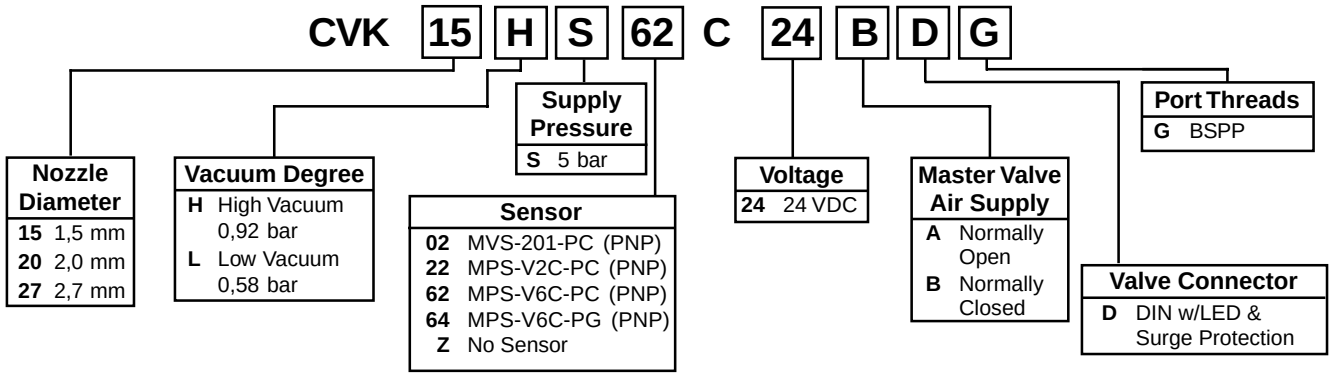


Normally Open Vacuum Circuit

The Vacuum Pilot is Energized to Deactivate Vacuum



Model Number Index



B

Specifications

Media	Non-Lubricated Compressed Air, Non-Corrosive Gases
Optimum Operating Pressure	5 bar
Humidity	35 to 85%
Pressure Port	**G:** 1/4 BSPP Female
Vacuum Port	**G:** 3/8 BSPP Female
Operating Temperature	5 to 50 °C
Material	Aluminium, Brass, NBR
Manifold Weight	2-Station: 680 g, 3-Station: 880 g, 4-Station: 1080 g, 5-Station: 1280 g

Vacuum Pilot and Blow-off Release Pilot

Type of Control Valve	Pilot Valve
Manual Operation	Non-Locking Manual Override
Electrical Connection	DIN Connector with LED and Surge Protection
Power Supply	24 VDC ± 10%
Power Consumption	1,8 W
Operating Pressure	5 bar
Pilot Valve Air Supply	Normally Closed

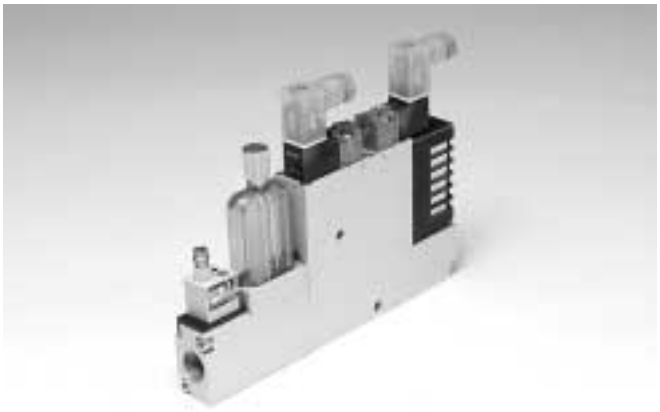
Performance

Item	Nozzle Diameter [mm]	Vacuum Degree at 5 bar [%]	Vacuum Flow [l/min]	Air Consumption [l/min]	Weight [g]
15HS	1,5	90	60	100	750
15LS	1,5	57	90	100	750
20HS	2,0	90	95	180	750
20LS	2,0	57	130	180	750
27HS	2,7	90	125	295	750

Evacuation Time

Series / Nozzle Diameter	Air Supply Pressure	Air Consumption	Evacuation Time in sec / liter to reach different Vacuum Levels [%]								
	[bar]	[l/min]	10	20	30	40	50	60	70	80	90
CVK-15HS	5	100	0,08	0,17	0,28	0,44	0,65	0,93	1,43	2,20	6,70
CVK-15LS	5	100	0,04	0,10	0,19	0,33	0,59	—	—	—	—
CVK-20HS	5	180	0,04	0,09	0,16	0,27	0,43	0,66	1,06	1,89	4,60
CVK-20LS	5	180	0,03	0,08	0,15	0,27	0,55	—	—	—	—
CVK-27HS	5	295	0,02	0,07	0,12	0,20	0,30	0,47	0,70	1,49	—

CVK with MPS-6 Series



The “V6” sensor has one normally open and one normally closed NPN or PNP output available for vacuum confirmation. The MPS-6 sensor is a cost effective performer with an output response time less than 1 msec. and a nice adjustable 220 degree output range.

The “V6” sensor is available with an M8, 4-Pin or grommeted (2M) electrical connector. The mating M8, 4-Pin cable is not included with the MPS-6 Sensor and must be ordered separately. See CVK Accessories for cable options.

CVK with MPS-2 Series

The “V2” sensor has 2 independent NPN or PNP outputs available for vacuum confirmation. Typical response times for the outputs with an average circuit is less than 50 msec. The output response time of this sensor is less than 2 msec.

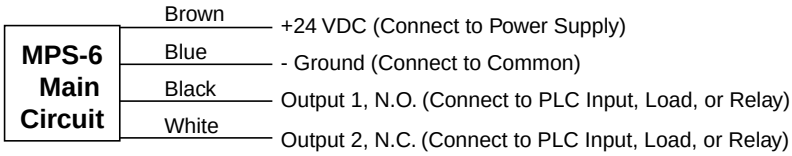
The “V2” sensor is available with an M8, 4-Pin or grommeted (2M) electrical connector. The mating M8, 4-Pin cable is not included with the MPS-2 Sensor and must be ordered separately. See CVK Accessories for cable options.

CVK with MVS-201 Series

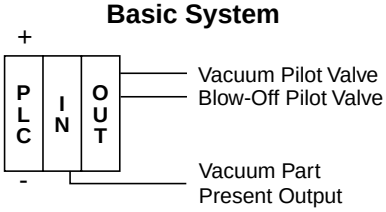
The “201” sensor has one output NPN or PNP for vacuum confirmation and a control output that interfaces directly with the blow-off release pilot valve. With programmable time control features and a special chip driver, the sensor automatically activates the blow-off release when the vacuum signal from the PLC is discontinued. This eliminates a PLC output to activate the blow-off release. This new technology reduces PLC output requirements by 50% and reduces installation to a simple 4 wire system. The output response of the sensor is less than 2 msec.

The “201” sensor is available with an M8, 4-Pin electrical connector. The MC2-201 valve cable and the mating M8, 4-Pin cable are not included with the MVS-201 Sensor and must be ordered separately. See CVK Accessories for cable options.

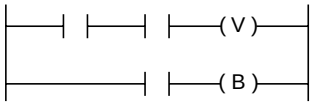
CVK with MPS-6 Series



Basic System

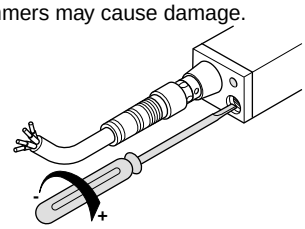


Vacuum System Programming

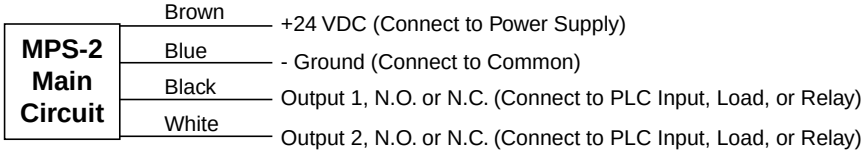


Output Adjustment

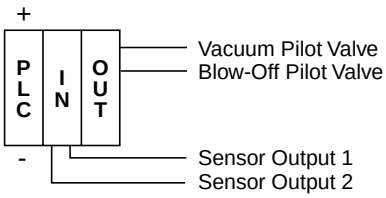
Rotate the potentiometer trimmer to increase or decrease pressure switch point output. Excessive force or exceeding the limits of the trimmers may cause damage.



CVK with MPS-2 Series

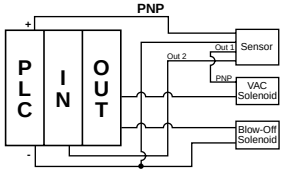


Basic System



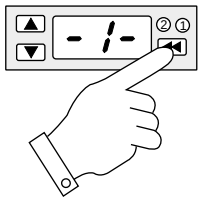
Air-Economizing System

N.C. Output 1 - Air Economizing
N.O. Output 2 - Part Present Output

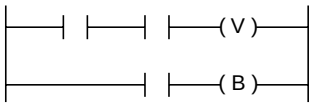


Output Adjustment

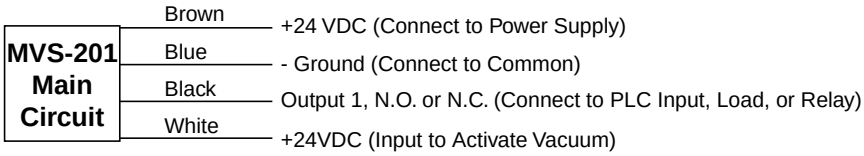
Sensor functions and outputs are programmed by touch panel.



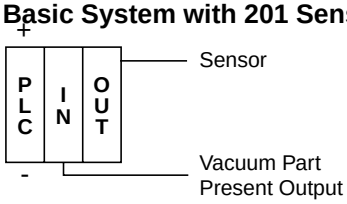
Vacuum System Programming



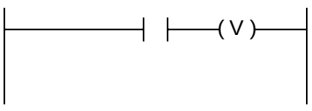
CVK with MVS-201 Series



Basic System with 201 Sensor



Vacuum System Programming



Output Adjustment

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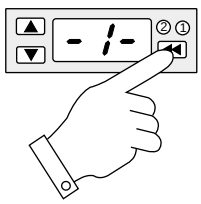


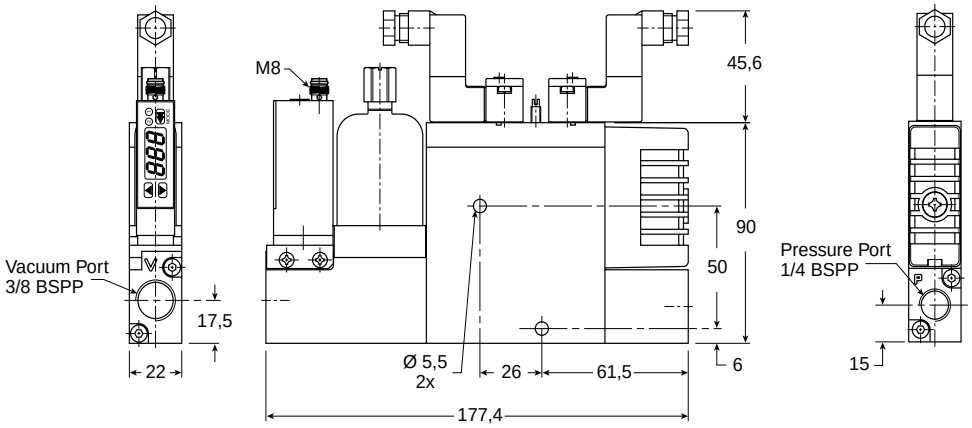
Station 1 Station 2 Station 3 Station 4 Station 5

Manifold Block

CVK - M 2 G

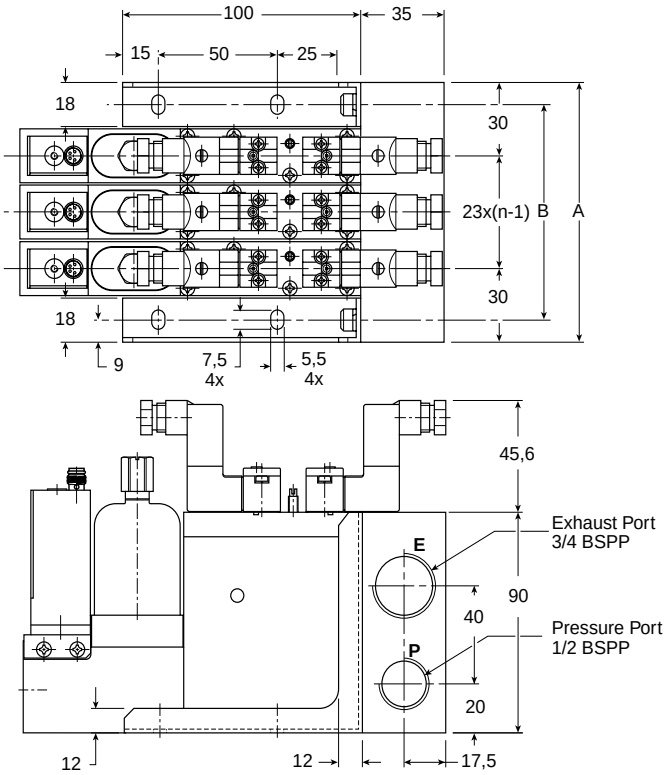
Manifold	Stations	Port Size
	2	G 1/8 BSPP
	3	
	4	
	5	

Generator

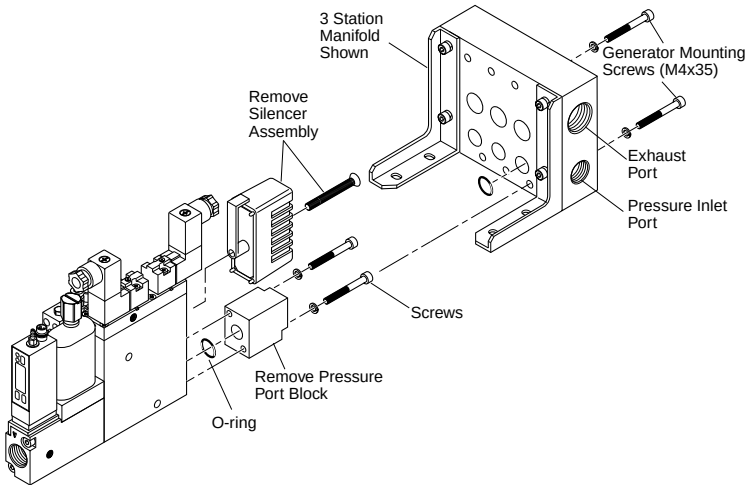


Manifold

3-Station Manifold Shown



Manifold Assembly
Remove Pressure Port Block and Silencer Assembly. Use existing O-rings and Manifold Mounting Screws to secure the CVK unit to the Manifold.

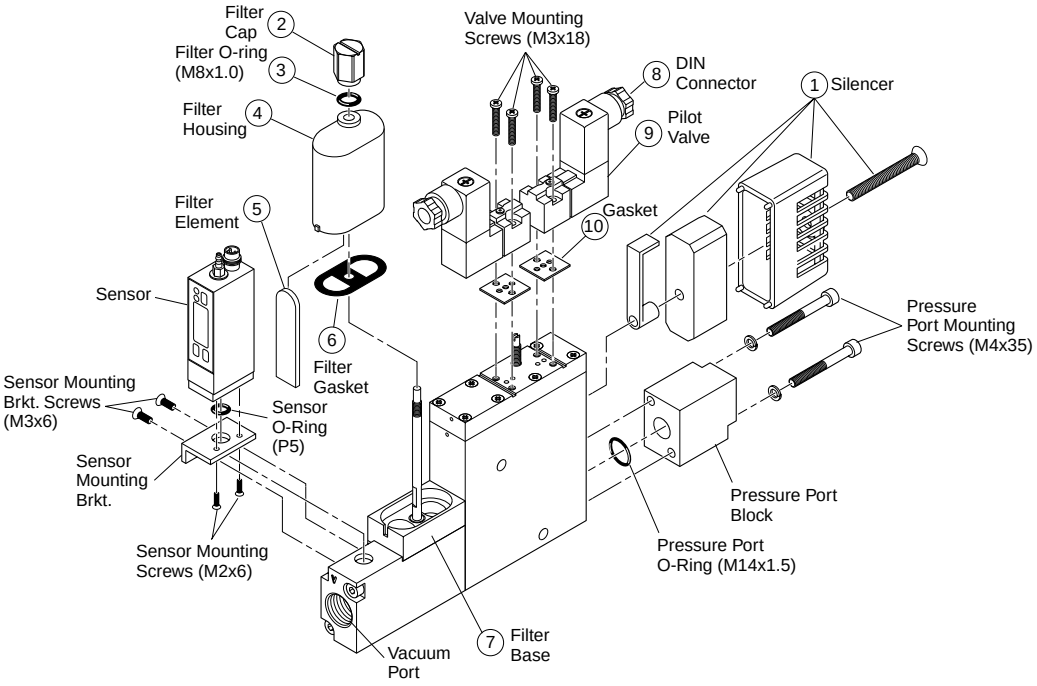


n	2	3	4	5
A	83	106	129	152
B	65	88	111	134

Millimeter
n = Number of Stations

Replacement Components

Item	Part Number	Description
1	CVK-S	Silencer
2 thru 7	CVK-F	Filter Kit
5	CVK-E	Filter Element
8, 9, 10	CVK-24D	Pilot Valve Kit



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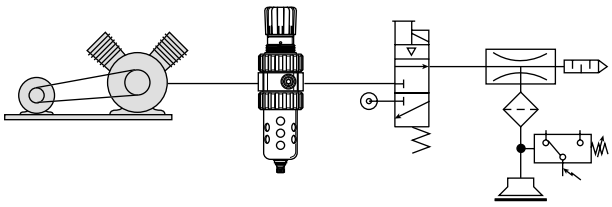

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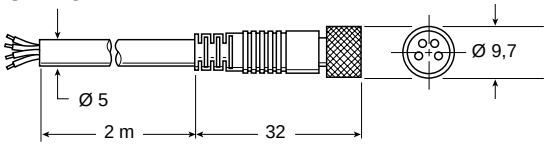
Check the insulation of all lead wires after installation to avoid shorts. Properly secure all lead wires to avoid stress or repeated movement that may fray lead wires.

Some electrical components are diode or zener diode protected. When installing solenoids and sensors, check the polarity of the component before applying power. Apply the appropriate voltage to the solenoids and sensors. Inappropriate voltage, shorts, or surges may damage the circuitry.

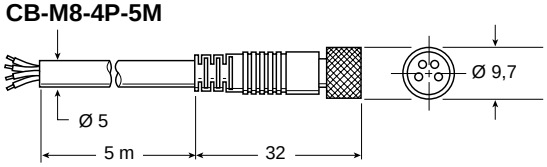
Accessories

Sensor Cables

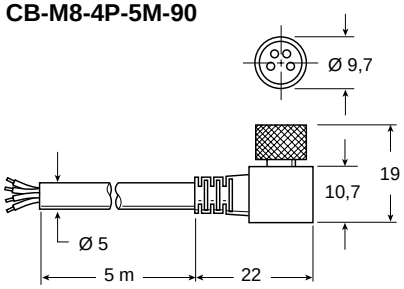
CB-M8-4P-2M



CB-M8-4P-5M



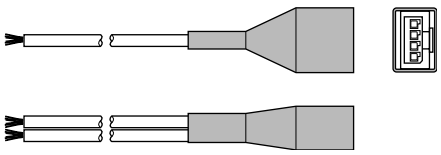
CB-M8-4P-5M-90



Valve Cable

(Connects Sensor to Vacuum & Blow-off Release Pilot Valves)

CVK-D201G



CVX-0260B E-Stop

Features

- **Optional DeviceNet™ Communication**
- **E-Stop Operating System (Patented)**
- **Eliminates All Unnecessary Air Consumption**
- **Fast Sensor and Vacuum Flow Response Times**
- **Large Vacuum Flow Rates**
- **Independent Vacuum Channels**

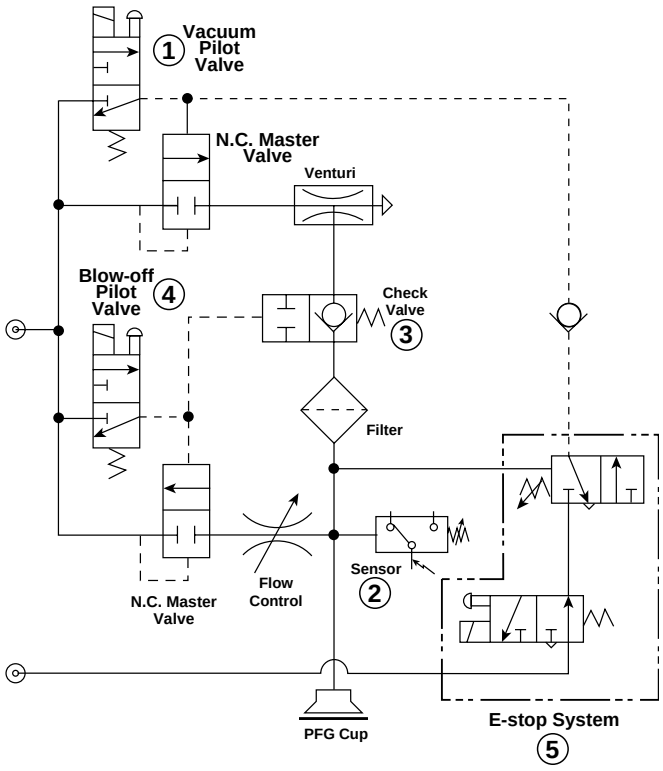
Characteristics

The CVX-0260B is a CVK package with the ultimate air circuit for all of your material handling systems. The CVX-0260B is ideal for non-porous applications that require fast response of large vacuum and blow-off release flow rates, E-Stop Management System, optional air-economizing features, and device net communication. The E-Stop Management System can operate a normally closed system during an E-Stop or power failure situation. Typically, with a normally closed air circuit, the user controls the vacuum with a command signal. During an E-stop or power failure event, the vacuum command signal is lost, but, the system can detect the presence of a part and continue to operate in the vacuum mode. If the system detects that a part is not present, each vacuum channel, operating independently, will close to eliminate any unnecessary air consumption. Additional air economizing features are controlled by the sensor outputs to make this unit the ultimate weapon against air consumption.

There are 4 separate states of air logic: vacuum, blow-off, idle, and EOS. The air circuit to the right illustrates a basic normally closed unit with the E-Stop operating system. Vacuum is created when a high signal is sent to Vacuum Pilot Valve **(1)**. The output of the vacuum Sensor **(2)**, controls the vacuum level and air economizing function by feedback to the Vacuum Solenoid Valve **(1)**. The Check Valve **(3)** maintains the vacuum level until the Blow-off Pilot Valve **(4)** is activated to release or the hysteresis value of Sensor **(2)** is reached to restore the original vacuum level. The E-Stop operating system **(5)** is activated by an E-Stop or power failure.

Vacuum Controlled E-Stop Circuit

The Vacuum Pilot is Energized to Activate Vacuum. The E-Stop Management System can maintain the last state of air during E-Stop or power failure.



Model Number Index

CVX-0260B **E0S** **DN** **G**

E-Stop Circuit	Communication	Port Threads
	DN DeviceNet™	**G** 3/8 BSPP
	— Without	

B

Specifications

CVX-0260B Specifications	
Media	Non-lubricated Compressed Air, Dry Air
Pressure Port	G
Vacuum Ports	G Ports
Operating Temperature	0 to 55 °C
Humidity	35 to 85% R.H.
Operating Pressure	5 bar
Vacuum Filtration	130 µm
Noise Level	72 dB
Air Consumption	295 l/min
Vacuum Flow	125 l/min
Sensor Response Time	< 2 msec
Maximum Vacuum Level	-0,92 bar
Cover	300 Series 22 Gauge Stainless Steel

Control Valve Specifications	
3-Way	Pilot Valves
Manual Operation	Manual Overrides Available
Electrical Connector	DIN type w/LED and Diode Protection, IP65 Rating
Power Supply	24 VDC ± 10%
Power Consumption	1,8 W
Pressure Range	1,5 to 10 bar
Pilot Valve Air Supply	Normally Closed
Mass	57 g

E-Stop Operating System Specifications	
Two-Way Valve	Diaphragm Actuated, Pneumatic Output
Media	Non-lubricated Air, Dry Air
Switch Point Pressure	0,3 bar
Operating Range	-0,15 to -0,85 bar Vacuum
Pressure Through-put Range	1,51 to 8 bar
Accuracy	± 0,05 bar
Port Connection	M5 Female
Air Supply	Normally Closed
Mass	34 g

Aux. Power Electrical Valve Specifications	
3-Way Valve	Direct Acting
Media	Compressed Air, Non-lubricated
Operating Range	0 to 7,03 bar
Electrical Connection	DIN Connector w/LED and Diode Protection, IP65
Operating Voltage	24 VDC ± 10%
Power Consumption	1,8 W
Current	0,075 A
Air Supply	Normally Open
Mass	61 g

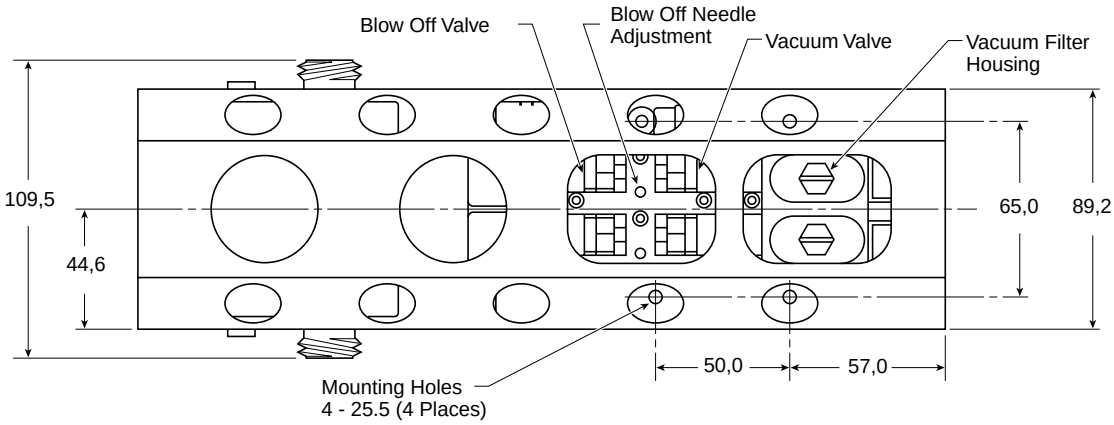
Check Valve Specifications	
One Way	One Way Spring Return
Operating Pressure	-0,9 to 16 bar
Mass	10 g

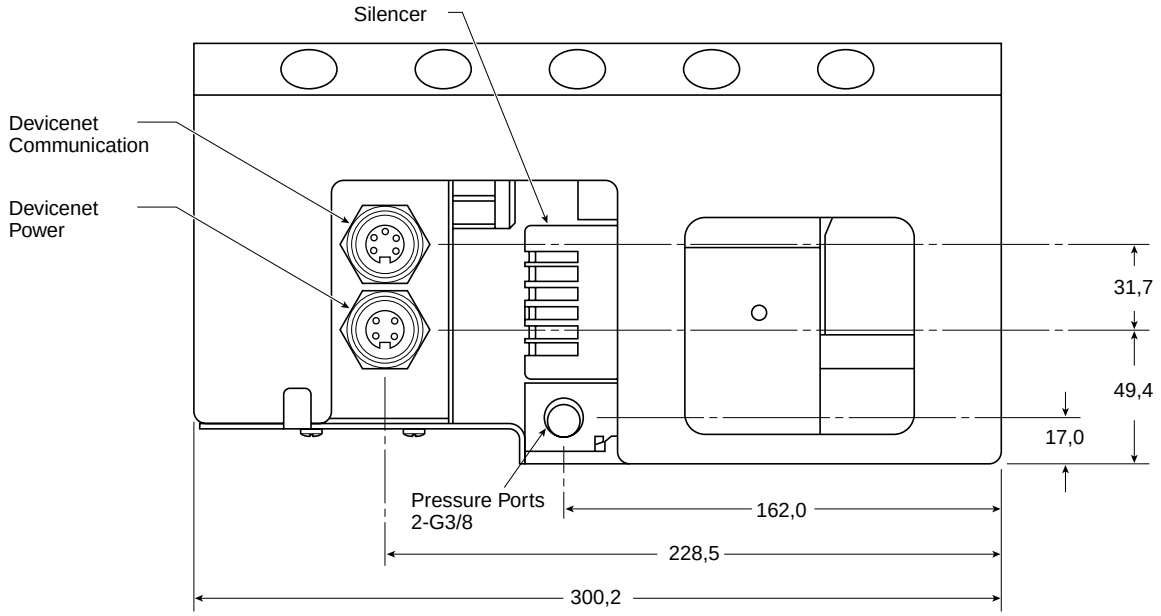
Performance

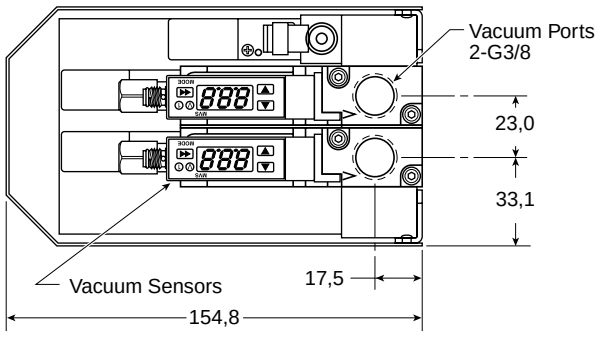
Item	Nozzle Diameter [mm]	Vacuum Degree at 5 bar [%]	Vacuum Flow [l/min]	Air Consumption [l/min]	Weight [g]
27HS	2,7	90	125	295	748

Evacuation Time

Series / Nozzle Diameter	Air Supply Pressure	Air Consumption	Evacuation Time in sec / liter to reach different Vacuum Levels [%]								
	[bar]	[l/min]	10	20	30	40	50	60	70	80	90
CVX-27HS	5	295	0,02	0,07	0,12	0,20	0,30	0,47	0,70	1,49	—

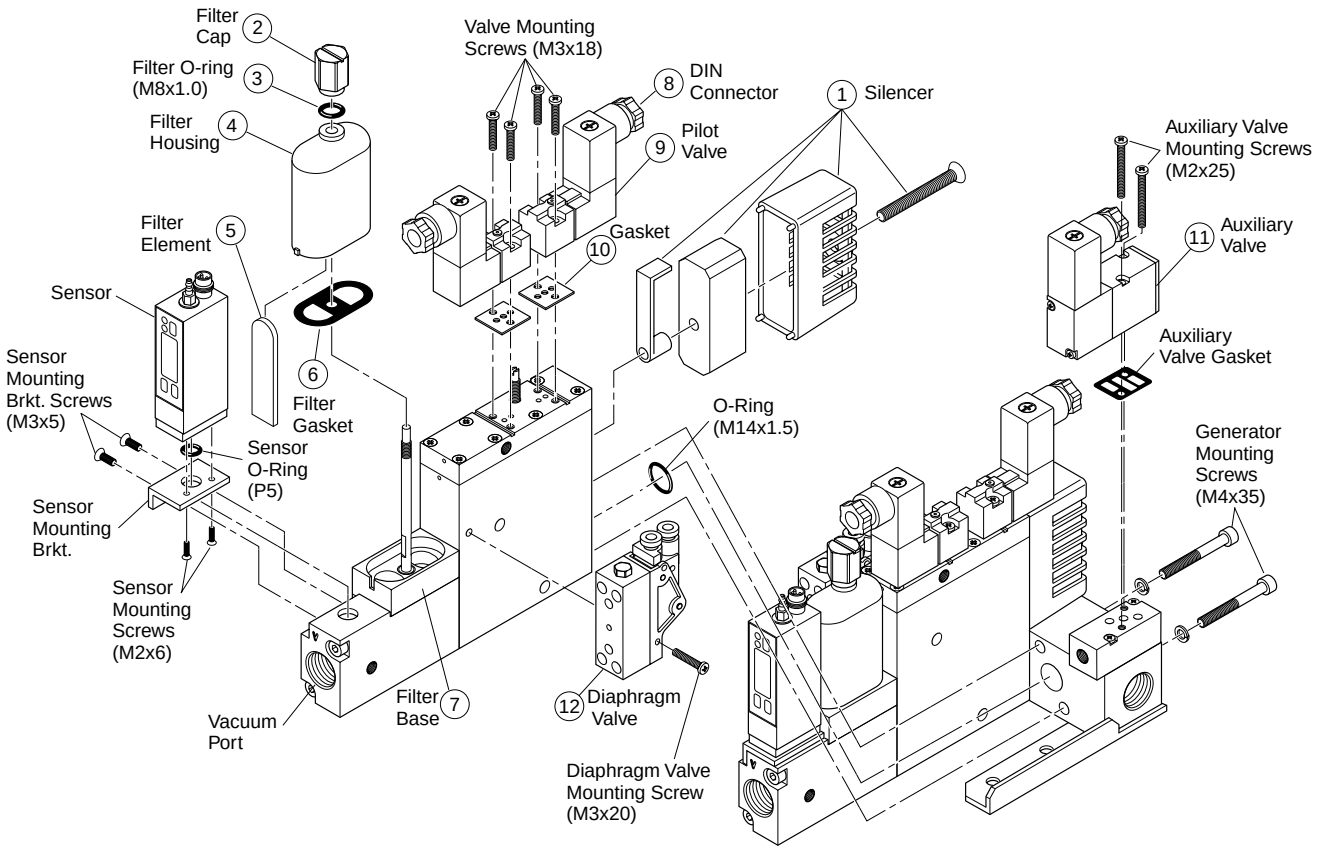

Blow Off Valve
Blow Off Needle Adjustment
Vacuum Valve
Vacuum Filter Housing
109,5
44,6
65,0
89,2
50,0
57,0
Mounting Holes
4 - 25.5 (4 Places)


Silencer
Devicenet Communication
Devicenet Power
31,7
49,4
17,0
Pressure Ports
2-G3/8
162,0
228,5
300,2


Vacuum Ports
2-G3/8
23,0
33,1
Vacuum Sensors
17,5
154,8

Replacement Components

Item	Part Number	Description
1	CVK-S	Silencer
2 thru 7	CVK-F	Filter Kit
5	CVK-E	Filter Element
8, 9, 10	CVK-24D	Pilot Valve Kit



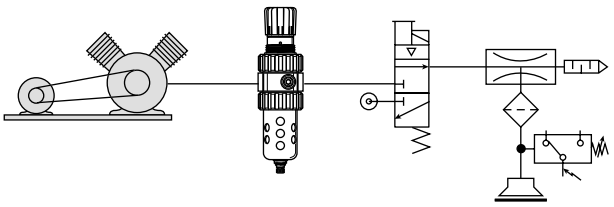
Cautions

Do not use or expose the CVX with fluids or corrosive gases. Vacuum Venturi's are designed to be used with non-lubricated, non-corrosive, compressed air.

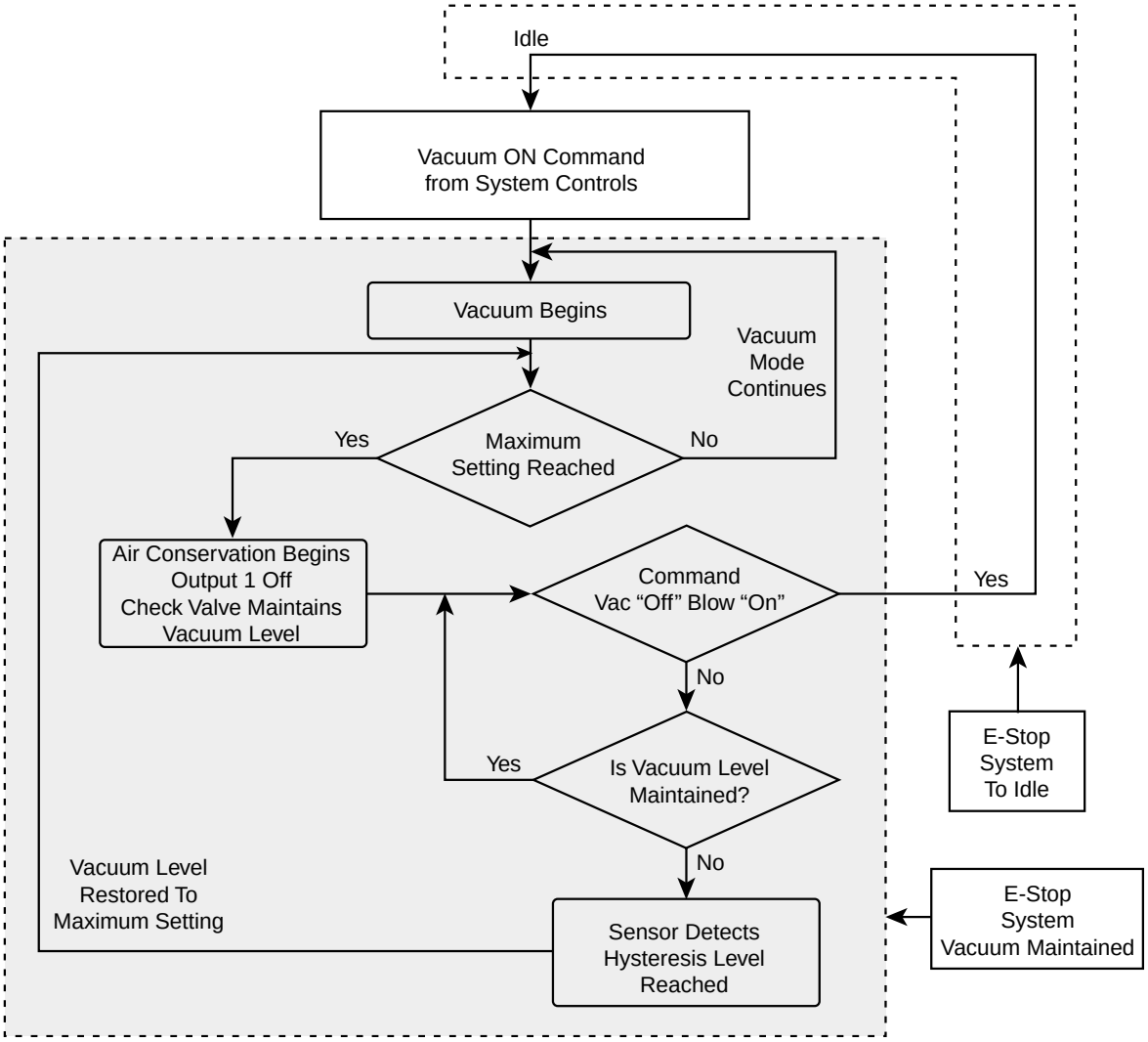
Do not operate CVX generators outside the temperature range and pressures listed in the specifications section of this catalog. Regulate the compressed air to 4,8 bar and filtrate with a maximum 40 micron filter. Non-lubricated compressed air will maintain the life and vacuum level of the generator.

Check the insulation of all lead wires after installation to avoid shorts. Properly secure all lead wires to avoid stress or repeated movement that may fray lead wires.

Some electrical components are diode or zener diode protected. When installing solenoids and sensors, check the polarity of the component before applying power. Apply the appropriate voltage to the solenoids and sensors. Inappropriate voltage, shorts, or surges may damage the circuitry.



CVX-0260-B - System Logic



CVX-0260-B - E-Stop Operating System (EOS)

The E-Stop Operating System is designed to maintain the last state of operation when an E-stop or power failure occurs.

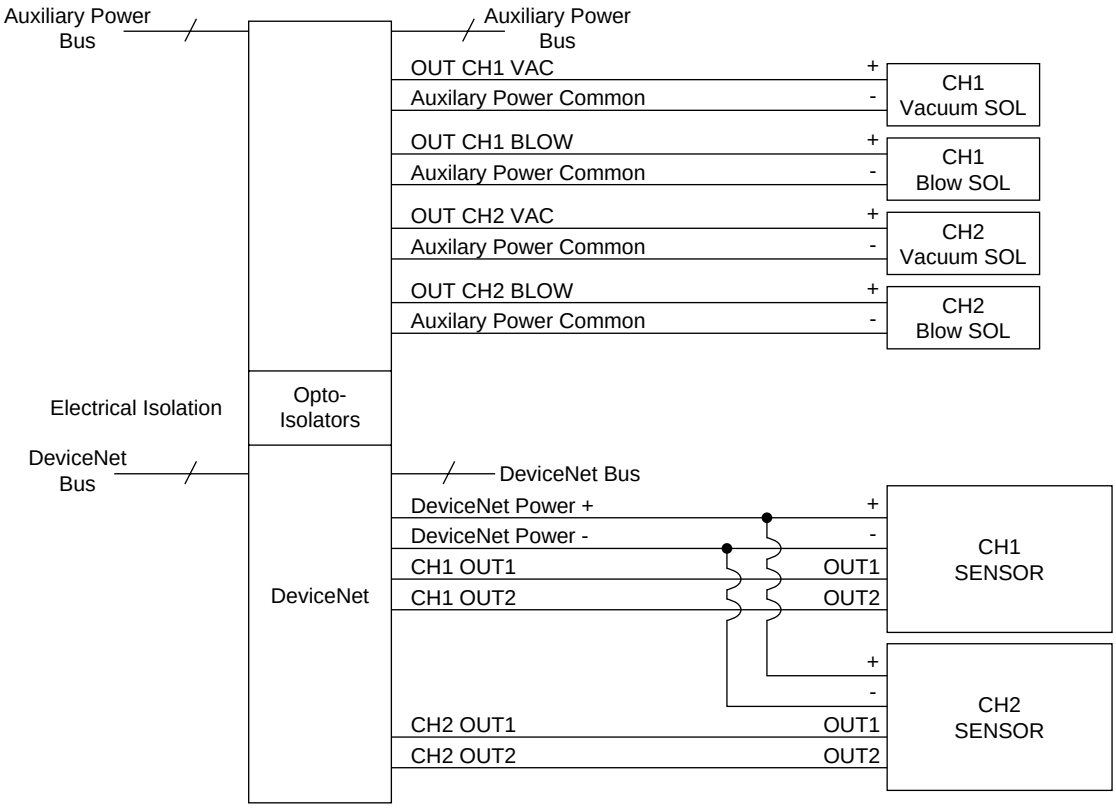
The chart below illustrates the state of operation in different modes.

Modes	Vacuum On	Vacuum Off	Blow-Off	EOS
Normal Conditions	Air-economizing between 0,61-0,54 bar	Idle	Blow-Off On Blow-Off Idle	EOS Off
Emergency-Stop, Power Failure, Loss of DeviceNet™ Communications or Power	Vacuum On ↓↓ Vacuum On	Idle	Blow-Off On or Idle ↓↓ Idle	EOS On
Restore Power	Vacuum On Air-economizing Function Resumes	Idle	Idle	EOS Off

DeviceNet™

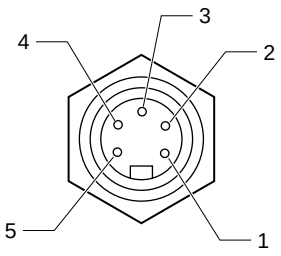
The DeviceNet™ power bus supplies power for the DeviceNet circuitry and the two sensors. The auxiliary power bus provides power for the vacuum solenoids and blow-off solenoids. The following are power requirements for the DeviceNet circuitry.

Voltage Range: 12,5 - 24 VDC
Current: 150 mA



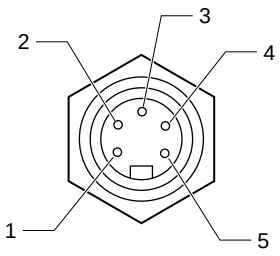
DeviceNet™ Bus Connectors

5-Pin Mini-Style



Male (Pins)

1.) Drain2.) V+
3.) V-
4.) CAN-H
5.) CAN-L

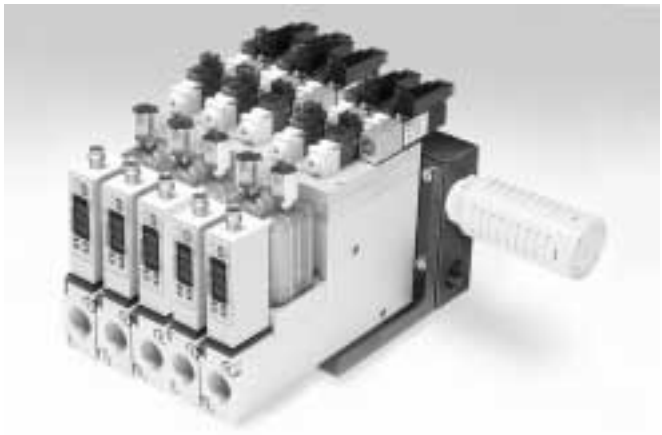


Female (Sockets)

CEK E-Stop

Features

- **Integrated Double Solenoid for Last State**
- **Integrated Vacuum Pilot**
- **Integrated Blow-off Pilot**
- **Integrated Filter, Silencer**
- **Air Economizing Capabilities**
- **DeviceNet™ Capable**
- **Manifolds for up to 5 Units**



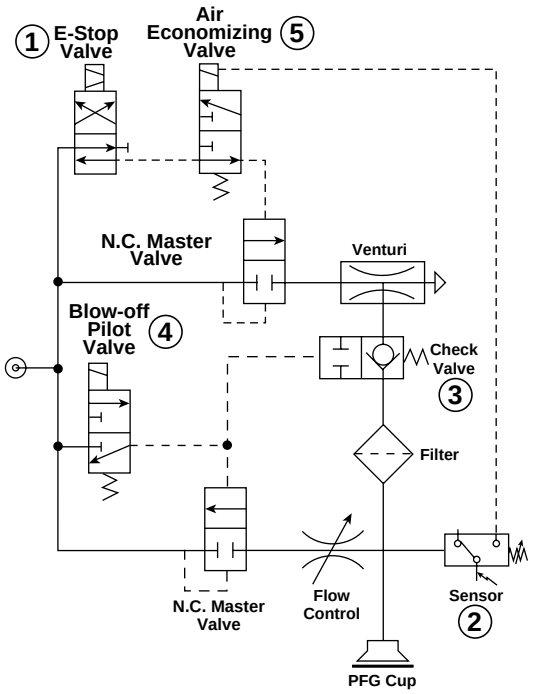
Characteristics

The CEK is a CVK unit with a Normally Closed E-Stop valve that maintains the last state of air during an E-stop or power loss. In addition to this, an air-economizing valve has been added to interrupt the air supply by connecting the output signal from the sensor to minimize air consumption.

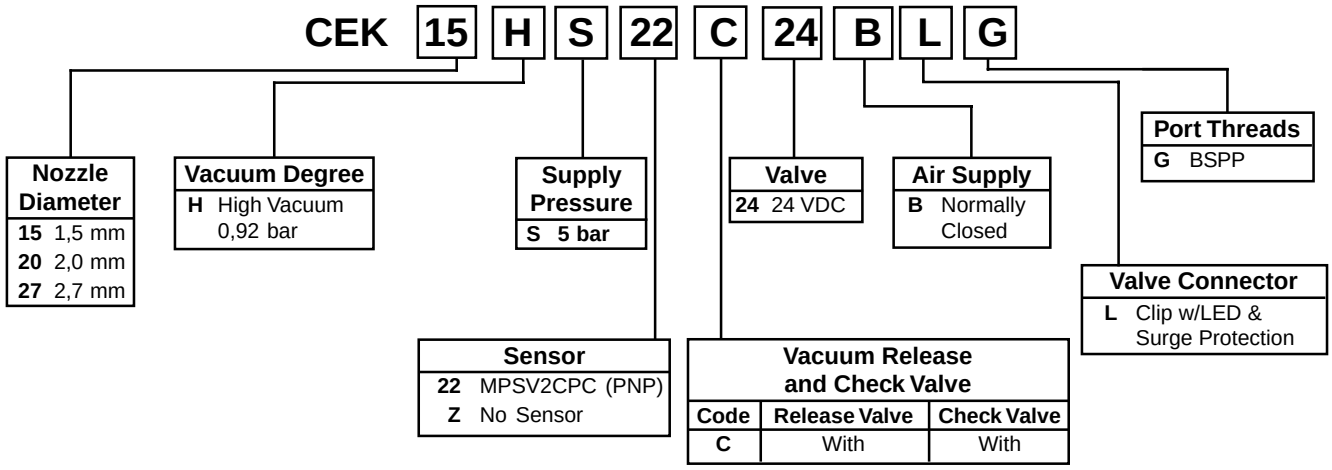
This unit is ideal for non-porous applications that require fast response of large vacuum and blow-off release flow, an E-Stop valve, optional air-economizing features, and DeviceNet™ communications.

Typically, with a Normally Closed air Circuit, the user controls vacuum with a command signal. During an E-Stop or power failure event, the vacuum command signal is lost, but, the E-Stop valve **(1)** remains in the current operating position due to the construction of the valve. The air-economizing valve **(5)**, in a Normally Open configuration, passes the air supply from the E-Stop valve **(1)**. The Sensor **(2)** output activates the air-economizing valve **(5)** closing the air supply to the Normally Closed master valve. The Check Valve **(3)** maintains the achieved vacuum level until the hysteresis value of the Sensor **(2)** is reached or when the E-Stop valve **(1)** has been returned to the closed position to stop the vacuum operation.

Valve Controlled E-Stop Circuit



Model Number Index



B

Specifications

Media	Non-Lubricated Compressed Air, Non-Corrosive Gases
Operating Pressure	5 bar
Humidity	35 to 85%
Pressure Port	**G:** 1/4 BSPP Female
Vacuum Port	**G:** 3/8 BSPP Female
Operating Temperature	5 to 50 °C
Material	Aluminium, Brass, NBR
Manifold Weight	2-Station: 680 g, 3-Station: 880 g, 4-Station: 1080 g, 5-Station: 1280 g

	Air-Economizing Valve and Blow-off Release Pilot	**E-Stop Valve**
Type of Control Valve	Pilot Valve	Double Solenoid
Manual Operation	Manual Override	Manual Overrides
Electrical Connection	Clip Connector with LED and Surge	Clip Connector with LED and Surge
Power Supply	24 VDC ± 10%	24 VDC ± 10%
Power Consumption	0,9 W	0,9 W
Operating Pressure	5 bar	5 bar
Air Supply	Normally Closed	Normally Closed

Performance

Item	Nozzle Diameter [mm]	Vacuum Degree at 5 bar [%]	Vacuum Flow [l/min]	Air Consumption [l/min]	Weight [g]
15HS	1,5	90	60	100	750
20HS	2,0	90	95	180	750
27HS	2,7	90	125	295	750

Evacuation Time

Series / Nozzle Diameter	Air Supply Pressure	Air Consumption	Evacuation Time in sec / liter to reach different Vacuum Levels [%]								
	[bar]	[l/min]	10	20	30	40	50	60	70	80	90
CEK-15HS	5	100	0,08	0,17	0,28	0,44	0,65	0,93	1,43	2,20	6,70
CEK-20HS	5	180	0,04	0,09	0,16	0,27	0,43	0,66	1,06	1,89	4,60
CEK-27HS	5	295	0,02	0,07	0,12	0,20	0,30	0,47	0,70	1,49	—

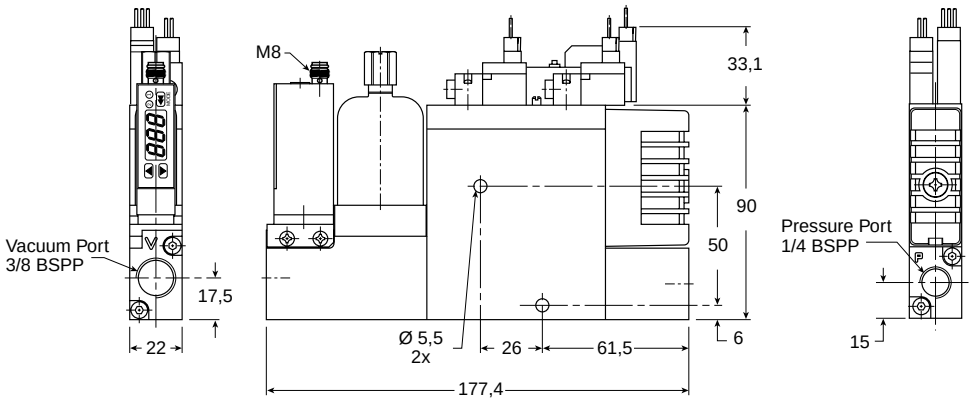
Station 1 Station 2 Station 3 Station 4 Station 5

Manifold Block

CVK - M 2 G

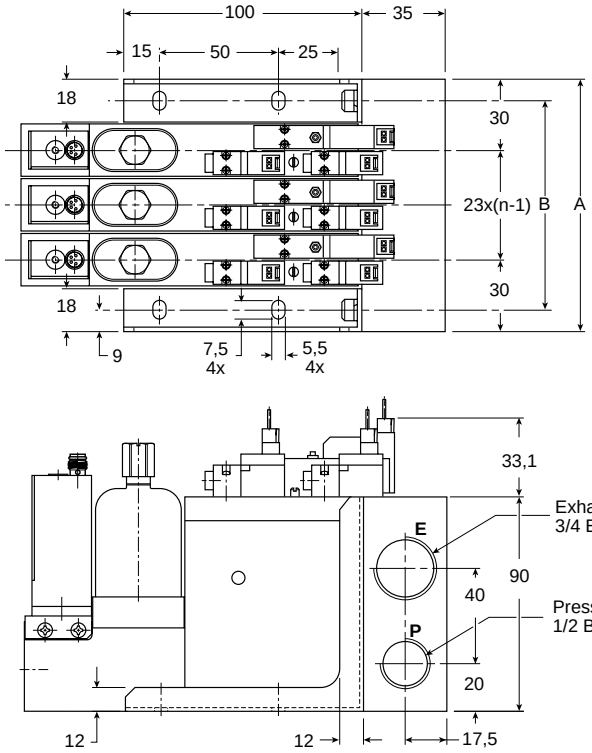
Manifold	Stations	Port Size
	2	G 1/8 BSPP
	3	
	4	
	5	

Generator

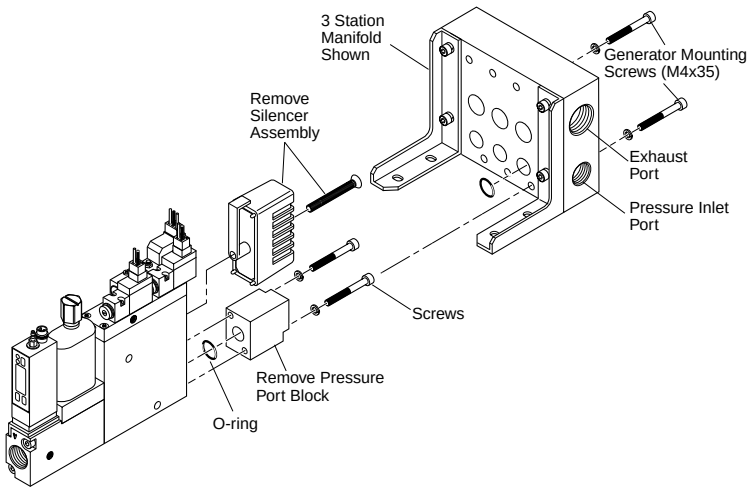


Manifold

3-Station Manifold Shown



Manifold Assembly
Remove Pressure Port Block and Silencer Assembly. Use existing O-rings and Manifold Mounting Screws to secure the CEK unit to the Manifold.

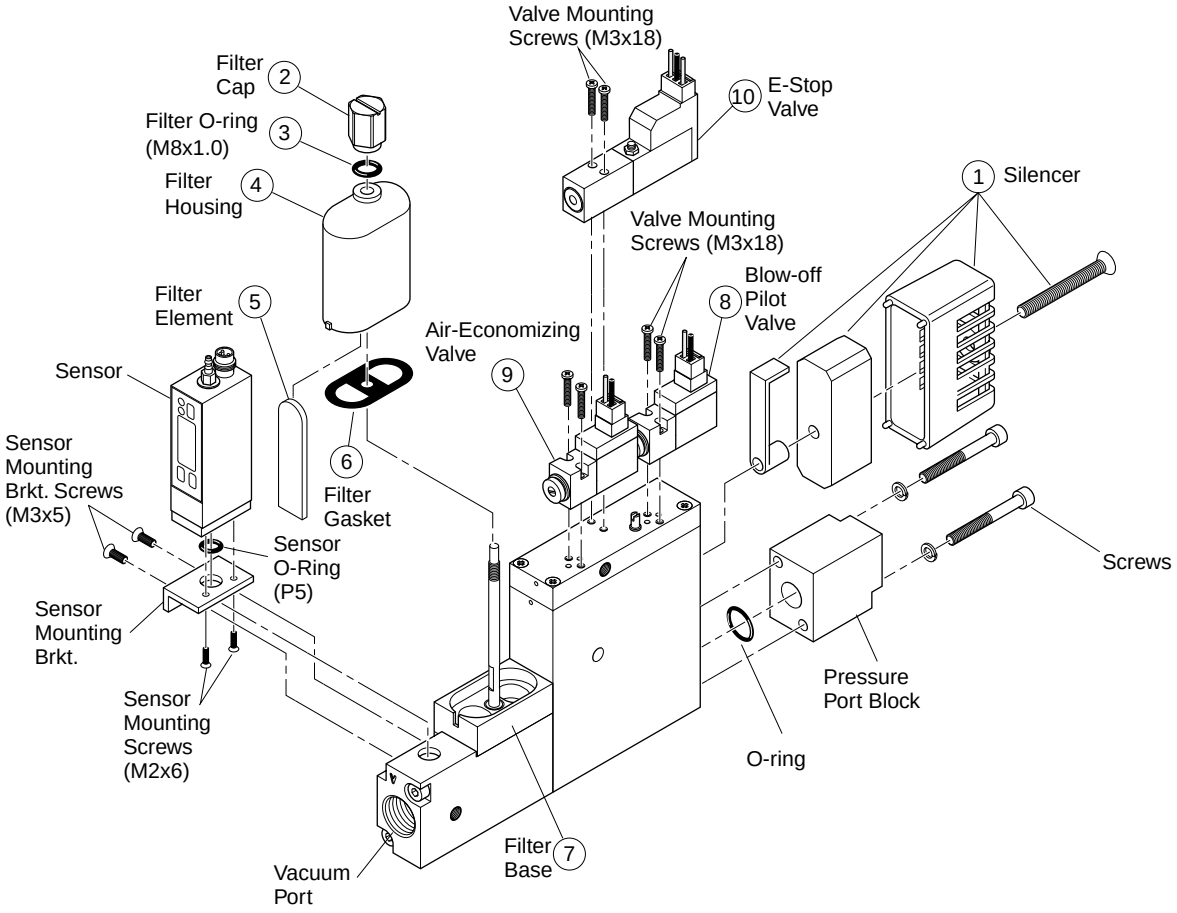


n	2	3	4	5
A	83	106	129	152
B	65	88	111	134

Millimeter
n = Number of Stations

Replacement Components

Item	Part Number	Description
1	CVK-S	Silencer
2 thru 7	CVK-F	Filter Kit
5	CVK-E	Filter Element



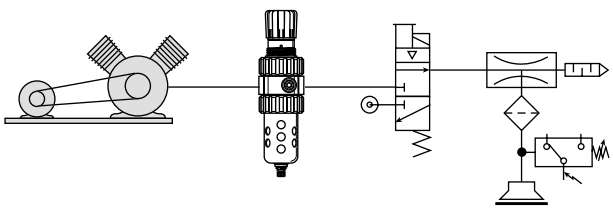
Cautions

Do not use or expose the CEK with fluids or corrosive gases. Vacuum Venturi's are designed to be used with non-lubricated, non-corrosive, compressed air.

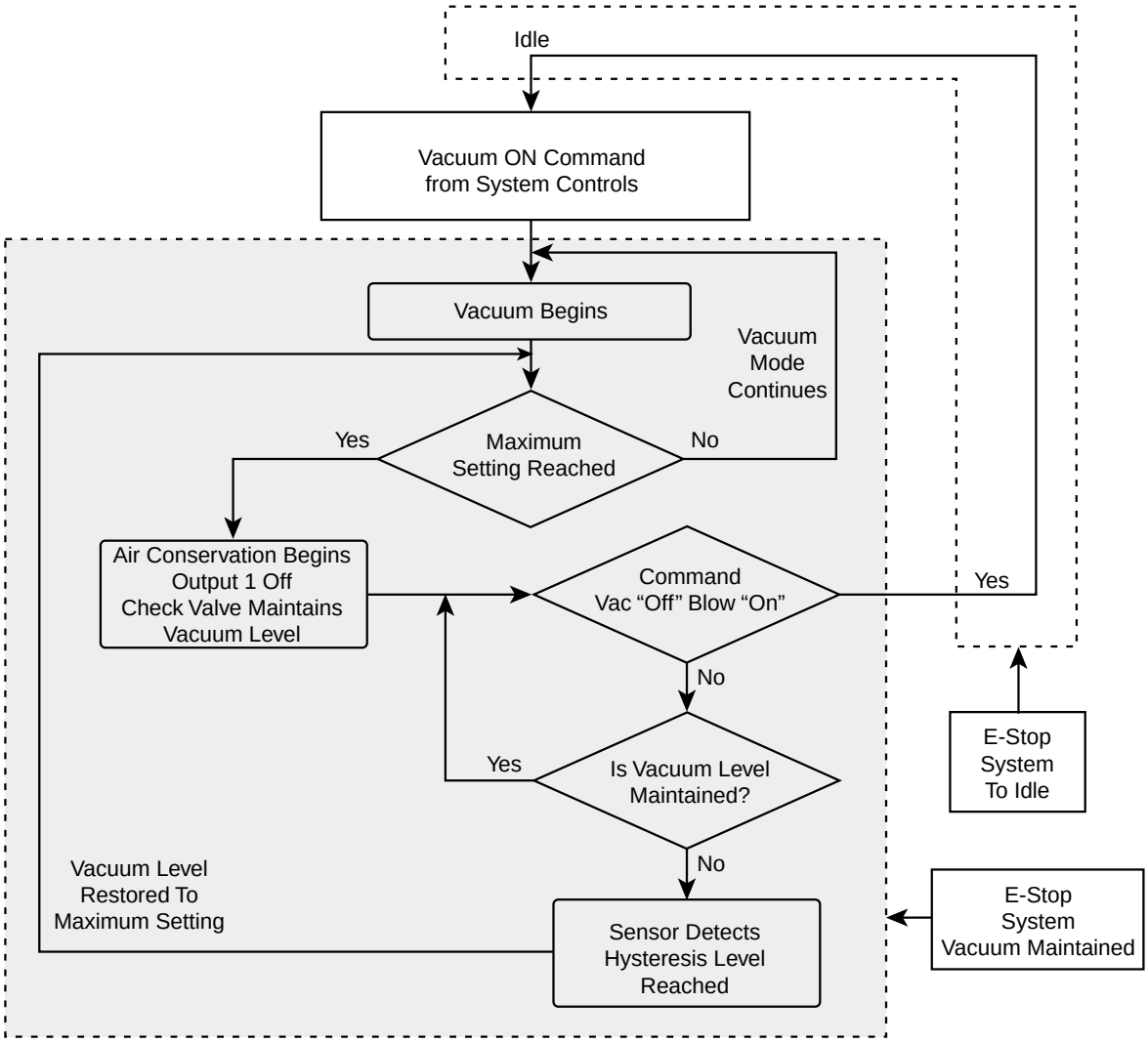
Do not operate CEK generators outside the temperature range and pressures listed in the specifications section of this catalog. Regulate the compressed air to 4,8 bar and filtrate with a maximum 40 micron filter. Non-lubricated compressed air will maintain the life and vacuum level of the generator.

Check the insulation of all lead wires after installation to avoid shorts. Properly secure all lead wires to avoid stress or repeated movement that may fray lead wires.

Some electrical components are diode or zener diode protected. When installing solenoids and sensors, check the polarity of the component before applying power. Apply the appropriate voltage to the solenoids and sensors. Inappropriate voltage, shorts, or surges may damage the circuitry.



CEK - System Logic



CEK - E-Stop Operating System (EOS)

The E-Stop Operating System is designed to maintain the last state of operation when an E-stop or power failure occurs.

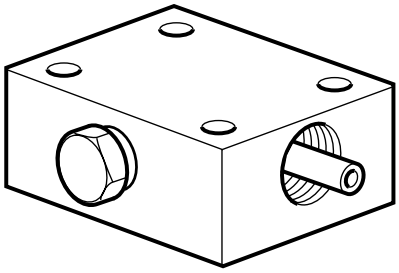
The chart below illustrates the state of operation in different modes.

Modes	Vacuum On	Vacuum Off	Blow-Off	EOS
Normal Conditions	Air-economizing between 0,61-0,54 bar	Idle	Blow-Off On Blow-Off Idle	EOS Off
Emergency-Stop, Power Failure, Loss of DeviceNet™ Communications or Power	Vacuum On ↓ Vacuum On	Idle	Blow-Off On or Idle ↓ Idle	EOS On
Restore Power	Vacuum On Air-economizing Function Resumes	Idle	Idle	EOS Off

This range of generators give high vacuum at low supply pressure, which makes them economical on energy. The generators provide more than 85% vacuum at 4 bar supply pressure, and are made from anodised aluminium with no moving parts, which gives them high reliability.

Typical applications are suction cups, evacuation of moulds, metering of fluids and powders, vacuum chucks, leakage finding, evacuation of contaminated media etc.

The generators are provided with a special union for quick and controlled component blow-off. This union can also be used to add optional equipment such as a vacuum monitor, vacuum gauge etc.



Model Number Index

P5V - GA | **R** | **0** | **3** | **1** | **2**

	Options and accessories
R*	With rapid release connection
V*	Fitted with holding valve with rapid release connection
N	No rapid release, only Size 72
*****	These features are not available on size 72

	Size
03	30 Nl/min
06	60 Nl/min
12	120 Nl/min
24	240 Nl/min
42	420 Nl/min
72	720 Nl/min

Port size vacuum

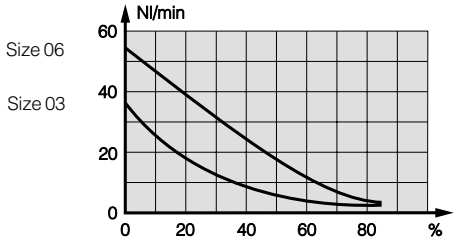
Possible combinations and order codes, see main data sheet.

Specification

Material

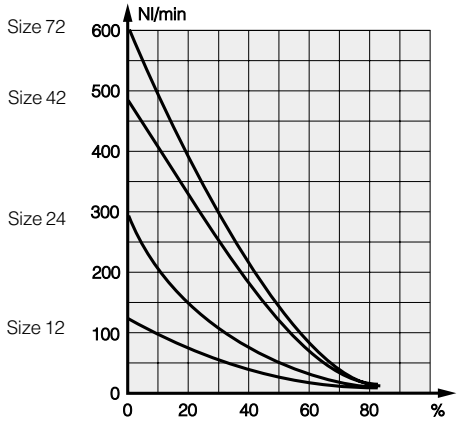
Body	Aluminium
Nozzle	Brass

Suction flow as function of vacuum level

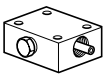


Options and additional information

Nozzle in acetal plastic on request.

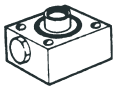


Main data for generator, Compact - Solid

	Time to evacuate 1litre to 75% vacuum [s]	Air consumption at 4 bar [Nl/min]	Port size (vacuum)	Weight [kg]	Order code
Basic					
	6,00	30	Female G1/4	0,08	**P5V-GAR0312**
	3,00	60	Female G1/2	0,11	**P5V-GAR0614**
	1,50	120	Female G1/2	0,14	**P5V-GAR1214**
	0,75	240	Female G1/2	0,19	**P5V-GAR2414**
	0,45	420	Female G3/4	0,24	**P5V-GAR4216**
	0,25	720	Female G1/2	0,55	**P5V-GAR7214**
With holding valve					
	3,00	60	Female G1/2	0,32	**P5V-GAV0614**
	1,50	120	Female G1/2	0,34	**P5V-GAV1214**
	0,75	240	Female G1/2	0,40	**P5V-GAV2414**
	0,45	420	Female G3/4	0,45	**P5V-GAV4216**

Air supply pressure for optimum vacuum level (92%): 4 bar

Main data for Vacuum Holding Valve, to be fitted to Compact Solid Generators from P5V-GAR0614 to P5V-GAR4216

	Weight kg	Order code
	**0,11**	8204950201

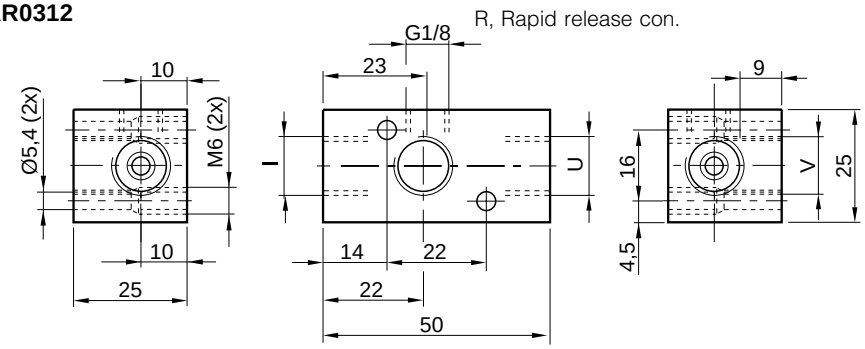
Generators in sizes 06-42 can also be combined with a vacuum lock, VSA60, which is a valve manifold containing two independent valves, a vacuum latching valve and an air entry valve which is installed directly on the generator. The low spring force means that the vacuum drop across the latching valve is minimal. When air supply to the generator ceases, the VSA60 retains the load with vacuum maintained. This gives energy savings and offers increased safety at the same time. The workpiece can be released quickly with a controlled compressed air signal via the air entry port of the vacuum lock.

The VSA60 can also be used separately, complete with flange unions and a housing to cover it, when you want to install generators centrally, in order to supply several suction cups with vacuum at the same time.

Generators Compact - Solid, serie P5V-GA

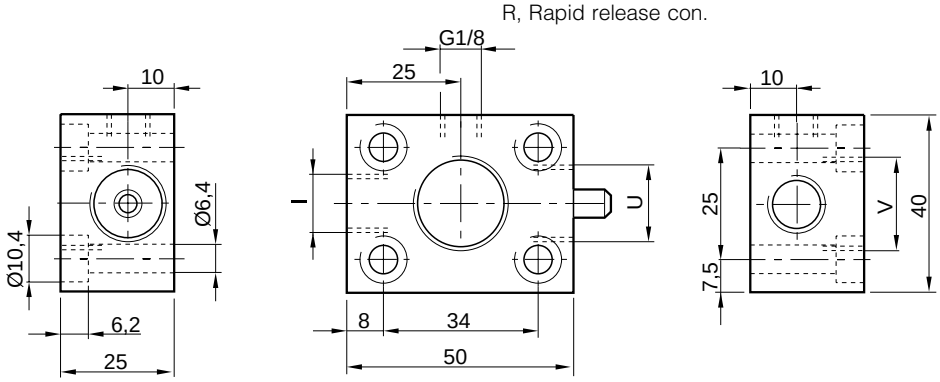
P5V-GAR0312

R, Rapid release con.



P5V-GAR0614

R, Rapid release con.

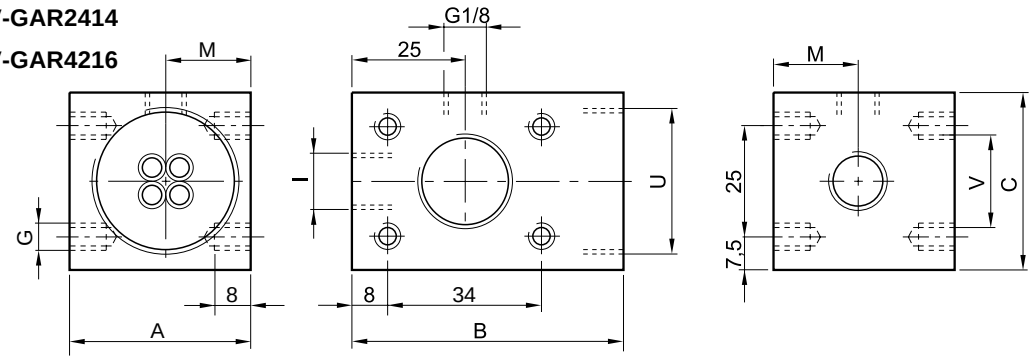


P5V-GAR1214

P5V-GAR2414

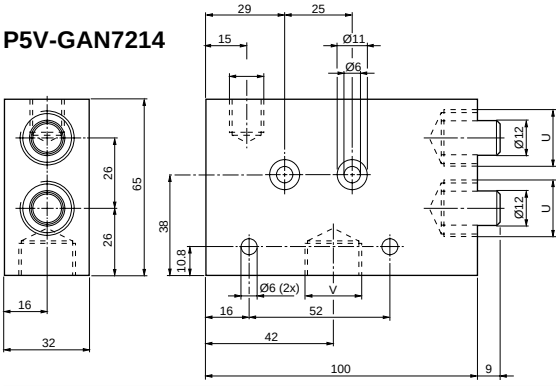
P5V-GAR4216

R, Rapid release con.

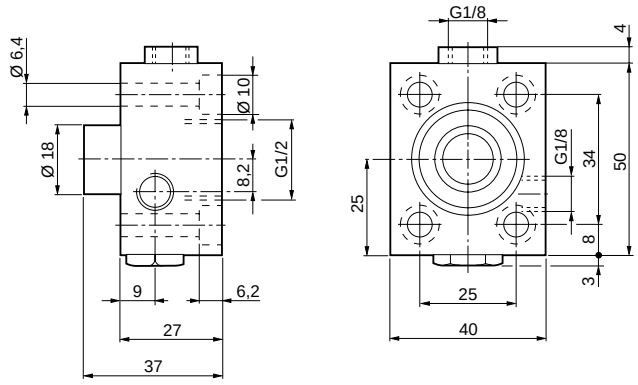


Order code	A	B	C	G	M	I Inlet	V Vacuum	U Outlet
P5V-GAR0312						G1/4	G1/4	G1/4
P5V-GAR0614						G1/4	G1/2	G3/8
P5V-GAR1214	25	50	40	M6	12,0	G1/4	G1/2	G1/2
P5V-GAR2414	40	60	40	M6	18,5	G1/4	G1/2	G1
P5V-GAR4216	40	60	40	M6	18,5	G1/4	G3/4	G1
P5V-GAN7214						G1/4	G1/2	G1/2

P5V-GAN7214



Holding valve

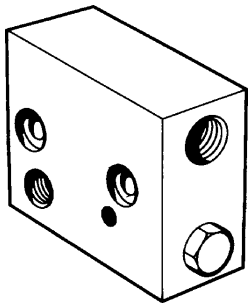


B

A range of generators, incorporating integral holding and rapid release valve features. The generators are available in four sizes, with air consumptions ranging from 20 l/min to 60 l/min at a supply pressure of 4 bar.

Incorporation of a holding valve allows vacuum to be maintained for a time after loss of the compressed air supply. The length of this time depends on the amount of leakage in the system. The holding function also allows compressed air to be saved, by operating the generator intermittently and monitoring the pressure with a vacuum switch.

The rapid release valve is used to break the vacuum by means of compressed air, in order quickly to release the load. Operation of this valve has been improved, so that it now opens at a pressure of only 0.5 bar, which means that a low pressure can be used for releasing the load.



Model Number Index

P5V - GW V 0 2 1 4

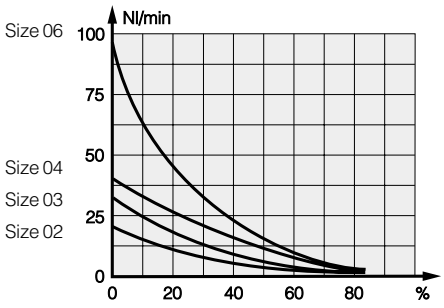
	Size
02	20 Nl/min
03	30 Nl/min
04	40 Nl/min
06	60 Nl/min

Specification

Material

Body	Aluminium
Nozzle	Brass
Seals	Nitrile, NBR

Suction flow as function of vacuum level

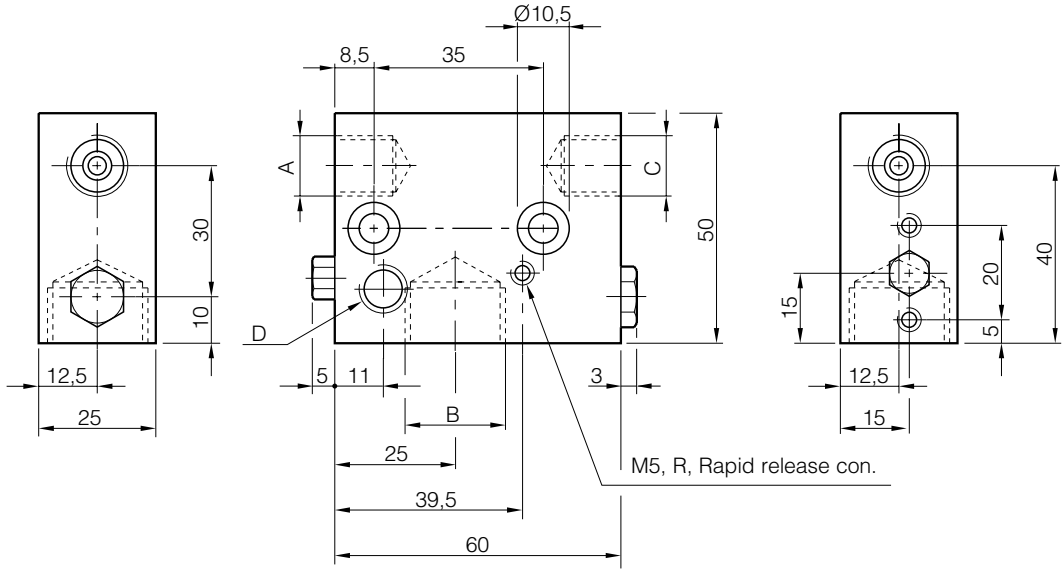


Main data for Generator Compact - AirSaver

Time to evacuate 1litre to 75% vacuum [s]	Air consumption at 4 bar [Nl/min]	Port size (vacuum)	Weight [kg]	Order code
9,0	20	G1/2 Female	0,18	**P5V-GWV0214**
6,0	30	G1/2 Female	0,18	**P5V-GWV0314**
4,5	40	G1/2 Female	0,18	**P5V-GWV0414**
3,0	60	G1/2 Female	0,18	**P5V-GWV0614**

Air supply pressure for optimum vacuum level (90%): 4 bar

Generators Compact - AirSaver, serie GW



Order code	A Inlet	B Vacuum	C Outlet	D* Vacuum
P5V-GWV0214	G1/4	G1/2	G1/4	G1/8
P5V-GWV0314	G1/4	G1/2	G1/4	G1/8
P5V-GWV0414	G1/4	G1/2	G1/4	G1/8
P5V-GWV0614	G1/4	G1/2	G1/4	G1/8

* Connection for vacuum gauge etc