Vacuum Generators
Convum

Section B

FLUIDS UNDER CONTROL
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## Technical Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCA</td>
<td>Venturi Generator for inline use or in combination with TYS level compensators.</td>
<td>124-127</td>
</tr>
<tr>
<td>CV</td>
<td>Venturi Generator, precision manufactured for long life. External valving is required for operation.</td>
<td>128-131</td>
</tr>
<tr>
<td>CV-CK</td>
<td>Venturi Generator with adjustable open contact switch for vacuum confirmation.</td>
<td>132-135</td>
</tr>
<tr>
<td>CV-VR</td>
<td>Venturi Generator with blow-off reservoir. Blow-off release occurs automatically when the air supply valve interrupts the air supply.</td>
<td>136-139</td>
</tr>
<tr>
<td>MC2</td>
<td>Sub compact venturi generator with valving to control vacuum and blow-off release. Includes filter, silencer, and sensor porting.</td>
<td>140-147</td>
</tr>
<tr>
<td>CVK</td>
<td>Venturi Generator for large flow rates with valving to minimize response time of the vacuum and blow-off release. Air-economizing features available. Includes filter, silencer, and sensor porting.</td>
<td>148-155</td>
</tr>
<tr>
<td>CVX-0260</td>
<td>Normally Closed vacuum venturi with a vacuum controlled E-Stop function. Large flow rates with valving to minimize response time of the vacuum and blow-off release. Air-economizing features available. Includes filter, silencer, and sensor porting.</td>
<td>156-161</td>
</tr>
<tr>
<td>CEK</td>
<td>Normally Closed vacuum venturi with a valve controlled E-Stop function. Large flow rates with valving to minimize response time of the vacuum and blow-off release. Air-economizing features available. Includes filter, silencer, and sensor porting.</td>
<td>162-167</td>
</tr>
<tr>
<td>Model</td>
<td>Description</td>
<td>Pages</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>P5V-GA</td>
<td>Basic Generator</td>
<td>168-171</td>
</tr>
<tr>
<td>P5V-GWV</td>
<td>Basic Generator with holding valve and release</td>
<td>172-173</td>
</tr>
</tbody>
</table>
**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

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.

<table>
<thead>
<tr>
<th>Nozzle Diameter</th>
<th>Minimum Tube I.D. [mm]</th>
<th>Flow [Cv]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,5 mm</td>
<td>4</td>
<td>0,16</td>
</tr>
<tr>
<td>1,0 mm</td>
<td>4</td>
<td>0,16</td>
</tr>
<tr>
<td>1,5 mm</td>
<td>6</td>
<td>0,379</td>
</tr>
<tr>
<td>2,0 mm</td>
<td>8</td>
<td>0,65</td>
</tr>
<tr>
<td>2,5 mm</td>
<td>8</td>
<td>0,95</td>
</tr>
<tr>
<td>3,0 mm</td>
<td>10</td>
<td>1,35</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Nozzle Diameter</th>
<th>Maximum Suction Cup Diameter [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,5 mm</td>
<td>20</td>
</tr>
<tr>
<td>1,0 mm</td>
<td>50</td>
</tr>
<tr>
<td>1,5 mm</td>
<td>60</td>
</tr>
<tr>
<td>2,0 mm</td>
<td>120</td>
</tr>
<tr>
<td>2,5 mm</td>
<td>150</td>
</tr>
<tr>
<td>3,0 mm</td>
<td>200</td>
</tr>
</tbody>
</table>

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.

\[
RT = \left( \frac{V_D}{C} \right)^{1/a}
\]

- \(RT(\text{sec})\) = 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
- \(V_D = 0.780 \times \text{ID}^2 \times \text{L(m)} / 1000 + P_V\) (n)
- \(P_V\) = Pad volume in liters
- \(n\) = Number of pads

### 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)

\[
P_V = 0.26 \text{ l} \quad n = 1
\]

\[
V_D = 0.780 \times (10 \text{ mm})^2 \times (3 \text{ meters} / 1000) + 0.26 \times (1) = 0.494 \text{ l}
\]

\[
RT = (0.494/0.69)^{1/1} = 0.71 \text{ sec.}
\]

Therefore, it would require 0.71 seconds to evacuate 0.26 liters of air to a vacuum level of 0.92 bar.
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.
**Vacuum Generators**

### Model Number Index

**MCA**

<table>
<thead>
<tr>
<th>Nozzle Diameter</th>
<th>Vacuum Degree</th>
<th>Supply Pressure</th>
<th>Pressure Port</th>
<th>Vacuum Port</th>
<th>Exhaust Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>05 0.5 mm</td>
<td>H High Vacuum</td>
<td>S 5 bar</td>
<td>T6 6 mm Tube</td>
<td>T6 6 mm Tube</td>
<td>G1 1/8 BSPP (05, 07)</td>
</tr>
<tr>
<td>07 0.7 mm</td>
<td>L Low Vacuum</td>
<td></td>
<td></td>
<td></td>
<td>G2 1/4 BSPP (10, 13)</td>
</tr>
<tr>
<td>10 1.0 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T6 6 mm Tube (05, 07)</td>
</tr>
<tr>
<td>13 1.3 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T8 8 mm Tube (10, 13)</td>
</tr>
</tbody>
</table>

### Specifications

<table>
<thead>
<tr>
<th>Media</th>
<th>Non-Lubricated Air, Non-Corrosive Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>1 to 8 bar</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 to 50 °C</td>
</tr>
<tr>
<td>Material</td>
<td>Polycarbonate, Aluminium Fittings</td>
</tr>
</tbody>
</table>

### Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Nozzle Diameter</th>
<th>Vacuum Degree at 5 bar [%]</th>
<th>Vacuum Flow [l/min]</th>
<th>Air Consumption [l/min]</th>
<th>Weight [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCA05HS*</td>
<td>0.5</td>
<td>88</td>
<td>5.5</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>MCA05LS*</td>
<td></td>
<td>55</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCA07HS*</td>
<td>0.7</td>
<td>88</td>
<td>12</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>MCA07LS*</td>
<td></td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>MCA10HS*</td>
<td>1.0</td>
<td>88</td>
<td>24</td>
<td>38</td>
<td>47</td>
</tr>
<tr>
<td>MCA10LS*</td>
<td></td>
<td>55</td>
<td></td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>MCA13HS*</td>
<td>1.3</td>
<td>88</td>
<td>36</td>
<td>79</td>
<td>23</td>
</tr>
</tbody>
</table>

### Evacuation Time

<table>
<thead>
<tr>
<th>Series / Nozzle Diameter</th>
<th>Air Supply Pressure [bar]</th>
<th>Air Consumption [l/min]</th>
<th>Evacuation Time in sec / liter to reach different Vacuum Levels [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10 20 30 40 50 60 70 80 90</td>
<td></td>
</tr>
<tr>
<td>MCA-05HS</td>
<td>5 5 5 5 5 5 5 5 5</td>
<td>0.74 1.87 2.90 4.44 6.44 8.84 12.50 17.50 22.50</td>
<td></td>
</tr>
<tr>
<td>MCA-05LS</td>
<td>5 5 5 5 5 5 5 5 5</td>
<td>0.43 0.95 1.61 2.55 4.12 6.81 — — —</td>
<td></td>
</tr>
<tr>
<td>MCA-07HS</td>
<td>5 5 5 5 5 5 5 5 5</td>
<td>0.34 0.75 1.25 1.98 3.10 4.62 6.45 9.29 —</td>
<td></td>
</tr>
<tr>
<td>MCA-07LS</td>
<td>5 5 5 5 5 5 5 5 5</td>
<td>0.20 0.44 0.76 1.25 2.63 — — —</td>
<td></td>
</tr>
<tr>
<td>MCA-10HS</td>
<td>5 5 5 5 5 5 5 5 5</td>
<td>0.18 0.39 0.65 1.00 1.45 2.06 2.94 4.36 —</td>
<td></td>
</tr>
<tr>
<td>MCA-10LS</td>
<td>5 5 5 5 5 5 5 5 5</td>
<td>0.11 0.22 0.38 0.67 1.21 2.87 — — —</td>
<td></td>
</tr>
<tr>
<td>MCA-13HS</td>
<td>5 5 5 5 5 5 5 5 5</td>
<td>0.13 0.26 0.44 0.69 1.01 1.41 2.07 3.69 —</td>
<td></td>
</tr>
</tbody>
</table>
## Replacement Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Model Number</th>
<th>Generator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silencer</td>
<td>MSS-01</td>
<td>MCA05HS/LS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MCA07HS/LS</td>
</tr>
<tr>
<td>Silencer</td>
<td>MSM-01</td>
<td>MCA10HS/LS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MCA13HS</td>
</tr>
<tr>
<td>Bracket</td>
<td>MCA-B</td>
<td>MCA05, 07, 10, 13</td>
</tr>
</tbody>
</table>

## 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.
### Vacuum Generators

#### MCA

#### Dimensions

<table>
<thead>
<tr>
<th>Item</th>
<th>A</th>
<th>B</th>
<th>P (Pressure Port)</th>
<th>V (Vacuum Port)</th>
<th>E (Exhaust Port)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCA05HS/LST6T6T6</td>
<td>55.2</td>
<td>28</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
</tr>
<tr>
<td>MCA05HS/LST6T6G1</td>
<td>55.2</td>
<td>28</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
<td>1/8&quot; BSPP Female</td>
</tr>
<tr>
<td>MCA07HS/LST6T6T6</td>
<td>55.2</td>
<td>28</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
</tr>
<tr>
<td>MCA07HS/LST6T6G1</td>
<td>55.2</td>
<td>28</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
<td>1/8&quot; BSPP Female</td>
</tr>
<tr>
<td>MCA10HS/LST6T6T8</td>
<td>70</td>
<td>29.5</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 8mm</td>
</tr>
<tr>
<td>MCA10HS/LST6T6G2</td>
<td>70</td>
<td>29.5</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
<td>1/4&quot; BSPP Female</td>
</tr>
<tr>
<td>MCA13HST6T6T8</td>
<td>70</td>
<td>29.5</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 8mm</td>
</tr>
<tr>
<td>MCA13HST6T6G2</td>
<td>70</td>
<td>29.5</td>
<td>One-touch Ø 6mm</td>
<td>One-touch Ø 6mm</td>
<td>1/4&quot; BSPP Female</td>
</tr>
</tbody>
</table>

Millimeter

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B
Vacuum Generators

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.
Model Number Index

<table>
<thead>
<tr>
<th>Nozzle Diameter</th>
<th>Vacuum Degree</th>
<th>Supply Pressure</th>
<th>Body Material</th>
<th>Nozzle Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>05</td>
<td>H (High Vacuum)</td>
<td>S (5 bar)</td>
<td>Blank</td>
<td>Blank</td>
</tr>
<tr>
<td>0.5 mm</td>
<td>90% High Vacuum</td>
<td></td>
<td>Aluminum</td>
<td>Nickel Plated</td>
</tr>
<tr>
<td>10</td>
<td>L (Low Vacuum)</td>
<td></td>
<td>S3 303SS</td>
<td>303SS</td>
</tr>
<tr>
<td>1,0 mm</td>
<td>57%</td>
<td></td>
<td>T PTFE</td>
<td>PTFE</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1,5 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,0 mm</td>
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<td></td>
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</tr>
<tr>
<td>25</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2,5 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,0 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30A</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Media</th>
<th>Non-Lubricated Air, Non-Corrosive Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>1 to 8 bar</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 to 50 °C</td>
</tr>
<tr>
<td>Material</td>
<td>Body: Aluminium, 303 Stainless, or PTFE</td>
</tr>
<tr>
<td></td>
<td>Nozzle: Nickel plated brass, 303 Stainless, PTFE</td>
</tr>
</tbody>
</table>

Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Nozzle Diameter [mm]</th>
<th>Vacuum Degree at 5 bar [%]</th>
<th>Vacuum Flow [l/min]</th>
<th>Air Consumption [l/min]</th>
<th>Weight [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV05HS</td>
<td>0.5</td>
<td>86</td>
<td>6</td>
<td>13</td>
<td>80</td>
</tr>
<tr>
<td>CV05LS</td>
<td></td>
<td>57</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV10HS</td>
<td>1.0</td>
<td>92</td>
<td>27</td>
<td>44</td>
<td>80</td>
</tr>
<tr>
<td>CV10LS</td>
<td></td>
<td>57</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV15HS</td>
<td>1.5</td>
<td>92</td>
<td>63</td>
<td>100</td>
<td>140</td>
</tr>
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<td>CV15LS</td>
<td></td>
<td>57</td>
<td>95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV20HS</td>
<td>2.0</td>
<td>92</td>
<td>110</td>
<td>180</td>
<td>350</td>
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<td>CV20LS</td>
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<td>165</td>
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<tr>
<td>CV25HS</td>
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<td>92</td>
<td>160</td>
<td>265</td>
<td>728</td>
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<tr>
<td>CV30ALSG</td>
<td></td>
<td>57</td>
<td>350</td>
<td></td>
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</tr>
</tbody>
</table>

Evacuation Time

<table>
<thead>
<tr>
<th>Series / Nozzle Diameter</th>
<th>Air Supply Pressure</th>
<th>Air Consumption</th>
<th>Evacuation Time in sec / liter to reach different Vacuum Levels [%]</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>[bar]</td>
<td>[l/min]</td>
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<td>44</td>
<td>0.17</td>
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<td>5</td>
<td>100</td>
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<tr>
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<td>385</td>
<td>0.04</td>
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</table>
Vacuum Generators

Replacement Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Model Number</th>
<th>Generator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silencer</td>
<td>MSS-01</td>
<td>CV05HS/LSG</td>
</tr>
<tr>
<td>Silencer</td>
<td>MSM-01</td>
<td>CV10HS/LSG</td>
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<td>Silencer</td>
<td>MSL-02</td>
<td>CV15HS/LSG</td>
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<td>Silencer</td>
<td>MS6-01</td>
<td>CV20HS/LSG</td>
</tr>
<tr>
<td>Silencer</td>
<td>CV25HS/LSG</td>
<td>CV30AHS/LSG</td>
</tr>
</tbody>
</table>

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.

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.
Vacuum Generators

CV

Dimensions

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

<table>
<thead>
<tr>
<th>Item</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV05HS/LSG</td>
<td>45</td>
<td>33</td>
<td>16</td>
<td>10</td>
<td>8</td>
<td>14</td>
<td>20</td>
<td>4.5</td>
<td>4.2</td>
<td>10</td>
<td>36</td>
<td>1/8 BSPP</td>
<td>1/8 BSPP</td>
<td>1/8 BSPP</td>
<td></td>
</tr>
<tr>
<td>CV10HS/LSG</td>
<td>45</td>
<td>33</td>
<td>16</td>
<td>10</td>
<td>8</td>
<td>14</td>
<td>20</td>
<td>4.5</td>
<td>4.2</td>
<td>10</td>
<td>36</td>
<td>1/8 BSPP</td>
<td>1/8 BSPP</td>
<td>1/8 BSPP</td>
<td></td>
</tr>
<tr>
<td>CV15HS/LSG</td>
<td>63</td>
<td>35</td>
<td>20</td>
<td>11</td>
<td>10</td>
<td>20</td>
<td>25</td>
<td>5</td>
<td>6</td>
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<td>45.5</td>
<td>14 BSPP</td>
<td>1/4 BSPP</td>
<td>1/4 BSPP</td>
<td></td>
</tr>
<tr>
<td>CV20HS/LSG</td>
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<td>15</td>
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<td>28</td>
<td>32</td>
<td>7</td>
<td>6</td>
<td>20</td>
<td>60.5</td>
<td>1/4 BSPP</td>
<td>3/8 BSPP</td>
<td>1/2 BSPP</td>
<td></td>
</tr>
<tr>
<td>CV25HS/LSG</td>
<td>100</td>
<td>60</td>
<td>40</td>
<td>20</td>
<td>16</td>
<td>20</td>
<td>50</td>
<td>5.5</td>
<td>6</td>
<td>17</td>
<td>96</td>
<td>3/8 BSPP</td>
<td>1/2 BSPP</td>
<td>3/4 BSPP</td>
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</tr>
<tr>
<td>CV30AHS/ALSG</td>
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<td>60</td>
<td>40</td>
<td>20</td>
<td>20</td>
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<td>6</td>
<td>20</td>
<td>96</td>
<td>1/2 BSPP</td>
<td>3/4 BSPP</td>
<td>3/4 BSPP</td>
<td></td>
</tr>
</tbody>
</table>

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.
Vacuum Generators

Model Number Index

<table>
<thead>
<tr>
<th>Nozzle Diameter</th>
<th>Vacuum Degree</th>
<th>Supply Pressure</th>
<th>Adjustable Mechanical Vacuum Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>05</td>
<td>High Vacuum</td>
<td>S 5 bar</td>
<td>CK G</td>
</tr>
<tr>
<td>10</td>
<td>Low Vacuum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Includes exhaust port silencer.

Specifications

<table>
<thead>
<tr>
<th>Media</th>
<th>Non-Lubricated Compressed Air, Non-Corrosive Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>1 to 8 bar</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 to 60 °C</td>
</tr>
<tr>
<td>Material</td>
<td>Body: Aluminium Nozzle: Nickel Plated Brass</td>
</tr>
<tr>
<td>Setting Range</td>
<td>0,20 to 0,53 bar</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0,05 bar</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>0,04 to 0,13 bar</td>
</tr>
<tr>
<td>Air Circuit</td>
<td>Normally Open</td>
</tr>
<tr>
<td>Switch Output</td>
<td>AC125V: 5A, AC250V: 3A, DC250V: 0,2A</td>
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Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Nozzle Diameter [mm]</th>
<th>Vacuum Degree at 5 bar [%]</th>
<th>Vacuum Flow [l/min]</th>
<th>Air Consumption [l/min]</th>
<th>Weight [g]</th>
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</thead>
<tbody>
<tr>
<td>CV05HSCKG</td>
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<td>6</td>
<td>13</td>
<td>119</td>
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<td>27</td>
<td>44</td>
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Evacuation Time

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<th>Air Supply Pressure [bar]</th>
<th>Air Consumption [l/min]</th>
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<th>20</th>
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<th>50</th>
<th>60</th>
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<td>0,72</td>
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<td>0,23</td>
<td>0,32</td>
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<td>0,09</td>
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<td>0,21</td>
<td>0,40</td>
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</tbody>
</table>
Replacement Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Model Number</th>
<th>Generator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silencer</td>
<td>MSS-01</td>
<td>CV05HS/LSCKG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CV10HS/LSCKG</td>
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<tr>
<td>Silencer</td>
<td>MSM-01</td>
<td>CV15HS/LSCKG</td>
</tr>
<tr>
<td>Silencer</td>
<td>MSL-02</td>
<td>CV20HS/LSCKG</td>
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<tr>
<td>Mechanical</td>
<td>CV-CK-SWITCH</td>
<td>CV05 thru 20</td>
</tr>
</tbody>
</table>

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.
Vacuum Generators

CV-CK

Dimensions

<table>
<thead>
<tr>
<th>Item</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>G1</th>
<th>G2</th>
<th>SW1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV05LSCKG</td>
<td>45</td>
<td>33</td>
<td>16</td>
<td>10</td>
<td>8</td>
<td>14</td>
<td>20</td>
<td>4.5</td>
<td>4.2</td>
<td>10</td>
<td>36</td>
<td>18.5</td>
<td>BSPP 1/8</td>
<td>BSPP 1/8</td>
<td>14</td>
</tr>
<tr>
<td>CV10LSCKG</td>
<td>45</td>
<td>33</td>
<td>16</td>
<td>10</td>
<td>8</td>
<td>14</td>
<td>20</td>
<td>4.5</td>
<td>4.2</td>
<td>10</td>
<td>36</td>
<td>18.5</td>
<td>BSPP 1/8</td>
<td>BSPP 1/8</td>
<td>14</td>
</tr>
<tr>
<td>CV15LSCKG</td>
<td>63</td>
<td>35</td>
<td>20</td>
<td>11</td>
<td>10</td>
<td>20</td>
<td>25</td>
<td>5</td>
<td>4.5</td>
<td>15</td>
<td>45.5</td>
<td>20</td>
<td>BSPP 1/4</td>
<td>BSPP 1/4</td>
<td>17</td>
</tr>
<tr>
<td>CV20LSCKG</td>
<td>85</td>
<td>40</td>
<td>30</td>
<td>15</td>
<td>13</td>
<td>28</td>
<td>32</td>
<td>7</td>
<td>6</td>
<td>20</td>
<td>60.5</td>
<td>30</td>
<td>BSPP 1/4</td>
<td>BSPP 3/8</td>
<td>24</td>
</tr>
</tbody>
</table>

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.
Vacuum Generators
CV-VR

Model Number Index

<table>
<thead>
<tr>
<th>CV</th>
<th>15</th>
<th>H</th>
<th>S</th>
<th>VR</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle Diameter</td>
<td>Vacuum Degree</td>
<td>Supply Pressure</td>
<td>Automatic Vacuum Release Type</td>
<td>Pressure &amp; Vacuum Port</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1.5 mm</td>
<td>H High Vacuum 90%</td>
<td>S 5 bar</td>
<td>G 1/4 BSPP</td>
<td></td>
</tr>
</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Media</th>
<th>Non-Lubricated Compressed Air, Non-Corrosive Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>1 to 8 bar</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 to 50 °C</td>
</tr>
<tr>
<td>Material</td>
<td>Body: Die-Cast Aluminium Packing: NBR</td>
</tr>
</tbody>
</table>

Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Nozzle Diameter [mm]</th>
<th>Blow-off Time (s) 30cc Max.</th>
<th>Vacuum Degree at 5 bar</th>
<th>Vacuum Flow [l/min]</th>
<th>Air Consumption [l/min]</th>
<th>Weight [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV15HSG</td>
<td>1.5</td>
<td>0.20</td>
<td>0.92</td>
<td>63</td>
<td>100</td>
<td>253</td>
</tr>
</tbody>
</table>

Evacuation Time

<table>
<thead>
<tr>
<th>Series / Nozzle Diameter</th>
<th>Air Supply Pressure [bar]</th>
<th>Air Consumption [l/min]</th>
<th>Evacuation Time in sec / liter to reach different Vacuum Levels [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>CV-15HS</td>
<td>5</td>
<td>100</td>
<td>0.09</td>
</tr>
</tbody>
</table>
Vacuum Generators

CV-VR

Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Model Number</th>
<th>Generator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silencer</td>
<td>MSM-01</td>
<td>CV15HSVRG</td>
</tr>
</tbody>
</table>

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.
## Dimensions

![Diagram of Vacuum Generators CV-VR Dimensions](image)

<table>
<thead>
<tr>
<th>Item</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV15HSVRG</td>
<td>70</td>
<td>64</td>
<td>40</td>
<td>20</td>
<td>60</td>
<td>20</td>
<td>6</td>
<td>36</td>
<td>7</td>
<td>25</td>
<td>22</td>
<td>9</td>
<td>32</td>
<td>17.5</td>
</tr>
</tbody>
</table>

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 footprint 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

---

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**Normally Closed Vacuum Circuit**
The Vacuum Pilot is Energized to Activate Vacuum

**Normally Open Vacuum Circuit**
The Vacuum Pilot is Energized to Deactivate Vacuum
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

<table>
<thead>
<tr>
<th>Item</th>
<th>Nozzle Diameter [mm]</th>
<th>Vacuum Degree at 5 bar [%]</th>
<th>Vacuum Flow [l/min]</th>
<th>Air Consumption [l/min]</th>
<th>Weight [g]</th>
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<tbody>
<tr>
<td>05HS</td>
<td>0.5</td>
<td>86</td>
<td>6</td>
<td>10</td>
<td>117</td>
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<tr>
<td>05LS</td>
<td>0.5</td>
<td>53</td>
<td>10</td>
<td>10</td>
<td>117</td>
</tr>
<tr>
<td>07HS</td>
<td>0.7</td>
<td>86</td>
<td>11</td>
<td>22.5</td>
<td>117</td>
</tr>
<tr>
<td>07LS</td>
<td>0.7</td>
<td>53</td>
<td>21</td>
<td>22.5</td>
<td>117</td>
</tr>
<tr>
<td>10HS</td>
<td>1.0</td>
<td>86</td>
<td>20</td>
<td>44</td>
<td>117</td>
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### Evacuation Time

<table>
<thead>
<tr>
<th>Series / Nozzle Diameter</th>
<th>Air Supply Pressure [bar]</th>
<th>Air Consumption [l/min]</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
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<td>10</td>
<td>0.64</td>
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<td>MC2-05LS</td>
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<td>0.63</td>
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<td>2.00</td>
<td>3.80</td>
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<tr>
<td>MC2-10HS</td>
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<td>0.72</td>
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<td>4.25</td>
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Model Number Index

<table>
<thead>
<tr>
<th>Function</th>
<th>Nozzle Diameter</th>
<th>Vacuum Degree</th>
<th>Sensor</th>
<th>Supply Pressure</th>
<th>Body Type</th>
<th>Pressure Port</th>
<th>Voltage</th>
<th>Master Valve Air Supply</th>
<th>Valve Connector</th>
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</thead>
<tbody>
<tr>
<td>S</td>
<td>0.5 mm</td>
<td>H</td>
<td>02</td>
<td>S</td>
<td>L</td>
<td>G</td>
<td>24</td>
<td>A</td>
<td>500 mm Lead Clip w/ Lamp &amp; Surge</td>
</tr>
<tr>
<td>0.7 mm</td>
<td>L</td>
<td>09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>1.0 mm</td>
<td>L</td>
<td>07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Z</td>
<td></td>
</tr>
</tbody>
</table>

---

Evacuation Time in sec / liter to reach different Vacuum Levels [%]
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 Pilot Valve
- Blow-Off Pilot Valve
- Vacuum Part Present Output

**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.

---

MC2 with MPS-2 Series

**Basic System**
- Vacuum Pilot Valve
- Blow-Off Pilot Valve
- Sensor Output 1
- Sensor Output 2

**Vacuum System Programming**

**Output Adjustment**
- Sensor functions and outputs are programmed by touch panel.

---

MC2 with MVS-201 Series

**Basic System with 201 Sensor**
- Sensor
- Vacuum Part Present Output

**Vacuum System Programming**

**Output Adjustment**
- Sensor functions and outputs are programmed by touch panel.
Manifold Part Number

MC2 - M 2 G

<table>
<thead>
<tr>
<th>Stations</th>
<th>Port Size</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>G 1/8 BSPP</td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Station Station Station Station Station Station Station Station
1 2 3 4 5 6 7 8
Vacuum Generators – Manifolds

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.

<table>
<thead>
<tr>
<th>n</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>56,5</td>
<td>77</td>
<td>97,5</td>
<td>118</td>
<td>138,5</td>
<td>159</td>
<td>179,5</td>
</tr>
</tbody>
</table>

Millimeter
n = Number of Stations
Replacement Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MC2-S</td>
<td>Silencer</td>
</tr>
<tr>
<td>2, 3, 4</td>
<td>MC2-F</td>
<td>Filter Kit</td>
</tr>
<tr>
<td>3</td>
<td>MC2-E</td>
<td>Filter Element</td>
</tr>
<tr>
<td>5</td>
<td>MC2-24B</td>
<td>N.C. Pilot Valve</td>
</tr>
<tr>
<td>7</td>
<td>MC2-B</td>
<td>Mounting Kit</td>
</tr>
</tbody>
</table>

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.

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.

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.
Vacuum Generators

MC2

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
Vacuum Generators

Model Number Index

CVK 15 H S 62 C 24 B D G

- Nozzle Diameter
  - 15: 1.5 mm
  - 20: 2.0 mm
  - 27: 2.7 mm

- Vacuum Degree
  - H: High Vacuum
  - L: Low Vacuum
  - 0.58 bar

- Supply Pressure
  - S: 5 bar

- Sensor
  - 02: MVS-201-PC (PNP)
  - 22: MPS-V2C-PC (PNP)
  - 62: MPS-V6C-PC (PNP)
  - 64: MPS-V6C-PG (PNP)
  - Z: No Sensor

- Voltage
  - 24: 24 VDC

- Master Valve Air Supply
  - A: Normally Open
  - B: Normally Closed

- Port Threads
  - G: BSPP

- Valve Connector
  - D: DIN w/LED & Surge Protection

Specifications

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

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Nozzle Diameter [mm]</th>
<th>Vacuum Degree at 5 bar [%]</th>
<th>Vacuum Flow [l/min]</th>
<th>Air Consumption [l/min]</th>
<th>Weight [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>15HS</td>
<td>1.5</td>
<td>90</td>
<td>60</td>
<td>100</td>
<td>750</td>
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<tr>
<td>15LS</td>
<td>1.5</td>
<td>57</td>
<td>90</td>
<td>100</td>
<td>750</td>
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<tr>
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<td>2.0</td>
<td>90</td>
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<td>180</td>
<td>750</td>
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<tr>
<td>20LS</td>
<td>2.0</td>
<td>57</td>
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<tr>
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<td>2.7</td>
<td>90</td>
<td>125</td>
<td>295</td>
<td>750</td>
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Evacuation Time

<table>
<thead>
<tr>
<th>Series / Nozzle Diameter</th>
<th>Air Supply Pressure [bar]</th>
<th>Air Consumption [l/min]</th>
<th>10</th>
<th>20</th>
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<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
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<td>0.17</td>
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<td>0.09</td>
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<td>0.30</td>
<td>0.47</td>
<td>0.70</td>
<td>1.49</td>
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</table>
Vacuum Generators – Sensor Options

CVK

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**

<table>
<thead>
<tr>
<th>MPS-6 Main Circuit</th>
<th>Brown</th>
<th>Blue</th>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+24 VDC (Connect to Power Supply)</td>
<td>- Ground (Connect to Common)</td>
<td>Output 1, N.O. (Connect to PLC Input, Load, or Relay)</td>
<td>Output 2, N.C. (Connect to PLC Input, Load, or Relay)</td>
</tr>
</tbody>
</table>

- Vacuum Pilot Valve
- Blow-Off Pilot Valve
- Vacuum Part Present Output

**Basic System**

<table>
<thead>
<tr>
<th>Basic System</th>
<th>Vacuum System Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>+24 VDC</td>
<td>N.O. or N.C. (Connect to PLC Input, Load, or Relay)</td>
</tr>
<tr>
<td>-</td>
<td>Output Adjustment</td>
</tr>
</tbody>
</table>

- 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**

<table>
<thead>
<tr>
<th>MPS-2 Main Circuit</th>
<th>Brown</th>
<th>Blue</th>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+24 VDC (Connect to Power Supply)</td>
<td>- Ground (Connect to Common)</td>
<td>Output 1, N.O. or N.C. (Connect to PLC Input, Load, or Relay)</td>
<td>Output 2, N.O. or N.C. (Connect to PLC Input, Load, or Relay)</td>
</tr>
</tbody>
</table>

- Vacuum Pilot Valve
- Blow-Off Pilot Valve
- Sensor Output 1
- Sensor Output 2

**Basic System**

<table>
<thead>
<tr>
<th>Critical</th>
<th>Vacuum System Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>+24 VDC</td>
<td>(V)</td>
</tr>
<tr>
<td>-</td>
<td>(B)</td>
</tr>
</tbody>
</table>

**Air-Economizing System**

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

**Output Adjustment**

Sensor functions and outputs are programmed by touch panel.

**CVK with MVS-201 Series**

<table>
<thead>
<tr>
<th>MVS-201 Main Circuit</th>
<th>Brown</th>
<th>Blue</th>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+24 VDC (Connect to Power Supply)</td>
<td>- Ground (Connect to Common)</td>
<td>Output 1, N.O. or N.C. (Connect to PLC Input, Load, or Relay)</td>
<td>+24VDC (Input to Activate Vacuum)</td>
</tr>
</tbody>
</table>

- Vacuum Pilot Valve
- Blow-Off Pilot Valve
- Sensor
- Vacuum Part Present Output

**Basic System with 201 Sensor**

<table>
<thead>
<tr>
<th>Critical</th>
<th>Vacuum System Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>+24 VDC</td>
<td>(V)</td>
</tr>
<tr>
<td>-</td>
<td>(B)</td>
</tr>
</tbody>
</table>

**Output Adjustment**

Sensor functions and outputs are programmed by touch panel.
Vacuum Generators – Manifolds

Manifold Block

CVK - M 2 G

Manifold

Stations
2
3
4
5

Port Size
G 1/8 BSPP
Vacuum Generators – Manifolds

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.

<table>
<thead>
<tr>
<th>n</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>83</td>
<td>106</td>
<td>129</td>
<td>152</td>
</tr>
<tr>
<td>B</td>
<td>65</td>
<td>88</td>
<td>111</td>
<td>134</td>
</tr>
</tbody>
</table>

Millimeter
n = Number of Stations
### Cautions

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

Do not operate CVK 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.
Vacuum Generators

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

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.

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
Vacuum Generators

CVX-0260B

Model Number Index

CVX-0260B E0S DN G

Specifications

<table>
<thead>
<tr>
<th>CVX-0260B Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
</tr>
<tr>
<td>Pressure Port</td>
</tr>
<tr>
<td>Vacuum Ports</td>
</tr>
<tr>
<td>Operating Temperature</td>
</tr>
<tr>
<td>Humidity</td>
</tr>
<tr>
<td>Operating Pressure</td>
</tr>
<tr>
<td>Vacuum Filtration</td>
</tr>
<tr>
<td>Noise Level</td>
</tr>
<tr>
<td>Air Consumption</td>
</tr>
<tr>
<td>Vacuum Flow</td>
</tr>
<tr>
<td>Sensor Response Time</td>
</tr>
<tr>
<td>Maximum Vacuum Level</td>
</tr>
<tr>
<td>Cover</td>
</tr>
</tbody>
</table>

Control Valve Specifications

<table>
<thead>
<tr>
<th>3-Way</th>
<th>Pilot Valves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual Operation</td>
<td>Manual Overrides Available</td>
</tr>
<tr>
<td>Electrical Connector</td>
<td>DIN type w/LED and Diode Protection, IP65 Rating</td>
</tr>
<tr>
<td>Power Supply</td>
<td>24 VDC ± 10%</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>1.8 W</td>
</tr>
<tr>
<td>Pressure Range</td>
<td>1.5 to 10 bar</td>
</tr>
<tr>
<td>Pilot Valve Air Supply</td>
<td>Normally Closed</td>
</tr>
<tr>
<td>Mass</td>
<td>57 g</td>
</tr>
</tbody>
</table>

E-Stop Operating System Specifications

<table>
<thead>
<tr>
<th>Two-Way Valve</th>
<th>Diaphragm Actuated, Pneumatic Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
<td>Non-lubricated Air, Dry Air</td>
</tr>
<tr>
<td>Switch Point Pressure</td>
<td>0.3 bar</td>
</tr>
<tr>
<td>Operating Range</td>
<td>-0.15 to -0.85 bar Vacuum</td>
</tr>
<tr>
<td>Pressure Through-put Range</td>
<td>1.51 to 8 bar</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 0.05 bar</td>
</tr>
<tr>
<td>Port Connection</td>
<td>M5 Female</td>
</tr>
<tr>
<td>Air Supply</td>
<td>Normally Closed</td>
</tr>
<tr>
<td>Mass</td>
<td>34 g</td>
</tr>
</tbody>
</table>

Aux. Power Electrical Valve Specifications

<table>
<thead>
<tr>
<th>3-Way Valve</th>
<th>Direct Acting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
<td>Compressed Air, Non-lubricated</td>
</tr>
<tr>
<td>Operating Range</td>
<td>0 to 7.03 bar</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>DIN Connector w/LED and Diode Protection, IP65</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>24 VDC ± 10%</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>1.8 W</td>
</tr>
<tr>
<td>Current</td>
<td>0.075 A</td>
</tr>
<tr>
<td>Air Supply</td>
<td>Normally Open</td>
</tr>
<tr>
<td>Mass</td>
<td>61 g</td>
</tr>
</tbody>
</table>

Check Valve Specifications

<table>
<thead>
<tr>
<th>One Way</th>
<th>One Way Spring Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>-0.9 to 16 bar</td>
</tr>
<tr>
<td>Mass</td>
<td>10 g</td>
</tr>
</tbody>
</table>

Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Nozzle Diameter [mm]</th>
<th>Vacuum Degree at 5 bar [%]</th>
<th>Vacuum Flow [l/min]</th>
<th>Air Consumption [l/min]</th>
<th>Weight [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>27HS</td>
<td>2.7</td>
<td>90</td>
<td>125</td>
<td>295</td>
<td>748</td>
</tr>
</tbody>
</table>

Evacuation Time

<table>
<thead>
<tr>
<th>Series / Nozzle Diameter</th>
<th>Air Supply Pressure [bar]</th>
<th>Air Consumption [l/min]</th>
<th>Evacuation Time in sec / liter to reach different Vacuum Levels [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVX-27HS</td>
<td>5</td>
<td>295</td>
<td>10 20 30 40 50 60 70 80 90</td>
</tr>
</tbody>
</table>

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Vacuum Generators

Replacement Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CVK-S</td>
<td>Silencer</td>
</tr>
<tr>
<td>2 thru 7</td>
<td>CVK-F</td>
<td>Filter Kit</td>
</tr>
<tr>
<td>5</td>
<td>CVK-E</td>
<td>Filter Element</td>
</tr>
<tr>
<td>8, 9, 10</td>
<td>CVK-24D</td>
<td>Pilot Valve Kit</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Modes</th>
<th>Vacuum On</th>
<th>Vacuum Off</th>
<th>Blow-Off</th>
<th>EOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Conditions</td>
<td>Air-economizing between 0.61-0.54 bar</td>
<td>Idle</td>
<td>Blow-Off On, Blow-Off Idle</td>
<td>EOS Off</td>
</tr>
</tbody>
</table>
| Emergency-Stop, Power Failure, Loss of DeviceNet™ Communications or Power | Vacuum On
   ↓
   ↓
   Vacuum On | Idle | Blow-Off
   ↓
   ↓
   Idle | EOS On |
| Restore Power                  | Vacuum On Air-economizing Function Resumes | Idle       | Idle | EOS Off |
Vacuum Generators

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
CEK E-Stop

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.

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
**Vacuum Generators**

**Model Number Index**

<table>
<thead>
<tr>
<th>CEK</th>
<th>H</th>
<th>S</th>
<th>22</th>
<th>C</th>
<th>24</th>
<th>B</th>
<th>L</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle Diameter</td>
<td>15</td>
<td>20</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>1,5 mm</td>
<td>2,0 mm</td>
<td>2,7 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum Degree</td>
<td>H</td>
<td>High Vacuum</td>
<td>0.92 bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Pressure</td>
<td>S</td>
<td>5 bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve</td>
<td>24</td>
<td>24 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Supply</td>
<td>B</td>
<td>Normally Closed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port Threads</td>
<td>G</td>
<td>BSPP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve Connector</td>
<td>L</td>
<td>Clip w/LED &amp; Surge Protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor</td>
<td>22</td>
<td>MPSV2CPC (PNP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Z</td>
<td>No Sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum Release and Check Valve</td>
<td>Code</td>
<td>Release Valve</td>
<td>Check Valve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>With</td>
<td>With</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Specifications**

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

**Air-Economizing Valve and Blow-off Release Pilot**

| Type of Control Valve | Pilot Valve |
| Manual Operation | Manual Overrides |
| Electrical Connection | Clip Connector with LED and Surge |
| Power Supply | 24 VDC ± 10% |
| Power Consumption | 0.9 W |
| Operating Pressure | 5 bar |
| Air Supply | Normally Closed |

**E-Stop Valve**

| Type of Control Valve | Double Solenoid |
| Electrical Connection | Clip Connector with LED and Surge |
| Power Supply | 24 VDC ± 10% |
| Power Consumption | 0.9 W |
| Operating Pressure | 5 bar |
| Air Supply | Normally Closed |

**Performance**

<table>
<thead>
<tr>
<th>Item</th>
<th>Nozzle Diameter [mm]</th>
<th>Vacuum Degree at 5 bar [%]</th>
<th>Vacuum Flow [l/min]</th>
<th>Air Consumption [l/min]</th>
<th>Weight [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>15HS</td>
<td>1.5</td>
<td>90</td>
<td>60</td>
<td>100</td>
<td>750</td>
</tr>
<tr>
<td>20HS</td>
<td>2.0</td>
<td>90</td>
<td>95</td>
<td>180</td>
<td>750</td>
</tr>
<tr>
<td>27HS</td>
<td>2.7</td>
<td>90</td>
<td>125</td>
<td>295</td>
<td>750</td>
</tr>
</tbody>
</table>

**Evacuation Time**

<table>
<thead>
<tr>
<th>Series / Nozzle Diameter</th>
<th>Air Supply Pressure [bar]</th>
<th>Air Consumption [l/min]</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEK-15HS</td>
<td>5</td>
<td>100</td>
<td>0.08</td>
<td>0.17</td>
<td>0.28</td>
<td>0.44</td>
<td>0.65</td>
<td>0.93</td>
<td>1.43</td>
<td>2.20</td>
<td>6.70</td>
</tr>
<tr>
<td>CEK-20HS</td>
<td>5</td>
<td>180</td>
<td>0.04</td>
<td>0.09</td>
<td>0.16</td>
<td>0.27</td>
<td>0.43</td>
<td>0.66</td>
<td>1.06</td>
<td>1.89</td>
<td>4.60</td>
</tr>
<tr>
<td>CEK-27HS</td>
<td>5</td>
<td>295</td>
<td>0.02</td>
<td>0.07</td>
<td>0.12</td>
<td>0.20</td>
<td>0.30</td>
<td>0.47</td>
<td>0.70</td>
<td>1.49</td>
<td>---</td>
</tr>
</tbody>
</table>

**Code**

<table>
<thead>
<tr>
<th>Code</th>
<th>Release Valve</th>
<th>Check Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>With</td>
<td>With</td>
</tr>
</tbody>
</table>
Manifold Block

CVK - M 2 G

<table>
<thead>
<tr>
<th>Manifold</th>
<th>Stations</th>
<th>Port Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>G 1/8 BSPP</td>
</tr>
</tbody>
</table>

Station Station Station Station Station
1 2 3 4 5
**Generator**

- Vacuum Port 3/8 BSPP
- Pressure Inlet Port
- Exhaust Port 3/4 BSPP
- Pressure Port 1/4 BSPP
- Generator Mounting Screws (M4x35)
- Remove Silencer Assembly
- Remove Pressure Port Block

**Manifold**

3-Station Manifold Shown

- 3 Station Manifold Shown
- Exhaust Port 3/4 BSPP
- Pressure Port 1/2 BSPP

**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.

<table>
<thead>
<tr>
<th>n</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>83</td>
<td>106</td>
<td>129</td>
<td>152</td>
</tr>
<tr>
<td>B</td>
<td>65</td>
<td>88</td>
<td>111</td>
<td>134</td>
</tr>
</tbody>
</table>

Millimeter

n = Number of Stations
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.

Replacement Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CVK-S</td>
<td>Silencer</td>
</tr>
<tr>
<td>2 thru 7</td>
<td>CVK-F</td>
<td>Filter Kit</td>
</tr>
<tr>
<td>5</td>
<td>CVK-E</td>
<td>Filter Element</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Modes</th>
<th>Vacuum On</th>
<th>Vacuum Off</th>
<th>Blow-Off</th>
<th>EOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Conditions</td>
<td>Air-economizing between 0,61-0,54 bar</td>
<td>Idle</td>
<td>Blow-Off On</td>
<td>EOS Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Blow-Off Idle</td>
<td></td>
</tr>
<tr>
<td>Emergency-Stop, Power Failure, Loss of DeviceNet™ Communications or Power</td>
<td>Vacuum On</td>
<td>Idle</td>
<td>Blow-Off On or Idle</td>
<td>EOS On</td>
</tr>
<tr>
<td>Restore Power</td>
<td>Vacuum On Air-economizing Function Resumes</td>
<td>Idle</td>
<td>Idle</td>
<td>EOS Off</td>
</tr>
</tbody>
</table>
Vacuum Generators

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**

<table>
<thead>
<tr>
<th>Options and accessories</th>
<th>Size</th>
<th>Port size vacuum</th>
</tr>
</thead>
<tbody>
<tr>
<td>R*</td>
<td>03 30 Nl/min</td>
<td></td>
</tr>
<tr>
<td>V*</td>
<td>06 60 Nl/min</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>12 120 Nl/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 240 Nl/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>42 420 Nl/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>72 720 Nl/min</td>
<td></td>
</tr>
</tbody>
</table>

Possible combinations and order codes, see main data sheet.

Specification

- **Material**
  - Body: Aluminium
  - Nozzle: Brass

Options and additional information

Nozzle in acetal plastic on request.
Vacuum Generators

Main data for generator, Compact - Solid

<table>
<thead>
<tr>
<th>Time to evacuate 1 litre to 75% vacuum [s]</th>
<th>Air consumption at 4 bar [Nl/min]</th>
<th>Port size (vacuum)</th>
<th>Weight [kg]</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.00</td>
<td>30</td>
<td>Female G1/4</td>
<td>0.08</td>
<td>P5V-GAR0312</td>
</tr>
<tr>
<td>3.00</td>
<td>60</td>
<td>Female G1/2</td>
<td>0.11</td>
<td>P5V-GAR0614</td>
</tr>
<tr>
<td>1.50</td>
<td>120</td>
<td>Female G1/2</td>
<td>0.14</td>
<td>P5V-GAR1214</td>
</tr>
<tr>
<td>0.75</td>
<td>240</td>
<td>Female G1/2</td>
<td>0.19</td>
<td>P5V-GAR2414</td>
</tr>
<tr>
<td>0.45</td>
<td>420</td>
<td>Female G3/4</td>
<td>0.24</td>
<td>P5V-GAR4216</td>
</tr>
<tr>
<td>0.25</td>
<td>720</td>
<td>Female G1/2</td>
<td>0.55</td>
<td>P5V-GAR7214</td>
</tr>
<tr>
<td>With holding valve</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>60</td>
<td>Female G1/2</td>
<td>0.32</td>
<td>P5V-GAV0614</td>
</tr>
<tr>
<td>1.50</td>
<td>120</td>
<td>Female G1/2</td>
<td>0.34</td>
<td>P5V-GAV1214</td>
</tr>
<tr>
<td>0.75</td>
<td>240</td>
<td>Female G1/2</td>
<td>0.40</td>
<td>P5V-GAV2414</td>
</tr>
<tr>
<td>0.45</td>
<td>420</td>
<td>Female G3/4</td>
<td>0.45</td>
<td>P5V-GAV4216</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Weight [kg]</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.11</td>
<td>8204950201</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Order code</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>G</th>
<th>M</th>
<th>I</th>
<th>V</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>P5V-GAR0312</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G1/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5V-GAR0614</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G1/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5V-GAR1214</td>
<td>25</td>
<td>50</td>
<td>40</td>
<td>M6</td>
<td>12.0</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G1/2</td>
</tr>
<tr>
<td>P5V-GAR2414</td>
<td>40</td>
<td>60</td>
<td>40</td>
<td>M6</td>
<td>18.5</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G1/2</td>
</tr>
<tr>
<td>P5V-GAR4216</td>
<td>40</td>
<td>60</td>
<td>40</td>
<td>M6</td>
<td>18.5</td>
<td>G1/4</td>
<td>G3/4</td>
<td>G1</td>
</tr>
<tr>
<td>P5V-GAR0614</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G1/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5V-GAR1214</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G1/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5V-GAR2414</td>
<td>25</td>
<td>50</td>
<td>40</td>
<td>M6</td>
<td>12.0</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G1/2</td>
</tr>
<tr>
<td>P5V-GAR4216</td>
<td>40</td>
<td>60</td>
<td>40</td>
<td>M6</td>
<td>18.5</td>
<td>G1/4</td>
<td>G3/4</td>
<td>G1</td>
</tr>
<tr>
<td>P5V-GAN7214</td>
<td>G1/4</td>
<td>G1/4</td>
<td>G1/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**P5V-**

---

[Diagram of Generators Compact - Solid, serie P5V-GA]
Holding valve
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**

<table>
<thead>
<tr>
<th>Model Number Index</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P5V - GW</strong></td>
</tr>
<tr>
<td><strong>02</strong></td>
</tr>
<tr>
<td><strong>03</strong></td>
</tr>
<tr>
<td><strong>04</strong></td>
</tr>
<tr>
<td><strong>06</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
</tr>
<tr>
<td>Body: Aluminium</td>
</tr>
<tr>
<td>Nozzle: Brass</td>
</tr>
<tr>
<td>Seals: Nitrile, NBR</td>
</tr>
</tbody>
</table>

**Suction flow as function of vacuum level**

<table>
<thead>
<tr>
<th>Main data for Generator Compact - AirSaver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to evacuate 1 litre to 75% vacuum [s]</td>
</tr>
<tr>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>9.0</td>
</tr>
<tr>
<td>6.0</td>
</tr>
<tr>
<td>4.5</td>
</tr>
<tr>
<td>3.0</td>
</tr>
</tbody>
</table>

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

Generators Compact - AirSaver, serie GW

<table>
<thead>
<tr>
<th>Order code</th>
<th>A Inlet</th>
<th>B Vacuum</th>
<th>C Outlet</th>
<th>D* Vacuum</th>
</tr>
</thead>
<tbody>
<tr>
<td>P5V-GWV0214</td>
<td>G1/4</td>
<td>G1/2</td>
<td>G1/4</td>
<td>G1/8</td>
</tr>
<tr>
<td>P5V-GWV0314</td>
<td>G1/4</td>
<td>G1/2</td>
<td>G1/4</td>
<td>G1/8</td>
</tr>
<tr>
<td>P5V-GWV0414</td>
<td>G1/4</td>
<td>G1/2</td>
<td>G1/4</td>
<td>G1/8</td>
</tr>
<tr>
<td>P5V-GWV0614</td>
<td>G1/4</td>
<td>G1/2</td>
<td>G1/4</td>
<td>G1/8</td>
</tr>
</tbody>
</table>

* Connection for vacuum gauge etc
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LOUNY – Vladimírská 2457, 440 01, tel./fax: 415 658 703 • PLZEŇ – Brojova 16, 326 00, tel.: 378 121 340, fax: 378 121 341
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