COVAL

vacuum managers

CMS M

Multi-stage Mini Vacuum Pumps

ADVANCED VACUUM SOLUTIONS

CMS M

Multi-stage Mini Vacuum Pumps

General Information

The **CMS M Series** multi-stage mini vacuum pumps, with their robust and ultra-compact design, are suitable for applications requiring high suction rates such as gripping porous parts, emptying tanks, or random gripping when integrated into vacuum grippers.

Industry-specific applications

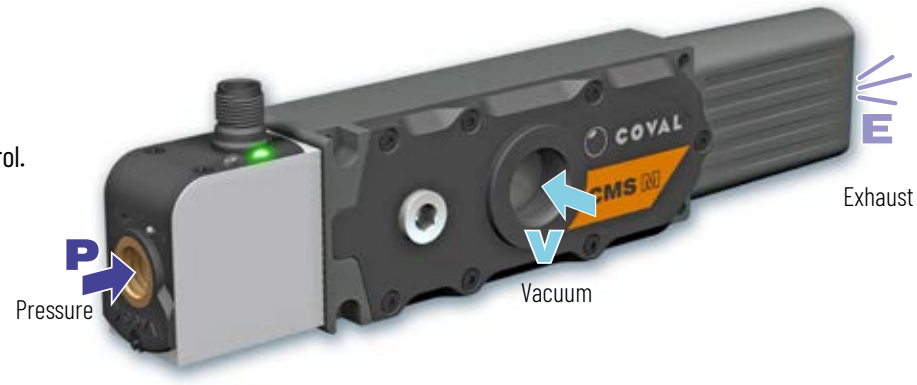
The **CMS M Series** is available in 2 suction flow rates, with or without vacuum and blow-off control, and 2 exhaust configurations.

Advantages

- Robust: resistant to the harsh environments of production lines.
- High performance: optimized multi-stage venturi system that guarantees powerful suction flow rates and reduced compressed air consumption.
- Modular: configurable according to needs and easy maintenance.

Main Specifications

- 80% vacuum
- 2 powerful suction flow rates:
  - CMSM90X15__ → 10.59 SCFM
  - CMSM90X30__ → 19.42 SCFM
- With or without vacuum and blow-off control.
- Vacuum control: NC, NO.
- One M12 4-pin male connector.
- 2 exhaust configurations.



A Complete Range

For each application, a suitable CMS M:

CMSM__NVO_

- Without control.

CMSM__SVO_ / VVO_

- With vacuum and blow-off control.
- One M12 4-pin male connector.
- Inputs / Outputs Digital mode.
- Visual indicators of vacuum and blow-off controls.

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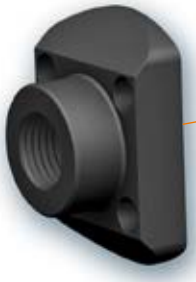
General Information

CMS M, a tailor-made solution

CMSM__NV0_
Pressure connection
end plate



CMSM90X15_ / CMSM90X30_
Body with multi-stage
Venturi profiles

Vacuum switch connection
G1/8"-F with plug

CMSM____E
Exhaust collector

CMSM____K
Through-type silencer

CMSM__SV0_ / VV0_

- Control valve block for vacuum and blow-off:
  - Vacuum control: NC or NO
  - One M12 4-pin male connector
- Status LED for the control functions:
  - Green LED = vacuum control.
  - Orange LED = blow-off control.

Accessories

Vacuum Switch with 3-color Display:

- PSD100CPNP
  - 1 digital output PNP and 1 analog output.
  - M8 connector.
- PSD100LPNP2
  - 2 digital outputs PNP.
  - cable 2 m length.

Vacuum Gauge

- VAF11140

CMS M

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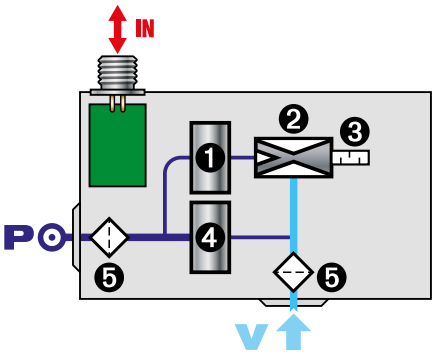
Integration and Performance

Integrated Functions

CMS M multi-stage mini vacuum pumps include all the vacuum functions required for an easy, efficient, and economical use of compressed air and suitable for any application:

❶ "Vacuum" solenoid valve
❷ Multi-stage Venturi pump
❸ Through-type silencer
❹ "Blow-off" solenoid valve
❺ Filter screens

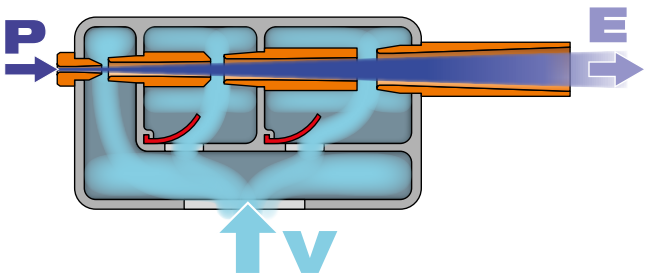


Primary Functions of Multi-stage Technology

Multi-stage technology consists of maximizing the energy input of the compressed air by cascading several stages of Venturi profiles and by combining their respective flows.

Intermediate valves allow the progressive isolation of each stage to obtain a maximum vacuum level.

This technology makes it possible to generate a high suction flow rate at a low vacuum level.

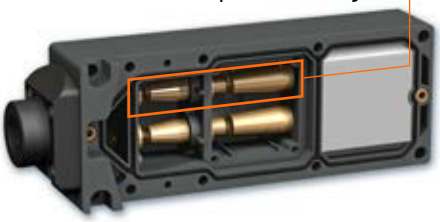


Performance Determined by CMS M Model

Model \ Vacuum achieved	Time to create vacuum (seconds) for a volume of 1 liter 45 %	55 %	65 %	75 %	Max. vacuum (%)	Air drawn in (SCFM)	Air consumed (SCFM)	Air pressure level* (bar)
CMSM90X**15**	0.21	0.35	0.60	1.14	80	10.59	5.30	5
CMSM90X**30**	0.11	0.18	0.30	0.56	80	19.42	9.89	5

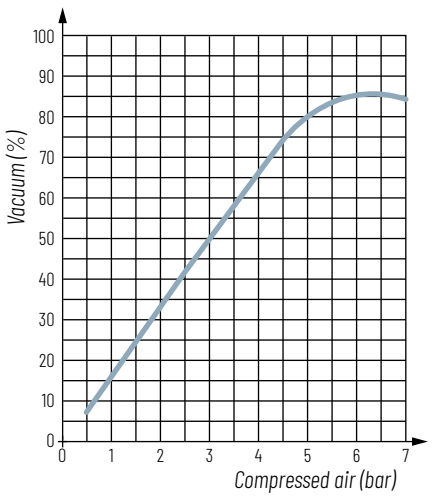
** 5.5 bar for controlled versions, CMSM__**S**_/ CMSM__**V***

- CMSM90X**15**__: 1 profile 2 stage
- CMSM90X**30**__ : 2 profiles 2 stage

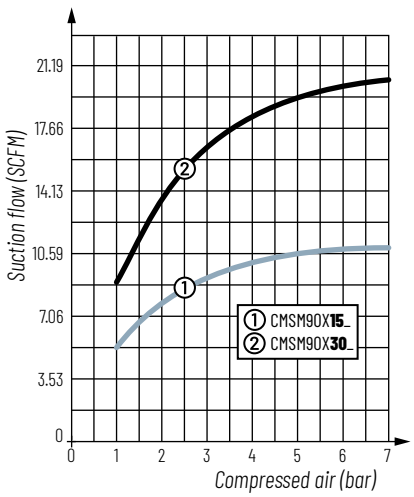


Curves

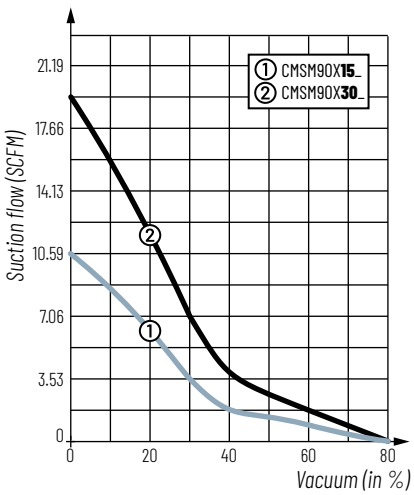
VACUUM/COMPRESSED AIR



SUCTION FLOW/COMPRESSED AIR



SUCTION FLOW/VACUUM



CMS M

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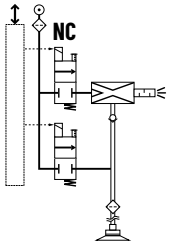
Selection Guide

Vacuum Control: 2 Solutions

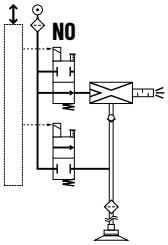
Model CMSM__S: Vacuum pump with **NC** vacuum control and **NC** blow-off.
In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.

- NC blow-off and vacuum control: solenoid valves.



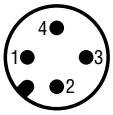
Model CMSM__V: Vacuum pump with **NO** vacuum control and **NC** blow-off
In the event of power failure, vacuum is still generated: object is held in place ➔ fail-safe.
In the event of compressed air failure, the vacuum is no longer maintained.

- NO vacuum control solenoid valve.
- NC blow-off control solenoid valve.



Electrical Connections

One M12 4-pin male connector.



1	/
2	24 V DC suction command [1]
3	0 V - GND
4	24 V DC blow-off command

[1] 24 V DC suction command, depending on version:
*- **S**: 24 V DC vacuum control.*
*- **V**: 24 V DC vacuum off command.*

Choice of 2 equipment options for the exhaust

Various configuration options are available for the CMS M exhaust:

Through-type silencer
CMSM___K version

- Reduction of the noise level
- Non-clogging

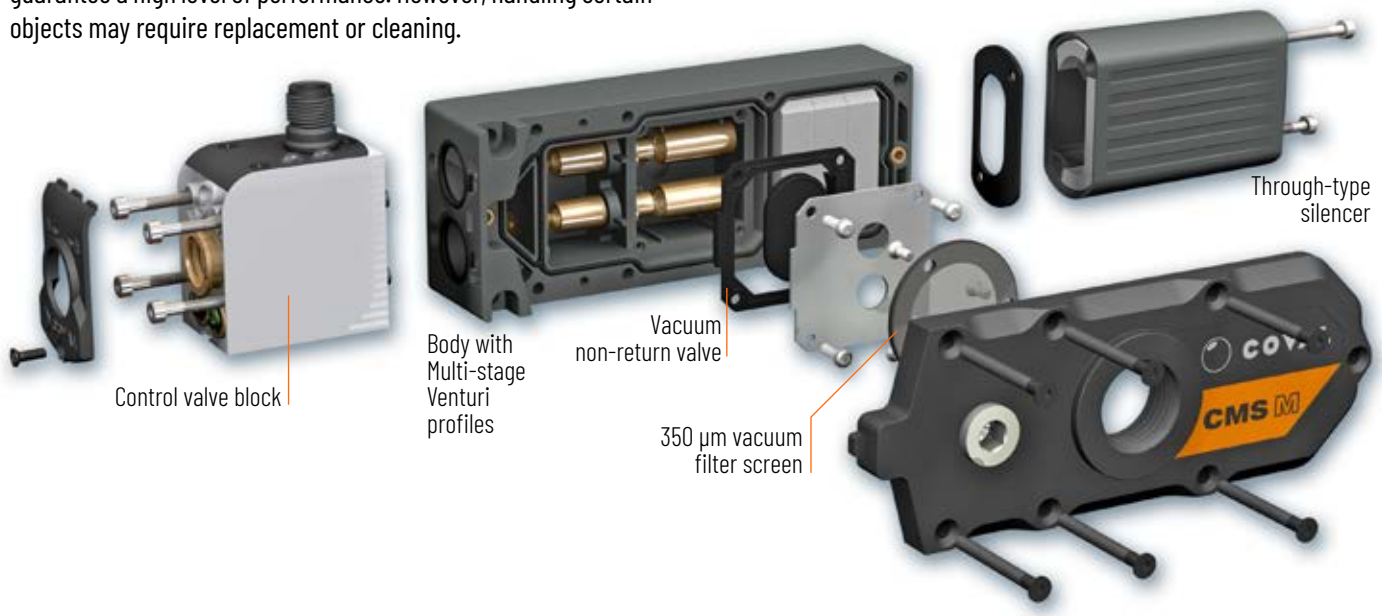
Exhaust Collector
CMSM___E version

- G1/2" female connection.

Maintenance

The CMS M multi-stage vacuum pumps have been designed to withstand the demands from all your applications and to guarantee a high level of performance. However, handling certain objects may require replacement or cleaning.

The modular design of the CMS M multi-stage pumps ensures easy maintenance as the functions are all easily accessible.



CMS M

Multi-stage Mini Vacuum Pumps

Configuring a Vacuum Pump

CMS M without control

CMSM90X	15	N	V0	G2	E

SUCTION FLOW RATE	
10.59 SCFM (1 profile 2 stage)	**15**
19.42 SCFM (2 profiles 2 stage)	**30**

EXHAUST OPTION	
K	Through-type silencer
E	Exhaust collector

CMS M controlled

CMSM90X	30	S		V0	C14P	G2	K

SUCTION FLOW RATE	
10.59 SCFM (1 profile 2 stage)	**15**
19.42 SCFM (2 profiles 2 stage)	**30**

GENERATOR CONTROL	
S	Mini vacuum pump with **NC** vacuum control and **NC** blow-off
V	Mini vacuum pump with **NO** vacuum control and **NC** blow-off

EXHAUST OPTION	
K	Through-type silencer
E	Exhaust collector

Sample part number consisting of a multi-stage mini vacuum pump:

CMSM90X15NV0G2E

Mini multi-stage vacuum pump without control, max. vacuum 80%, suction flow rate 10.59 SCFM, with exhaust collector.

CMSM90X30SV0C14PG2K

Mini multi-stage vacuum pump, max. vacuum 80%, suction flow rate of 19.52 SCFM, controlled by one NC vacuum control and one NC blow-off, one M12 4-pin connector, with through-type silencer.

Accessories

Electronic vacuum switch with 3-color display

- Vacuum connection: G1/8"-M.
- Pressure rating range: 0.0 ~ -101.3 kPa.
- Pressure setting range: 10.0 ~ -101.3 kPa.
- Max. pressure: 300 kPa.
- Fluid: Air, non-corrosive/non-flammable gas.
- Hysteresis: adjustable.
- Response time: ≤ 2.5ms, with anti-vibration function.
- 7 segment LCD display : 2 color (red/green) main display, orange sub-display (refresh rate: 5 times/1 sec.).
- Choice of pressure unit display: kPa, MPa, kgf/cm2, bar, psi, InHg, mmHg.
- Power supply voltage: 12 to 24 V DC ±10%.
- Current consumption: ≤ 40mA (without load).
- Repeatability (switch ouptut): ≤ ±0.2% F.S. ±1 digit.
- Digital output: Max. load current: 125 mA, Max. supply voltage: 24 VDC, Residual voltage: ≤ 1.5 V.
- Protection: IP40.
- Ambient temperature range: 0 – 50° C (operation).

- Part No. **PSD100CPNP**
- One M8 4-pin connector.
- 1 digital output PNP (NO or NC).
- 1 analog output (Output voltage: 1 to 5 V ≤ ± 2.5% F.S. (within rated pressure range), linearity: ≤ ± 1% F.S. / Output impedance: approx. 1 kΩ).

- Part No. **PSD100LPNP2**
- 2 m cable.
- 2 digital outputs PNP (NO or NC).

Vacuum gauge with needle

- Ø 40 mm: Part No. **VAF11140**
- Damping: by silicone movement (patented).
- Measuring: Bourdon tube in CuSn.
- Precision: cl. 2.5 (+/- 2.5% of max. scale value).
- Frame: black ABS.
- Vacuum connection: G1/8"-M.

Power supply cable

M12 4-pin, female – open end

- Part No. **CDM12N**: straight connector, length 2 m.
- Part No. **CDM12L5**: straight connector, length 5 m.
- Part No. **CCM12**: elbow connector, length 2 m.
- Part No. **CCM12L5**: elbow connector, length 5 m.

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Technical Specifications and Dimensions

Technical specifications

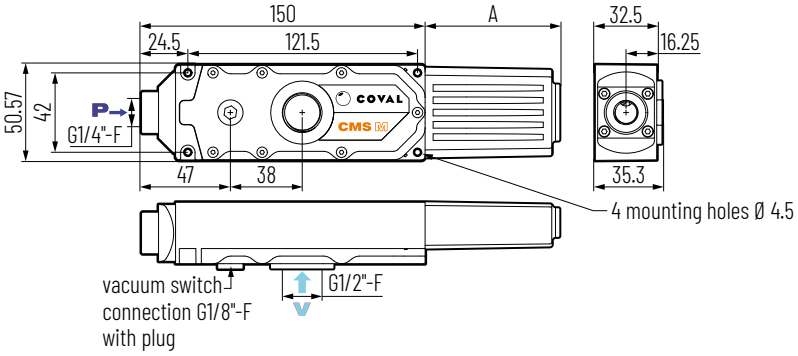
- Supply: non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:4].
- Operating pressure: from 2 to 7 bar.
- Optimal dynamic pressure:
  - CMSM___**NVO**_ (without control): 5 bar.
  - CMSM___**S**_ / CMSM___**V**_ (controlled): 5.5 bar.
- Pressure connection: G1/4"-F with 200 µm filter screen.
- Vacuum connection: G1/2"-F with removable 350 µm filter screen.
- Connection for version with exhaust collector: G1/2"-F.
- Vacuum switch connection: G1/8"-F.
- Max. vacuum: 80%.
- Air suction flow rate: 10.59 to 19.42 SCFM.
- Air consumption: 5.30 to 9.89 SCFM.
- Noise level with through-type silencer :
  - CMSM90X**15**__**K**: 61 dBA.
  - CMSM90X**30**__**K**: 65 dBA.
- Degree of protection: IP40.
- Max. operating frequency: 2 Hz.
- Endurance: 30 million cycles.
- Operating temperature: from 32 to 122°F (from 0 to 50°C).
- Weight: - CMSM without control: - 275 g.
  - CMSM controlled: - 330 g.
- Materials:
  - Main body: PA GF, brass, NBR, PU.
  - Control valve body: PA 6 GF.
  - Pressure connection end plate (NVO version): aluminum.
  - Vacuum connection end plate: PETP.
  - Exhaust collector (CMSM___**E** version): aluminum.
  - Silencer: body PA FG, felt.
  - Internal parts of the pump: brass, aluminum.
  - Internal parts of the valve block: brass, aluminum, steel, NBR, PU, FKM.
  - Screws: zinc plated steel.
  - Seals and diaphragm: NBR, PU.

Integrated electronics (CMSM_**S** / **V** version)

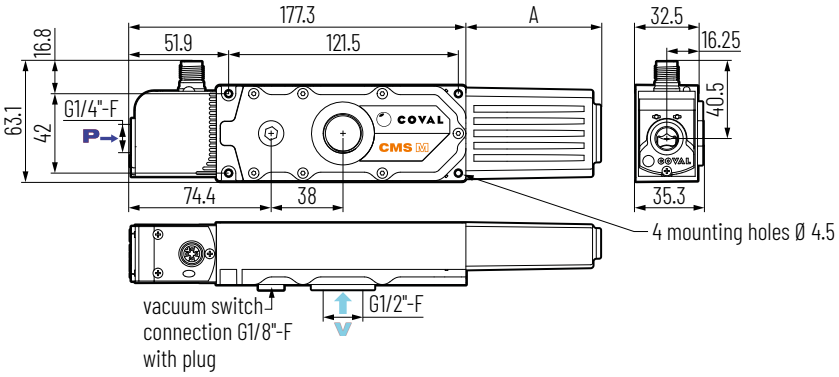
- 24 V DC power supply (regulated ±10%).
- Consumption: 60 mA max. (without load).
- Inputs/outputs protected against reversed wiring and polarity.

Dimensions

CMS M without control

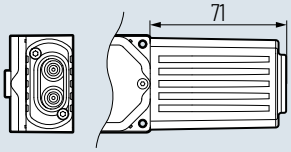


CMS M controlled

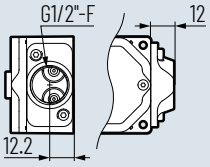


Exhaust options

CMSM___**K** version
Through-type silencer



CMSM___**E** version
Exhaust collector



Exhaust type	A
Through-type silencer	71
Exhaust collector	12

3D COVAL Data You can access 3D files of all COVAL products in formats compatible with the main CAD software on COVAL's website **www.coval.com**

Note: all dimensions are in mm.

COVAL
vacuum managers

vacuum
components

A TECHNOLOGICAL PARTNER ON A GLOBAL SCALE

Located in the southeast region of France, COVAL conceives, manufactures and globally distributes high performance, advanced vacuum automation components and systems for industrial applications in all branches.

COVAL is an ISO 9001:V2015 certified company which offers innovative solutions integrating reliable and optimized components with intelligent functionalities. The focus is to provide the most personalized and economic solution to a given application while assuring a significant improvement in the productivity and the safety for the vacuum users around the world.

COVAL has an ambition for technical excellence and innovation. As a specialist in vacuum automation, COVAL is reputed for offering reliable, personalized, cost effective and productive solutions.

The references of COVAL can be found in several industrial sectors (Packaging, Automotive Industry, Plastic, Graphic, Aeronautic...) where vacuum handling is important for high efficiency and productivity.

COVAL markets its products and services all over Europe, in the United States and South America through its subsidiaries and authorized distribution network. COVAL strives to provide customer driven solutions and gives the best possible treatment to satisfy all its clients.

For all enquiries from Australia, Africa and Asia kindly contact COVAL head office in France.

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Head Office

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Certified quality management system

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