

# COVAL

vacuum managers

## LEM+

Compact High Flow Vacuum Pumps with "ASR"



**AIR**Saving  
Regulator

## ADVANCED VACUUM SOLUTIONS

# LEM+

## Compact, High Flow Vacuum Pumps

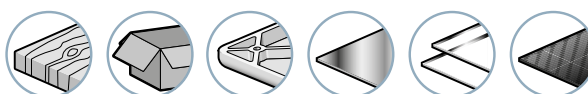
### General Information

**LEM+ Series**, compact, high flow vacuum pumps, integrate **ASR** (Air Saving Regulator) technology that allows up to 40% of energy savings. They are designed for gripping porous products or those with a rough surface. For gripping airtight or semi-airtight products, it is recommended to use the **LEM+ Series**.

**ASR** Saving Regulator



Industry-specific applications



### Advantages

- Easy implementation: Plug & Play, multiple choices, every type of application.
- Maximum automatic energy savings:
  - ASR**: 40% savings for porous products.
- Compactness: LEM+ vacuum pumps are the most compact on the market.
- Short response times: Possible installation very close to vacuum pads.
- Automatic blow-off: Reduced PLC I/O requirement thanks to the automatic blow-off function (blow-off time configurable from 0 to 10s).
- Dust resistant: Non-clogging through-type silencer.
- Safety: Product gripping is maintained even during power failure.

### Configurations

- 60% or 85% of maximum vacuum.
- NC or NO, depending on safety.
- Combined **ASR** "venturi regulator".
- With or without visual display.
- With or without vacuum sensor.
- With or without controlled blow-off or automatic blow-off function.
- Powerful blow-off as option.
- Versions with 1 or 2 M12 connectors.
- Suction flow rate (SCFM):

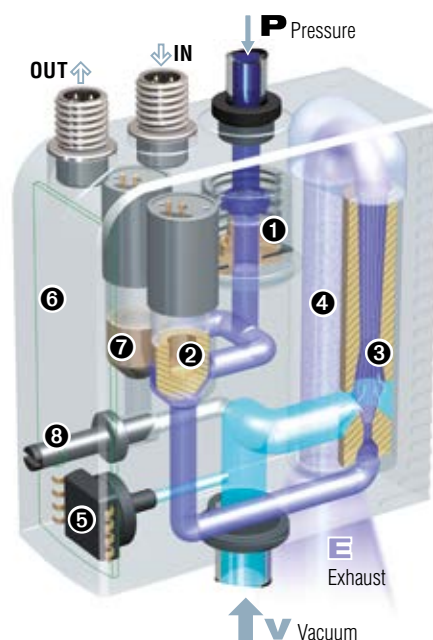
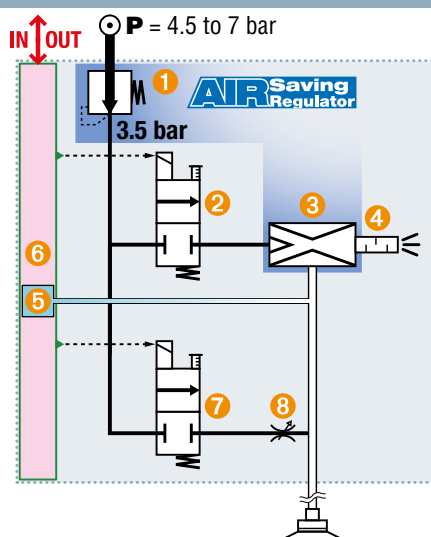
max. vacuum nozzle Ø	60%	85%
2.0 mm	6.67	4.41
2.5 mm	9.71	7.06



### Integration

The **LEM+** compact modules integrate all the functions of "industrial vacuum" including simple, efficient, economical compressed air and are adapted for every application:

- 1 3.5 bar pressure regulator
- 2 "Vacuum" solenoid valve
- 3 3.5 bar optimized venturi
- 4 Optimized silencer
- 5 Electronic vacuum sensor
- 6 Integrated electronics
- 7 "Blow-off" solenoid valve
- 8 Blow-off flow rate regulator



Schematic representation

**ASR** Saving Regulator

**40%** energy savings  
(on average).

Combined "venturi regulator" **ASR**: pressure regulator 1 feeds venturi 3 with 3.5 bar, optimal for its operation.

→ No more unnecessary consumption of compressed air.

# LEM+

## Compact, High Flow Vacuum Pumps Energy Savings & Intelligence



**AR**Saving  
Regulator

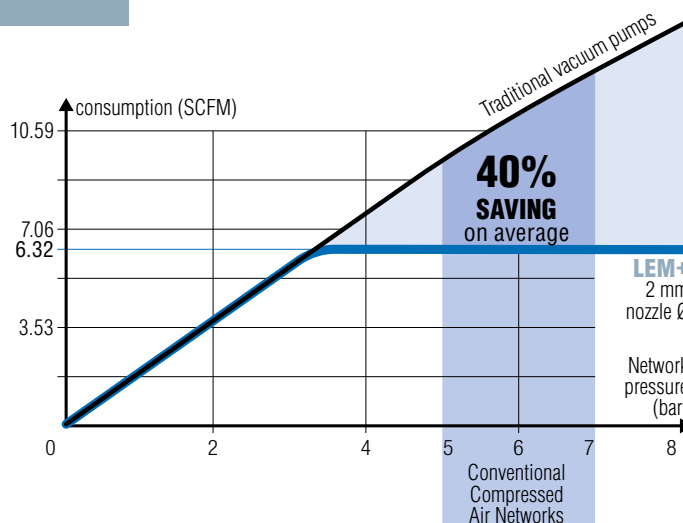
**AR**Saving  
Regulator

### (ASR): Air Saving Regulator

The LEM+ vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation. Regardless of pressure supplied by the compressed air network, the integrated regulator feeds the venturi at **3.5 bar** pressure, optimal for its operation.

- ➔ No more unnecessary energy consumption.
- ➔ No external regulator required and thus the risk of inadvertent misadjustment is eliminated.

Compared to pressures found in most compressed air networks (5-7 bar), the graph opposite demonstrates an achieved economy of 40% on average.



### Intelligence

The front communication face panel allows access and programming of all operations: Various types of monitoring, threshold settings, pump configuration, diagnostics, etc. This front face panel can be locked to prevent an inadvertent misadjustment.

Built-in intelligence, as well as standard factory settings, optimize the implementation, operation, monitoring and maintenance.

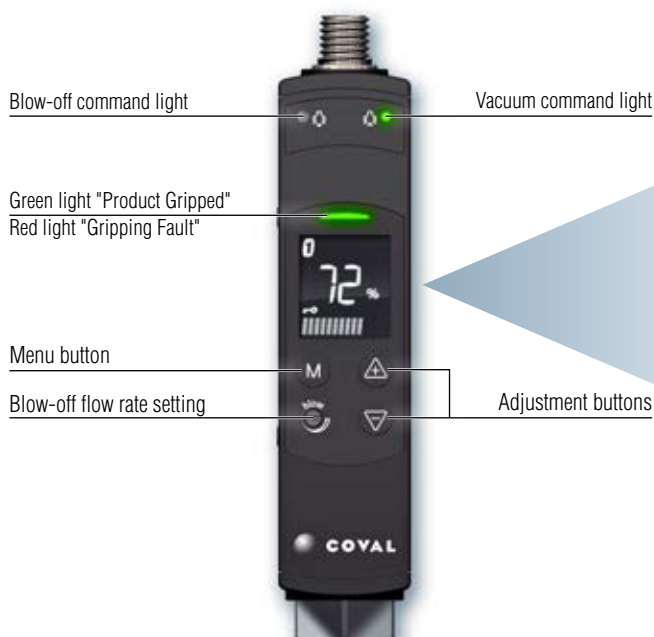
- ➔ **Simplified & Protected Installation and Operation.**

Due to the high visibility display of the **LEM+** modules, all useful information can be seen at a single glance: vacuum level, product gripped, thresholds reached, energy saving mode activated, etc.

The actual vacuum level is shown with direct reading (selection of different display units), and with "bar graph".

Configuration help messages (multilingual: in French, English, Italian, Spanish, German) are also provided.

- ➔ **Clear & Complete Communication at Each Stage.**



L1 "Product Gripped" visualization and setting: (vacuum threshold, hysteresis)



Display units: %, mbar, inHg.

Display shows data in many languages / bar graphs

## Compact, High Flow Vacuum Pumps Selection Guide



### Select Vacuum Level and Nozzle Diameter

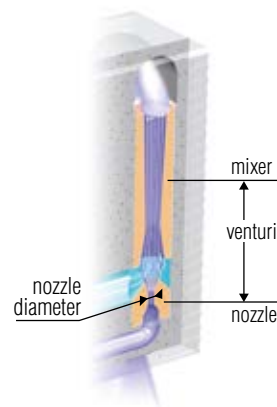
The introductory guide in this catalog shows that for porous objects, a 30-55% vacuum is economical and effective. This is obtained with a 60% maximum vacuum pump.

The table below helps to select the nozzle diameter which generates enough vacuumed air flow to respond in the time required by the application, based on a measurement of the material's leakage rate.

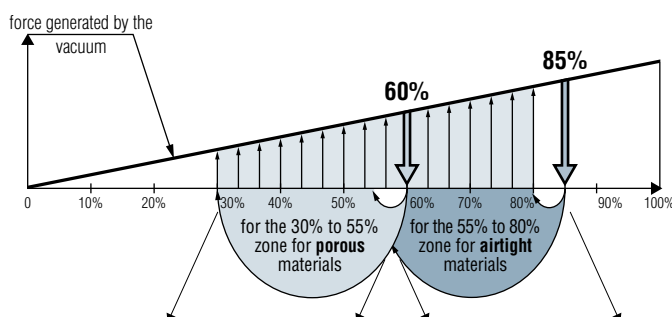
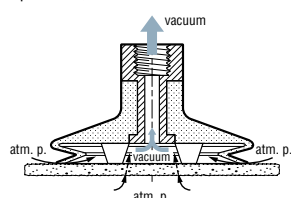
On the contrary, with an airtight material, the vacuum used is 55% to 80%, obtained by a 85% max. vacuum pump.

For standard cases, with its integrated blow-off the **LEM+** series is preferable, and more economical due to its **ASC** (Air Saving Control) function.

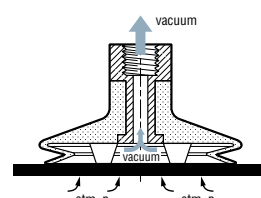
For special cases, the **LEM+** series contains versions without blow-off and versions without a vacuum switch. The table below helps to select the nozzle diameter required for the application.



**Porous materials:**  
cardboard, unfinished wood,  
pastries, etc.



**Airtight materials:**  
glass, plastic, sheet metal,  
finished wood

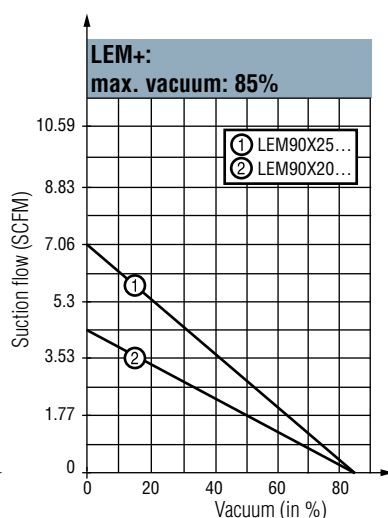
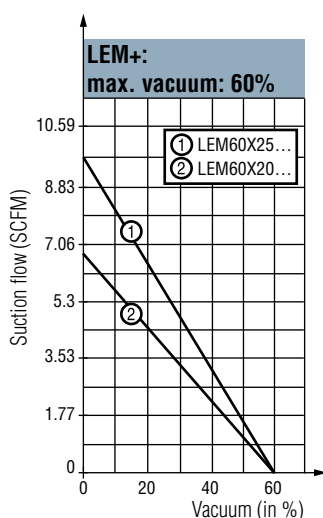


Porous Objects ▶ Maximum Vacuum Level: 60%					
Time to create vacuum (seconds) for a volume of 1 liter					
vacuum achieved	35 %	45 %	55 %	Air consumed (SCFM)	Air drawn in (SCFM)
Ø nozzle					
2.0 mm	0.16	0.27	0.42	6.32	6.67
2.5 mm	0.11	0.18	0.31	9.18	9.71

Airtight Objects ▶ Maximum Vacuum Level: 85%					
Time to create vacuum (seconds) for a volume of 1 liter					
vacuum achieved	55 %	65 %	75 %	Air consumed (SCFM)	Air drawn in (SCFM)
Ø nozzle					
2.0 mm	0.38	0.55	0.80	6.32 *	4.41
2.5 mm	0.26	0.35	0.50	9.18 *	7.06

\* To save compressed air, choose **LEM+** → **ASC** reduces the air consumption by 90%

### Suction Flow Rate / Vacuum Curves

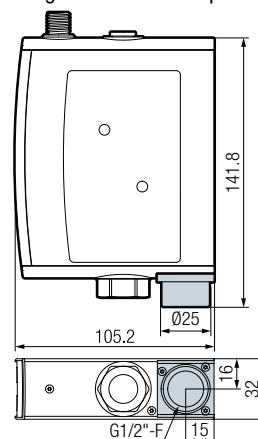


### Exhaust manifold: option E

The LEM+ vacuum pumps can be equipped with the "exhaust manifold" option, which provides a G1/2"-F connection to the exhaust in order to add a silencer, transfer the exhaust outside the work area or to avoid air discharge near the workpiece. (LEM\_\_E Version).

This option can be added at a later date by ordering the reference **GVOKITEC2**.

**Note:** The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.





**LEM 60 X 25**

**S**

**VA C15 P G1**

**F -**

#### VACUUM LEVEL

60 % max. vacuum  
is optimal for  
porous materials

**60**

85 % max. vacuum  
is optimal for air-  
tight products

**90**

#### NOZZLE DIAMETER

2 mm nozzle Ø **20**

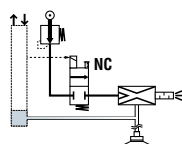
2.5 mm nozzle Ø **25**

#### MODULE COMPOSITION

##### NC Vacuum Pump Without Blow-Off

LEM\_\_X\_\_RV\_C\_\_PG1

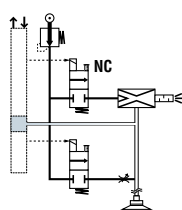
- Single command signal.
- NC vacuum command valve.



##### NC Vacuum Pump With Blow-Off

LEM\_\_X\_\_SV\_C\_\_PG1

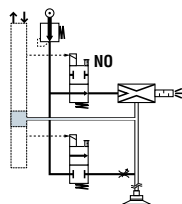
- 2 command signals.
- NC vacuum command valve.
- Blow-off configured on site, at choice:
  - Blow-off controlled by specific signal;
  - Automatic blow-off function (blow-off time configurable from 0 to 10s), only with VA option (advantage: reduced PLC I/O requirement).
- Adjustable blow-off flow rate.



##### NO Vacuum Pump With Blow-Off

LEM\_\_X\_\_VV\_C\_\_PG1

- 2 command signals.
- NO vacuum command valve.
- Blow-off controlled by external signal.
- Adjustable blow-off flow rate.



#### Safety in Case of Power Failure

This version is suitable for applications where product gripping safety must be ensured in the event of an untimely power failure, and this even in the case of leakage (failsafe). This version does not include automatic blow-off function that enables control of the module with a single "vacuum and blow-off" signal.

#### VACUUM SENSOR DIALOGUE

Vacuum pump  
without vac. sensor

**V0**

**C14**

#### CONNECTORS

one M12 connector  
4 pins (C14)

LEM\_\_X\_\_VOC14PG1

- Simplified LEM+ without settings and dialogue.
- Automatic operation until maximum vacuum level.



Vacuum pump with  
vacuum sensor &  
dialogue

**VA**

**C15**

one M12 connector  
5 pins (C15)

LEM\_\_X\_\_VAC15PG1

- Electronic vacuum sensor (VA).
- "Gripped product" switching output 24V DC / NO.
- Front face panel and full dialogue.



Vacuum pump with  
vacuum sensor &  
dialogue

**VA**

**C24**

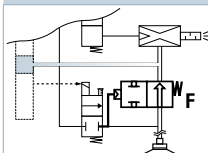
two M12 connectors  
4 pins (C24)

LEM\_\_X\_\_VAC24PG1

- Electronic vacuum sensor (VA).
- Stand alone I/O.
- "Gripped product" switching output 24V DC / NO.
- 1 auxiliary output: "Vacuum level" signal analogic 1 to 5V DC.
- Front face panel with full dialogue.



#### POWERFUL BLOW-OFF



Without

**-**

With

**F**

The powerful blow-off option allows you to release the product quickly. Isolation valve F directs the entire blow-off flow to the vacuum pad. The option is only available with LEM+ modules equipped with a blow-off regulation: Version LEM\_\_X\_\_SV... and LEM\_\_X\_\_VV... NB: If option F is selected, no blow-off flow rate setting is available.

#### EXAMPLE OF COMPLETE PART NUMBER: LEM60X25SVAC15PG1

LEM+ vacuum pump, 60% maximum vacuum, 2.5 mm nozzle Ø, controlled by a NC (Normally Closed) solenoid valve with vacuum sensor and dialogue, connection by 1 M12 5-pin connector.

#### EXHAUST

Open (integrated silencer)

**-**

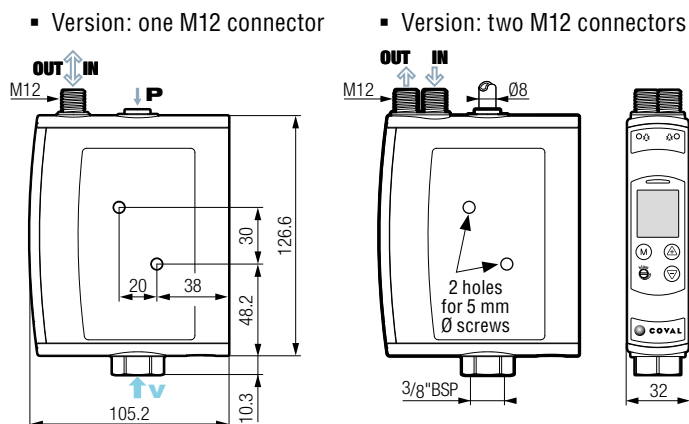
Exhaust manifold (G1/2"-F)

**E**



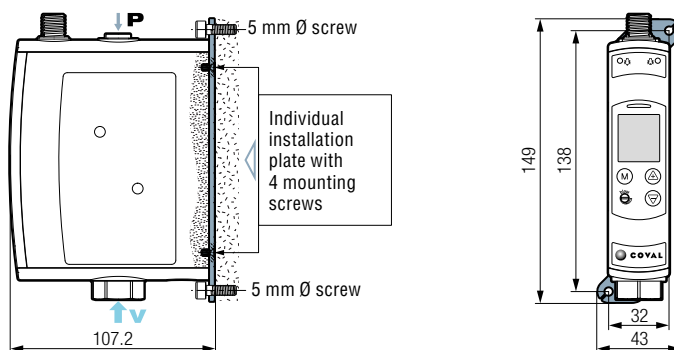


#### Side Mounting



Mounting from the side is the simplest to implement: Two Ø 5 mm through screws or bolts with large washers.

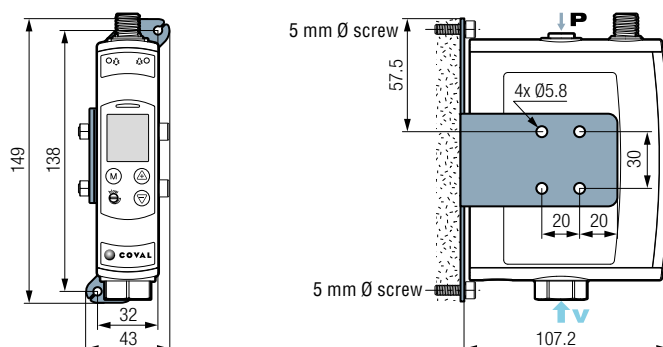
#### Mounting from Front



For mounting from the front, in addition to the module, you need to order an additional kit:

Mounting from front kit:  
1 plate + 4 screws

**Part No.: LEMFIX2A**

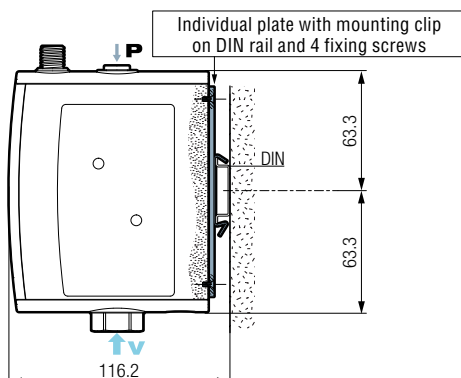


For front installation with side pump mounting this kit is needed in addition to the module:

Front installation kit:  
1 bracket + 2 screws CHC5x40 + 2 nuts

**Part No.: LEMFIX2D**

#### Mounting on DIN rail



For a static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for fixing onto a DIN rail, to be ordered separately:

Kit for mounting on DIN rail:  
1 plate / clip + 4 screws

**Part No.: LEMFIX2B**



#### Specifications

##### COMMON SPECIFICATIONS

- Supply: Non-lubricated air 5 microns filtered, according to ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Blow-off: Adjustable flow rate.
- Powerful blow-off (option F) P = 3.5 bar without flow rate control.
- Maximum vacuum: 60% or 85% depending on model.
- Suction flow rate: From 4.41 to 9.71 SCFM, depending on model.
- Air consumption: From 6.32 to 9.18 SCFM, depending on model.
- Integrated non-clogging silencer.
- Sound level: From 72 to 75 dBA.
- Display status:
  - of the vacuum control on the front panel: Green LED.
  - of the blow-off control on the front panel: Orange LED.
- Electric protection grade: IP 65.
- Maximum operating frequency: 4 Hz.
- Response time for opening / closing: 20/30 ms.
- Service life: 30 million cycles.
- Weight: From 410 to 460 g, depending on model.
- Operating temperature: From 32 to 122°F.
- Materials: PA 6-6 15% FG, brass, aluminum, NBR, HNBR, PU.

##### Electrical Controls

- Control voltage: 24V DC ( $\pm 10\%$  regulated).
- Current consumption: 30 mA (0.7W) by vacuum or blow-off solenoid valve.

##### VA MODEL SPECIAL SPECIFICATIONS

###### Displays

- Display status of the threshold on the front panel: Green or red LED.
- Black and white LCD display, 7 matrix, symbols, vacuum reading area.
- Displaying the vacuum level and bar graph.
- Displaying number of cycles (vacuum cycles counter).
- Indication of exceeding service life (> 30 million cycles).

###### Settings

- Using membrane keypad and pull down menu.
- Language selection: FR, ENG, DE, IT or ES.
- Blow-off type selection: controlled or automatic (blow-off time configurable from 0 to 10s).
- Measurement unit selection (% , mbar, inHg).
- Manual, electrical, monostable commands.
- If the application requires, specific setting of thresholds and hysteresis that are different from the initial factory settings: L1 = 65%, h1 = 10%.

###### Vacuum Sensor

- Power supply voltage: 24V DC ( $\pm 10\%$  regulated).
- Current consumption: Standby: <25mA / max. 60 mA.
- Measurement range: 0 to 99% of vacuum, 0 to -999 mbar, 0 to -29.9 inHg.
- Measurement accuracy:  $\pm 1.5\%$  of range, temperature compensated.

###### "Gripped Product" Output Signal

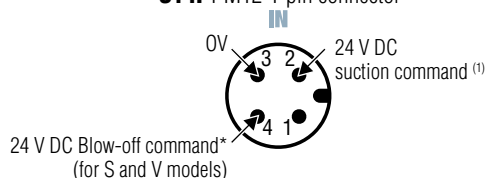
- 24V DC, switching output / NO, switching capacity: 125 mA PNP.

###### Auxiliary output (C24 model only, 2 x M12 4 pins)

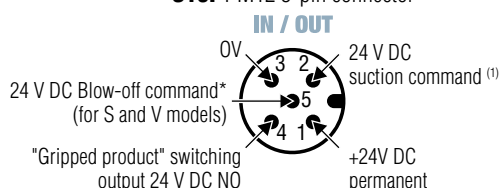
- "Vacuum level" signal, analogic 1 to 5V DC of measuring range.

#### Electrical Connections

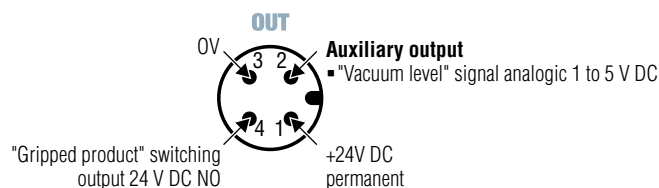
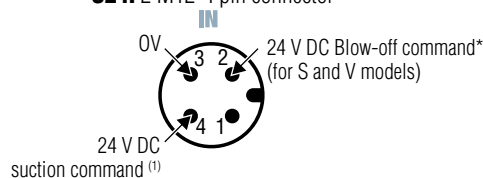
##### • C14: 1 M12 4-pin connector



##### • C15: 1 M12 5-pin connector



##### • C24: 2 M12-4 pin connector



(1) 24 V DC suction command, depending on version:

- for vacuum pumps model **R** and **S** (vacuum control NC valve): 24 V DC vacuum control
- for vacuum pumps Model **V** (vacuum control NO valve): 24 V DC vacuum off command

\* **S** externally controlled blow-off or automatic blow-off function > economy of an automaton outlet.

#### Accessories

Power supply cable: M12, straight, female – open end

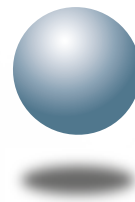
- **CDM12N**: 4-pin, length. 2 m.
- **CDM12L5**: 4-pin, length. 5 m.
- **CDM125PL2**: 5-pin, length. 2 m.
- **CDM125PL5**: 5-pin, length. 5 m.



Power supply cable: M12, elbow, female – open end

- **CCM12**: 4-pin, length. 2 m.
- **CCM125PL2**: 5-pin, length. 2 m.





# 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.*



**COVAL S.A.S.**  
Head Office



**COVAL INC.**



**COVAL IBERICA**



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