MPXE

Controlled Micro Vacuum Pumps

COVAL
vacuum managers

EN

OPERATING INSTRUCTIONS

This manual is intended for users of **MPXE** series controlled micro vacuum pumps.
It contains all the information you need to integrate the vacuum pumps, as well as the instructions for use and maintenance.

The operating instructions were originally drafted in French (original version).
They must be kept for any future use.
Subject to technical changes, mistakes or printing errors.

For any additional information, please contact COVAL:

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IO-Link
AIR Saving Control

**PRIOR TO COMMISSIONING THIS PRODUCT,
PLEASE CAREFULLY READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS.**

Retrouvez tous les documents en différentes langues sur le site COVAL : https://doc.coval.com/MPXE

All documents are available in multiple languages on the COVAL website: https://doc.coval.com/MPXE

Finden Sie alle Dokumente in verschiedenen Sprachen auf der COVAL-Homepage: https://doc.coval.com/MPXE

Tutti i documenti nelle differenti lingue sono presenti sul sito COVAL: https://doc.coval.com/MPXE

Podrá encontrar todos los documentos en diferentes idiomas en la página web de COVAL: https://doc.coval.com/MPXE

SUMMARY

1. IMPORTANT INFORMATION

This document contains important instructions and information regarding various stages in the life cycle of the product:
- Transporting, storing, commissioning, and decommissioning.
- Operating and servicing.

The operating instructions correspond to the product actually delivered.

This document is part of the product and the instructions below must be followed:
- Read this document carefully and observe the instructions to ensure safe installation, optimal operation of the product and to avoid any malfunction.
- Keep the document within reach of the product so that the staff can easily access it.

- **Failure to observe the instructions specified in this document may lead to injury or even death!**
- **COVAL will not be held liable for any damage or breakdown as a consequence of failure to observe instructions.**

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- E-mail: coval@coval.com
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2. OPERATING AND SAFETY INSTRUCTIONS

2.1. Assembly / Dismantling

Only qualified personnel is authorized to use the components. Such personnel must be trained in the following areas:
- Installing pressure and electrical equipment.
- Applicable safety rules and requirements for using components and installing them in devices, machines, and machine lines.
- Appropriate handling of components and their respective products.
- Proper use with the operating materials and supplies.

The improper use of components with other operating materials and supplies than those defined, other voltages, and under other environmental conditions can lead to failure, damage, and injury.
This list must be considered as an overview and does not claim to be exhaustive. It can be further expanded by users according to their particular needs.

2.2. Safety instructions

In order to ensure flawless installation and operation, the following rules must also be observed:
- Vacuum pumps must be carefully removed from their packaging.
- Vacuum pumps must be protected against any and all damage.
- During installation and maintenance work, the vacuum pump must be de-energized and secured against any unauthorized activation.
- Any attempt to alter the vacuum pump is strictly prohibited.
- The area surrounding the vacuum gripper and the location where it is used must be kept clean.
- It is forbidden for persons to remain under the payload handled by the vacuum pump in its transport area.
- Only appropriate fittings and connectors must be used.
- During installation, only flexible tubes and tubes that are suitable for the specific operating material may be used (tubes that come loose or electrical connection lines constitute a major safety hazard—**including risk of death!**).
- Conductive and live cable lines must be insulated, of an adequate size, and properly installed.
- Pneumatic and electric lines must be connected to the component in a stable and safe manner.
- Ensure that any physical contact with electric parts is prevented (protect electrical contacts).
- Only available fastening means described in chapter 7.5 maybe used and tightening torques must be used accordingly.
- The possibility of power or pneumatic supply interruption must be taken into consideration to ensure people and systems are protected at all times.
- Emergency stops should be accounted for when designing the system.

- The latest applicable EC directives, legislations, decrees, and standards, as well as the current state of the technology for its intended use.
- Taking any special measures to meet above said requirements, as well as the current state of the technology.

- **Failure to observe the above safety instructions may lead to failure, damage, and injury—even risk of death.**
- **The components of the device that are no longer in working order must be recycled in an environmentally-friendly manner! (see chapter RECYCLING) !**

2.3. Commissioning and decommissioning

Commissioning:

- Ensure the flexible tubes for compressed air and power supply are connected correctly using the appropriate connectors.

Decommissioning (prior to any disassembly or maintenance work):

- Check that the parts to be handled are not held by the system (load may drop).

2.4. Disposal

When disposing of the system or any of its constituent parts that are no longer functional, follow the procedure below:
Waste electrical and electronic equipment (WEEE) must not be disposed of in urban waste collection bins but given to the appropriate recycling organization (see section on RECYCLING).

3. NAMEPLATE

The nameplate is affixed under the head module of the bank in such a way that it is legible at all times.
It includes the following information:

- Part number
- Serial number
- A datamatrix code containing the reference and serial number of the vacuum pump.
- CE marking

Sample nameplate

4. MAIN FUNCTIONS OF MPXE MICRO VACUUM PUMPS

MPXE micro vacuum pumps have the following characteristics:

- Vacuum generated by a Venturi effect (maximum negative pressure: -85 kPa, i.e. 85% vacuum).
- NC or NO vacuum control and NC blow-off control.
- Standard or adjustable powerful blow-off.
- Electronic vacuum switch with analog output 5V DC.
- Vacuum check valve.
- Open clog-free silencer or exhaust collector.
- Standalone micro vacuum pumps or bankable from 1 to 8 modules with common pressure and collectable exhaust.
- Standard Input/Output (SIO).

INSTRUCTION FOR USE

MPXE micro vacuum pumps are designed for the generation of vacuum allowing the gripping and the transfer of parts by means of suction cups.
Authorized gases: only neutral gases such as air, nitrogen.

Once the device is installed, make sure that the device remains clear of any moving parts.

MPXE micro vacuum pumps are not suitable for the following purposes:

- Transporting liquids or granules
- Filling compressed air tanks, driving pressure elements (valves, cylinders, etc.)
- Vacuuming dangerous materials
- Vacuuming any aggressive gases or products
- Handling people or animals
- Usage in environments subject to explosion hazard
- Usage in medical applications.

COVAL is not liable for any damage resulting from improper use of the vacuum pump.

5. CONFIGURATION REMINDER

STANDALONE MPXE MICRO VACUUM PUMP

MPXE90X	10	S	L15	P	R2	F1	E

NOZZLE DIA.

0.7 mm dia.	07
1.0 mm dia.	10

GENERATOR CONTROL

Vacuum **NC** and blow-off **NC**	S
Vacuum **NO** and blow-off **NC**	V

BLOW-OFF

Standard blow-off	F1
Adjustable powerful blow-off	F3

EXHAUST COLLECTION

X	Without
E	With

MPXE MICRO VACUUM PUMPS IN BANK

MPXE90X	10	S	L15	P	R2	F1	EB4		L

NOZZLE DIA.

0.7 mm dia.	07
1.0 mm dia.	10

GENERATOR CONTROL

Vacuum **NC** and blow-off **NC**	S
Vacuum **NO** and blow-off **NC**	V

BLOW-OFF

Standard blow-off	F1
Adjustable powerful blow-off	F3

NUMBER OF MODULES

EB1	Bank of 1 MPXE module
EB2	Bank of 2 MPXE modules
EB3	Bank of 3 MPXE modules
EB4	Bank of 4 MPXE modules
EB5	Bank of 5 MPXE modules
EB6	Bank of 6 MPXE modules
EB7	Bank of 7 MPXE modules
EB8	Bank of 8 MPXE modules

BANK END SETS

L	**Single Left** End Set for a bank of 1 to 4 MPXE modules with a 1.0 mm nozzle, and up to 8 MPXE modules with a 0.7 mm nozzle. ▪ 1 x common pressure connection, push-to-connect 8x10 mm ▪ 1 x Exhaust collector, push-to-connect 10x12 mm
D	**Double** End Set for a bank of 1 to 8 MPXE modules. ▪ 2 x common pressure connections, push-to-connect 8x10 mm ▪ 2 x Exhaust collectors, push-to-connect 10x12 mm

6. COMPOSITION

6.1. Overview

Ultra-compact and lightweight design

- 12.5 mm wide
- 82 g minimum
- Volume: 71 cm^3

Vacuum generation with single-stage Venturi pump

- Short evacuation times
- No moving parts
- Dust resistant
- No maintenance required

Inputs / Outputs Digital (SIO)

- JST male connector 5 pins with 1 mm pitch, type NSH

Simple and efficient HMI

Control status LEDs:

- Green LED: vacuum control
- Orange LED: blow-off control

Vacuum check valve

Open clog-free silencer or exhaust collector depending on the version

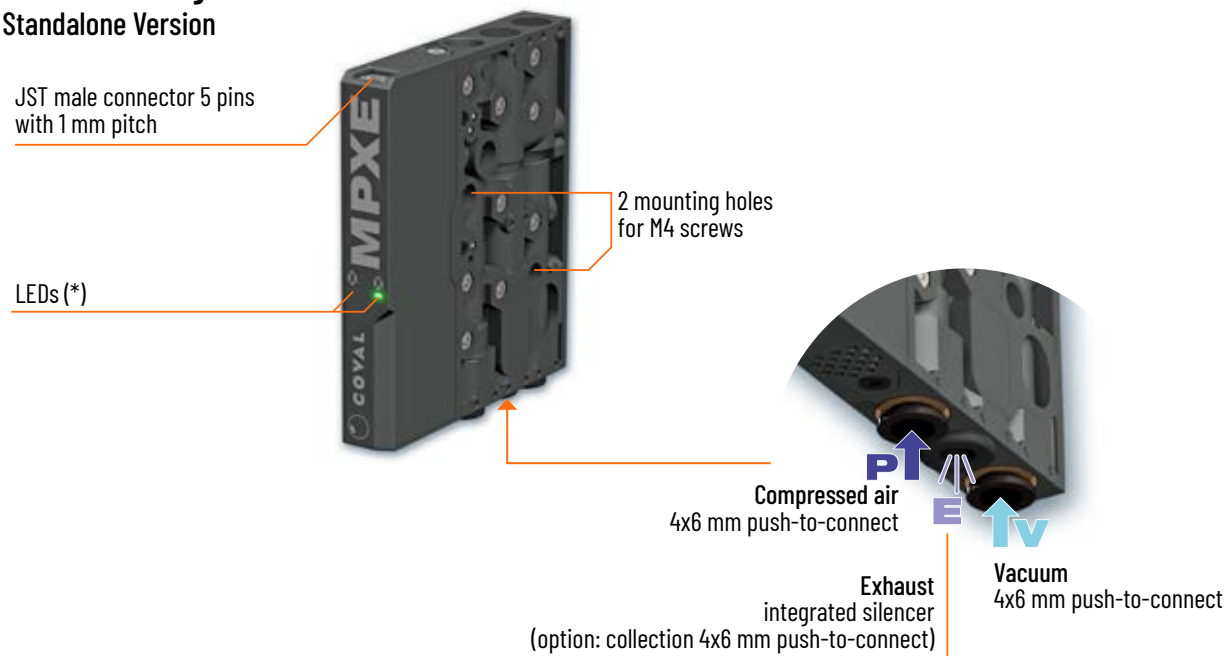
Available configurations

- **Standalone module**: ultra-thin and lightweight micro vacuum pump.

- **Bank from 1 to 8 modules** with common pressure and collectable exhaust.

6.2. Available configurations

6.2.1. Standalone Version



*** Green and orange LEDs on the front**

On the MPXE mini vacuum pumps, the LEDs correspond to the solenoid valve controls.

- Model **MPXE_S**: Vacuum pump with normally closed (NC) vacuum control and normally closed (NC) blow-off.
  - Green LED: vacuum control
  - Orange LED: blow-off control
- Model **MPXE_V**: Vacuum pump with normally open (NO) vacuum control and normally closed (NC) blow-off.
  - No LEDs: vacuum control (NO)
  - Both LEDs on: blow-off control.

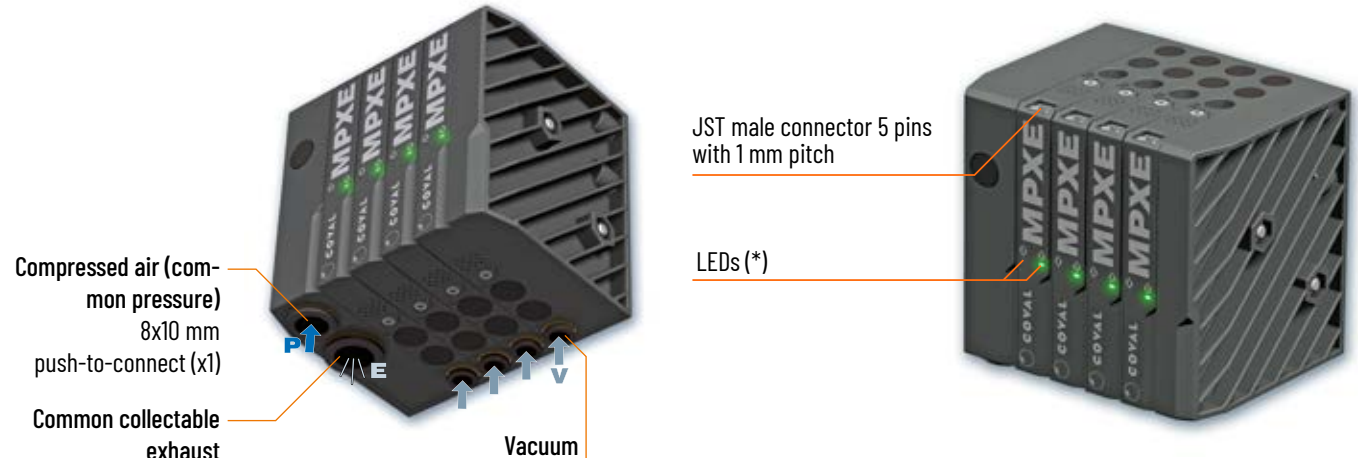
MPXE_F3

The MPXE micro pumps in the adjustable powerful blow-off version (**F3**) feature an adjustment screw with a locking nut to adjust the power as needed (blow-off flow rate adjustable from 16 to 55 Nl/min at 3.7 bar).

6.2.2. Bankable Version

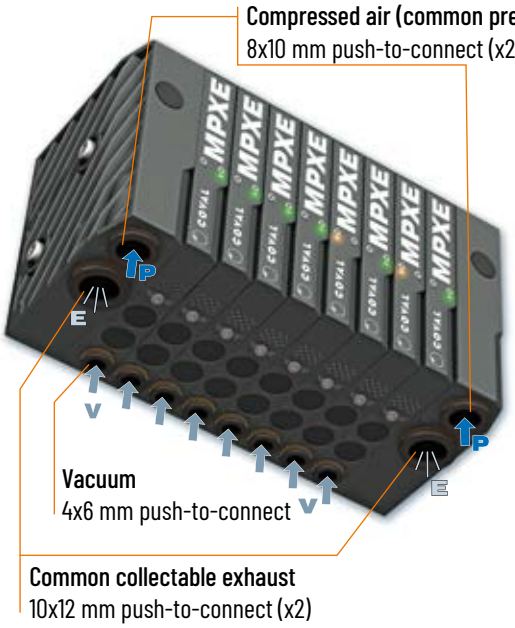
BANK EQUIPPED WITH SINGLE END SET - LEFT (MPXE___B_L)

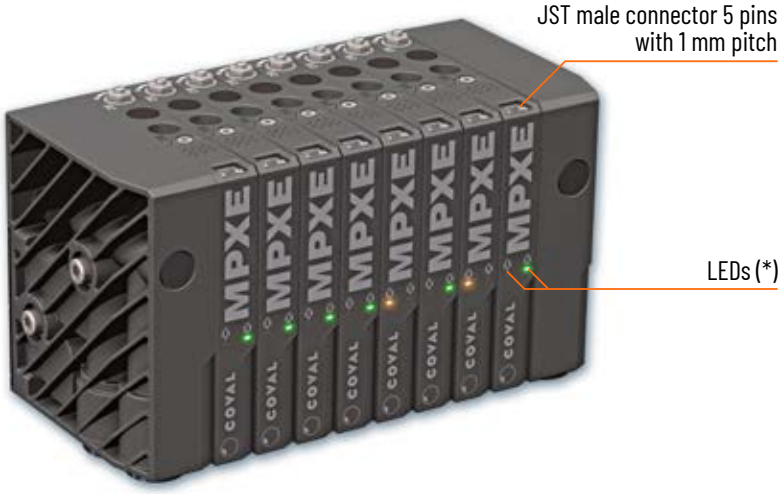
- Nozzle Dia. 0.7 mm: 1 to 8 modules per bank
- Nozzle Dia. 1.0 mm: 1 to 4 modules per bank
- 1 x Common Pressure
- 1 x Unrestricted and collectable exhaust



BANK EQUIPPED WITH **DOUBLE** END SET (MPXE___B_D)

- 1 to 8 modules per bank
- 2 x Common Pressure
- 2 x Unrestricted and collectable exhaust





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- Model **MPXE_V**: Vacuum pump with normally open (NO) vacuum control and normally closed (NC) blow-off.
  - No LEDs: vacuum control (NO)
  - Both LEDs on: blow-off control.

MPXE_F3

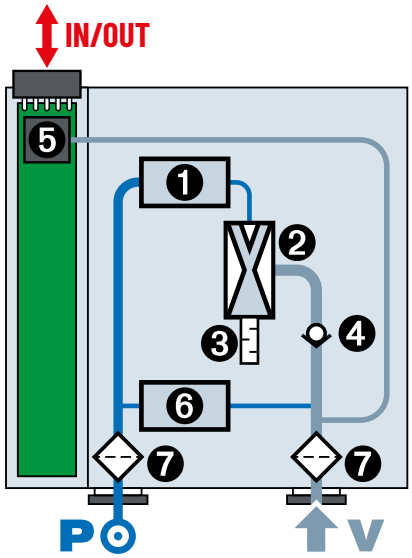
The MPXE micro pumps in the adjustable powerful blow-off version (**F3**) feature an adjustment screw with a locking nut to adjust the power as needed (blow-off flow rate adjustable from 16 to 55 Nl/min at 3.7 bar).

7. TECHNICAL DATA

7.1. Integrated Functions

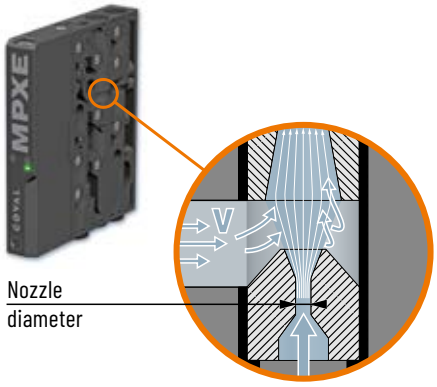
The **MPXE Series** micro vacuum pumps integrate all the necessary functions into a compact footprint for a simple, efficient solution adapted to each application:

❶ Vacuum solenoid valve
❷ Single-stage Venturi pump
❸ Open silencer or exhaust collector
❹ Vacuum check valve
❺ Electronic vacuum switch
❻ Blow-off solenoid valve
❼ 200 µm filter screen



7.2. Characteristics

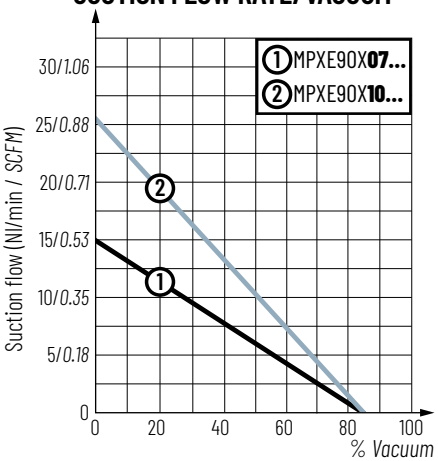
The table specifies the performance levels and evacuation times generated for each nozzle diameter available.



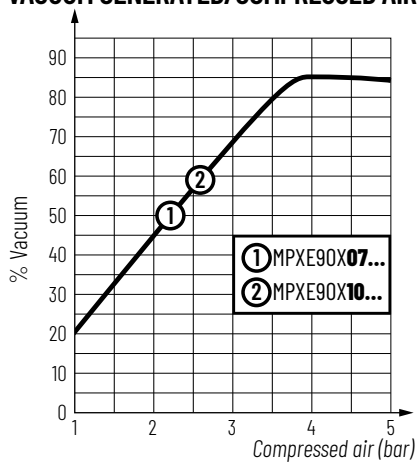
Vacuum reached / Nozzle dia. (mm)	Evacuation time[1] (s) of a volume of 5 cl[2] 50%	60%	70%	80%	Max. vacuum (%)	Air drawn in (Nl/min/*SCFM*)	Air consumed (Nl/min/*SCFM*)	Air pressure level (bar)
0.7	0.15	0.25	0.42	0.70	85	15 / *0.53*	22 / *0.78*	3.7
1.0	0.09	0.14	0.24	0.37	85	26 / *0.92*	44 / *1.55*	3.7

(1) Out of valve response time. (2) Example of a 5 cl volume: 4 suction cups 1.5 bellows Ø 25 (VSA25) + 4 airlines 4x6 mm lg 600 mm + 1 airline 4x6 mm lg 500 mm.

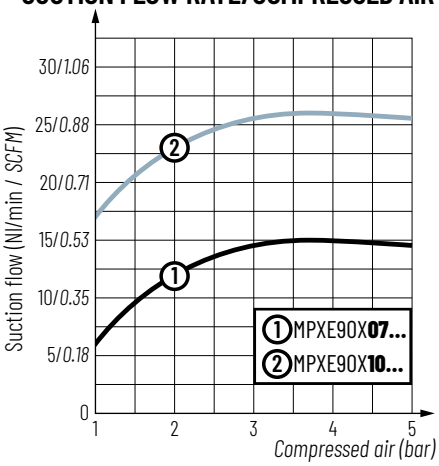
SUCTION FLOW RATE/VACUUM



VACUUM GENERATED/COMPRESSED AIR



SUCTION FLOW RATE/COMPRESSED AIR



7.3. General characteristics

General characteristics

- Supply: non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:3].
- Operating pressure: from 3.5 to 7 bar.
- Optimal dynamic pressure per module: 3.7 bar *(bank supply pressure must be adjusted according to the number of modules to ensure 3.7 bar dynamic pressure / module).*
- Standard blow-off (MPXE__**F1**): network pressure (blow-off flow rate of 7 Nl/min/*0.24 SCFM* at 3.7 bar).
- Adjustable powerful blow-off (MPXE__**F3**): network pressure with valve (flow rate adjustable from 16 to 55 Nl/min, *0.56 to 1.94 SCFM*, at 3.7 bar).
- Pressure connection:
  - Standalone vacuum pumps: 4x6 mm push-to-connect with 200 µm filter screen.
    Bank: 8x10 mm push-to-connect with 200 µm filter screen.
- Vacuum connection: 4x6 mm push-to-connect with 200 µm filter screen.
- Common collectable exhaust:
  - Standalone vacuum pumps: 4x6 mm push-to-connect.
    Bank: 10x12 mm push-to-connect.
- Noise level:
  - Standalone vacuum pumps: max 66 dBA
    Bank of 1 to 4 vacuum pumps: max 74 dBA
  - Bank of 5 to 8 vacuum pumps: max 82 dBA
- Protection rating: IP40.
- Max. operating frequency: 4 Hz.
- Endurance: 30 million cycles.
- Weight:
  - Standalone vacuum pumps:
    - MPXE___**F1**: 85 g
      MPXE___**F3**: 90 g.
  - Bank:
    - MPXE_B_**L**: 82 g (F1) or 86 g (F3) X number of stand-alone modules + 145 g for ends set.
      MPXE_B_**D**: 82 g (F1) or 86 g (F3) X number of stand-alone modules + 185 g for ends set.
- Operating temperature: from 0 to 50°C (32 to 122°F).
- Storage temperature: from -10°C to 60°C (14°F to 140°F).
- Materials: PA 6.6 GF, aluminum, stainless steel, brass, steel, NBR, PC+ABS, FKM, POM, PU. Housing materials comply with the requirements of UL standard 94 class HB.

Electrical controls

- Control voltage: 24V DC (regulated ± 10 %), PNP.
- Max. consumption: 60 mA (1.4 W) per vacuum and blow-off solenoid valve.
- Valve response time:
  - opening: 20 ms.
  - closure: 24 ms.

Integrated electronics

- 24 V DC power supply (regulated ± 10 %).
- Typical current consumption: < 35 mA / max. 50 mA.
- Measuring range: 0 to 99 % vacuum.
- Measurement accuracy: ± 2% of the range, compensated for temperature.
- Protected against reversed wiring and polarity.
- Protection against short circuits.
- Inputs switching type: PNP.
- LEDs for visualization of the controls:
  - Model **MPXE_S**, Vacuum pump with NC vacuum control and NC blow-off:
    - Green LED: vacuum control.
    - Orange LED: blow-off control.
  - Model **MPXE_V**, Vacuum pump with NO vacuum control and NC blow-off:
    - No LEDs: vacuum control.
    - Both LEDs on: blow-off control.

Electrical connections

- JST connector 5 pins with 1 mm pitch type NSH, A-Coded.
- SIO (Standard Inputs Outputs) operation.

Output signal

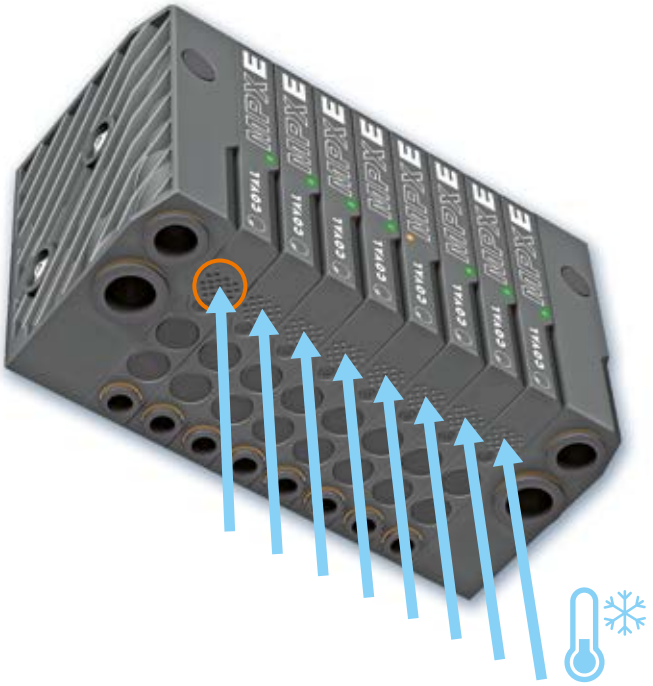
- Vacuum level signal, analog output 5V DC: from 1 to 4V DC from 0 to 90% of vacuum.

7.4. Integration and Thermal Constraints

Recommended horizontal installation with respect to the designated openings for optimal cooling through natural convection.
In the case of enclosure or other types of installations, ensure the integration of the equipment to comply with the allowed ambient temperature range and, if necessary, provide suitable cooling.

Operating temperature: from 0 to 50°C (32 to 122°F).

It is crucial to ensure the equipment is properly cooled and operated within the specified temperature range to prevent potential hazards, damage, or reduced product lifespan. Always follow the manufacturer's guidelines and safety instructions to maintain the reliability and safe operation of the equipment.



BURN HAZARD

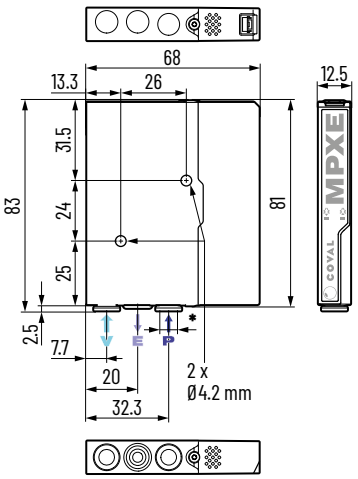
WARNING

In the event of a compressed air supply failure while keeping the controls activated and in the absence of adequate cooling, the equipment's temperature may exceed the burning threshold of 51°C (123.8°F) according to the NF EN ISO 13732-1 standard.

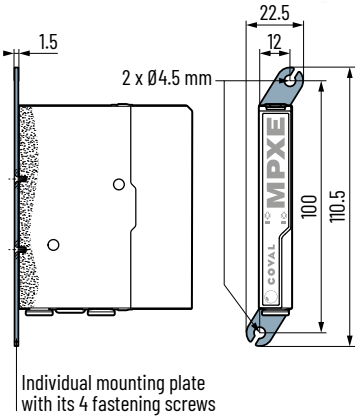
7.5. Dimensions and Installation

Standalone Module

LATERAL INSTALLATION
2 x 4.2 mm dia.
(for two Ø 4 mm through screws or bolts with large washers).



MOUNTING FROM FRONT
2 x 4.5 mm dia.
(for M4 screws)

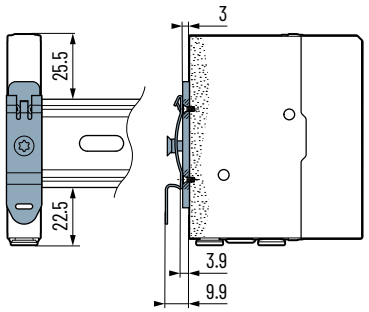


Individual mounting plate with its 4 fastening screws

For front panel installation, order the following installation kit:

Part No.: **MPXFIXA**
(1 plate + 4 fastening screws)

INSTALLATION ON DIN RAIL
For a static installation (e.g., in a cabinet), an MPXE micro vacuum pump can be mounted on a DIN rail.



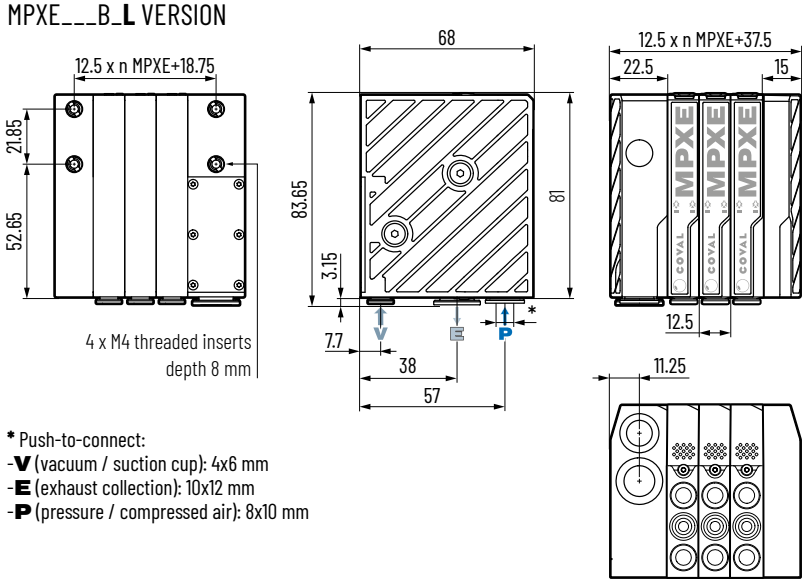
In this case, it must be equipped with an installation clip that is to be ordered separately:

Part No.: **MPXFIXB**
(1 bracket + 1 clip + 5 fastening screws)

***** Push-to-connect:
-**V** (vacuum / suction cup): 4x6 mm
-**E** (exhaust collection, E option): 4x6 mm
-**P** (pressure / compressed air): 4x6 mm

Bank

MPXE___B_**L** VERSION



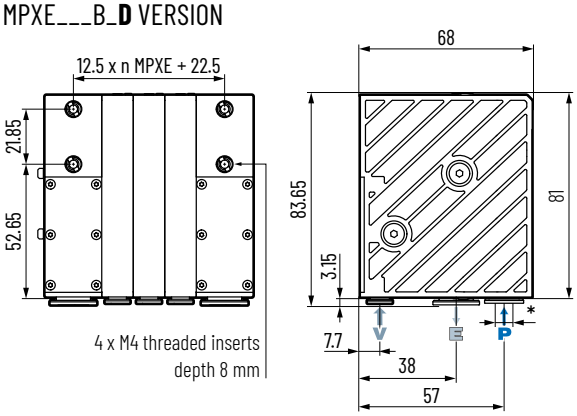
***** Push-to-connect:
-**V** (vacuum / suction cup): 4x6 mm
-**E** (exhaust collection): 10x12 mm
-**P** (pressure / compressed air): 8x10 mm

Dimensions of the MPXE_F3 Option (Adjustable Powerful Blow-off)

The MPXE micro vacuum pumps in the F3 version feature an adjustment screw with a locking nut to adjust the blow-off power.

Note: All dimensions are in mm.

MPXE___B_**D** VERSION



Dimensions

Part No.	A
MPXE___**B1D**	0
MPXE___**B2D**	3
MPXE___**B3D**	0
MPXE___**B4D**	3
MPXE___**B5D**	0
MPXE___**B6D**	3
MPXE___**B7D**	0
MPXE___**B8D**	0

***** Push-to-connect:
-**V** (vacuum / suction cup): 4x6 mm
-**E** (exhaust collection): 10x12 mm
-**P** (pressure / compressed air): 8x10 mm

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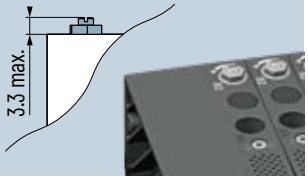
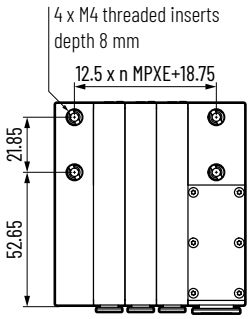


Note: All dimensions are in mm.

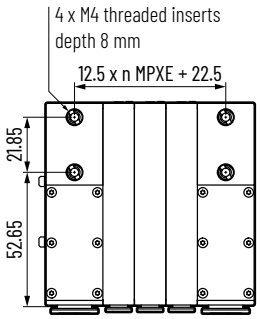
MOUNTING FROM REAR

4 x M4 threaded inserts
depth 8 mm

MPXE_B_**L** VERSION



MPXE_B_**D** VERSION

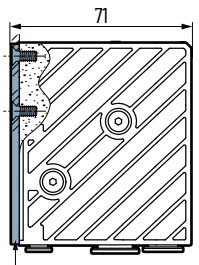


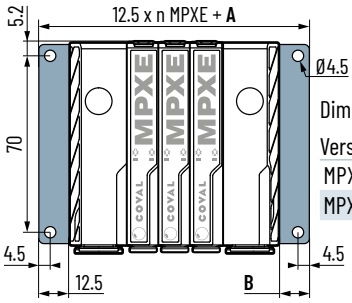
MOUNTING FROM FRONT

4 x 4.5 mm dia.
(for M4 screws)

For front panel installation, order the following installation kit:

Part No.: **MPXFIXD**
(2 plates + 4 fastening screws





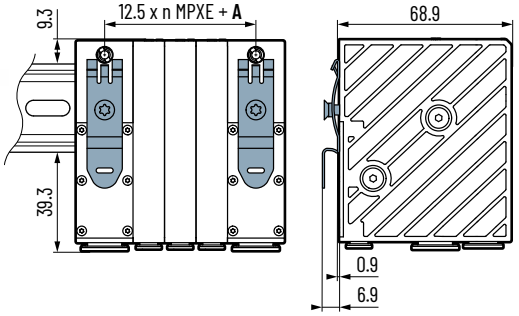
Dimensions

Version	A	B
MPXE___B_**L**	66.3	16.25
MPXE___B_**D**	70	12.5

INSTALLATION ON DIN RAIL

The bank can be mounted on a DIN rail for a static installation (e.g. in a cabinet).
In this case, it must be equipped with an installation clip that is ordered separately:

Part No.: **MPXFIXC**
(2 clips + 2 fastening screws)



Dimensions

Version	A
MPXE___B_**L**	18.75
MPXE___B_**D**	22.5

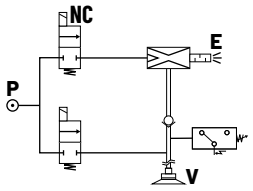
8. FINDING YOUR MODULE

In order to meet all your needs, the **MPXE** range includes bankable micro vacuum pumps, each one with NC or NO solenoid valve vacuum control. To efficiently implement your vacuum pump using the present operating instructions, you need to find your module in the range based on its reference number.

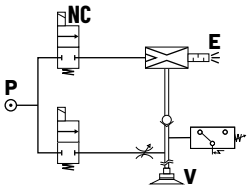
Model MPXE_S:
Vacuum pump with **NC** vacuum control and **NC** blow-off.

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.

NC vacuum control
Standard blow-off (**F1**)



NC vacuum control
Adjustable powerful blow-off (**F3**)

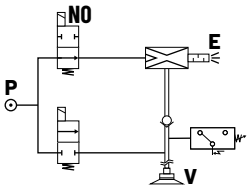


P: *Pressure / Compressed Air* **V**: *Vacuum / Suction Cup* **E**: *Exhaust*

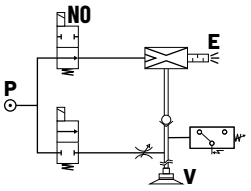
Model MPXE_V:
Vacuum pump with **NO** vacuum control and **NC** blow-off.

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.

NO vacuum control
Standard blow-off (**F1**)



NO vacuum control
Adjustable powerful blow-off (**F3**)



P: *Pressure / Compressed Air* **V**: *Vacuum / Suction Cup* **E**: *Exhaust*

9. CONNECTIONS

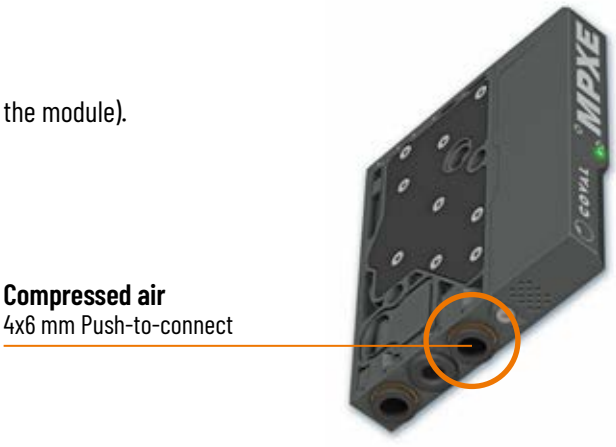
COMPRESSED AIR OR VACUUM NETWORKS:
- Wear safety goggles
- Make sure all fittings and tubes are tightened securely
- Tube ends must be fastened to avoid any risk of being pulled off in the event of accidental breakage

9.1. Pressure supply connection

- Non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:3].
- Operating pressure: from 3.5 to 7 bar.
- Optimal dynamic pressure per module: 3.7 bar *(bank supply pressure must be adjusted according to the number of modules to ensure 3.7 bar dynamic pressure / module).*
- 200 µm filter screen integrated in the vacuum connection to protect the pump against particles.

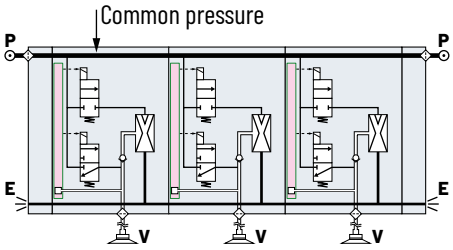
9.1.1. Standalone Modules

Compressed air connection through a 4x6 mm push-to-connect (mark **B** on the module).



9.1.2. Banks

The banks group the MPXE vacuum pump modules with a common internal pressure.

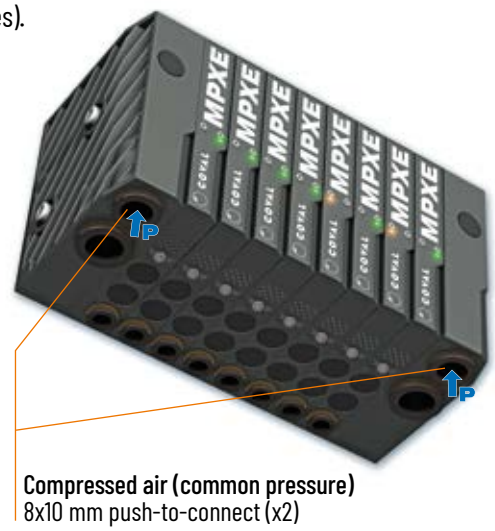


BANK EQUIPPED WITH SINGLE END SET - LEFT (MPXE___B_L)

Compressed air (common pressure):
1 x 8x10 mm push-to-connect (mark **E** on the head plate).

BANK EQUIPPED WITH DOUBLE END SET (MPXE___B_D)

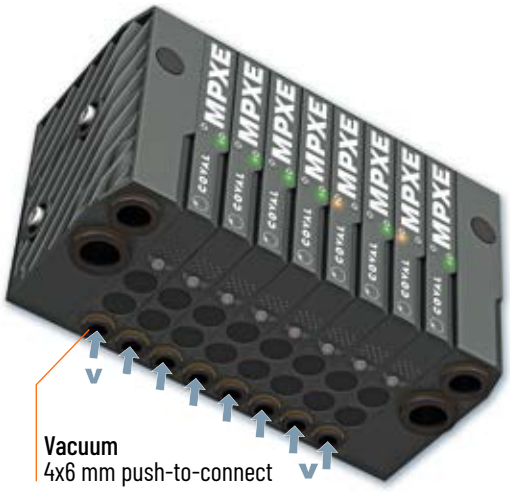
Compressed air (common pressure):
2 x 8x10 mm push-to-connect (mark **E** on the head and tail plates).



9.2. Vacuum circuit connection

4x6 mm push-to-connect with 200 µm filter screen on each module (mark **A** on module).

For optimal vacuum regulation, the vacuum circuit must be airtight at all times.



NOTE: MODULE PROTECTION

- 200 µm filter screen integrated in the vacuum connection to protect the pump against particles.
- Possible additional filter on vacuum circuit: In the rare cases of fine dust in a wet environment, the use of an appropriate filter will prevent any internal clogging: → See COVAL catalog: "Filters for vacuum circuits".

For short response times and minimum consumption, try reducing the volume to evacuate. To this end, as the module is installed as close as possible to the suction cups, ensure the length of the tube connecting the suction cups to the module is as short as possible.

9.3. Collectable exhaust connection

9.3.1. Exhaust collection on standalone vacuum micro pump (MPXE_E)

1 x 4x6 mm push-to-connect (mark **C** on the module).

Exhaust
4x6 mm push-to-connect

9.3.2. Common exhaust collection on bank

BANK EQUIPPED WITH SINGLE END SET - LEFT (MPXE___B_L)

Common collectable exhaust:
1 x 10x12 mm push-to-connect (mark **F** on the head plate).

Common collectable exhaust
10x12 mm
push-to-connect (X1)

BANK EQUIPPED WITH DOUBLE END SET (MPXE___B_D)

Common collectable exhaust:
2 x 10x12 mm push-to-connect (mark **F** on the head and tail plates).

Common collectable exhaust
10x12 mm push-to-connect (X2)

9.4. Internal diameter and tube length

Device	Compressed air inlet			Suction inlet	Exhaust collector		
	Standalone modules	Banks **L**	Banks **D**	Standalone modules and banks	Standalone modules	Banks **L**	Banks **D**
MPXE90X07	4 mm dia. max. length 20 m.	8 mm dia. max. length 20 m.	2 X 8 mm dia. max. length 40 m.	4 mm dia. max. length 4 m.	4 mm dia. max. length 1 m.	10 mm dia. max. length 1 m.	2 X 10 mm dia. max. length 2 m.
MPXE90X10	4 mm dia. max. length 15 m.	8 mm dia. max. length 20 m.	2 X Ø mm dia. max. length 40 m.	4 mm dia. max. length 2 m.	4 mm dia. max. length 0,5 m.	10 mm dia. max. length 0.5 m.	2 X 10 mm dia. max. length 1 m.

The values of the compressed air network are given for a maximum tolerated ΔP of 0.5 bar.
The values of the vacuum network are given for a maximum tolerated residual vacuum of 10% on an open network.
The values of the exhaust network are given for a maximum tolerated vacuum pressure drop of 5% at zero suction flow.

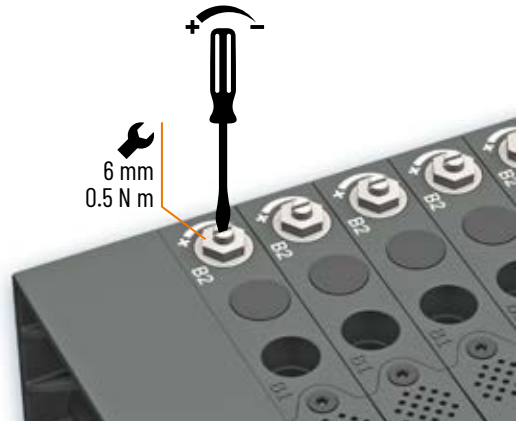
➔ Flexible tubes must be as short as possible in order to minimize response times.
➔ Make sure there is no pollution in the device connections and tubes.
➔ Flexible tubes must be connected without bends and without crushing them.

IF THESE CONDITIONS ARE NOT OBSERVED, YOU RISK THE FOLLOWING ISSUES:
■ If the chosen internal diameter on the compressed air inlet is too small, the compressed air supply will be insufficient to achieve optimal performance. The generator will be unable to achieve the specified maximum vacuum rate.
■ If the chosen internal diameter on the vacuum inlet is too small, the airflow is slowed down due to this restriction, which has a negative effect on suction power and on suction or exhaust time.

10. ADJUSTMENT OF POWERFUL BLOW-OFF (F3)

Blow-off flow rate adjustable from 16 to 55 Nl/min at 3.7 bar.

1- Unscrew the locking nut
2- Adjust the blow-off flow rate
3- Screw the locking nut



11. ELECTRICAL CONNECTIONS

MPXE vacuum pumps must be used with power supply units that provide a Protective Extra Low Voltage (PELV) and with an isolation of the supply voltage according to EN 60204.

JST male connector 5 pins
with 1 mm pitch, type NSH

IN / OUT

1	brown	24V DC
2	white	24V DC PNP suction command (1)
3	blue	0V - GND
4	black	Vacuum level signal - analog output 5V DC
5	gray	24V DC PNP blow-off command

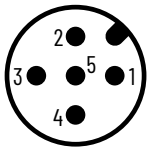
(1) 24 V DC suction command, depending on version:
*- **S**: 24 V DC vacuum control*
*- **V**: 24 V DC vacuum off command*

12. CONNECTION CABLES

Part No.: **CDM8M6PJSTF5PL01**
Cable JST 5P NSH to M8 6P straight male A-coded, Lg 10 cm.

1	brown	24V DC
2	white	24V DC suction command
3	blue	0V - GND
4	black	Vacuum level signal - analog output 5V DC
5	gray	24V DC blow-off command
6	/	/

Part No.: **CDM12M5PJSTF5PL02**
Cable JST 5P NSH to M12 5P straight male A-coded, Lg 20 cm.



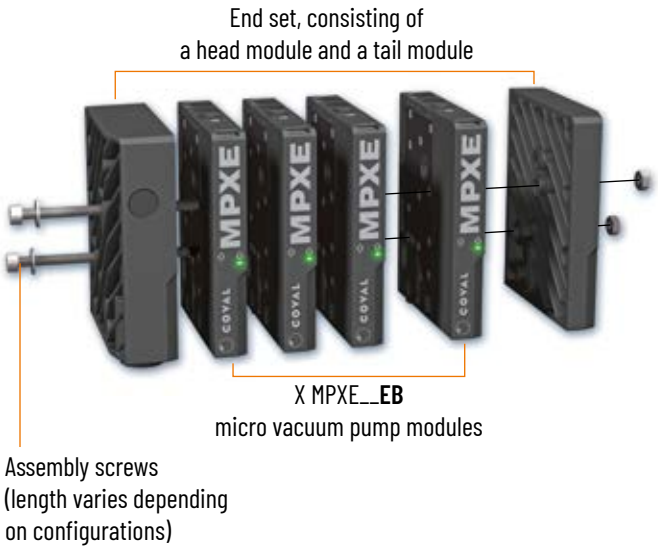
1	brown	24V DC
2	white	24V DC suction command
3	blue	0V - GND
4	black	Vacuum level signal - analog output 5V DC
5	gray	24V DC blow-off command

13. COMPOSITION OF A BANK

Standard banks are composed of 1 to 8 identical **MPXE** vacuum modules in the MPXE_**EB** version, an end set consisting of a head module and a tail module, and assembly screws corresponding to the number of modules in the bank.

The end sets are available in two versions:

- **Single** version – left: 1 x Common Pressure and 1 x Unrestricted and collectable exhaust
- **Double** version: 2 x Common Pressure and 2 x Unrestricted and collectable exhaust



14. PROCEDURE FOR ADDING A MICRO VACUUM PUMP TO AN EXISTING BANK

It is possible to add an MPXE micro vacuum pump to an existing bank by ordering the desired MPXE micro vacuum pump module in the EB version, along with the assembly screw kit corresponding to the new number of modules in the bank.

Select the Micro Vacuum Pump Modules for Bank

MPXE90X	10	S	L15	P	R2	F1	EB

NOZZLE DIA.		GENERATOR CONTROL		BLOW-OFF	
0.7 mm dia.	**07**	**S**	Vacuum **NC** and blow-off **NC**	**F1**	Standard blow-off
1.0 mm dia.	**10**	**V**	Vacuum **NO** and blow-off **NC**	**F3**	Adjustable powerful blow-off

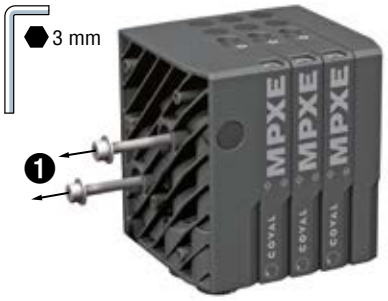
Select the Assembly Screw Kit

Assembly Screw Kit for a **Single Left** Bank Version	
MPXSETVB1L	For a bank of **1 MPXE module**
MPXSETVB2L	For a bank of **2 MPXE modules**
MPXSETVB3L	For a bank of **3 MPXE modules**
MPXSETVB4L	For a bank of **4 MPXE modules**
MPXSETVB5L	For a bank of **5 MPXE modules**
MPXSETVB6L	For a bank of **6 MPXE modules**
MPXSETVB7L	For a bank of **7 MPXE modules**
MPXSETVB8L	For a bank of **8 MPXE modules**

Assembly Screw Kit for a **Double** Bank Version	
MPXSETVB1D	For a bank of **1 MPXE module**
MPXSETVB2D	For a bank of **2 MPXE modules**
MPXSETVB3D	For a bank of **3 MPXE modules**
MPXSETVB4D	For a bank of **4 MPXE modules**
MPXSETVB5D	For a bank of **5 MPXE modules**
MPXSETVB6D	For a bank of **6 MPXE modules**
MPXSETVB7D	For a bank of **7 MPXE modules**
MPXSETVB8D	For a bank of **8 MPXE modules**

14.1. Procedure for adding a module to a bank

- ❶ Unscrew and remove the 2 M4 hex socket head screws from the head module using a 3 mm hex bit.



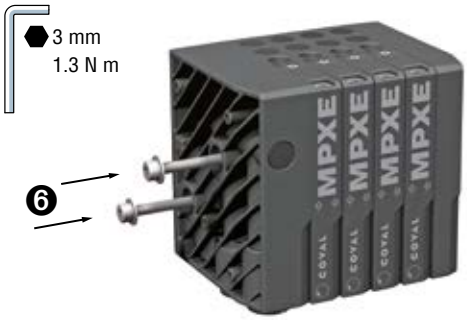
- ❷ Detach the end module from the island.
  ⚠ Be careful with the sealing gaskets and nuts.

- ❸ Position the new module, ensuring the correct placement of the 2 sealing gaskets.

- ❹ Reposition the end module, ensuring the correct placement of the 2 sealing gaskets.
- ❺ Reposition the 2 nuts of the end module in their housing.

- ⚠ ***The assembly screws must be replaced with the assembly screw kit corresponding to the new number of modules in the island (see chap. 14).***

- ❻ Position the 2 new assembly screws and screw them into the nuts of the end module using a 3 mm hex bit (tightening torque 1.3 N m).



15. MAINTENANCE

15.1. Troubleshooting

Failure	Possible cause	Remedy
The vacuum pump does not work.	No supply voltage or power supply defective.	Check the electrical connection and the pin assignment on the connector(s)
	No compressed air supply	Check the compressed air supply
The vacuum level is not correct.	Leakage in the vacuum network	Check the fittings and tubes.
	Suction cup leakage	Check the suction cup.
The vacuum build-up is too slow.	Pressure too low	Increase the pressure (refer to technical data).
Cannot hold the payload in place.	Vacuum level too low	Check the vacuum values
	Suction cup too small or insufficient number of suction cups	Choose a larger suction cup and/or increase the number of suction cups.

16. SPARE PARTS FOR BANK

1 Select the Bank End Set

MPXSETAL	**Single Left Bank End Set:** ▪ Head module on the left with 8x10 mm pressure connection and 10x12 mm exhaust collector. ▪ Tail module on the right (simple). → For a bank of 1 to 4 MPXE micro vacuum pump modules with a 1.0 mm nozzle, and up to 8 modules with a 0.7 mm nozzle.
MPXSETAD	**Double Bank End Set:** ▪ Head and tail modules with 8x10 mm pressure connection and 10x12 mm exhaust collector. → For a bank of 1 to 8 MPXE micro vacuum pump modules.

2 Select the Micro Vacuum Pump Modules for Bank

MPXE90X	10	S	L15	P	R2	F1	EB

NOZZLE DIA.		GENERATOR CONTROL		BLOW-OFF	
0.7 mm dia.	**07**	**S**	Vacuum **NC** and blow-off **NC**	**F1**	Standard blow-off
1.0 mm dia.	**10**	**V**	Vacuum **NO** and blow-off **NC**	**F3**	Adjustable powerful blow-off

3 Select the Assembly Screw Kit

Assembly Screw Kit for a **Single Left** Bank Version	
MPXSETVB1L	For a bank of **1 MPXE module**
MPXSETVB2L	For a bank of **2 MPXE modules**
MPXSETVB3L	For a bank of **3 MPXE modules**
MPXSETVB4L	For a bank of **4 MPXE modules**
MPXSETVB5L	For a bank of **5 MPXE modules**
MPXSETVB6L	For a bank of **6 MPXE modules**
MPXSETVB7L	For a bank of **7 MPXE modules**
MPXSETVB8L	For a bank of **8 MPXE modules**

Assembly Screw Kit for a **Double** Bank Version	
MPXSETVB1D	For a bank of **1 MPXE module**
MPXSETVB2D	For a bank of **2 MPXE modules**
MPXSETVB3D	For a bank of **3 MPXE modules**
MPXSETVB4D	For a bank of **4 MPXE modules**
MPXSETVB5D	For a bank of **5 MPXE modules**
MPXSETVB6D	For a bank of **6 MPXE modules**
MPXSETVB7D	For a bank of **7 MPXE modules**
MPXSETVB8D	For a bank of **8 MPXE modules**

17. WARRANTY

We provide a warranty for this product and for any COVAL spare parts in accordance with our general terms of sale (GTS).
The exclusive use of COVAL spare parts is a condition required to ensure the product's flawless operation and we will not be held liable for any damage resulting from the use of spare parts or accessories that are not made by COVAL.
Wearing parts are excluded from the warranty.

18. RECYCLING

Waste from electrical and electronic equipment (WEEE) is a category of waste consisting of equipment at the end of its life cycle that uses electricity or electromagnetic fields to operate and designed to be used at a voltage that does not exceed 1000 volts for alternating current and 1500 volts for direct current.

MPXE Micro Vacuum Pumps are products that fall under this category of waste.

Waste from electrical and electronic equipment (WEEE) requires separately collection and recycling according to the European directive 2012/19/EU and to French legislation: decree no. 2014-928 from 19 August 2014.

For France: COVAL is a member of ECOSYSTEM for the collection, decontamination and recycling of professional WEEE. If you own any COVAL WEEE products, contact ECOSYSTEM who will collect and treat the products. (Collection only applies to France).
https://www.ecosystem.eco/

19. DECLARATION OF CONFORMITY

CE EC DECLARATION OF CONFORMITY

COVAL, the manufacturer, confirms that the product "MPXE vacuum pump" described in this manual meets the following applicable EC directives:

- **2014/30/UE**: Electromagnetic Compatibility (EMC) 26/02/2014.
- **2011/65/UE**: Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS 2), 08/06/2011.

The following harmonized standards have been applied:

- **NF EN IEC 61000-6-2:2019**: Electromagnetic compatibility (EMC) - Part 6-2 : generic standards - Immunity standard for industrial environments.
- **NF EN IEC 61000-6-4:2019**: Electromagnetic compatibility (EMC) - Part 6-4 : generic standards - Emission standard for industrial environments.
- **NF EN 61000-4-2:2009**: Electromagnetic compatibility (EMC) - Part 4-2 : testing and measurement techniques - Electrostatic discharge immunity test.
- **NF EN IEC 61000-4-3:2020**: Electromagnetic compatibility (EMC) - Part 4-3 : testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test.
- **NF EN 61000-4-4:2013**: Electromagnetic compatibility (EMC) - Part 4-4 : testing and measurement techniques - Electrical fast transient/burst immunity test.

20. CERTIFICATES / TESTS

EMC	CEI 61000-6-2 (2019) Electromagnetic compatibility (EMC). Generic standards. Immunity standard for industrial environments	NF EN 61000-4-2 (2009) Electrostatic discharges (ESD)
		NF EN 61000-4-3 (2020) Radiofrequency electromagnetic field amplitude modulated
		NF EN 61000-4-4 (2013) Fast transients (Burst)
		NF EN 61000-4-6 (2014) Radio-frequency common mode
		NF EN61000-4-8 (2010) Magnetic fields
	CEI 61000-6-4 (2019) Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments	NF EN 55011 (2021) Conducted Emissions.
		NF EN 55011 (2021) Radiated Emissions
	FCC 47 CFR part 15 B Emission standard for industrial environments	limits identical to the NF EN 55032 class B limits (2020) Conducted Emissions.
		FCC part 15B Radiated Emissions
Degrees of protection	NF EN 60529 (2014)	IP 40
	NF EN 60 068-2-75 (2015)	IK 06
Temperature variations	IEC 60068-2-14 (2009)	0°C +50°C
Humidity	IEC 60068-2-30 (2006)	10% – 95%
Vibrations	NF EN 60068-2-6 (2008)	5 *g*
Shocks	NF EN 60068-2-27 (2009)	15 *g*
Storage	IEC 60068-2-1 & IEC 60068-2-2 (2007)	-10°C to 60°C (without condensation or frost)

COVAL
vacuum managers

vacuum
components

A TECHNOLOGICAL PARTNER ON A GLOBAL SCALE

Located in the South of France, COVAL SAS designs, produces, and markets high-performance vacuum components and systems for industrial applications in all sectors worldwide.

An ISO 9001: V2015 certified company, COVAL innovates globally in vacuum handling. Our optimized components integrate intelligent and reliable functionalities, adapt to your industrial context, and safely improve your productivity.

With a strong spirit of innovation and technological advancements, the COVAL team is now recognized as an expert in developing reliable, economical, and productive custom solutions.

COVAL's references are found in major industrial sectors such as packaging, food processing, automotive, plastics, aerospace, and robotics, where vacuum handling is crucial for efficiency and productivity.

COVAL markets its products and services worldwide through its subsidiaries and authorized distributor network. Always attentive to its customers, COVAL supports the implementation of its solutions with a continuous and attentive relationship.

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