

GVMAX HD

HEAVY DUTY

Communicating Vacuum Pumps



EN

OPERATING INSTRUCTIONS

GVMAXHD (v02.6-2022)

This manual is intended for users of the **GVMAX HD** series Heavy Duty communicating vacuum pumps. They include information on how to integrate vacuum pumps, as well as on their use and maintenance.

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NFC))))

IO-Link

AIR Saving Control

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



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1. IMPORTANT INFORMATION

This document contains important instructions and information regarding the product's various operational phases:

- Transport, storage, commissioning and decommissioning
- Use and maintenance

The operating instructions correspond to the product actually delivered.

This document is part of the product and the following information must be observed:

- Please carefully read this document and observe the instructions to ensure safe installation, optimal operation of the product, and to avoid any malfunction
- Please keep the document within reach of the product so that the staff can easily access it.

Important:

- 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.

For any additional information, please contact COVAL:

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2. INSTRUCTIONS FOR USE AND SAFETY

2.1. ASSEMBLY/DISASSEMBLY

Only qualified personnel is authorized to use the components. Such personnel must be trained in the following areas:

- 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.
- The latest applicable EC directives, legislations, decrees and standards, as well as the current technical standards.

The improper use of components with other operating materials than those defined, other voltages, or under other environmental conditions can lead to failure, damage, and injury.

This list is considered an overview and does not claim to be exhaustive. Users can complement it according to their particular needs.

2.2. SAFETY INSTRUCTIONS

In order to ensure flawless installation and operation, the following rules must also be observed:

- The components must be carefully removed from their packaging.
- The components must be protected against any and all damage.
- During installation and maintenance work, remove the voltage and pressure from the Venturi pump and ensure that unauthorized personnel cannot restart it.
- Any attempt to alter the components is strictly prohibited.
- The area surrounding the components and the location where used must be kept clean.
- Standing under the payload being handled by the vacuum pump and in its pathway is strictly prohibited.
- Only the fittings/connectors provided may be used.
- During installation, only use flexible tubes and tubes that are suitable for the specific operating material (tubes that come loose or electrical connection lines constitute a major safety hazard—including risk of death!).
- Conductive and live cables lines must be insulated, of appropriate size, and properly installed.
- Pneumatic and electric lines must be connected to the component in a stable and safe manner.
- Prevent any physical contact with electric parts (protect electrical contacts).
- Only use the available fastening means described in section 6.5.
- Always observe the latest applicable directives, regulations, and standards as well as the current technical standards for suggested use.
- Wherever necessary, users must take specific measures to meet the requirements of applicable directives, legislations, regulations, and standards as well as the current technical standards.



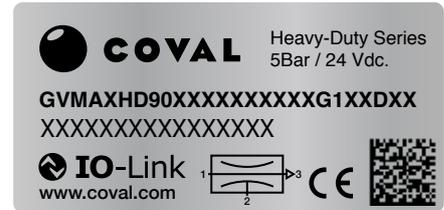
Failure to observe the above safety instructions may lead to failure, damage, and injury—even risk of death. The components of the device that are no longer in working order must be recycled in an environmentally-friendly manner (see section 28)!

2.3. NAMEPLATE

The nameplate is affixed to the left side of the vacuum pump and under the silencer so that it is legible at all times.

It includes the following information:

- Product ID
- Serial number
- Optimal operating pressure
- Supply voltage
- Pneumatic symbol with the location of the various ports found on the product:
 - 1/ Pneumatic supply
 - 2/ Vacuum outlet
 - 3/ Venturi exhaust
- Datamatrix code containing the reference number and serial number of the vacuum pump.



3. MAIN FUNCTIONS OF GVMAX HD VACUUM PUMPS

COVAL's new **GVMAX HD** series heavy duty communicating vacuum pumps are the result of many years of attentiveness, discussions and listening to feedback from manufacturers, integrators and users from the automotive, aerospace and packaging industries.

Our heavy duty vacuum pumps meet their expectations in terms of power, robustness, ease-of-configuration and use, communication, and modularity, while remaining compact and light for effortless integration in a smart factory.

GVMAX HD vacuum pumps have the following characteristics:

- Vacuum generated by a Venturi effect (maximum negative pressure: -85 kPa, i.e. 85% vacuum)
- Air Saving Control (ASC) intelligent vacuum control system
- Vacuum control: NC, NO or pulse-triggered bistable control
- Blow-off: standard or powerful, controlled or automatic timed
- High-visibility color display with clear multi-lingual messages and straightforward settings menu
- IO-Link communications interface
- Easy set up made possible by NFC technology and COVAL Vacuum Manager mobile application

PRESCRIBED USE

GVMAX HD vacuum pumps are designed to generate vacuum for gripping and handling objects using suction cups. Authorized gases: only non-hazardous gases such as air and nitrogen.



Once the device is installed, make sure that the display is easy to read and that the status indicator light is clearly visible. Above all, it is essential for the device to remain clear of any moving parts.

GVMAX HD 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.

4. CONFIGURATION REMINDER

 **GVMAXHD90X 25 L C15A1 X G1 F1 D RB3L**

NOZZLE DIA.	
2.5 mm dia	25
3.0 mm dia	30

BLOW-OFF	
Standard blow-off	F1
Powerful blow-off <i>The powerful blow-off option is used when the object needs to be released quickly.</i>	F2

CONFIGURATIONS

Standalone vacuum pumps

VA	GVMAXHD90X__XG1_D_VA GVMAX HD module screwed onto its pneumatic socket	
RA	GVMAXHD90X__XG1_D_RA Standalone GVMAX HD module with SMART SWAP quick-mounting system and pneumatic socket	

Vacuum pumps mounted on an island (with SMART SWAP quick-mounting system)

RB1L*	GVMAXHD90X__XG1_D_RB1L 1 x GVMAX HD module with SMART SWAP quick-mounting system and pneumatic socket with 1 slot ▪ Left lateral pressure connection	
RB2L*	GVMAXHD90X__XG1_D_RB2L Island consisting of 2 GVMAX HD modules with SMART SWAP quick-mounting system and pneumatic socket with 2 slots ▪ Common pressure supply ▪ Left lateral pressure connection	
RB3L*	GVMAXHD90X__XG1_D_RB3L Island consisting of 3 GVMAX HD modules with SMART SWAP quick-mounting system and pneumatic socket with 3 slots ▪ Common pressure supply ▪ Left lateral pressure connection	
RB4L*	GVMAXHD90X__XG1_D_RB4L Island consisting of 4 GVMAX HD modules with SMART SWAP quick-mounting system and pneumatic socket with 4 slots ▪ Common pressure supply ▪ Left lateral pressure connection	

GENERATOR CONTROL	
Vacuum pump with NC vacuum control and NC blow-off Choice of blow-off settings: ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output)	S
Vacuum pump with NO vacuum control and NC blow-off ▪ Blow-off controlled by external signal	V
Vacuum pump with pulse-triggered bistable vacuum control and NC blow-off ▪ Blow-off controlled by external signal	L

CONNECTOR(S)	
C15A1	1 x M12 5-pin male
C18A1	1 x M12 8-pin male
C24A2	2 x M12 4-pin male
C25A5	2 x M12 5-pin male For use with remote HMI

* On request, an **RB_R** version with right-hand pressure connection or a **RB_T** version with top pressure connection is available.

5. LAYOUT

5.1. OVERVIEW



Inputs / Outputs
Digital (SIO) / **IO-Link**

M12 connectors available in 4 versions:

- One 5 or 8-pin connector
- or two 4 or 5*-pin connectors

**Version for use with remote HMI*



3-color status indicator light

1.54" high-visibility color LCD display with clear multilingual messages and straightforward settings menu

Settings keypad



NFC

Straightforward setup and diagnostics made possible by NFC technology and COVAL Vacuum Manager mobile application.

Pressure



Pneumatic socket:
Combines the compressed air supply and the vacuum outlet

- NC, NO or pulse-triggered bistable vacuum control
- Blow-off: Standard or powerful, controlled or automatic timed



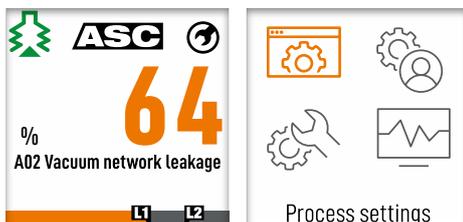
Air Saving Control (ASC), our smart vacuum control system: Averages 90% energy savings

Open clog-free silencer

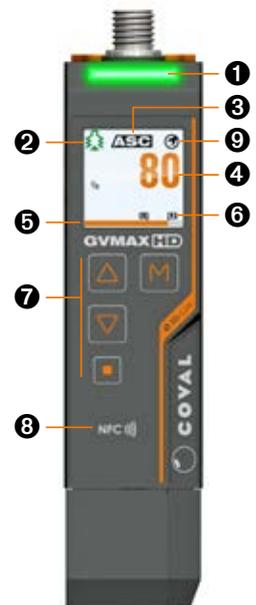


5.2. DIALOG FRONT PANEL

The GVMAX HD's HMI allows for easy and efficient reading of the pump's operation. The 1.54" high-visibility color LCD screen gives real-time access to the process data, settings, and diagnostic data. Refer to section 15 for a detailed description of the menus and parameters.

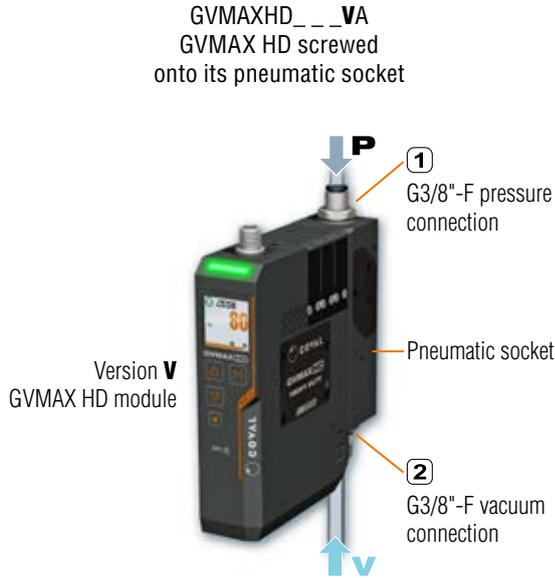


- Gripping status indicator light:
 - Green: object gripped
 - Red: object lost
 - Yellow: ASC disabled due to vacuum leakage (object held in place).
- Status indicator for vacuum and blow-off commands:
 - Vacuum generation
 - Blow-off
 - Simultaneous vacuum and blow-off controls
- ASC (Air Saving Control) indicator:
 - : ASC enabled
 - * : ASC disabled due to vacuum leakage (in this case, vacuum generation is constant)
- Live vacuum level (in kPa, % vacuum, mbar or inHg)
- Bar chart indicating the live vacuum level
- L1 and L2 vacuum thresholds: - L1: threshold for "object gripped" signal - L2: "ASC" threshold
- Keypad: M button (menu), and buttons, button (return)
- NFC antenna
- Maintenance indicator



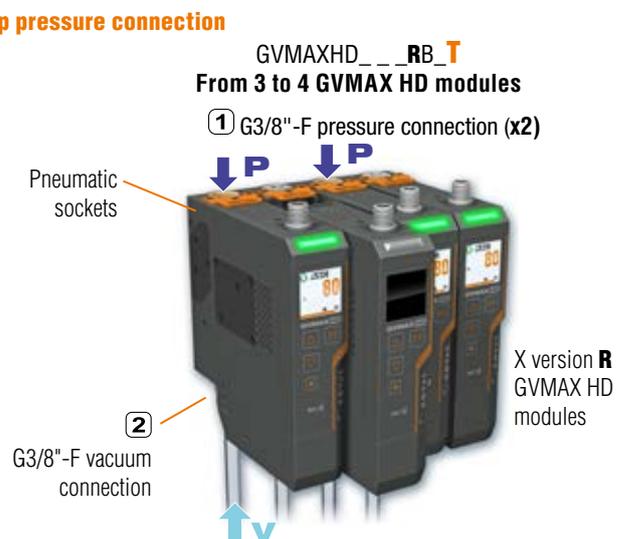
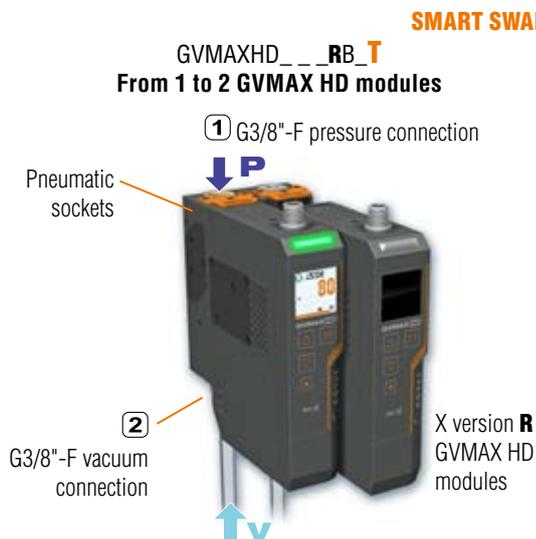
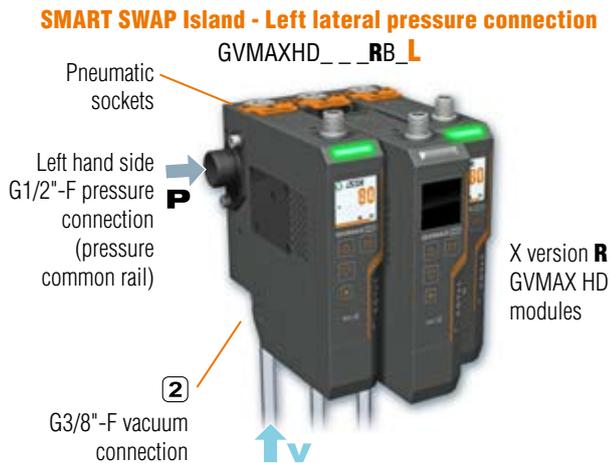
5.3. AVAILABLE CONFIGURATIONS

5.3.1. Standalone models



5.3.2. Island models

Islands consisting of standalone GVMAX HD modules with SMART SWAP quick-mounting system on pneumatic sockets.



5.3.3. Model with remote HMI

GVMAXHD__C25A5

To make it easier to use and set up vacuum pumps in certain use cases, the GVMAX HD range includes a version without a front dialog panel that can be used with a remote HMI.

Advantages:

- Place the HMI in an easily accessible and visible area
- Use one HMI for several GVMAX HD vacuum pumps
- Copy settings from one pump to another
- Use the GVMAX HD vacuum pump without any HMI connected

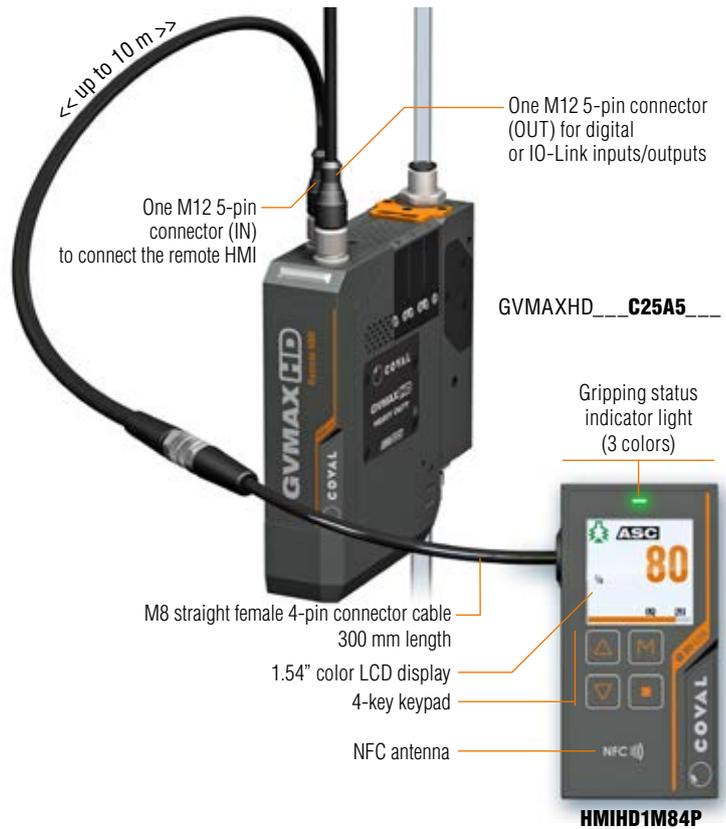
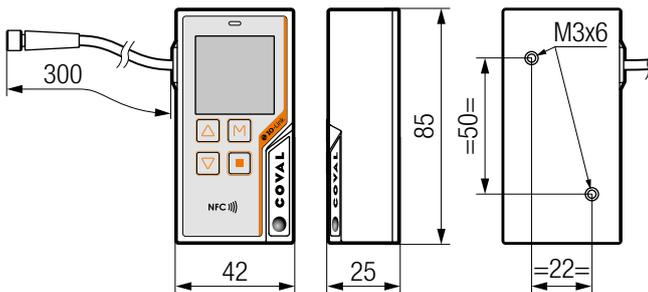
→ GVMAX HD vacuum pump without HMI

Part No.: GVMAXHD__C25A5__

- Two M12 5-pin connectors
- M12 blanking plug provided for use without HMI (electrical connections: see section 9).

→ Remote HMI

Part No.: HMIHD1M84P

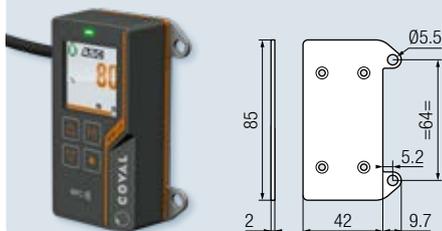


Note: The remote HMI uses the exact same screen and features as standard versions of the GVMAX HD.

→ The HMI is installed and configured on the GVMAXHD__C25A5 module, see section 10.

Front mounting plate

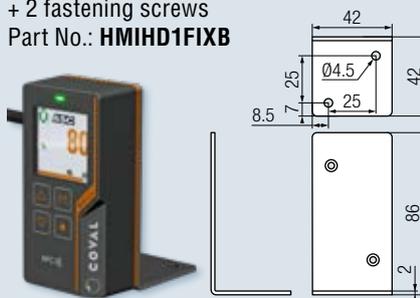
+ 2 fastening screws
Part No.: HMIHD1FIXA



ACCESSORIES FOR REMOTE HMI

90° angled mounting plate

+ 2 fastening screws
Part No.: HMIHD1FIXB



Connector cable

M12 4-pin, female / M8 4-pin, male

- 2 m length: Part No. CDM8MM12F4PL2
- 5 m length: Part No. CDM8MM12F4PL5
- Other lengths available upon request.



6. TECHNICAL DATA

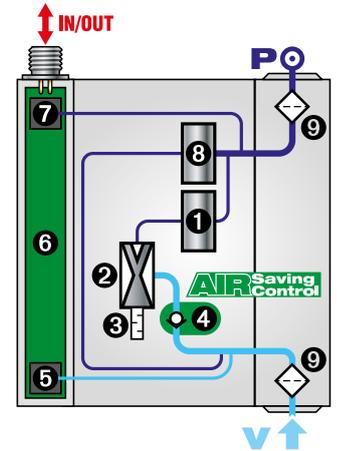
6.1. INTEGRATED FUNCTIONS

GVMAX HD 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 Single-stage Venturi pump
- ❸ Open silencer
- ❹ “Vacuum” non-return valve
- ❺ Electronic vacuum switch
- ❻ Integrated electronics
- ❼ Pressure sensor
- ❽ “Blow-off” solenoid valve
- ❾ 350 µm filter screen

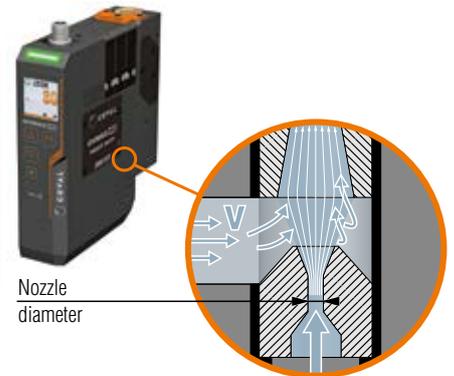
+ AIR Saving Control
90% energy savings
(on average, see § 6.3)

The combined action of the non-return valve ❹ and of the integrated electronics ❻ automatically ensures ASC management.
 → **Once the vacuum has been established, the pump does not consume any more air to hold the object.**

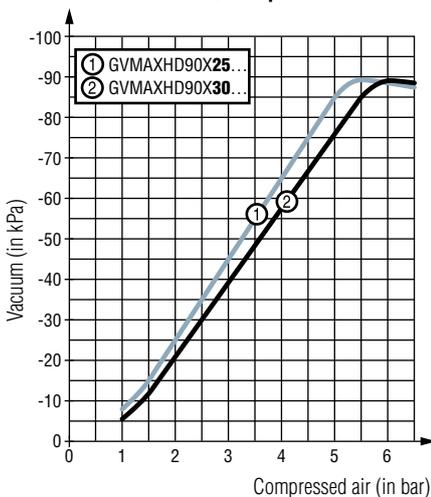


6.2. PERFORMANCE CHARACTERISTICS

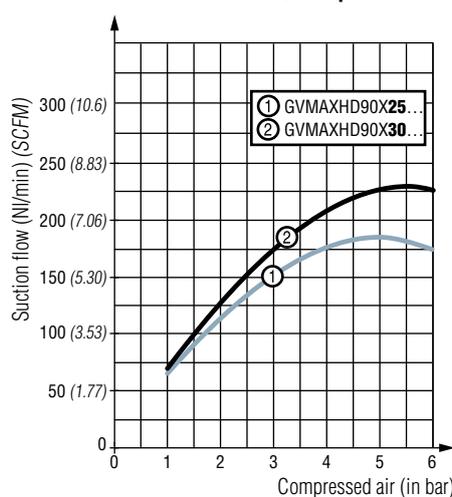
Nozzle dia.	Evacuation time (seconds) of a volume of 1 liter				Max. vacuum (kPa)	Air drawn in (NI/min) (SCFM)	Air consumed (NI/min) (SCFM)	Air pressure level (bar)
	-45 kPa	-55 kPa	-65 kPa	-75 kPa				
2.5 mm	0.17	0.24	0.35	0.52	-85	185 (6.48)	294 (10.29)	5
3.0 mm	0.15	0.20	0.27	0.42	-85	230 (8.05)	380 (13.30)	5.5



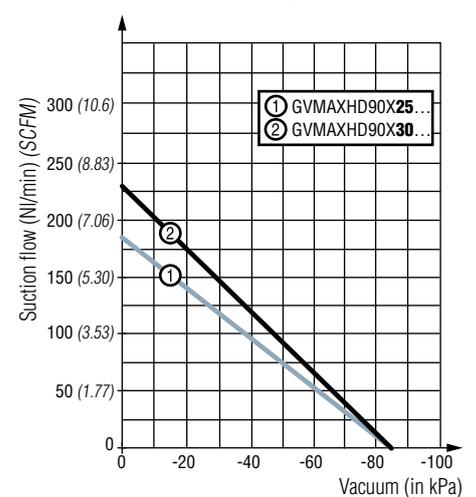
Vacuum Generated/Compressed Air



Suction Flow Rate/Compressed Air



Suction Flow Rate/Vacuum



6.3. OPERATING PROCEDURE

The GVMAX HD vacuum pumps operate with "ASC": **Air Saving Control**. Once vacuum is established, no more air consumption to hold the product. The resulting energy saving is a key progress → 90% energy savings on average. Here is how it is obtained.

A- The "Air Saving Control" automatic cycle

The **A** diagram presents the 3 steps of the cycle.

1- Product gripping

Vacuum signal v starts the cycle by piloting valve ① that feeds venturi ②. The generated vacuum grips the product.

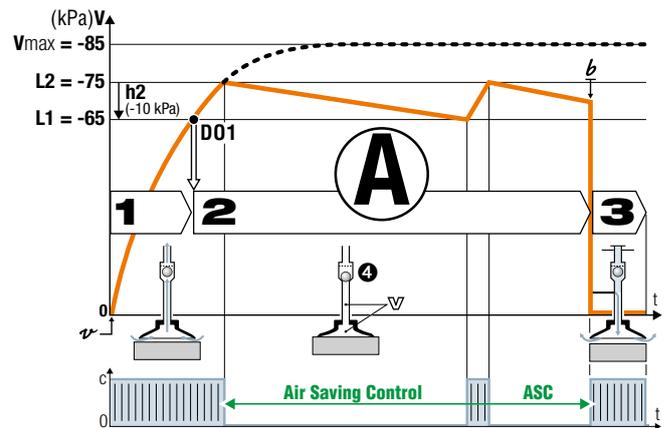
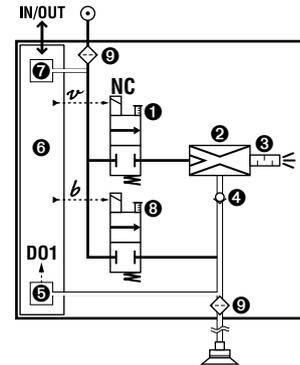
When the vacuum reaches the threshold L1 (-65 kPa), vacuum sensor ⑤ generates the "product gripped" **DO1** signal that authorizes next step.

2- Operations on vacuum gripped product

The operations on the product (transfer, machining, etc.) will start. When vacuum reaches threshold L2 (-75 kPa), the pressure supply to the venturi is automatically stopped by solenoid valve ③ → no more consumption. The product remains gripped by vacuum V that is preserved, due to the closing of poppet ④. Micro-leaks may lead to the decrease in vacuum level. Each time it goes below L2-h2 (-65 kPa), the vacuum level is regenerated to L2 (-75 kPa) thanks to a brief pressure supply to the venturi.

3- Product release

At the end of operations, release is ordered. "Blow-off" solenoid valve ⑥, piloted by blow-off signal b , generates an air jet that blows off the product for a fast release.

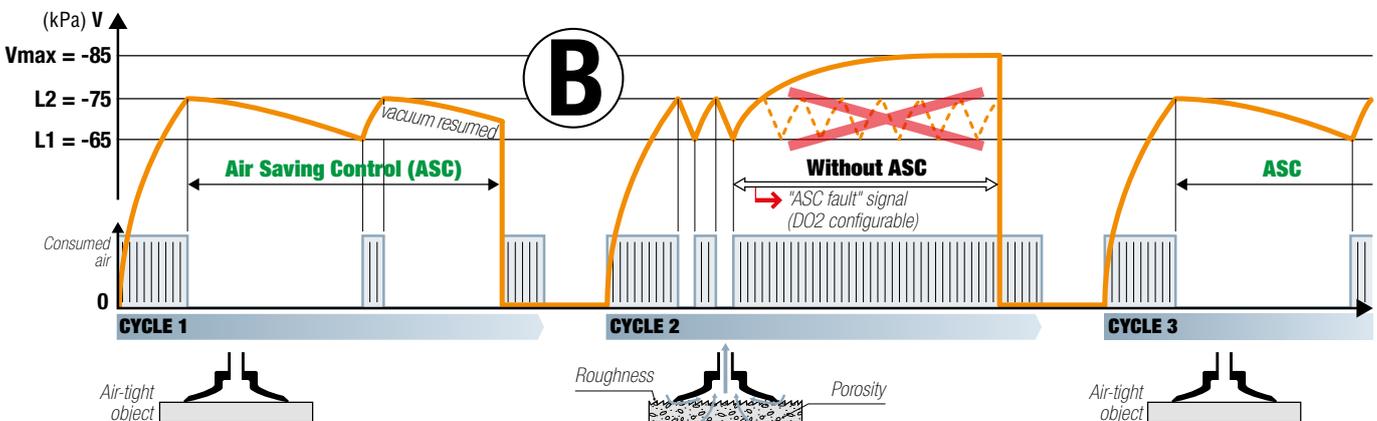


B- "Air Saving Control" cycle self-adaptation

The **B** diagram shows how the module adapts the cycle to fit to the production realities: leaks due to products, to vacuum pads...

Here, cycle 1 deals with an air tight product under the influence of "ASC", resulting in optimum energy savings.

At cycle 2 however, the porous product generates leaks that provoke repeated intermittent vacuum regeneration. The anomaly is automatically detected, and the cycle goes on but without "ASC".



An "ASC fault" signal is then emitted and displayed (*), and production goes on.

Cycle 3 illustrates the automatic return to the "ASC" cycle as soon as leaks are eliminated: air tight products, vacuum circuit maintenance...

The GVMAX HD module thus provides the maximum energy saving, without any limitations to the performance and functioning of the overall production system.

6.4. GENERAL CHARACTERISTICS

- Supply: non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:4]
- Operating pressure: from 2 to 8 bar
- Optimal dynamic pressure:
 - 5 bar for dia. 2.5 mm nozzle
 - 5.5 bar for dia. 3.0 mm nozzle
- Powerful blow-off (option F2): network pressure
- Pressure connection:
 - Standalone vacuum pump: G3/8"-F with removable 350 µm filter screen
 - Island assembly: G1/2"-F with 350 µm filter screen
- Vacuum connection: G3/8"-F with removable 350 µm filter screen
- Max. vacuum: 85 kPa
- Air suction flow rate: 185 / 230 NI/min
- Air consumption: 294 / 380 NI/min, when operating "without ASC"
- Integrated non-clogging silencer
- Noise level: approx. 71 dBA "without ASC" 0 dBA with ASC
- Degree of protection: IP65
- Max. operating frequency: 4 Hz
- Endurance: 50 million cycles
- Weight: 870 g
- Operating temperature: from 0 to 50 °C
- Materials: PA GF, brass, aluminum, steel, NBR, PU, FKM
- M12 male connectors

Analysis of ASC vacuum control system

- Permanent monitoring of leakage level: abort or automatically return to ASC operation

Integrated electronics

- 24 V DC power supply (regulated ±10%)
- Vacuum measuring range: 0 to -99 kPa.
- Pressure measuring range: 0 to 10 bar.
- Vacuum and pressure measurement accuracy: ±1.5% of the range, compensated for temperature
- Inputs/outputs protected against reversed wiring and polarity
- Consumption: 170 mA max. (without load)
- Configurable input/output switching mode: PNP or NPN
- IO-Link or SIO (Standard Inputs Outputs) operation

DO1/DO2 output signals

- Configurable as PNP or NPN
- NO or NC
- Breaking capacity: 330 mA
- DO2 configurable (see Parameter settings)

Diagnostics

- Instantaneous vacuum level (unit transmitted over IO-Link: mbar)
- Available information: Object gripped, object lost, control in progress, and control fault
- Cycle counters (vacuum, blow-off, object gripped, object lost, ASC, etc.)
- Vacuum network sizing support to prevent head losses
- Clogging detection function
- Supply pressure monitoring
- Supply voltage monitoring
- Product item number and serial number
- Software version

Information displayed

- LED gripping status indicator on front panel (green: object gripped ; yellow: ASC disabled due to vacuum leakage (object held in place) ; red: object lost)
- 1.54" high-visibility color LCD display:
 - Displays vacuum level with bar graph and thresholds
 - Warns when service life has been exceeded (> 50 million cycles)
 - Explicit fault messages
 - "Suction cup" icon indicating the control status of control functions:
 - Green suction cup: vacuum control
 - Orange suction cup: blow-off control
 - Red suction cup: simultaneous vacuum and blow-off controls
 - Configurable display orientation: 0 – 90 – 180 – 270°

Parameter settings

- Performed with 4-key membrane keyboard
- Choice of language: EN, FR, DE, IT, or ES
- Choice of blow-off type:
 - Controlled
 - Automatic timed, adjustable from 50 to 9999 ms
- Choice of vacuum measurement unit (kPa, %, mbar, inHg)
- Choice of pressure measurement unit (MPa, bar, psi)
- Monostable electrical manual controls
- Object gripped (L1) and L2 control thresholds
- Whenever required by the application, specific threshold and hysteresis settings that are different from the initial factory settings can be defined: L1 = -65 kPa, h1 = -10 kPa, L2 = -75 kPa, h2 = -10 kPa
- DO2 configurable (24 V DC) (only on C18A1 et C24A2 models):
 - ASC status (default)
 - or Pressure fault (below 5 bar or above 8 bar)
 - or Power supply fault (below 21.6 V or above 26.4 V)
 - or ASC fault
 - or Object lost
- Activation/deactivation of the ASC control system
- Activation/deactivation of the leakage level monitoring system (DIAG ECO) + adjustment of monitoring parameters

Communication**IO-Link**

- Revision: 1.1
- Transmission rate: COM3 - 230.4 kbit/s
- Min. cycle time: 1 ms
- SIO mode: Yes
- Process Data Input (PDI): 6 bytes
- Process Data Output (PDO): 1 byte
- IO device description file (IODD) available for download

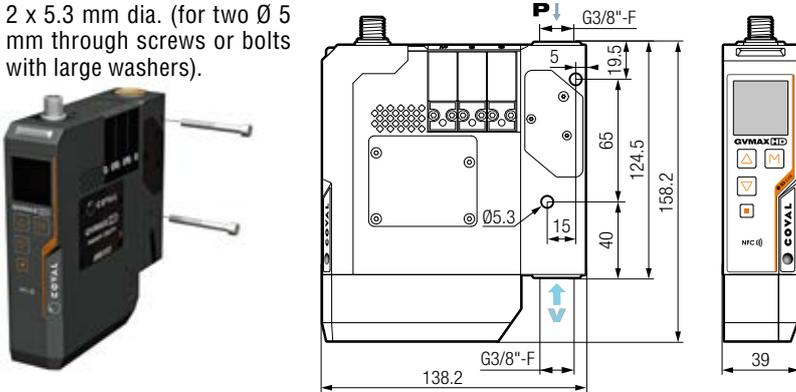
NFC

- COVAL VACUUM MANAGER Mobile app available:
 - Android, version 8.1 and higher
 - iOS, version 13 and higher

6.5. DIMENSIONS AND INSTALLATION

LATERAL INSTALLATION (STANDALONE VERSION)

2 x 5.3 mm dia. (for two Ø 5 mm through screws or bolts with large washers).



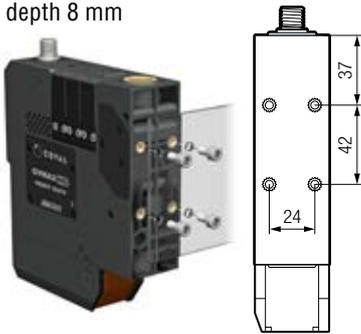
Note: All dimensions are in mm.

You can access 3D files of all our products in formats compatible with the main CAD software on our website
www.coval.com



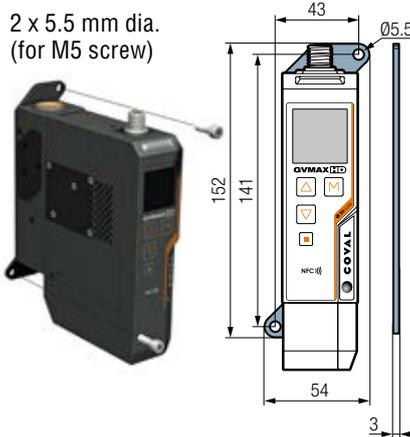
FRONT PANEL INSTALLATION MOUNTING FROM REAR

4 M5 screw threads, depth 8 mm



MOUNTING FROM FRONT

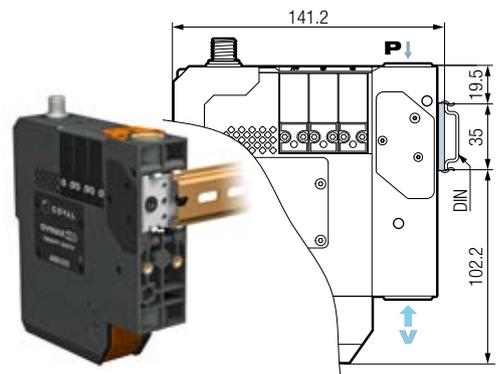
2 x 5.5 mm dia. (for M5 screw)



For front panel installation, order the following installation kit:

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

INSTALLATION ON DIN RAIL



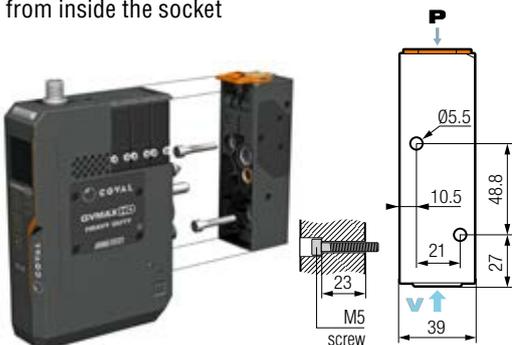
The pump can be mounted on a DIN rail for a static installation (e.g. in a cabinet). In this case, it must be equipped with an installation clip that is to be ordered separately:

Part No.: **GVMAXHDFIXB**
(1 clip + 2 fastening screws) Note: For an island assembly, you need to order 2 installation kits.

FRONT PANEL INSTALLATION FOR MODULES WITH SMART SWAP QUICK-MOUNTING SYSTEM

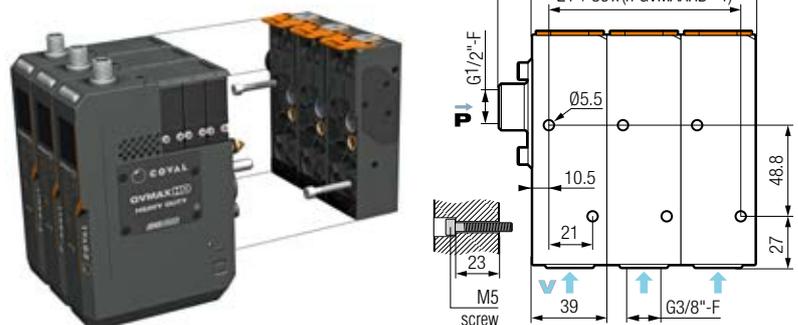
STANDALONE VERSION

2 x 5.5 mm dia. (for M5 screws) from inside the socket



ISLAND VERSION

2 x 5.5 mm dia. (for M5 screws) from inside the socket



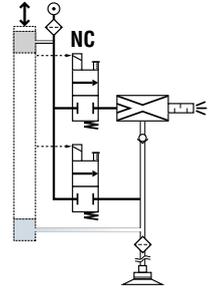
7. FINDING YOUR MODULE

In order to meet all your needs, the GVMAX HD range includes standalone and island assembly vacuum pumps, each one with NC, NO or pulse-triggered bistable solenoid valve vacuum control. For efficient use of your vacuum pump with this operating manual, please identify your model by its part number.

Model GVMAXHD__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
- Choice of blow-off settings:
 - Controlled by external signal
 - Automatic timer from 50 to 9999 ms (advantage: saves one controller output)

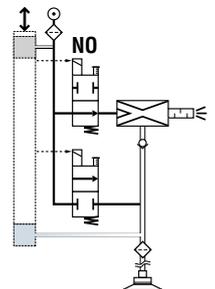


Model GVMAXHD__V: vacuum pump with **NO** vacuum control and **NC** blow-off

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 solenoid valve
- NC blow-off control solenoid valve
- Blow-off controlled by external signal



Model GVMAXHD__L: vacuum pump with **pulse-triggered bistable** vacuum control and **NC** blow-off (patented system)

In the event of power failure, the vacuum pump maintains its previous state.

More specifically, one of the following two scenarios will take place should this occur:

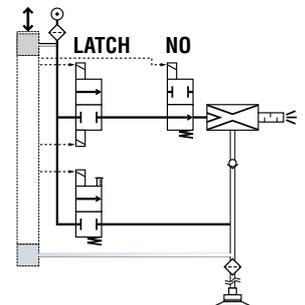
- ☞ During vacuum generation, the vacuum is maintained → fail-safe
- During blow-off or when the pump is off, the pump remains "Off"

Vacuum control is automatically stopped when the blow-off command is activated.

The vacuum can only be stopped with the blow-off command.

In the event of compressed air failure, the vacuum is no longer maintained.

- Pulse-triggered bistable vacuum control solenoid valve (50 ms min.)
- NC blow-off control solenoid valve
- Blow-off controlled by external signal



Note: Upon delivery, the pulse-triggered bistable control version of the GVMAX HD vacuum generators (L) are in "neutral position" by default. Suction starts after sending an initial pulse to the suction command input.

8. CONNECTIONS



COMPRESSED AIR OR VACUUM NETWORKS:

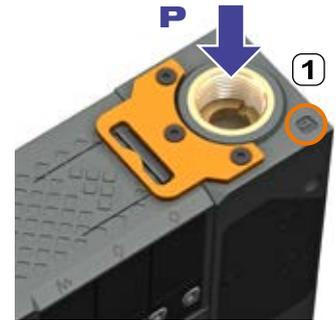
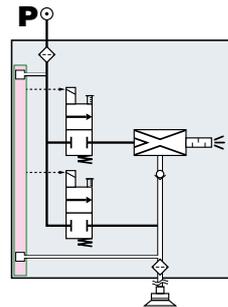
- Wear safety goggles
- Make sure all fittings and tubes are tightened securely
- Tube ends must be fastened to avoid any risk of being pulled off in the event of accidental breakage

8.1. PRESSURE SUPPLY CONNECTION

- Non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:4]
- Optimal dynamic pressure:
 - 5 bar for dia. 2.5 mm nozzle
 - 5.5 bar for dia. 3.0 mm nozzle
- 350 µm filter grid integrated in the vacuum connection to protect the pump against particles.

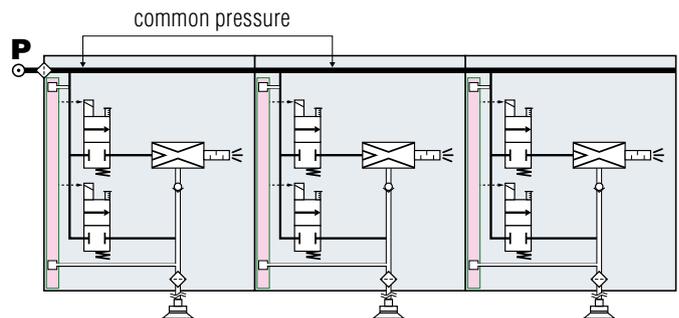
8.1.1. Standalone modules

- Compressed air connection through a G3/8"-F port (mark ① on pneumatic socket).



8.1.2. Island assemblies

Island assemblies consist of 1 to 4 GVMAX HD vacuum pumps and a shared internal pressure supply. GVMAXHD__RB1/2/3/4 vacuum pump islands come with the SMART SWAP quick-mounting system as standard to quickly mount the GVMAX HD module on its pneumatic socket.



GVMAXHD__RB_L

- Compressed air connection through a G1/2"-F port on **left** side of island assembly



GVMAXHD__RB_R

- Compressed air connection through a G1/2"-F port on **right** side of island assembly



GVMAXHD__RB_T

from 1 to 2 GVMAX HD modules

- Mark ① on pneumatic socket: G3/8"-F **top** pressure connection (on first module from left)



from 3 to 4 GVMAX HD modules

- Mark ① on pneumatic socket: G3/8"-F (x2) **top** pressure connection on 1st and 3rd module

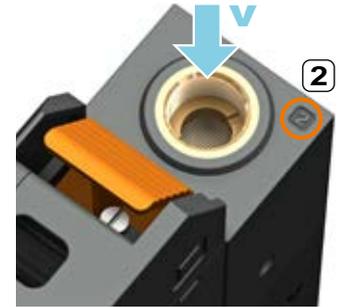


8.2. VACUUM CIRCUIT CONNECTION

- Connection through a G3/8"-F port (mark ② on pneumatic socket).

Note: For easier access to the vacuum connection port, we recommend removing the vacuum pump's silencer (see § 24.2.3) or, if the GVMAX HD is equipped with the SMART SWAP quick-mounting system, remove the GVMAX HD module while performing the connection (see chapter 11)

For optimal Air Saving Control performance, the vacuum circuit must be airtight at all times. If the vacuum tube moves in relation to the module, a compression fitting is recommended.



For short response times and minimum consumption, it is advisable to reduce the volume to be evacuated. 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.

NOTE: MODULE PROTECTION

- Removable 350 µm filter grid integrated in the vacuum connection to protect the pump against particles.
- Possible additional filter on vacuum circuit: In the rare cases of thin dust in a wet environment, an adequate filter will prevent any internal clogging: → See COVAL catalog: "Filters for vacuum circuits"

Device	Min. internal tube dia.			
	Compressed air inlet		Suction inlet	
	Standalone modules	Island assemblies		
GVMAXHD25	6 mm dia.	10 mm dia.	8 mm dia. max. length 2 m	10 mm dia. max. length 5 m
GVMAXHD30	6 mm dia.	12 mm dia.	∅ 10 mm max. length 2 m	∅ 12 mm max. length 5 m

- 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.



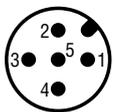
IF THESE CONDITIONS ARE NOT OBSERVED, YOU RISK THE FOLLOWING ISSUES:

- 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.

9. ELECTRICAL CONNECTIONS

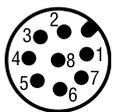
GVMAX HD vacuum pumps must be used with power supply units that provide a Protective Extra Low Voltage (PELV) and with an isolation of the supply voltage according to EN 60204.

▪ C15A1: One M12 5-pin male connector



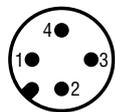
- 1 24 V DC
- 2 24 V DC suction command ⁽¹⁾
- 3 0 V - GND
- 4 24 V DC object gripped DO1 - C/Q
- 5 24 V DC blow-off command

▪ C18A1: One M12 8-pin male connector



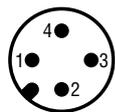
- 1 24 V DC object gripped DO1
- 2 24 V DC
- 3 /
- 4 24 V DC suction command ⁽¹⁾
- 5 24 V DC ASC Status DO2 - C/Q ⁽²⁾
- 6 24 V DC blow-off command
- 7 0 V - GND
- 8 /

▪ C24A2: Two M12 4-pin male connectors



Rear connector:
IN

- 1 /
- 2 24 V DC blow-off command
- 3 0 V - GND
- 4 24 V DC suction command ⁽¹⁾



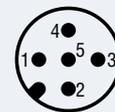
Front connector:
OUT

- 1 24 V DC
- 2 24 V DC ASC Status DO2 ⁽²⁾
- 3 0 V - GND
- 4 24 V DC object gripped DO1 - C/Q

Nota : les signaux TOR1 et TOR2 sont permutable par paramétrage.

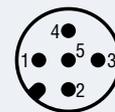
Version for use with remote HMI

▪ C25A5: Two M12 5-pin male connectors



Rear connector:
IN

- 1 24 V DC
- 2 RS485 +
- 3 0 V - GND
- 4 RS485 -
- 5 /



Front connector:
OUT

- 1 24 V DC
- 2 24 V DC suction command ⁽¹⁾
- 3 0 V - GND
- 4 24 V DC object gripped DO1 - C/Q
- 5 24 V DC blow-off command

⊗ : connections for ⊗ IO-Link

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

- S: 24 V DC vacuum control
- V: 24 V DC vacuum off command
- L: 24 V DC vacuum control with min. pulse-triggering of 50 ms

⁽²⁾ DO2 configurable: - ASC status (default)

- or Pressure fault (below 5 bar or above 8 bar)
- or Power supply fault (below 21.6 V or above 26.4 V)
- or ASC fault
- or Object lost

10. CONFIGURING A REMOTE HMI

Reminder: The remote HMI with ref. no. HMIHD1M84P can only be used with a GVMAXHD_C25A5 vacuum pump.

The GVMAXHD_C25A5 is supplied with the standard factory settings described in this manual. To be able to modify them, you must use a remote HMI or configure the module using IO-Link.

Configuration procedure

Step 1: Connect the remote HMI to the IN connector on the GVMAX HD. The GVMAX HD must be powered on.

Step 2: When the HMI is powered on, a message is displayed asking which settings should be used (HMI or IO).

➔ **Transfer and apply settings from the HMI module? YES/NO?**

Step 3: Choose either YES or NO.

- **NO** (selected by default): If the user presses M or does nothing within 5 seconds, the settings present in the vacuum switch of the GVMAX HD are transferred to the remote HMI.
- **YES**: The process settings and device settings contained in the remote HMI are transferred to the vacuum switch of the GVMAX HD and applied immediately.

This operation can be used to copy settings from one product to the next. The device's own product ID, serial number and device name remain unchanged. Likewise, the display settings (language, vacuum and pressure units, display rotation), also called "user settings", are not transferred since they are only related to the remote HMI.



Overview:



Process settings (for details see sect. 17)

- L1/h1
- L2/h2
- ASC
- DIAG Eco
- Auto Blow-off



Device settings (for details see sect. 19)

- Specific wiring
- PNP/NPN
- NO/NC
- Output 2 mode

11. SMART SWAP QUICK-MOUNTING SYSTEM

The GVMAXHD__RA and RB__ vacuum pumps feature COVAL's patented SMART SWAP quick-mounting system allowing you to mount/unmount the GVMAX HD module onto/from its pneumatic socket in the blink of an eye, without needing to disconnect compressed air and vacuum tubes.

The pneumatic sockets are equipped with non-return valves allowing for the GVMAX HD modules to be removed under pressure.



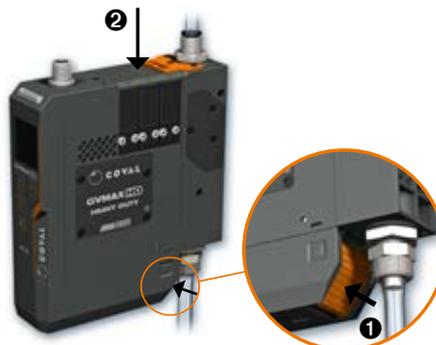
11.1. ASSEMBLY

Place the GVMAX HD module opposite the pneumatic socket. Press down on it until the module comes in full contact with the socket and the upper clip is well seated in its slot. Check to make sure that there is no gap between the GVMAX HD module and its socket.



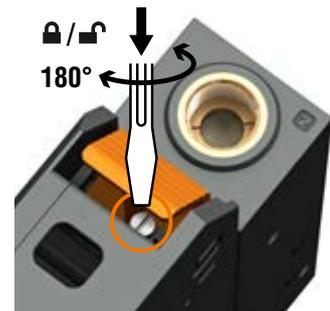
11.2. DISASSEMBLY

No tools required, just two steps by operator to release: press release tab ❶ at back of silencer and apply pressure to upper housing ❷ of GVMAX HD, while slightly pulling the GVMAX HD module towards you.



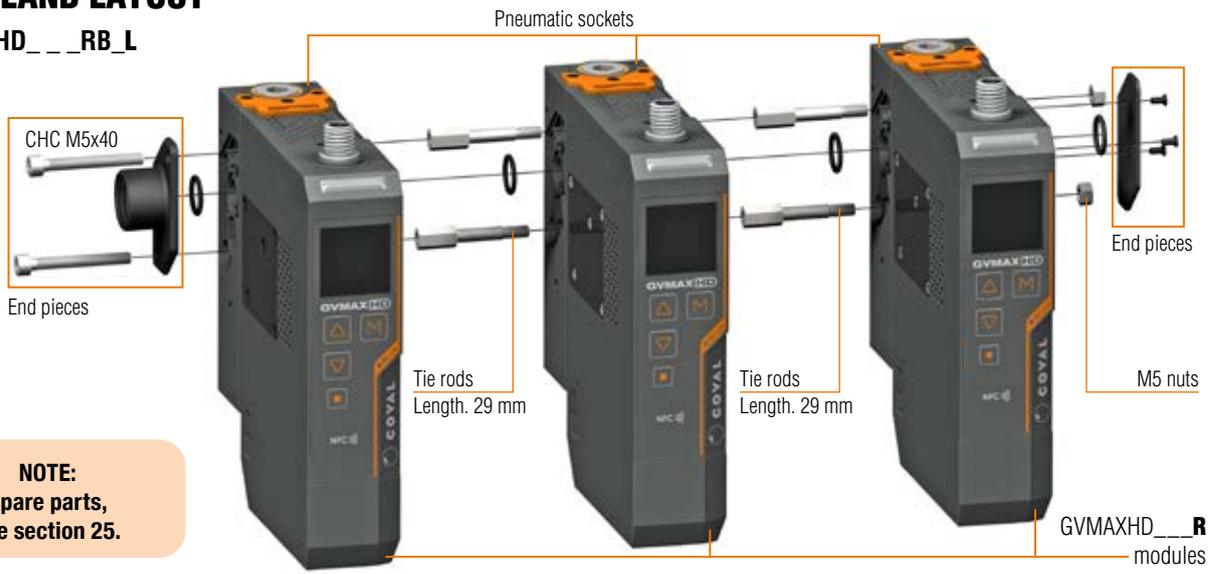
11.3. LOCKING RELEASE TAB WITH SCREW

There is a locking screw on the release tab, which can be tightened to require operators to use a screwdriver to remove the module. To lock/unlock the release tab, turn the screw 180° using a screwdriver, while pushing down on the screw.



12. ISLAND LAYOUT

GVMAXHD__RB_L



NOTE:
Spare parts,
see section 25.

GVMAXHD__RB_R



GVMAXHD__RB_T



13. PROCEDURE FOR ADDING A VACUUM PUMP TO AN EXISTING ISLAND

A GVMAX HD vacuum pump can be added to an existing island by ordering the pneumatic socket for the GVMAXHDPBG1RB island and the desired R version of the GVMAX HD module.

- Reminder:
- No more than 4 GVMAX HD modules/island
 - Always add the new module to the left

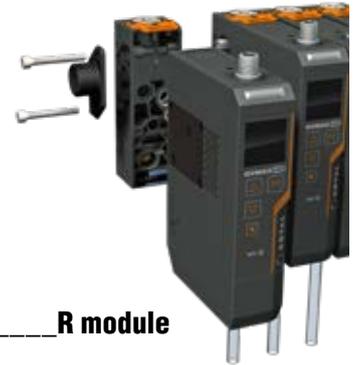
REQUIRED ACCESSORIES

Ref. no. GVMAXHDPBG1RB

Single pneumatic socket with SMART SWAP quick-mounting system to add a GVMAX HD vacuum pump to an existing island. Supplied with 2 bolts for assembly and a 12x2 NBR O-ring.



+ one GVMAXHD____R module



OVERVIEW OF AVAILABLE OPTIONS FOR GVMAX HD __R MODULES

 **GVMAXHD90X 25 L C15A1 X G1 F1 D R**

NOZZLE DIA.		CONNECTOR(S)		BLOW-OFF	
2.5 mm dia	25	C15A1	1 x M12 5-pin male	F1	Standard blow-off
3.0 mm dia	30	C18A1	1 x M12 8-pin male	F2	Powerful blow-off <i>The powerful blow-off option is used when the object needs to be released quickly.</i>
		C24A2	2 x M12 4-pin male		
		C25A5	2 x M12 5-pin male For use with remote HMI		

GENERATOR CONTROL	
Vacuum pump with NC vacuum control and NC blow-off Choice of blow-off settings: ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output)	S
Vacuum pump with NO vacuum control and NC blow-off ▪ Blow-off controlled by external signal	V
Vacuum pump with pulse-triggered bistable vacuum control and NC blow-off ▪ Blow-off controlled by external signal	L



13.1. PROCEDURE FOR ADDING A MODULE TO AN ISLAND EQUIPPED WITH THE LEFT SIDE PRESSURE CONNECTION END PLATE (GVMAXHD__RB_L)

STEP 1

- ❶ Remove the 2 CHC M5x40 screws from the left end plate on the existing island (using a 4 mm Allen key).
- ❷ Remove the pressure connection end plate.
- ⚠ If necessary, reposition the O-ring in its groove on the socket of the existing island.



STEP 2

- ❸ Tighten the 2 tie rods on the existing island using an 8 mm open-end wrench (tightening torque 2.5 Nm).
- ⚠ In order to be able to assemble the additional socket, the 2 bolts must be indexed. The 2 flat sides of the hexagonal bolt head must be vertical.



STEP 3

- ⚠ Make sure that the O-ring on the existing island is well seated in its groove.
- ❹ Place the single pneumatic socket with ref. no. GVMAXHDPGB1RB on the existing socket.



STEP 4

- ❺ Place the O-ring in its groove.
- ❻ Set the left hand side end plate in place.
- ❼ Tighten the 2 CHC M5x40 screws using a 4 mm Allen key (tightening torque 2.5 Nm).



STEP 5

- ❸ Mount the GVMAXHD_R module onto the pneumatic socket.



13.2. PROCEDURE FOR ADDING A MODULE TO AN ISLAND EQUIPPED WITH THE RIGHT SIDE PRESSURE CONNECTION END PLATE (GVMAXHD__RB_R) OR THE BLANK END PLATE (GVMAXHD__RB_T)

STEP 1

- 1 Remove the 3 CHC M2.5x6 screws from the blank end plate on the existing island using a T6 Torx screwdriver.
- ⚠ If necessary, reposition the O-ring in its groove on the socket of the existing island.
- 2 Remove the 2 CHC M5x30 existing screws.

STEP 2

- 3 Tighten the 2 bolts on the existing island using an 8 mm open-end wrench (tightening torque 2.5 Nm).
- ⚠ In order to be able to assemble the additional socket, the 2 bolts must be indexed. The 2 flat sides of the hexagonal bolt head must be vertical.

STEP 3

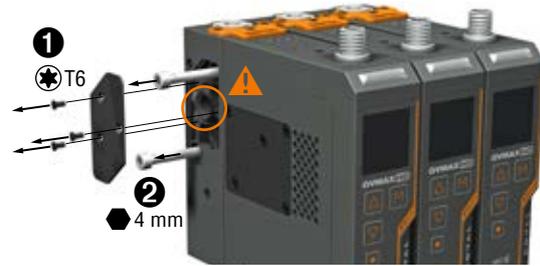
- ⚠ Make sure that the O-ring on the existing island is well seated in its groove.
- 4 Place the single pneumatic socket with ref. no. GVMAXHDPGB1RB on the existing socket.

STEP 4

- 5 Tighten the 2 CHC M5x30 screws using a 4 mm Allen key (tightening torque 2.5 Nm).
- 6 Place the O-ring in its groove.
- 7 Set the blank end plate in place.
- 8 Tighten the 3 CHC M2.5x6 screws using a T6 Torx screwdriver (tightening torque 0.45 Nm).

STEP 5

- 9 Mount the GVMAXHD_R module onto the pneumatic socket.



Note: For an island fitted with a compressed air supply on top (version GVMAXHD __RB_T, see sect. 8.1.2 to adjust the position and the number of compressed air supplies according to the number of modules in the island).

14. HMI DETAILS AND FEATURES

14.1. MAIN SCREEN

14.1.1. Powering on

The following occurs when the device is powered on:

- 1: COVAL logo is displayed (for about 15 seconds).
- 2: Main screen is displayed showing the vacuum level.
- 3: The keyboard is locked by default.

Note: During the startup phase (1), the product is immediately operational in terms of inputs/outputs (suction/blow-off commands, contact outputs). Only the "HMI" part is being initialized during this phase.

14.1.2. Details of the main screen

Status indicator for vacuum and blow-off commands:

-  Vacuum generation
-  Blow-off command
-  Simultaneous vacuum and blow-off commands

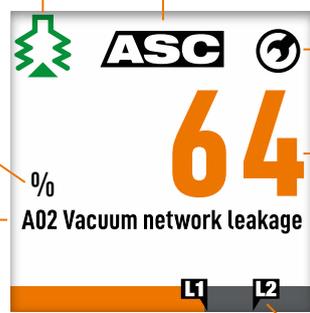
Vacuum unit

kPa / % of vacuum / mbar / inHg

Variable message

Displays code + error messages, alarms (see sect. 21)

Bar chart indicating the live vacuum level



ASC (Air Saving Control) indicator
ASC : ASC enabled
 * : ASC disabled due to vacuum leakage (in this case, vacuum generation is constant)

Maintenance indicator
 Icon shown if the vacuum solenoid valve has reached 50 million cycles.

Live vacuum level
 Displayed in:
 - kPa: 0 to -99
 - % of vacuum 0 to 99
 - mbar: 0 to -999
 - inHg: 0 to -29.9

L1 and L2 vacuum thresholds
 L1: Threshold for "object gripped" signal
 L2: "ASC" threshold (vacuum control threshold)
Note: L2 must always be set to a higher value than L1.

Note: See detailed screens and menus in section 15.

14.1.3. Keypad functions

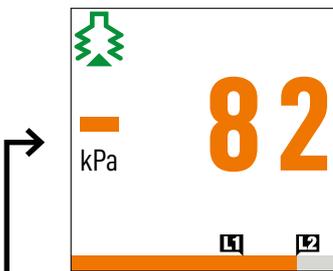
The keypad consists of 4 keys used to navigate to the various menus/screens and to change the parameters, etc.



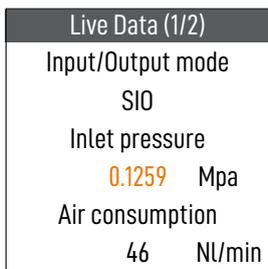
-  Navigate to screens and menus
Increase/decrease values
-  Hold down to quickly scroll through values
-  From main screen: access main menu
Validate menus and settings
-  From main screen: access secondary screen
From menus: return to previous menu

15. SUMMARY OF FUNCTIONS

15.1. ACCESSING LIVE DIAGNOSTIC DATA



Main screen



Secondary screens: live diagnostic data

Shows operating mode of device (automatic detection) and communication status (if IO-Link):

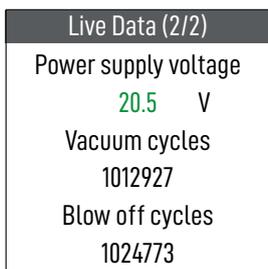
- SIO: standard input/output mode
- IO-Link: IO-Link mode and communication established



Live supply pressure monitoring

(bar, MPa, psi depending on unit defined in dedicated menu)

Value is shown in **orange** if it is outside the authorized range. Otherwise, it is shown in **green**.



Live air consumption in NI/min

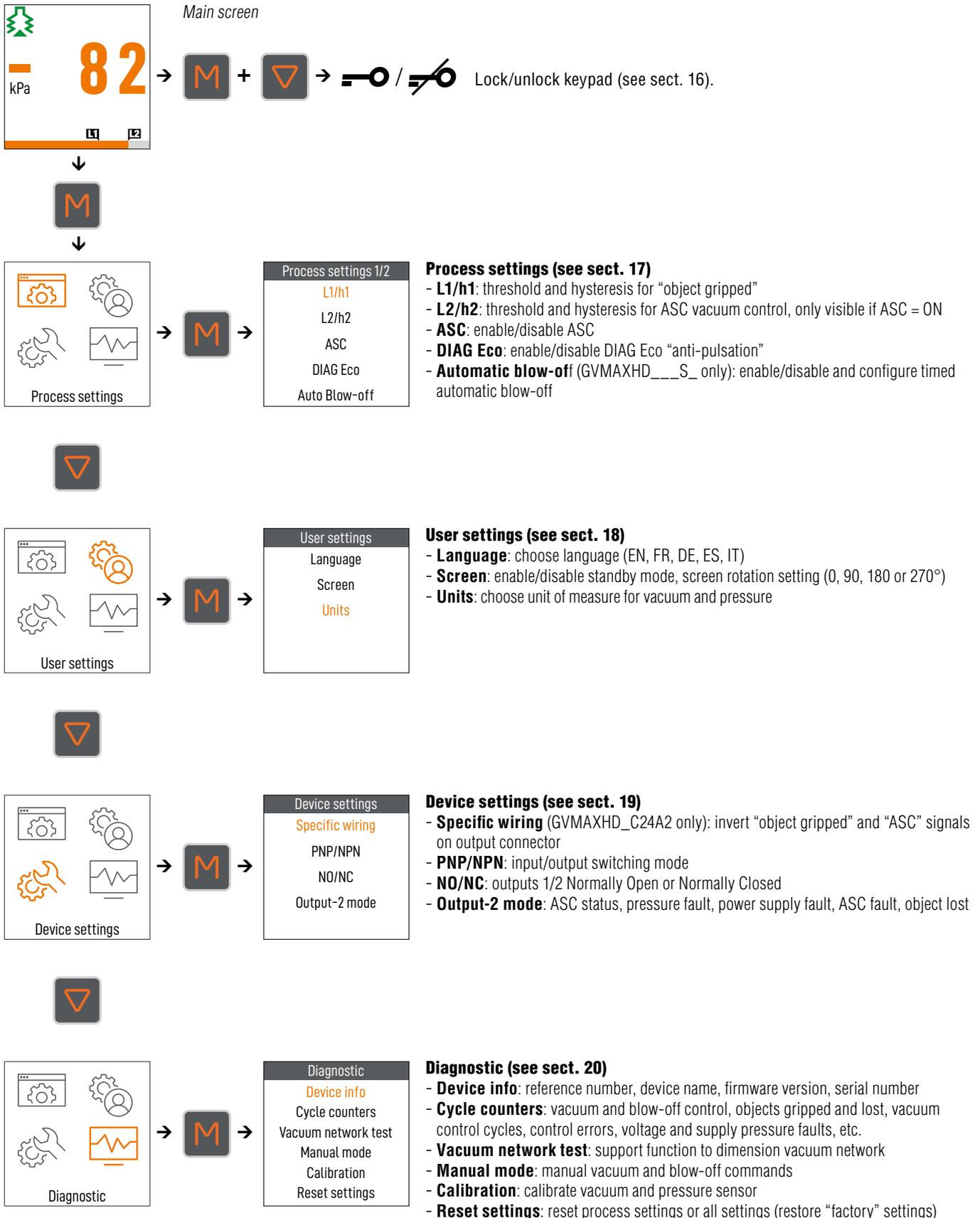
Power supply monitoring

Value is shown in **orange** if it is outside the authorized range. Otherwise, it is shown in **green**.



Vacuum and blow-off cycles

15.2. MENU TREE



16. LOCKING/UNLOCKING THE KEYBOARD



- 1- Simultaneously pressing the M and ▽ keys unlocks the keyboard (pressing them again locks it).
- 2- Pressing the keys will successively display the messages *K01 Keyboard locked, M + Down to unlock* and *K02 Keyboard unlocked*.
- 3- The display automatically returns to the vacuum level 0 kPa



17. PROCESS SETTINGS

Main menu	Secondary menu	Display conditions	Factory settings
	L1/h1	Permanent	L1 = -65 kPa h1 = -10 kPa
	L2/h2	ASC enabled	L2 = -75 kPa h2 = -10 kPa

17.1. SETTING THE THRESHOLDS 1 AND 2

Reminder of the “factory” setting

This initial factory setting is suitable for most applications.

Threshold L1:

L1= -65 kPa, vacuum threshold that generates the DO1 “object gripped” signal.

h1= -10 kPa, L1 hysteresis, drop in vacuum that will make the DO1 signal “object gripped” disappear.

Threshold L2: (only available when the ASC mode is enabled (ON))

L2= -75 kPa, vacuum threshold that triggers the vacuum generation cut-off.

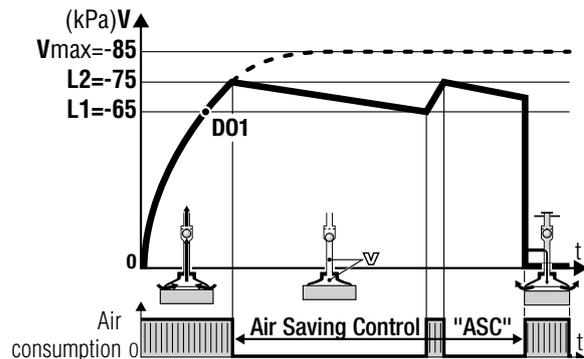
h2= -10 kPa, L2 hysteresis, drop in vacuum that will make vacuum generation resume.

The figure shows a reminder of how this “factory” setting works.

Recommendations

The L1 threshold (object gripped) must be lower than the L2 threshold (ASC vacuum control).

Recommended value: Hysteresis from -1 to -20 kPa.



Main menu	Secondary menu	Display conditions	Factory settings
	ASC	Permanent	ON

17.2. DISABLING THE AIR SAVING CONTROL (ASC)

In some cases, as when porous objects are gripped, the smart vacuum control system ASC can be disabled to allow for permanent suction, an operating mode offering no energy savings.

- ON confirms that the ASC mode is enabled (factory setting).
- OFF confirms that the ASC mode is disabled.

Note: When the ASC mode is disabled (OFF), the following settings are no longer accessible:

- Threshold L2
- Diag Eco “anti-pulsation” mode
- Control cycle counter (ASC)
- Control fault counter

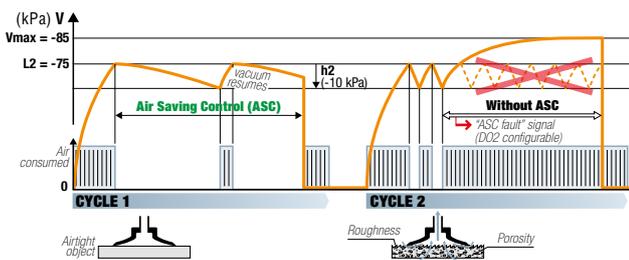
Furthermore, the DO2 output is inactive if it is set to “ASC status” mode. (Refer to sect. 19.4 for details on the Output 2 mode)

Refer to sect. 6.3 for details on ASC works.

Main menu	Secondary menu	Display conditions	Factory settings
	DIAG Eco	ASC enabled	ON 2 bounces 1 second

17.3. DISABLING THE DIAG ECO “ANTI-PULSATION”

Reminder: The Air Saving Control (ASC) mode controls the vacuum to reduce compressed air consumption and includes a self-adapting function (DIAG Eco) that analyzes the leakage level in the vacuum network.



The figure opposite shows how the GVMAX HD module adapts the cycle according to the actual production conditions: leaks due to objects, suction cups, etc.

- In this case, cycle 1 handles an airtight object and operates with ASC, leading to optimal energy savings.
- However, a porous object is introduced in cycle 2, which leads to leaks requiring vacuum generation to be resumed in successive bursts.

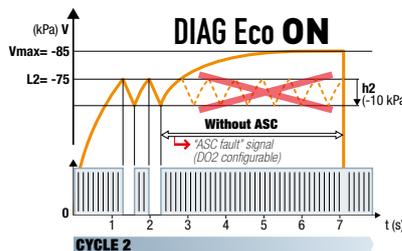
The unwanted condition is detected automatically and operation carries on, though without ASC vacuum control.

If the DO2 output is set to “ASC fault” mode, a signal is sent and * replaces ASC on the display, the indicator light on the GVMAX HD turns orange, but production carries on.

The DIAG Eco “anti-pulsation” function can be disabled for certain specific applications:

- ON confirms that DIAG Eco “anti-pulsation” is enabled (factory setting).
- OFF: DIAG Eco “anti-pulsation” is disabled.

Note: If DIAG Eco “anti-pulsation” is disabled (OFF), the DO2 contact output will be inactive if it is set to “ASC fault” mode.

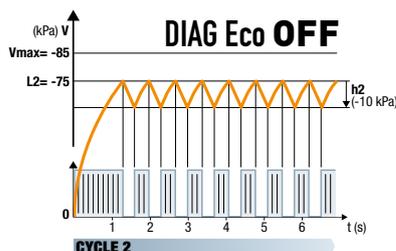


The maximum number of bounces allowed within the allotted time is set in the “Analysis time” submenu.

Factory setting: 2 bounces max./second (can be set from 1 to 10 bounces).

Analysis time: 1 second (can be set from 1 to 6 seconds)

Note: The DIAG Eco “anti-pulsation” function is part of ASC operation (refer to sect. 6.3 for details on how ASC works).



Main menu	Secondary menu	Display conditions	Factory settings
	Auto Blow-off	GVMAXHD version S	OFF

17.4. AUTO BLOW-OFF

Timed automatic blow-off eliminates the need for a Controller output and controls the blow-off as soon as vacuum control is stopped and for a configurable amount of time.

The initial “factory” setting for blow-off is the “blow-off controlled by external signal” option.

This setup is only available for GVMAXHD_**S**.

(Refer to section 9, Electrical connections)

OFF: Auto blow-off disabled = blow-off controlled by external signal

ON: Auto blow-off enabled

If enabled, the duration of the automatic blow-off can be adjusted from 50 to 9999 ms (factory setting 500 ms).



18. USER SETTINGS

Main menu	Secondary menu	Display conditions	Factory settings
	Language	Permanent	English

18.1. LANGUAGE

To make the GVMAX HD easier to use and configure, all information, messages and menus are available in the following 5 languages:

- EN: English
- FR: French
- DE: German
- IT: Italian
- ES: Spanish

Main menu	Secondary menu	Display conditions	Factory settings
	Screen	Permanent	Sleep mode: ON Rotation: 0°

18.2. SCREEN

The display goes into sleep mode after 10 min. if no external commands are received (suction or blow-off) and no key is pressed on the keyboard.

- ON: Sleep mode enabled
- OFF: Sleep mode disabled

Rotation:

To make it easier to read the information displayed on the GVMAX HD’s screen, the display on the screen can be rotated according to how the vacuum pump is placed in the facility.

The display rotation can be configured as follows: 0 / 90 / 180 / 270°

Main menu	Secondary menu	Display conditions	Factory settings
	Units	Permanent	Vacuum: kPa Pressure: MPa

18.3. UNITS

The unit of measure to display the vacuum level can be selected from among the following:

- kPa
- %
- mbar
- inHg

The unit of measure to display the pressure can be selected from among the following:

- MPa
- bar
- psi



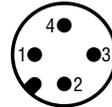
19. DEVICE SETTINGS

Main menu	Secondary menu	Display conditions	Factory settings
	Specific wiring	GVMAXHD_C24A2	OFF

19.1. SPECIFIC WIRING

To make it easier to integrate the GVMAX HD in facilities, the DO1 “object gripped” signal and the DO2 “ASC status” signal can be inverted on the output connector on the **GVMAXHD_C24A2** version.

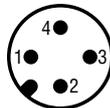
- **C24A2** : Two M12 4-pin male connectors



Rear connector:
IN

- | | |
|---|--|
| 1 | / |
| 2 | 24 V DC blow-off command |
| 3 | 0 V – GND |
| 4 | 24 V DC suction command ⁽¹⁾ |

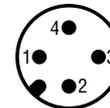
Setting OFF



Front connector:
OUT

- | | |
|---|----------------------------------|
| 1 | 24 V DC |
| 2 | 24 V DC ASC status DO2 |
| 3 | 0 V – GND |
| 4 | 24 V DC object gripped DO1 – C/Q |

Setting ON



Front connector:
OUT

- | | |
|---|------------------------------|
| 1 | 24 V DC |
| 2 | 24 V DC object gripped DO1 |
| 3 | 0 V – GND |
| 4 | 24 V DC ASC status DO2 – C/Q |

Main menu	Secondary menu	Display conditions	Factory settings
	PNP/NPN	Permanent	PNP

19.2. INPUT/OUTPUT SWITCHING MODE: PNP OR NPN

Select PNP or NPN to choose the switching mode for inputs (vacuum and blow-off commands) and for outputs (DO1/DO2).

Main menu	Secondary menu	Display conditions	Factory settings
	NO/NC	Output 1: Permanent Output 2: GVMAXHD_C18A1 GVMAXHD_C24A2	Output 1: NO Output 2: NO

19.3. NO/NC

The 2 contact outputs (DO1 and DO2) can be set to either NO (Normally Open) mode or NC (Normally Closed) mode.

Factory setting:

- DO1 “Object gripped”: NO
- DO2 “ASC status”: NO

Note: DO2: only for GVMAX HD_C18A1 and C24A2

Main menu	Secondary menu	Display conditions	Factory settings
	Output 2 mode	GVMAXHD_C18A1 GVMAXHD_C24A2	ASC status

19.4. CONFIGURABLE DO2 OUTPUT

The DO2 contact output can be configured to make available any information useful for your process.

ASC status (24 V DC) indicates that the GVMAX HD vacuum pump handles the vacuum control for the ASC mode. Threshold 2 (L2) active

Or configurable as follows:

- Air pressure fault (lower than 5 bar or greater than 8 bar)
- Power supply fault (lower than 21.6 V or greater than 26.4 V)
- ASC fault
- Grip fault

Note: DO2 only for GVMAXHD_C18A1 and C24A2.



20. DIAGNOSTIC

Main menu	Secondary menu	Display conditions	Factory settings
	Device info	Permanent	

Main menu	Secondary menu	Display conditions	Factory settings
	Cycle counters	Permanent	

20.1. DEVICE INFO

The information concerning the GVMAX HD are available on the following 3 screens:

“Device info” screen 1/3:

The full product ID of the GVMAX HD consists of the following 2 parts:

- Part 1/2: e.g. GVMAXHD90X25
- Part 2/2: e.g. SC24A2XG1F1DR

Example of a full product ID:

GVMAXHD90X25SC24A2XG1F1DR

“Device info” screen 2/3:

IO firmware version and IO serial number

“Device info” screen 3/3:

HMI firmware version and HMI serial number

20.2. CYCLE COUNTERS

The menu used to access counters consists of 5 screens.

Screen 1/5:

- **Vacuum commands (int.):** Total number of times vacuum solenoid valve activated (external/customer command + automatic commands related to ASC).
- **Vacuum commands (ext.):** Number of times external vacuum activated (controller command).
- **Blow-off commands:** Number of times blow-off solenoid valve activated (external command and automatic blow-off).

Screen 2/5:

- **Gripped parts:** Number of parts handled by the vacuum pump.
- **Lost parts:** Number of parts lost during handling stage.
- **ASC cycles:** Number of times air saving mode enabled (ASC control), if DO2 set to “ASC control”.

Screen 3/5:

- **ASC faults:** Number of control cycles interrupted following leakage on vacuum network (switch to permanent suction) if Diag Eco “anti-pulsation” is enabled.
- **Power too high faults:** Number of vacuum or blow-off commands that have occurred while the supply voltage was greater than 26.4 V.
- **Power too low faults:** Number of vacuum or blow-off commands that have occurred while the supply voltage was lower than 21.6 V.

Screen 4/5:

- **Pressure too high faults:** Number of vacuum or blow-off commands that have occurred while the pressure was greater than 8 bar.
- **Pressure too low faults:** Number of vacuum or blow-off commands that have occurred while the pressure was lower than 5 bar.
- **Vac. and blow-off cmds:** Number of times the vacuum and blow-off commands have been activated simultaneously. To ensure efficient blow-off, vacuum generation must be stopped to set down the object.

Main menu	Secondary menu	Display conditions	Factory settings
	Cycle counters	Permanent	

Main menu	Secondary menu	Display conditions	Factory settings
	Vacuum network test	Permanent	

Screen 5/5:

- Blow-off faults: Number of unloading cycles during which blow-off did not work properly (residual vacuum rate after blow-off).

20.3. VACUUM NETWORK TEST

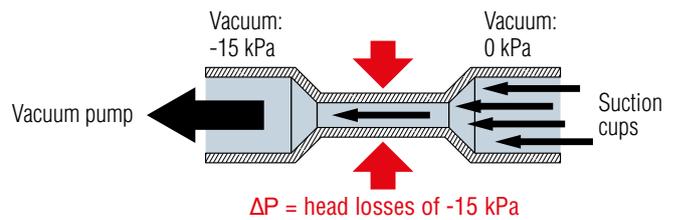
The GVMAX HD vacuum pump is equipped with a tool to help with sizing and detecting when the vacuum network is clogged to avoid head losses.

A properly sized vacuum network, i.e. with a minimum of head losses, will help to optimize the evacuation and blow-off times, and increases the performance of your facility.

Head losses are often due to tubes with an inner diameter that is too small in relation to their length and/or to T-fittings that lead to restrictions and do not enable the pump's air intake flow rate to circulate properly.

Note: For a reminder of tube diameters and lengths, refer to section 8 Connections.

Example of a restriction in a vacuum network



VACUUM NETWORK TESTING PROCEDURE

1- Vacuum network sizing support

The first time the vacuum pump is installed on the vacuum network, start the **Installation check** and follow the instructions. This check is to be performed without the suction cups being in contact with the object to be handled and is used to measure the head losses on the vacuum network.

Once the test has been started, the head loss measurement (**reference measurement**) is displayed as well as the test results:

- **TEST OK:** head loss < -20 kPa = vacuum network is properly sized
- **TEST FAILED:** head loss > -20 kPa = vacuum network needs to be optimized

In this case, adjust the lengths and/or inner diameters of the tubes and replace T-fittings with straight or Y-fittings. Once all the changes have been made, restart the test to obtain a correct reference measurement that will be used for the **periodic check**.

2- Periodic check

Note: This function is only available if the test results from the previous step are OK. It can be accessed from the HMI or via IO-Link.



Caution: This function must only be used during periodic maintenance of the facility (not during production) without no objects being gripped.

The **Periodic check** function is used to perform the following operations:

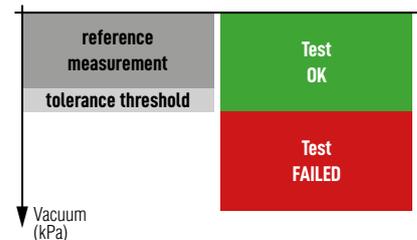
- Unclogging the network by temporarily activating the blow-off command
- Measuring the current head loss to compare it with the reference measurement

If the value measured during the periodic check exceeds the **reference measurement + tolerance threshold**, the test fails, which indicates the vacuum network is clogged or faulty.

Description from HMI:

Press **M** to access the **Periodic check** menu.

- The **tolerance threshold** is shown: for example **-10 kPa** (default value).
- If necessary, adjust the value: range of values from -1 to -20 kPa
- Press **M** to start the test. The vacuum pump automatically carries out the following cycle:
 - Blow-off for 3 seconds to clean the network
 - Suction, then wait for 3 seconds
- Results:
 - The measured head loss value is shown in kPa.
 - **Test OK:** The network's head loss value is **lower** than the **reference measurement + tolerance threshold**.
 - **Test failed:** If the network's head loss value is **greater** than the **reference measurement + tolerance threshold**.



Test results:

This menu is used to view the results of the last test carried out:

- **Reference:** Indicates the reference measurement made during step 1 of the Vacuum network test
- **Threshold:** Indicates the value of the set **tolerance threshold**
- **Last measure:** Indicates the value measured during the last periodic check

Main menu	Secondary menu	Display conditions	Factory settings
	Manual mode	Permanent	

20.4. MANUAL MODE

The GVMAX HD vacuum pump is equipped with an electronic manual control for the vacuum and blow-off solenoid valves.

Pressing and holding \triangle once activates the vacuum solenoid valve (green suction cup icon lights up on the main screen), while pressing and holding ∇ once activates the blow-off solenoid valve (orange suction cup icon lights up on the main screen).

Wait 10 seconds or press **M** to exit the mode.

Main menu	Secondary menu	Display conditions	Factory settings
	Calibration	Permanent	

20.5. CALIBRATION

Vacuum sensor calibration

The calibration procedure may only be performed when the vacuum network is at atmospheric pressure.

Note: Zero point correction is only possible within a +/-5% range around atmospheric pressure.

Follow the instructions in the “Vacuum sensor” menu.

Pressure sensor calibration

The calibration procedure may only be performed when the compressed air supply pressure is null.

Note: Zero point correction is only possible within a +/-5% range around atmospheric pressure.

Follow the instructions in the “Pressure sensor” menu.

Main menu	Secondary menu	Display conditions	Factory settings
	Reset settings	Permanent	

20.6. RESET SETTINGS

Various settings on GVMAX HD vacuum pumps can be reset to revert to the “factory settings”:

- Process settings
- All settings
- Maintenance status

21. EVENTS, ALARMS AND ERROR MESSAGES

Whenever necessary, messages are displayed on the main screen during operation to warn about an event, error or alarm:

EVENTS

Message	Condition for raising	Condition for clearing	Action
K01 Keyboard locked, M + ∇ to unlock	When you press a button without having unlocked the keyboard	This message is cleared automatically after 1 s.	If necessary, unlock the keyboard (see sect. 16)
K02 Keyboard unlocked	When you press M and ∇ simultaneously, when the keyboard is locked	This message is cleared automatically after 1 s.	See sect. 16
I01 Manual mode, \triangle – vacuum, ∇ – blow-off	Upon confirming the menu Diagnostic/Manual mode	This message is cleared automatically after 10 s or when you change screens.	Pressing and holding \triangle activates the vacuum solenoid valve Pressing and holding ∇ activates the blow-off solenoid valve

ALARMS

Message	Condition for raising	Condition for clearing	Action
A01 Lost part	Suction command active and vacuum level lower than L1-h1. The LED on the vacuum pump's front panel is red.	Vacuum control is stopped and/or blow-off is activated	Check the various parameter settings, the vacuum pump's supply pressure as well as the quality of the vacuum network and the suction cup size in relation to the load being handled.
A02 Vacuum network leakage	The "ASC" mode has detected vacuum leakages leading to vacuum generation resuming in successive bursts. The unwanted condition is detected automatically and operation carries on, though without "ASC" vacuum control. The LED on the vacuum pump's front panel is yellow.	Vacuum control is stopped and/or blow-off is activated	Check the vacuum network for leakage. Check the suction cups for wear. Make sure the suction cups are properly positioned on the object being handled (clear of any holes that may lead to leakages). Do not handle rough or porous objects unless ASC mode is disabled (see section 15.2).
A03 Power supply too high (> 26.4 V)	Supply voltage higher than 26.4 V	Supply voltage is set within the recommended voltage range (24 V DC +/-10%)	Use a regulated 24 V DC power supply +/-10%
A04 Power supply too low (< 21.6 V)	Supply voltage is lower than 21.6 V	Supply voltage is set within the recommended voltage range (24 V DC +/-10%)	Use a regulated 24 V DC power supply +/-10%
A05 Input pressure too high (> 8 bar)	Supply pressure is greater than 8 bar	Supply pressure is set within the recommended pressure range (5 to 8 bar)	Check the supply pressure on the compressed air network
A06 Input pressure too low (< 5 bar)	Supply pressure is lower than 5 bar	Supply pressure is set within the recommended pressure range (5 to 8 bar)	Check the supply pressure on the compressed air network

ERRORS

Message	Condition for raising	Condition for clearing	Action
I02 Invalid product reference	The reference detected when the product is started corresponds to the factory reference "GVMAXHD90X25NC15A1XG1F1DV"	Enter a valid product reference.	Transfer a valid reference number using the COVAL Vacuum Manager mobile application by scanning the datamatrix code on the product or follow the pairing procedure described in section 24.2.7.

22. IO-LINK PARAMETER SETTINGS

GVMAX HD vacuum pumps feature an IO-Link communications interface based on the IEC 61131-9 standard. This protocol is used to establish a point-to-point link between a sensor/actuator and an IO-Link input/output module called "IO-Link master", which is connected to the programmable logic controller.

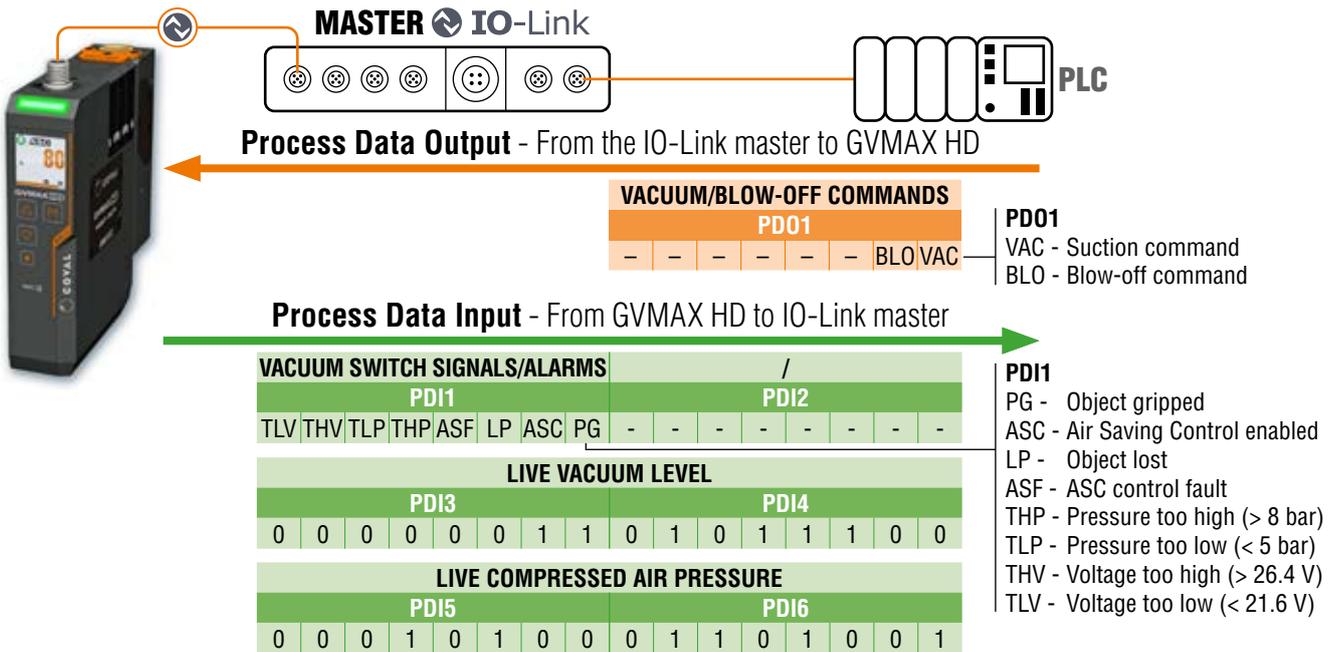
22.1. IO-LINK COMMUNICATION

IO-Link revision	1.1
Transmission rate	COM3 - 230.4 kbit/s
Min. cycle time	1 ms

SIO mode	Yes
Process data input (PDI)	6 bytes
Process data output (PDO)	1 byte

Update of IO Device Description (IODD) file: available for download.

22.2. CYCLICAL DATA (PDI/PDO)



Process Data	Parameter	Bit	Length (byte)	R/W	Unit	Comment
PDI1	PG - Part gripped (L1)	0	BOOL	RO		Vacuum level greater than L1 then between L1 and L1-h1
	ASC - Air Saving Control (L2)	1	BOOL	RO		Vacuum level greater than L2 then between L2 and L2-h2
	LP - Lost Part	2	BOOL	RO		Vacuum level lower than L1-h1 during part handling
	ASF - Air Saving Failure	3	BOOL	RO		Vacuum leakages leading to a permanent vacuum state of the ejector
	THP - Too High Pressure	4	BOOL	RO		Compressed air level greater than 8 bar
	TLP - Too Low Pressure	5	BOOL	RO		Compressed air level lower than 5 bar (dynamic)
	THV - Too High Voltage	6	BOOL	RO		Power supply voltage greater than 26.4 V
	TLV - Too Low Voltage	7	BOOL	RO		Power supply voltage lower than 21.6 V (dynamic)
PDI2	-	0-7	8xBOOL	RO		Not used
PDI3 / PDI4	Instant vacuum level	0-15	2	RO	mbar	Instantaneous vacuum level (0 to -1013 mbar)
PDI5 / PDI6	Instant pressure level	0-15	2	RO	mbar	Instantaneous compressed air pressure level (0 to 10 000 mbar)
PDO1	VAC - Vacuum command	0	BOOL	RW		0: vacuum OFF 1: vacuum ON
	BLO - Blow-off command	1	BOOL	RW		0: Blow-off OFF 1: Blow-off ON
	-	2-7	6xBOOL	RW		Not used

22.3. ACYCLICAL DATA

IDENTIFICATION

Index (dec)	Parameter	Length (byte)	R/W	Unité	Value			Comment
					min	Typ.	max	
7	Vendor ID	2	RO	-		0x04		0x0421 = COVAL SAS
8						0x21		
9						0x00		
10	Device ID	3	RO	-		0x20		0x2001 = GVMAXHD Series
11						0x01		
16	Vendor name	9	RO		COVAL SAS			
17	Vendor text	15	RO		Vacuum managers			
18	Product name	32	RO		GVMAXHD--X-----			Full reference
19	Product ID	10	RO		GVMAXHDCxx			Simplified reference
20	Product text	38	RO		Heavy Duty Vacuum Pump			
21	Serial number	8	RO		20420852461000000			
22	Hardware revision	3	RO		1.0			
23	Firmware revision	22	RO		io01.05.00_hmi01.05.00			



PROCESS SETTINGS

Index (dec)	Parameter	Length (byte)	R/W	Unité	Value			Comment
					min	Typ.	max	
64	Gripped product threshold L1	2	RW	mbar	10	650	999	Recommendations : h1 & h2 ≥ 10 L2-h2 ≥ L1 L1 > h1 & L2 > h2
65	Gripping threshold hysteresis h1	2	RW	mbar	0	100	999	
66	Air Saving threshold L2	2	RW	mbar	10	750	999	
67	Air Saving threshold hysteresis h2	2	RW	mbar	0	100	999	
68	ASC (Air Saving Control)	1	RW	-	0	1	1	0: OFF / 1: ON
69	DIAG Eco	1	RW	-	0	1	1	0: OFF / 1: ON
70	DIAG Eco Max. bounces number	1	RW	-	1	2	10	The ejector automatically switches to permanent suction once the vacuum valve bounces more than "Maximum bounces No." during a period of "DIAG Eco analysis time".
71	Diag Eco analysis time		RW	sec	1	1	60	
72	Automatic blow-off	1	RW	-	0	0	1	0: OFF / 1: ON
73	Automatic blow-off duration	2	RW	msec	100	500	9999	Automatic blowing for a period of 100 to 9999 ms as soon as vacuum control is disabled.

▼ Preset configurations ▼

74	CONF1-L1	2	RW	mbar	10	650	999	
75	CONF1-h1	2	RW	mbar	0	100	999	
76	CONF1-L2	2	RW	mbar	10	750	999	
77	CONF1-h2	2	RW	mbar	0	100	999	
78	CONF2-L1	2	RW	mbar	10	500	999	
79	CONF2-h1	2	RW	mbar	0	0	999	
80	CONF2-L2	2	RW	mbar	10	700	999	
81	CONF2-h2	2	RW	mbar	0	50	999	
2	Configuration 1 selection	1	WO	-	162 / 0xA2			Enables the following settings: CONF1-L1/h1/L2/h2
2	Configuration 2 selection	1	WO	-	163 / 0xA3			Enables the following settings: CONF2-L1/h1/L2/h2



DEVICE SETTINGS

Index (dec)	Parameter	Length (byte)	R/W	Unité	Value			Comment
					min	Typ.	max	
90	I/O switching type	1	RW	-	0	0	1	0: PNP / 1: NPN
91	Switching output-1 (DO1)	1	RW	-	0	0	1	0: NO / 1: NC
92	Switching output-2 (DO2)	1	RW	-	0	0	1	0: NO / 1: NC
93	Specific wiring	1	RW	-	0	0	1	0: OFF / 1: ON (reverse DO1 ↔ DO2)



DIAGNOSTIC

Index (dec)	Parameter	Length (byte)	R/W	Unité	Value			Comment
					min	Typ.	max	
100	Custom device name	20	RW	-	GVMAXHD			Free field, 20 characters max.
101	HMI serial number	20	RO	-	20420852461000000			
▼ Vacuum network diagnostic feature ▼								
2	Start vacuum network diagnostic (initial check)	1	WO		164 / 0xA4			The vacuum network diagnostic feature aims to periodically measure the vacuum drop to compare it to the initial measurement done when commissioning the ejector.
2	Start vacuum network diagnostic (periodic check)	1	WO		165 / 0xA5			An alarm is triggered when the measured vacuum drop is greater or equal to Vacuum drop reference (index 103) + Allowed vacuum drop threshold (index 105).
102	Last test result	1	RO	-	0	0	2	0: Test not done 1: Test failed 2: Test OK
103	Vacuum drop reference	2	RO	mbar	0	0	999	Vacuum drop measured when commissioning the ejector (Initial check : Index 2 / 164d). Shall be ≤ 200 mbar to get "Test OK" result.
104	Last vacuum drop measured value	2	RO	mbar	0	0	999	
105	Allowed vacuum drop threshold	2	RW	mbar	10	100	200	Defines the allowed margin of vacuum drop before triggering the "Clogged vacuum network" alarm.
▼ Cycles counters ▼								
110	External vacuum commands counter	4	RO	-	0	0	1E+08	
111	Internal vacuum commands counter	4	RO	-	0	0	1E+08	
112	Blow-off commands counter	4	RO	-	0	0	1E+08	
113	Grip counter	4	RO	-	0	0	1E+08	
114	Grip faults counter	4	RO	-	0	0	1E+08	
115	ASC counter	4	RO	-	0	0	1E+08	
116	ASC faults counter	4	RO	-	0	0	1E+08	
117	Power supply too high faults counter	4	RO	-	0	0	1E+08	
118	Power supply too low faults counter	4	RO	-	0	0	1E+08	
119	Vacuum and blow-off at the same time counter	4	RO	-	0	0	1E+08	
120	Pressure too high faults counter	4	RO	-	0	0	1E+08	
121	Pressure too low faults counter	4	RO	-	0	0	1E+08	
122	Blow-off faults counter	4	RO	-	0	0	1E+08	
▼ Sensors calibration ▼								
2	Vacuum sensor calibration	1	WO	-	160 / 0xA0			
2	Pressure sensor calibration	1	WO	-	161 / 0xA1			
▼ Factory settings ▼								
2	Reset Process settings	1	WO	-	166 / 0xA6			
2	Reset all settings	1	WO	-	130 / 0x82			

23. NFC

23.1. TECHNICAL DATA

GVMAX HD vacuum pumps include Near Field Communication (NFC) technology that enables short-range wireless data transfers between two devices.

The GVMAX HD and the remote HMI both include an NFC tag that gives mobile devices read and/or write access to the diagnostic data and pump settings, provided they feature this technology and have the COVAL Vacuum Manager mobile app installed (available on App Store and Google Play).

23.2. USING NFC

Proceed as follows for efficient use and optimal connection between devices:

- Locate the NFC antenna on your mobile device
- **When prompted by the app** (initial connection or settings update), place your mobile device as parallel as possible to the front panel of the GVMAX HD making sure to align the NFC antennas

GVMAX HD data can be read or written regardless of whether the vacuum pump is switched on or off. However, firmware updates require the pump to be switched on.

23.3. FUNCTIONALITY

The NFC wireless technology integrated in the GVMAX HD together with the COVAL Vacuum Manager application allow you to access and make changes to all the configuration and diagnostic functions using your mobile devices.

Additional functions:

- Read/write settings with the device powered off or on
- Copy settings from one GVMAX HD to another
- Save up to 5 setting configurations
- COVAL support: Send a report specifying the settings and diagnostic data to COVAL for technical support.



23.4. DOWNLOADING THE COVAL VACUUM MANAGER NFC APP

Mobile apps available:

- Android, version 8.1 and higher.
- iOS, version 13 and higher.



NFC APP:
COVAL VACUUM MANAGER

Android version GET IT ON Google Play

iOS version Download on the App Store

24. MAINTENANCE

24.1. 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 M12 connector(s)
	No compressed air supply	Check the compressed air supply
The vacuum level is not correct.	A filter is clogged in the facility.	Clean or replace the filter grid of the Vacuum connection. If the facility includes an additional vacuum filter, clean or replace the filter cartridge.
	Vacuum check valve clogged.	Clean or replace the vacuum check valve.
The vacuum build-up is too slow.	Leakage in the vacuum network	Check the fittings and tubes.
The vacuum pump is quickly switching on and off.	Suction cup leakage	Check the suction cup.
	Pressure too low	Increase the pressure (refer to technical data).
	Inner diameter of tubes too small	See recommendations for tube diameters
Cannot hold the payload in place.	Vacuum level too low	Check the values of thresholds 1 and 2.
	Suction cup too small or insufficient number of suction cups	Choose a larger suction cup and/or increase the number of suction cups.
The Venturi pump is running permanently (no vacuum control).	L2 threshold set to a higher value than what the vacuum pump is able to reach	Reduce the value of the L2 vacuum control threshold or revert to factory settings.
The vacuum decreases in the network, but Venturi pump does not switch back on.	The h2 hysteresis value is too high	Check the values of the L2 threshold and reduce the h2 hysteresis if necessary.
Screen is off	Screen is in sleep mode (if sleep mode is ON)	Press on a key on the keyboard, send a suction or blow-off command or disable the sleep mode (see sect. 18.2).
	Power supply and/or electrical connection not correct	Check the electrical connection and the pin assignment on the M12 connector(s)
The screen shows a message (events, alarms or error messages)		See section 21.

Establish the frequency of maintenance activities based on the cycle rates, the environment, and the type of load. To carry out maintenance work on version VA GVMAX HD vacuum pumps, the compressed air supply must be shut off.

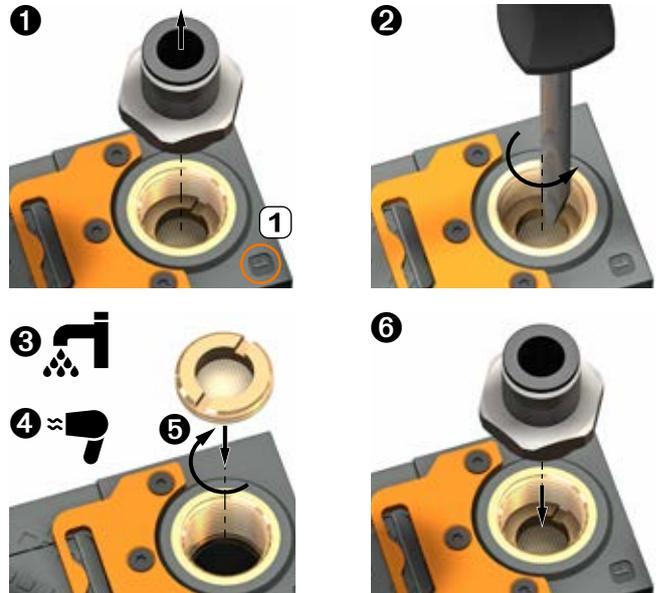
For vacuum pump versions equipped with the SMART SWAP quick-mounting system (GVMAX HD versions RA and RB), you can disconnect the GVMAX HD module from its pneumatic socket while it is pressurized.

24.2. MAINTENANCE PROCEDURES

24.2.1. Cleaning the filter grid on the compressed air supply (mark ① on pneumatic socket).

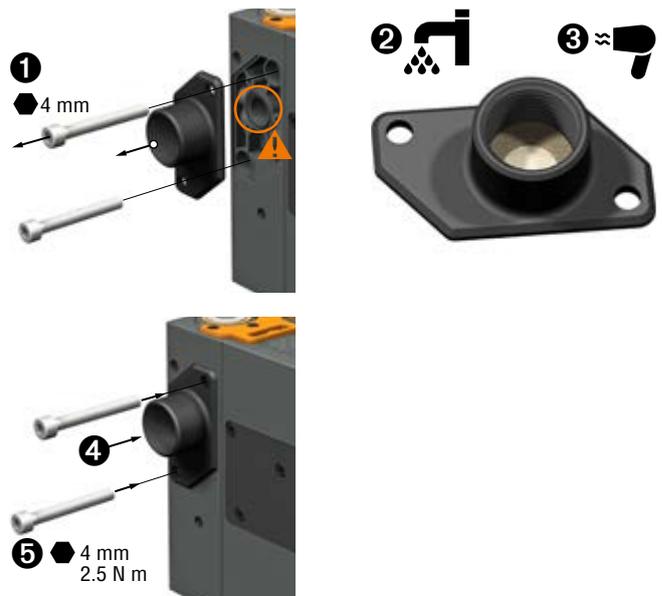
→ For standalone vacuum pump version (GVMAXHD-VA / RA)
→ For version T island (GVMAXHD...RB_T)

- ① Loosen the G3/8" fitting on the pneumatic socket to access the filter grid.
- ② Use a slotted screwdriver. Turn counterclockwise.
- ③ Clean the protective grid.
- ④ Dry the grid.
- ⑤ Reassemble the grid by screwing clockwise.
- ⑥ Mount the G3/8" fitting back onto the pneumatic socket.



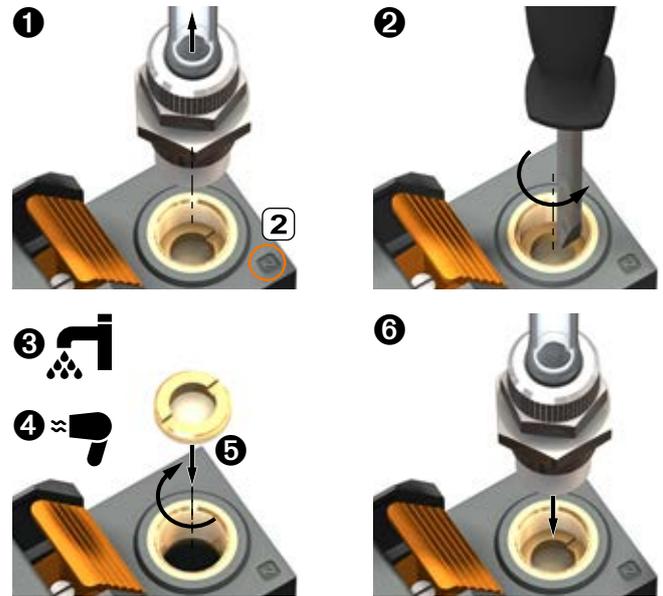
→ For version L (GVMAXHD...RB_L)
and version R (GVMAXHD...RB_R) islands

- ① Remove the 2 CHC M5x40 screws from the end plate, which comprises the pressure connection and the filter grid, using a 4 mm Allen key.
⚠ If necessary, reposition the O-ring in its groove on the island's socket.
- ② Clean the protective grid.
- ③ Dry the grid.
- ④ Set the end plate in place.
- ⑤ Tighten the 2 CHC M5x40 screws using a 4 mm Allen key (tightening torque 2.5 Nm).



24.2.2. Cleaning the filter grid on the “vacuum” connection (mark ② on the pneumatic socket).

- ① Loosen the G3/8” fitting on the pneumatic socket to access the filter grid.
- ② Use a slotted screwdriver. Turn counterclockwise.
- ③ Clean the protective grid.
- ④ Dry the grid.
- ⑤ Reassemble the grid by screwing clockwise.
- ⑥ Mount the G3/8” fitting back onto the pneumatic socket.



24.2.3. Removing the silencer

(ref. no.: 80005237)

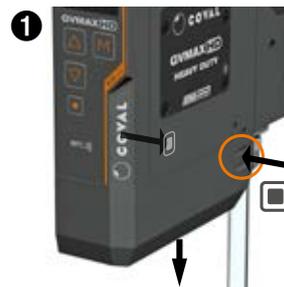
The silencer on the GVMAX HD module is open and does not require any maintenance. However, it is sometimes necessary to remove it to gain easy access to the Vacuum connection or to replace it if it has suffered damage.

The silencer can be removed without using any tools.

Note: As the silencer is made up of porous material, we do not recommend cleaning it.

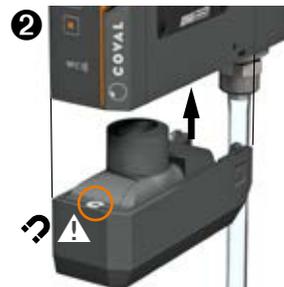
① To remove the silencer, proceed as follows:

- Press on either side of the silencer (square marks).
- Pull down.
- ⚠ The front end of the silencer is held in place by a magnet.



② To put the silencer back in place, proceed as follows:

- Make sure to properly position the clips on the silencer opposite the notches on the body.
- Push up to snap the silencer onto the GVMAX HD's body
- ⚠ Check to make sure that the front side is in contact with the magnet.



24.2.4. Replacing the solenoid valves

To remove the solenoid valves, it is essential to separate the GVMAX HD module from its socket.

→ Version GVMAXHD...VA

(Version with pneumatic socket screwed onto the GVMAX HD module.)

Remove the 2 rear screws from the socket to be able to remove the GVMAX HD module. →

→ Version GVMAXHD...RA/RB1/2/3/4

(Version with SMART SWAP quick-mounting system, see details in sect. 11.)

Make sure the release tab is not blocked.

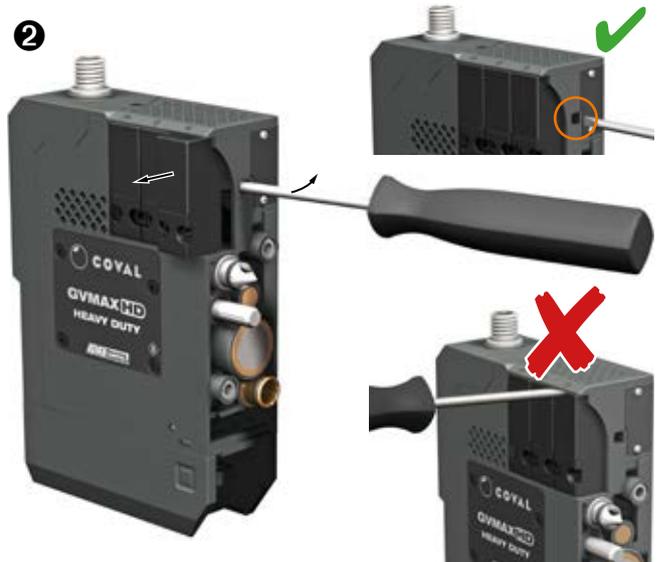
Simultaneously press on the release tab ❶ at the rear of the silencer and on the upper part ❷ of the GVMAX HD module, then pull on the GVMAX HD module to separate it from its socket.



- ❶ Remove the CHC M3x18 screws that hold in place the solenoid valve(s) to be replaced (use a 2.5 mm hexagon bit socket).



- ❷ Slide a small screwdriver into the slot behind the solenoid valve(s) to unsnap the solenoid valve(s) to be replaced.



- ❸ Replace the solenoid valve(s) as required (for item numbers, refer to sect. 25.5).

⚠ Caution: Make sure to properly place the pins of the solenoid valves in the respective holes by pressing slightly.

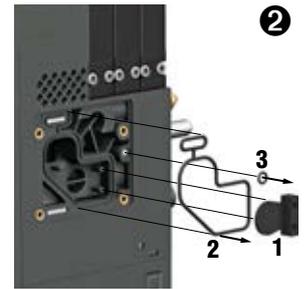
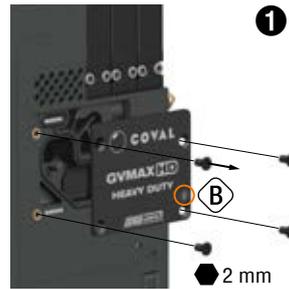
- ❹ Tighten the CHC M3x18 screws (tightening torque 2.5 Nm)..
- ❺ Mount the GVMAX HD module back onto the pneumatic socket.



24.2.5. Replacing the "Vacuum" check valve

Use the maintenance kit (item no. 80005598), which includes the vacuum check valve, the membrane, and the gaskets, to perform the maintenance of the vacuum check valve and control valves (see sect. 24.2.6).

- **1** Remove the 4 FHC M3x6 screws from the end plate, mark **B**, using a 2 mm hexagon bit socket.
- **2** Remove the vacuum check valve (mark **1**) as well as the 2 gaskets (marks **2** and **3**)



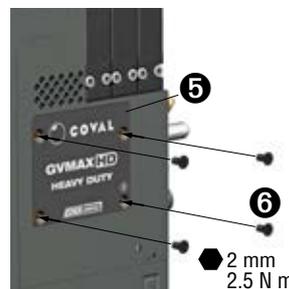
- **3** Replace the vacuum check valve by placing it onto the 2 spurs
⚠ Note the valve direction: the mobile part of the check valve must be in contact with the valve seat



- **4** Remove and replace the 2 gasket seals (marks **2** and **3**)
⚠ Make sure that the gasket seals are properly placed in their groove.



- **5** Set the end plate in place (mark **B**).
- **6** Tighten the 4 FHC M3x6 screws using a 2 mm hexagon bit socket (tightening torque 2.5 Nm).



VALIDATION TEST

Following maintenance work on the vacuum check valve, it is necessary to make sure that the vacuum pump is airtight. To do this, follow the instructions below:

Note: This test must be carried out with the GVMAX HD module on its pneumatic socket.

- Connect the compressed air and pressurize.
- Connect the M12 connector(s).
- Seal the Vacuum output (G3/8"-F fitting) using a G3/8"-M plug. Make sure the assembly is airtight by using a plug with an O-ring or Teflon tape.
- Activate vacuum generation on the vacuum pump.
- The ASC icon should appear on the vacuum pump's screen and the pump should be in vacuum control mode. There should be no air consumption and no pulsation.

The loss of vacuum should be less than -2 kPa after 10 seconds.

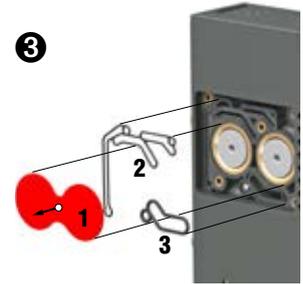
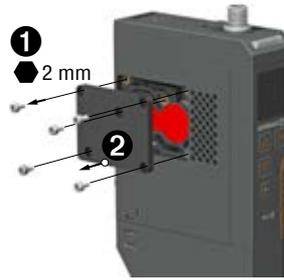
If the loss of vacuum is lower than the above value: The pump is airtight and you may use it in your facility.

If the loss of vacuum is greater than this value, check to make sure that the G3/8" plug is airtight and also check the gasket seals as well as the position of the vacuum check valve.

24.2.6. Replacing the membrane of the control valves

Use the maintenance kit (ref. no. 80005598) comprising the vacuum check valve, the membrane and the gaskets to perform the maintenance of the vacuum check valve and control valves.

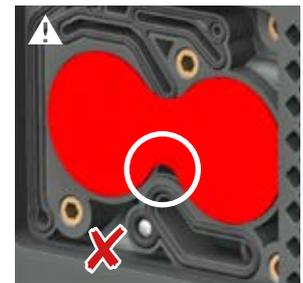
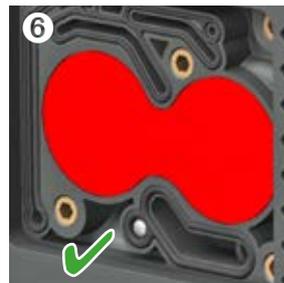
- **1** Remove the 5 CHC M3x6 screws using a 2 mm hexagon bit socket.
- **2** Remove the end plate.
- ⚠ **Caution**, the gaskets may be stuck to the end plate.
- **3** Remove the membrane (mark **1**) as well as the gasket seals (marks **2** and **3**).



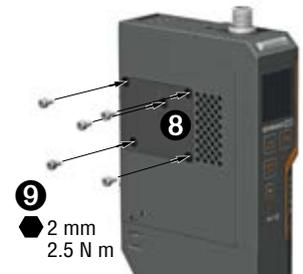
- **4** Clean the upper surfaces of the 2 control valves using a soft cloth and a degreasing agent..
- **5** Place the new gaskets in their respective groove (marks **2** and **3**).



- **6** Replace the membrane.
- ⚠ **Pay attention to the direction of the membrane**: make sure that the membrane perfectly fits into its groove.



- **7** Clean the end plate.
- **8** Set the end plate in place making sure that the membrane and gaskets are in their respective grooves.
- **9** Tighten the 4 CHC M3x6 screws using a 2 mm hexagon bit socket (tightening torque 2.5 Nm).



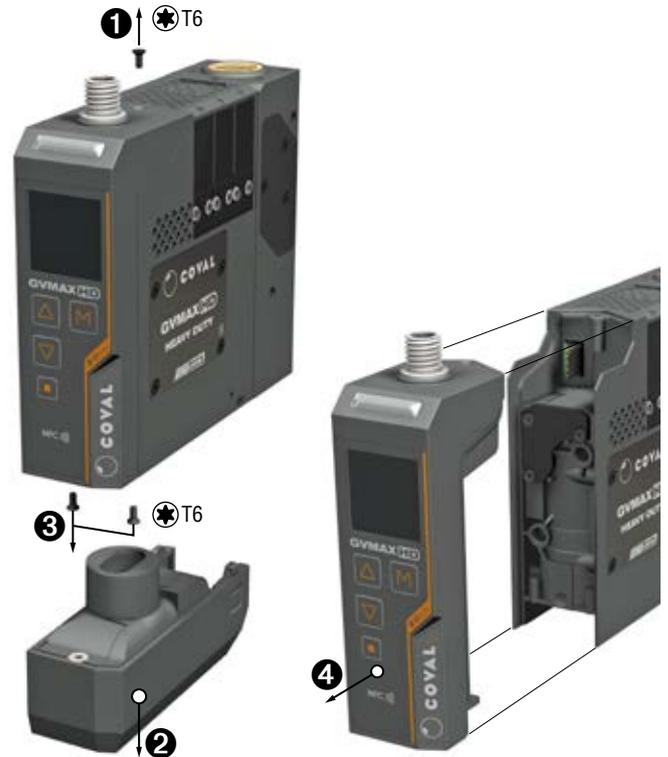
24.2.7. Replacing the front panel

For the item number, see sect. 25.3.



To replace the front panel of the GVMAX HD, make sure that the compressed air network is not pressurized and that the M12 connector(s) has (have) been disconnected.

- **1** Remove the upper screw using a T6 Torx screwdriver.
- **2** Remove the silencer (see sect. 24.2.3).
- **3** Remove the 2 lower screws using a T6 Torx screwdriver.
- **4** Remove the front panel by pulling it carefully towards the front.



- **5** Prior to mounting the new front panel, make sure that the gasket seal of the electrical connector is properly placed in its groove.

▲ Pay attention to the direction of the gasket seal!

- **6** Position the new front panel on the body of the GVMAX HD module by placing the female connector opposite the male connector.



Note: be careful with the gasket seal!

- **7** Push the front panel by sliding it onto the body until the electrical connector is connected and the front panel rests against the body.
- **8** Tighten the 2 lower screws using a T6 Torx screwdriver (tightening torque 0.45 Nm).
- **9** Tighten the upper screw using a T6 Torx screwdriver (tightening torque 0.45 Nm)
- **10** Mount the silencer back in place (see sect. 24.2.3).



CONFIGURING THE NEW FRONT PANEL

Version GVMAXHD___C25A5

Replacement front panels for versions C25A5 are configured at the factory and can be used immediately without requiring any specific settings.

Versions GVMAX HD___C15, C18 and C24

After having replaced the front panel of your GVMAX HD, it must be configured for it to work with the GVMAX HD you own. Configuring the front panel involves pairing it with the GVMAX HD vacuum pump and specifying the pump's full product ID.

Note: Prior to starting, locate the nameplate of the vacuum pump to get the product ID.
Example: GVMAXHD90X25LC15A1XG1F1DV

There are 2 different ways to pair the front panel with the GVMAX HD vacuum pump:

Configuring with the HMI:

Perform the pairing by entering the product ID of the GVMAX HD vacuum pump directly in the HMI.



During the pairing procedure, only use the M, △ and ▽ keys to select the values, confirm and switch menus/screens. Do not use the ■ key. Otherwise, you will be redirected to the main screen without defining the pump's product ID and the following message will be displayed: I02 Invalid product reference. Should this happen, the front panel will need to be reset to restart the pairing procedure.

Follow the instructions below to enter the product ID of the GVMAX HD:

- Connect the vacuum pump to power.
- The COVAL logo is displayed during the initialization phase.
- The **Product ID** screen is displayed: Product type GVMAXHD.
- Follow the steps to define the pump's product ID by choosing the values in the various screens.
- To confirm the information and/or move on to the next screen, press **M**.

Definition of the product ID:

Example: **GVMAXHD 90 X**

25	L	C15A1	X	G1	F1	D	V
25	S	C15A1	X		F1		V
30	V	C18A1	P		F2		R
	L	C24A2	N				
		C24A3					
		C24A4					
		C24A5					



After having paired the front panel with the vacuum pump, we recommend that you check the reference number that is registered with the one shown on the pump's nameplate (see sect. 20.1 to find the pump's reference number).

If a reference number error is detected, the front panel must be reset.

RESETTING PROCEDURE:

- Disconnect the front panel from the power supply.
- Press and hold △ and ▽, then connect the front panel to power. Keep the 2 buttons pressed until the COVAL logo disappears from the screen.
- The front panel is reset. Restart the pairing procedure.

Configuring with the mobile application:

Download the COVAL Vacuum Manager application on a mobile device equipped with NFC functionality and then enter the identification data.

Reminder:

The COVAL Vacuum Manager mobile application is available on the following devices:

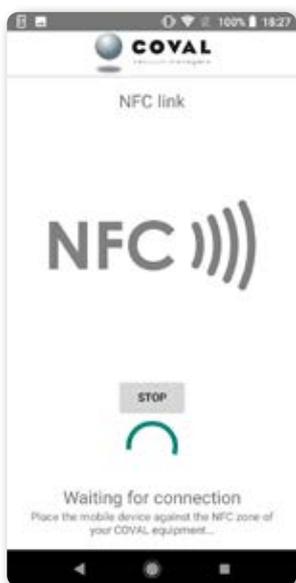
- Android, à partir de la version 8.1.
- iOS, à partir de la version 13.

See sect. 23.4

Follow the instructions below to enter the product ID of the GVMAX HD:

- Connect the vacuum pump to power.
- The COVAL logo is displayed during the initialization phase.
- The **Product ID** screen is displayed: Product type GVMAXHD.
- Press the **■** key to return to the main screen.
- Start the COVAL Vacuum Manager application on the mobile device and confirm by tapping OK.
- Connect the mobile device to the vacuum pump by moving it closer to the NFC antenna on the front panel of the vacuum pump (the antenna is located next to the NFC logo).
- Once the transfer is done, move the mobile device away from the front panel.
- Access the **Product Identity** menu on the mobile device.
- Access the datamatrix scanning function.
- Scan the datamatrix code on the vacuum pump's nameplate.
- Check the product ID that is displayed.
- Tap **Transfer**.
- Move the mobile device closer to the vacuum pump's NFC antenna to transfer the reference.
- Once the transfer has been carried out, the message **Transfer completed successfully** will be shown in the application.

Note: Entering the reference via NFC can also be done with the device powered off..



Product identity menu
Access to datamatrix scanning function



Scan the datamatrix code



Check the reference no.
Transfer



After having paired the front panel with the vacuum pump, we recommend that you check the reference number that is registered with the one shown on the pump's nameplate (see sect. 20.1 to find the pump's reference number).

If a reference number error is detected, follow the procedure for entering the reference number via NFC described below one more time or follow the manual entry procedure described in the previous section.

RESETTING PROCEDURE:

- Disconnect the front panel from the power supply.
- Press and hold **△** and **▽**, then connect the front panel to power. Keep the 2 buttons pressed until the COVAL logo disappears from the screen.
- The front panel is reset. Restart the pairing procedure.

25. SPARE PARTS



1 PNEUMATIC SOCKET

(item code depends on GVMAX HD model)

For model	Item code
GVMAXHD90X__XG1_DVA	GVMAXHDPBG1VA
GVMAXHD90X__XG1_DRA	GVMAXHDPBG1RA
GVMAXHD90X__XG1_DRB1/2/3/4	GVMAXHDPBG1RB



ACCESSORIES

Designation	Item code
350 µm filter screen - G3/8"	80005035



SETS OF ENDS FOR ISLANDS

Désignation	Code article
<p>Full set of ends for island (version R) includes the following:</p> <ul style="list-style-type: none"> ▪ Right end plate with G1/2"-F pressure connection + 350 µm filter grid + 2 tie rods length 34 mm. ▪ Blank end plate on left side + end plate fastening screws. ▪ 2 connection screws CHC M5x30. 	 80005594
<p>Full set of ends for island (version L) includes the following:</p> <ul style="list-style-type: none"> ▪ Left end plate with G1/2"-F pressure connection + 350 µm filter grid + 2 connection screws CHC M5x40. ▪ Blank end plate on right side + end plate fastening screws. ▪ 2 tie rods length 29 mm and 2 M5 nuts. 	 80005413
<p>Full set of ends for island (version T) includes the following:</p> <ul style="list-style-type: none"> ▪ 2 blank end plates + end plate fastening screws. ▪ 2 connection screws CHC M5x30. ▪ 2 tie rods length 29 mm and 2 M5 nuts. 	 80005960

2 GVMAX HD MODULE (reference number to be selected according to the characteristics)

	GVMAXHD90X	25	L	C15A1	X	G1	F1	D	V
---	-------------------	-----------	----------	--------------	----------	-----------	-----------	----------	----------

NOZZLE DIA.		CONNECTOR(S)	BLOW-OFF
2.5 mm dia	25	C15A1 1 x M12 5-pin male	F1 Standard blow-off
3.0 mm dia	30	C18A1 1 x M12 8-pin male	F2 Powerful blow-off <i>The powerful blow-off option is used when the object needs to be re-released quickly.</i>

GENERATOR CONTROL	
Vacuum pump with NC vacuum control and NC blow-off Choice of blow-off settings: ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output)	S
Vacuum pump with NO vacuum control and NC blow-off ▪ Blow-off controlled by external signal	V
Vacuum pump with pulse-triggered bistable vacuum control and NC blow-off ▪ Blow-off controlled by external signal	L

CONNECTOR(S)	
C15A1 1 x M12 5-pin male	
C18A1 1 x M12 8-pin male	
C24A2 2 x M12 4-pin male	
C25A5 2 x M12 5-pin male For use with remote HMI 	

CONFIGURATIONS	
Standalone GVMAX HD module to be screwed onto its pneumatic socket 	V
Standalone or island GVMAX HD module with SMART SWAP quick-mounting system 	R

3 FRONT PANEL WITH VACUUM SWITCH/CONNECTORS FOR GVMAX HD

Front panel with vacuum switch/connectors for GVMAX HD versions C15 – C18 – C24

For model	Designation	Item code
GVMAXHD90X__ C15A1 XG1__D__	1 x M12 – 5-pin male connector	GVMAXHDPC15D
GVMAXHD90X__ C18A1 XG1__D__	1 x M12 – 8-pin male connector	GVMAXHDPC18D
GVMAXHD90X__ C24A2 XG1__D__	2 x M12 – 4-pin male connector	GVMAXHDPC24D



Front panel with vacuum switch/connectors for GVMAXHD Version C25A5

For model	Designation	Item code
GVMAXHD90X25 L C25A5XG1F1DR	2 x M12 – 5-pin male connector	GVMAXHDPC25 L C25A5XG1F1DR
GVMAXHD90X25 L C25A5XG1F1DV	2 x M12 – 5-pin male connector	GVMAXHDPC25 L C25A5XG1F1DV
GVMAXHD90X25 L C25A5XG1F2DR	2 x M12 – 5-pin male connector	GVMAXHDPC25 L C25A5XG1F2DR
GVMAXHD90X25 L C25A5XG1F2DV	2 x M12 – 5-pin male connector	GVMAXHDPC25 L C25A5XG1F2DV
GVMAXHD90X25 SC 25A5XG1F1DR	2 x M12 – 5-pin male connector	GVMAXHDPC25 SC 25A5XG1F1DR
GVMAXHD90X25 SC 25A5XG1F1DV	2 x M12 – 5-pin male connector	GVMAXHDPC25 SC 25A5XG1F1DV
GVMAXHD90X25 SC 25A5XG1F2DR	2 x M12 – 5-pin male connector	GVMAXHDPC25 SC 25A5XG1F2DR
GVMAXHD90X25 SC 25A5XG1F2DV	2 x M12 – 5-pin male connector	GVMAXHDPC25 SC 25A5XG1F2DV
GVMAXHD90X25 VC 25A5XG1F1DR	2 x M12 – 5-pin male connector	GVMAXHDPC25 VC 25A5XG1F1DR
GVMAXHD90X25 VC 25A5XG1F1DV	2 x M12 – 5-pin male connector	GVMAXHDPC25 VC 25A5XG1F1DV
GVMAXHD90X25 VC 25A5XG1F2DR	2 x M12 – 5-pin male connector	GVMAXHDPC25 VC 25A5XG1F2DR
GVMAXHD90X25 VC 25A5XG1F2DV	2 x M12 – 5-pin male connector	GVMAXHDPC25 VC 25A5XG1F2DV
GVMAXHD90X30 L C25A5XG1F1DR	2 x M12 – 5-pin male connector	GVMAXHDPC30 L C25A5XG1F1DR
GVMAXHD90X30 L C25A5XG1F1DV	2 x M12 – 5-pin male connector	GVMAXHDPC30 L C25A5XG1F1DV
GVMAXHD90X30 L C25A5XG1F2DR	2 x M12 – 5-pin male connector	GVMAXHDPC30 L C25A5XG1F2DR
GVMAXHD90X30 L C25A5XG1F2DV	2 x M12 – 5-pin male connector	GVMAXHDPC30 L C25A5XG1F2DV
GVMAXHD90X30 SC 25A5XG1F1DR	2 x M12 – 5-pin male connector	GVMAXHDPC30 SC 25A5XG1F1DR
GVMAXHD90X30 SC 25A5XG1F1DV	2 x M12 – 5-pin male connector	GVMAXHDPC30 SC 25A5XG1F1DV
GVMAXHD90X30 SC 25A5XG1F2DR	2 x M12 – 5-pin male connector	GVMAXHDPC30 SC 25A5XG1F2DR
GVMAXHD90X30 SC 25A5XG1F2DV	2 x M12 – 5-pin male connector	GVMAXHDPC30 SC 25A5XG1F2DV
GVMAXHD90X30 VC 25A5XG1F1DR	2 x M12 – 5-pin male connector	GVMAXHDPC30 VC 25A5XG1F1DR
GVMAXHD90X30 VC 25A5XG1F1DV	2 x M12 – 5-pin male connector	GVMAXHDPC30 VC 25A5XG1F1DV
GVMAXHD90X30 VC 25A5XG1F2DR	2 x M12 – 5-pin male connector	GVMAXHDPC30 VC 25A5XG1F2DR
GVMAXHD90X30 VC 25A5XG1F2DV	2 x M12 – 5-pin male connector	GVMAXHDPC30 VC 25A5XG1F2DV

④ BODY FOR GVMAX HD

For model	Designation	Item code
GVMAXHD90X25__XG1_F1DV_	2.5 mm nozzle dia, standard blow-off, screwed standalone version	GVMAXHDMB90X25F1V
GVMAXHD90X25__XG1_F2DV_	2.5 mm nozzle dia, powerful blow-off, screwed standalone version	GVMAXHDMB90X25F2V
GVMAXHD90X25__XG1_F1DR_	2.5 mm nozzle dia, standard blow-off, version with SMART SWAP quick-mounting system	GVMAXHDMB90X25F1R
GVMAXHD90X25__XG1_F2DR_	2.5 mm nozzle dia, powerful blow-off, version with SMART SWAP quick-mounting system	GVMAXHDMB90X25F2R
GVMAXHD90X30__XG1_F1DV_	3.0 mm nozzle dia, standard blow-off, screwed standalone version	GVMAXHDMB90X30F1V
GVMAXHD90X30__XG1_F2DV_	3.0 mm nozzle dia, powerful blow-off, screwed standalone version	GVMAXHDMB90X30F2V
GVMAXHD90X30__XG1_F1DR_	3.0 mm nozzle dia, standard blow-off, version with SMART SWAP quick-mounting system	GVMAXHDMB90X30F1R
GVMAXHD90X30__XG1_F2DR_	3.0 mm nozzle dia, powerful blow-off, version with SMART SWAP quick-mounting system	GVMAXHDMB90X30F2R



⑤ SOLENOID VALVES FOR GVMAX HD

DETAILS ON SOLENOID VALVE POSITIONS AND FUNCTIONS ACCORDING TO GVMAX HD VERSION

Version GVMAXHD90X_S...

Position	Function
1	NC solenoid valve: vacuum control + vacuum regulation
2	Solenoid valve: pressure distribution
3	NC solenoid valve: blow-off control

Version GVMAXHD90X_V...

Position	Function
1	NO solenoid valve: vacuum control + vacuum regulation
2	Solenoid valve: pressure distribution
3	NC solenoid valve: blow-off control

Version GVMAXHD90X_L...

Position	Function
1	NO solenoid valve: controls vacuum regulation
2	Latch solenoid valve: vacuum control
3	NC solenoid valve: blow-off control

Solenoid valve position



Item code	Designation	Position								
		GVMAXHD90X_S...			GVMAXHD90X_V...			GVMAXHD90X_L...		
		1	2	3	1	2	3	1	2	3
80004627	NC - 3/2 - 24V - Solenoid valve - 8 mm center distances	×		×			×			×
80004628	NO - 3/2 - 24V - Solenoid valve - 8 mm center distances				×			×		
80004629	LATCH- 3/2 - 24V - Solenoid valve - 8 mm center distances								×	
80005018	Pressure distribution pilot		×			×				

⑥ SILENCER

Designation	Item code
Open silencer	80005237



⑦ MAINTENANCE KIT

Designation	Item code
Maintenance kit including 1 non return valve, 1 diaphragm for control valves, 1 form seal for the front panel and 1 set of O-rings and form seals.	80005598

26. GLOSSARY

- **HMI:** Human-machine interface
- **I/O:** Input/Output
- **SIO:** Standard input/output
- **DO :** Digital output
- **SDCI:** Single-drop digital communication interface, commonly known as IO-Link
- **C/Q:** Connection for communication or switching signal
- **Digital I/O:**
 - **DO:** Digital output
 - **DI:** Digital input
- **IODD:** IO device description, a file that provides all the properties required to establish the communication and the parameters to establish the desired function of a sensor or actuator
- **Acyclical data:** Data transmitted from the controller only following a request (e.g. settings data, diagnostic data)
- **Cyclical data:** Data automatically transmitted by the controller at regular intervals (processing data, changes to values)
- **COMx:** IO-Link communication transmission rate (COM1: 4.8 kbit/s, COM2: 38.4 kbit/s, COM3: 230.4 kbit/s)

27. 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.

28. 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.

GVMAX HD 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/>

29. EC DECLARATION

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

- 2014/30/EC Electromagnetic Compatibility (EMC)
- 2011/65/EC Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment

The following harmonized standards have been applied:

- IEC 61000-6-2:2016 Electromagnetic Compatibility (EMC) – Immunity standard for industrial environments
- IEC 61000-6-4:2006/A1:2010 Electromagnetic Compatibility (EMC) – Emission standard for industrial environments
- EN 61000-4-2:2009 Electromagnetic Compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test

30. CERTIFICATES/TESTS

EMC	IEC 61000-6-2 (2016) Electromagnetic Compatibility (EMC). Generic standards – Immunity standard for industrial environments	NF EN 61000-4-2 (2008) Electrostatic discharges (ESD)	
		NF EN 61000-4-3 (2006) + A1(2008) + A2 (2011) Radiated, radio-frequency, electromagnetic fields	
		NF EN 61000-4-4 (2012) Electrical fast transients (bursts)	
		NF EN 61000-4-6 (2013) Conducted disturbances, induced by radio-frequency fields	
		NF EN61000-4-8 (2009) Magnetic fields	
	IEC 61000-6-4 (2007) + A1(2010) Electromagnetic Compatibility (EMC). Generic standards – Emission standard for industrial environments	NF EN 55011 (2016) Émissions conduites	
		NF EN 55011 (2016) Émissions rayonnées	
Degrees of protection	NF EN 60529 (2014)		IP 65
	NF EN 60 068-2-75 (2015)		IK 07
Temperature variations	IEC 60068-2-14 (2009)		0°C +50°C
Humidity	IEC 60068-2-30 (2005)		0 à 95%
Vibrations	NF EN 60068-2-6 (2008)		5 g
Shocks	NF EN 60068-2-6 (2008)		15 g

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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