

LEM MAX IO

Mini Vacuum Pumps with Communication

 IO-Link



COVAL
vacuum managers



EN

SETTINGS DESCRIPTION

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This guide describes the settings of mini vacuum pump IO-Link, LEM MAX IO Series.

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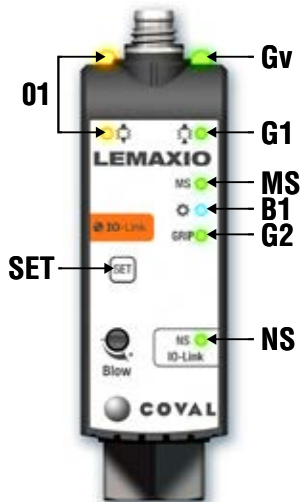
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Operating instruction and Description files of the IO-Link equipment available for download:
<https://doc.coval.com/LEM MAX IO/>

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1. FRONT PANEL INDICATORS AND BUTTON



Ref.	Related to	Meaning
● O1	Parts handling	ON: Blow-off command enabled / otherwise OFF
● G1	Parts handling	ON : Vacuum is generated / otherwise OFF
● Gv	Parts handling	GV gives an indication of vacuum valve status : if Normally Closed (NC) valve → Gv behaves as G1 if Normally Open (NO) valve → Gv OFF : Vacuum is generated / otherwise ON
● G2	Parts handling	ON: Object gripped signal (vacuum level>L1 threshold)/Otherwise OFF
● B1	Custom led	LED configurable according to customer requirements (see chap. 1.1)
● MS	Module Status	Indicates the current status of the device (see chap. 1.2)
● NS	Network Status	Indicates the current status of the IO-Link communication (see chap. 1.3)
SET	Setting button	Back to "factory" settings (see chap. 2 and 4)

1.1. CUSTOMER LED (B1)

Functioning mode of the blue led can be configured according to customer needs The following modes are available:

Mode	Detailed functioning
BL 1	ASC ENABLED + REGULATION ERROR: Led ON if ASC option is enabled / Blinking in case of regulation issue (permanent vacuum) / OFF otherwise
BL 2	ASC ENABLED: Led ON if ASC option is enabled / OFF otherwise
BL 3	REGULATION IN PROGRESS: Led ON during regulation phase / OFF otherwise
BL 4	REGULATION ERROR: Led blinking in case of regulation issue (permanent vacuum) / OFF otherwise
BL 5	30M CYCLES PREVENTIVE MAINTENANCE: Led ON if Vacuum counter > 30 million cycles / OFF otherwise

1.2. MODULE STATUS INDICATOR (MS)

Red LED	Green LED	Meaning
● OFF	● OFF	Not Powered: check power supply connection.
● OFF	● ON	Operational: Device is configured and operating correctly.
● Blinking	● OFF	Major Recoverable Fault: incorrect vacuum settings, low voltage error.
● ON	● OFF	Major Unrecoverable Fault: part lost error.
● Blinking	● Blinking	Self-Test: start-up phase in progress.

1.3. NETWORK STATUS INDICATOR (NS)

Red LED	Green LED	Meaning
● OFF	● OFF	Not powered, no IO-Link connection: the device is powered off, or is powered on but no IO-Link connection is established
● OFF	● ON	Connected to IO-Link Master: connection with the IO-Link master is established.
● Blinking	● Blinking	Self-Test: start-up phase in progress.

2. REMINDER OF “FACTORY” SETTINGS

L1/h1	65 % / 10 %
L2/h2	75 % / 10 %
Automatic blow-off	OFF
Duration of the automatic blow-off	500 ms
ASC	ON
DIAG ECO	ON
Maximum number of bounces DIAG ECO	2
Analysis time DIAG ECO (s)	1
Custom LED (B1)	BL1

Recommendations

Default vacuum parameters may need to be adjusted to perfectly suit the requirements of your application. If this is the case, we recommend observing the following conditions:

- $L2-h2 > L1$: regulation zone should be above the “object gripped” threshold
- $h1 < L1$: hysteresis should be lower than “object gripped” threshold
- $h2 < L2$: hysteresis should be lower than “regulation” threshold
- In case of rough or porous product handling, disable ASC to avoid vacuum pilot from turning ON and OFF frequently.

3. SETTINGS

3.1. SETTING THE THRESHOLDS 1 AND 2

This initial factory setting is suitable for most applications.

Threshold L1:

- $L1 = 65\%$, vacuum threshold generating “gripped product” signal.
- $h1 = 10\%$, L1 hysteresis, vacuum drop generating “gripped product” signal disappearing.

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

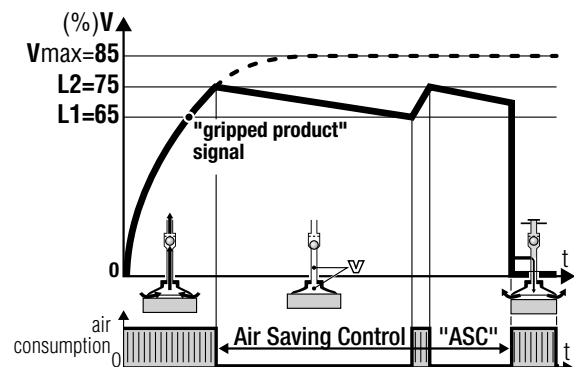
- $L2 = 75\%$, vacuum threshold emits vacuum generation cut-off.
- $h2 = 10\%$, L2 hysteresis, vacuum drop signaling regeneration of vacuum.

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 % vacuum.



3.2. 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 not considered:

- Threshold L2
 - Diag Eco “anti-pulsation” mode
 - Control cycle counter (ASC)
 - Control fault counter
- And the customer LED (blue), if set to BL1, BL2, BL3 or BL4 mode, is off.
Refer to Chap.1 of the Operating instructions for details on ASC works.

3.3. 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 LEMAX IO 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, an "ASC fault" signal is emitted, and operation carries on, though without ASC vacuum control.

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

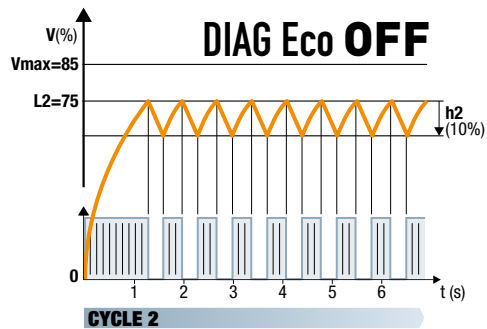
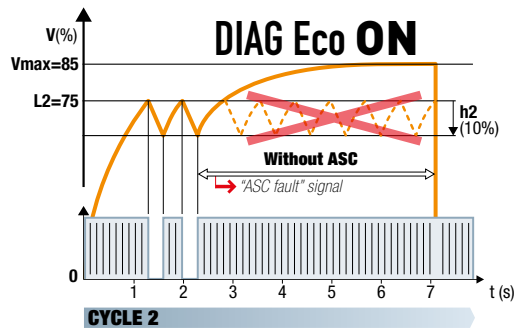
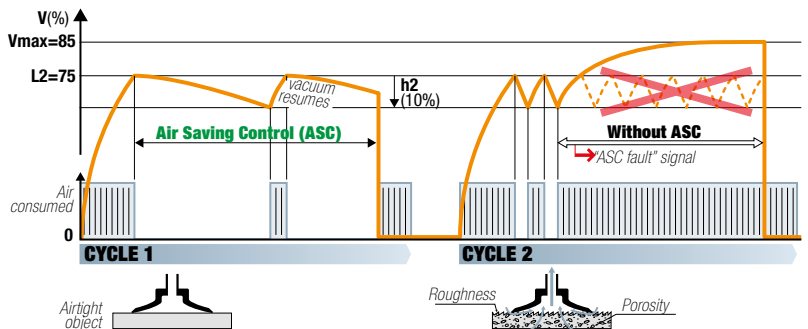
- **ON** confirms that DIAG Eco “anti-pulsation” is enabled (factory setting).
- **OFF:** DIAG Eco “anti-pulsation” is disabled.

See chapter 1.1 for details of the indications of the configurable LED).

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 Chap.1 of the Operating instructions for details on ASC works).



3.4. AUTO BLOW-OFF

Timed automatic blow-off 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" option. This setup is only available for LEMAXIO_5.

- **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).

3.5. CYCLE COUNTERS

- **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).
- **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).
- **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.

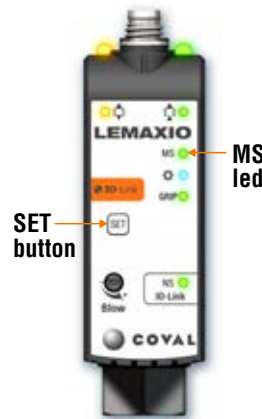
4. RESET

Restore "factory" settings

To reinitialize settings please follow these steps :

- 1- Unplug the power cable
- 2- Press and hold the "SET" button on the module
- 3- Plug the power cable back in
- 4- Release the button when MS LED starts flashing (green).

The "factory" settings are now set.



Please find all the documents in different languages on the COVAL website: <https://doc.coval.com/LEMAXIO>

