COVAL
vacuum managers

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LEMCOM modules

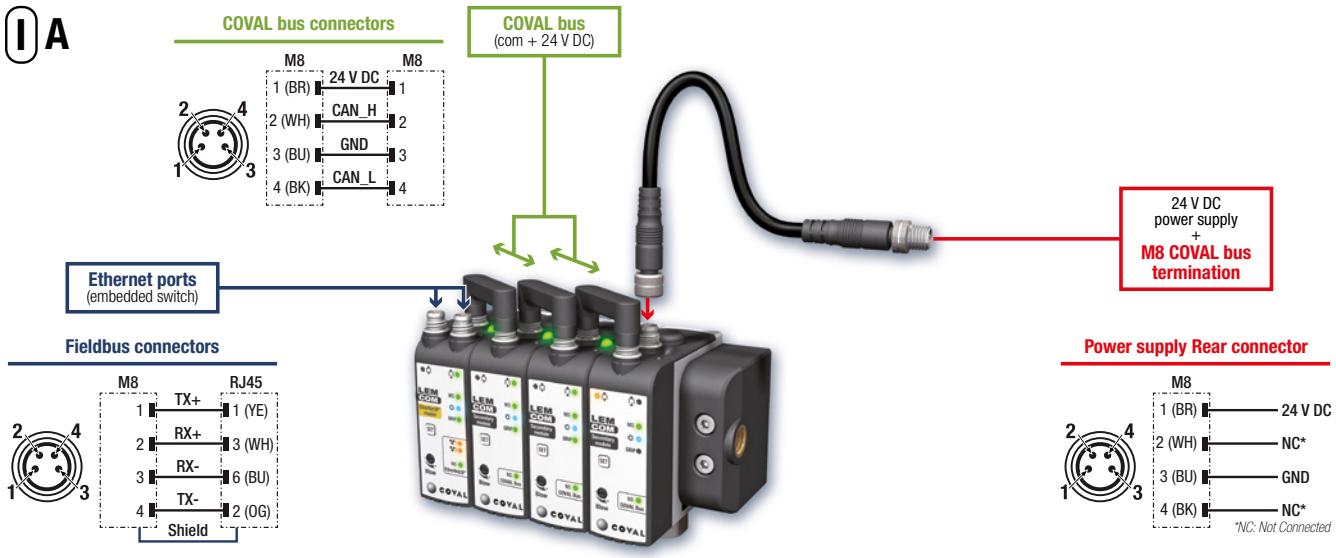
EtherNet/IP™ ODVA

EN

Quick Start Guide

v04 - 03/2020

This guide provides first-time users with information on wiring the different modules of a LEMCOM island and on setting up the LEMCOM.



I - ELECTRICAL CONNECTIONS

A- Wiring instructions

The LEMCOM vacuum pump 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 EN60204.

Standalone secondary module or "Secondary only" island?
Refer to chapter VI for wiring and initial setup.

Factory fieldbus (EtherNet/IP™) is connected to one of the 2 ports of the embedded Ethernet switch (shielded M8/RJ45 cable).

Connect the "COVAL bus" using the provided bridge connectors or M8/M8 female cable for remote modules.

24V DC power supply is connected to the rear connector of the last secondary module of the island (or to the rear connector of master module if used as standalone LEMCOM) through the **COVAL bus termination cable.**

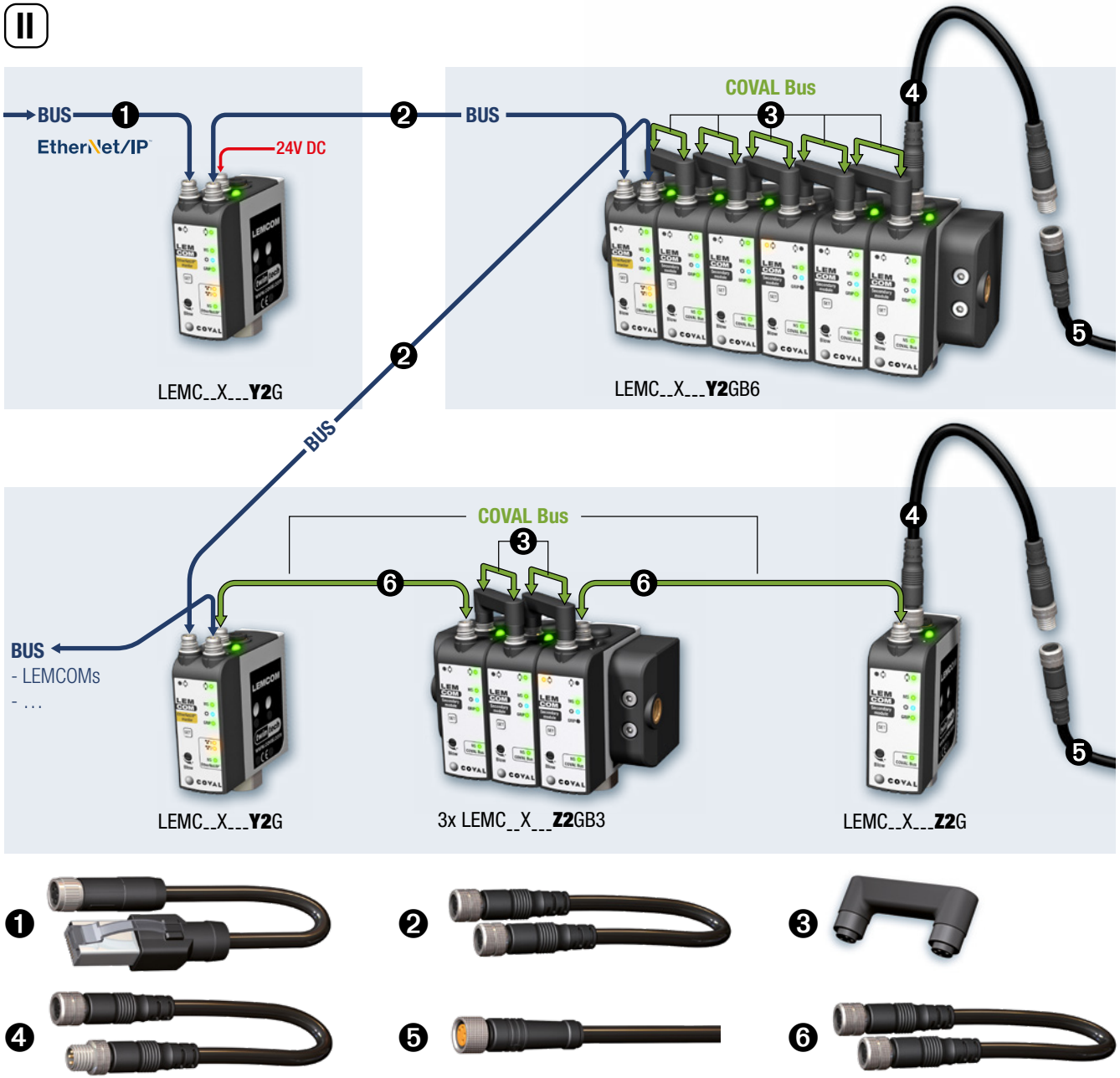
B- Consumption

The LEMCOM structure implies that all vacuum generators connected together on the COVAL bus are electrically supplied by the same power source. The consumption table(left) must be followed when calculating the required power supply voltage and amperage.

B Consommation de courant d'un îlot LEMCOM / *Current consumption of a LEMCOM island*
Stromverbrauch einer LEMCOM-Inselanlage / *Consumo di corrente di un'isola LEMCOM* / Consumo de corriente de un grupo LEMCOM

Nombre de modules / ***Number of modules*** / Anzahl Module ***Quantità moduli*** / Número de módulos	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Consommation maximale de courant (mA) alimentation 24 V / ***Maximum current draw (mA) 24 V supply*** / Max. Stromaufnahme (mA), bei 24 V / ***Consumo massimo di corrente (mA) alimentazione 24 V*** / Consumo eléctrico máximo (mA) alimentación 24 V	150	250	350	450	550	650	750	850	950	1050	1150	1250	1350	1450	1550	1650

II



II - CONFIGURATIONS AND ACCESSORIES

LEMCOM is based on an innovative product architecture:

- The master module manages the fieldbus communication, handles secondary module management and is a complete vacuum pump. Its two communication ports ensure the continuity of the fieldbus.
- The secondary modules are interconnected with the master module via the COVAL bus.

The link between the master module and the secondary modules is handled by an M8 bridge connector for island configurations or by a standard M8/M8 cable for configurations using remote modules.

❶ Cat 5 shielded Ethernet cable: M8, straight, female, 4-pin – RJ45, straight, male, 8-pin – suitable for drag chain use

- CDM8RJ45L2: length 2 m.
- CDM8RJ45L5: length 5 m.
- CDM8RJ45L10: length 10 m.

❷ Cat 5 shielded Ethernet cable: M8, straight, female, 4-pin, on both ends – suitable for drag chain use

- 80003053: length 1 m.

❸ "COVAL bus" bridge connector

- 80001231

❹ 120 Ω "COVAL bus" termination: M8, straight, female, 4-pin – M8, plug, male, 4-pin

- 80002303: length 0.2 m.

The COVAL bus is based on a CAN architecture and requires the addition of a bus termination to ensure proper communication between the secondary and master modules.

It takes the form of an M8 male/M8 female cable that includes a 120 Ω line termination resistor.
It must be integrated on the last secondary of the COVAL bus, between the module's rear connector and the 24 V DC power supply.

When using a stand-alone master module, this termination is not required.

One "master" module controls up to 15 secondary modules.

❺ Power supply cable: M8, straight, female, 4-pin – open end

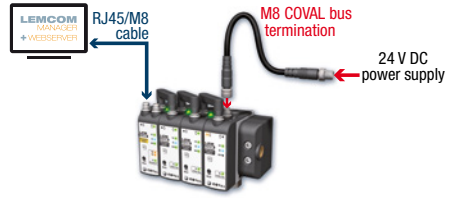
- CDM8: length 2 m.
- CDM8N: length 0.5 m.

❻ M8/M8 "COVAL bus" cable: M8, straight, female, 4-pin – M8, straight, female, 4-pin

- CDM8FFL05: length 0.5 m.
- CDM8FFL1: length 1 m.
- CDM8FFL2: length 2 m.
- CDM8FFL4: length 4 m.

Other lengths available upon request.

III 1



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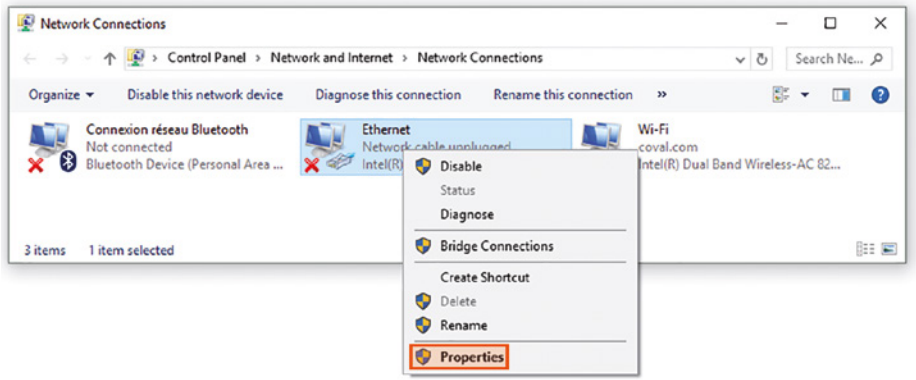

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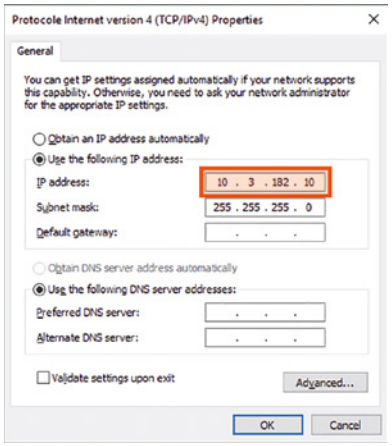

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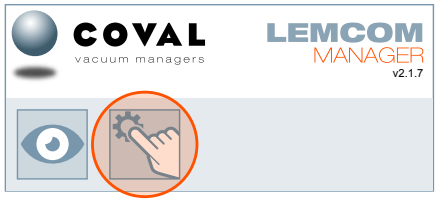

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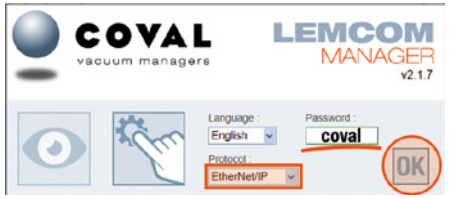

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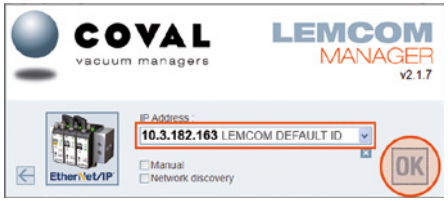


III- IP SETUP INSTRUCTIONS

The IP address of the LEMCOM master module is factory set to 10.3.182.163.
In order to use the LEMCOM, its IP address must be set up according to your network configuration.

1- Plug the power supply to the last secondary module or to the rear connector of the master module (if standalone LEMCOM). Set up a direct cable connection between the LEMCOM module and a computer using an M8/RJ45 cable.

2- Set the computer's IP address to: 10.3.182.10
2-1 *Control panel > Network and internet > Network Connections. Ethernet > Properties*
2-2 IP address: **10.3.182.10**
The computer and the LEMCOM module must be on the same network.

3- Download and start LEMCOM Manager software
Download it from the COVAL website:

https://doc.coval.com/lemcom/

3-1 Select Configuration Mode.

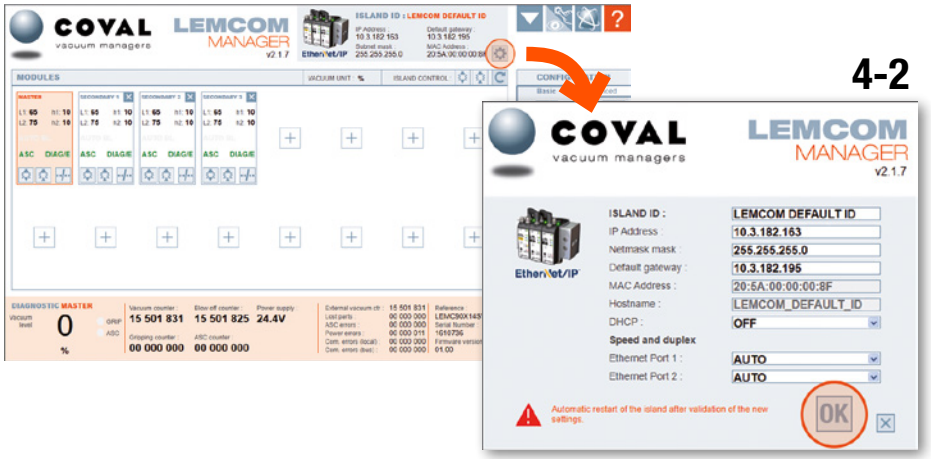
3-2 Enter password "coval", select "EtherNet/IP", then click OK.

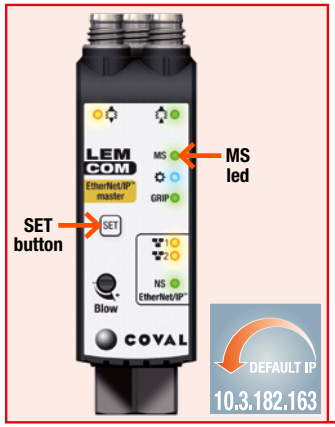
3-3 Default IP address 10.3.182.163 is automatically selected. Click OK to connect to the LEMCOM module.

4- Replace the default IP address by the one that will be used on your factory network.

4-1 Open the network settings screen by clicking on ⚙.

4-2 Set IP address, subnet mask and default gateway.
Click OK. The module restarts with the new settings.





Back to default IP address
To reinitialize the IP address to the default IP 10.3.182.163, please follow these steps:
5-1 Unplug the power cable
5-2 Press and hold the "SET" button on the master module
5-3 Plug the power cable back in
5-4 Release the button when MS LED starts flashing (green).
→ IP address is now 10.3.182.163.

IV

	LEMC60X… 60% max. vacuum	LEMC90X… 90% max. vacuum
L1/h1	**35 %** / 10%	**65 %** / 10%
L2/h2	**45 %** / 10%	**75 %** / 10%
Auto-blow	OFF	
Auto-blow duration	500 ms	
ASC	ON	
DIAG ECO	ON	
Maximum number of bounces	2	
DIAG ECO analysis time(s)	1	
Custom LED mode	BL1	
Valve status mode	MD1	

IV- FACTORY SETTINGS

The LEMCOM provided to you has been configured with default settings that suit most applications. Depending on the chosen model (LEMC60X or LEMC90X), the LEMCOM module is configured as shown opposite.

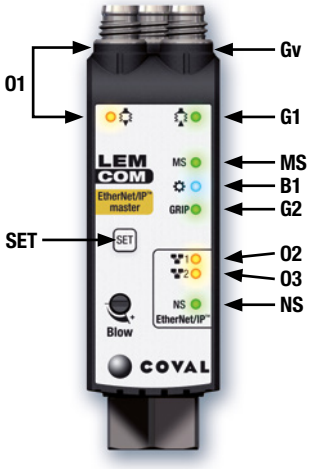
Recommendations
Default vacuum parameters may need to be adjusted to perfectly suit the requirements of your application. If this is the case, we recommend observing the following conditions:
- L2-h2 > L1 → regulation zone should be above the "object gripped" threshold
- h1<L1 → hysteresis should be 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.

INCORRECT SETTINGS INDICATION
If the recommendations provided above are not observed when configuring a LEMCOM module, the MS LED of the corresponding module will flash in red.

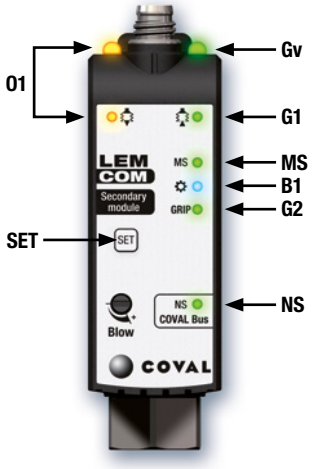
V

V- FRONT PANEL INDICATOR

LEMCOM master EtherNet/IP



LEMCOM secondary module



Colors: Ox (Orange) - Gx (Green) - Bx (Blue) - MS, NS (Red/Green).

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 provides an indication of the 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 (refer to main user manual / section 4.1 for detailed meaning)
MS	Module Status	Indicates the current status of the device (refer to main user manual / section 4.2 for detailed meaning)
NS	Network Status	Indicates the current status of the EtherNet/IP or COVAL bus network interface (refer to main user manual / section 4.3 for detailed meaning).
O2/O3	Ethernet network	Ethernet link / activity - Left Port (02), Right Port (03) OFF : No network connection Steady ON: Network connection OK but no activity Blinking: Network connection is OK and activity
SET	Setting button	Master module: IP address reset Secondary module: COVAL bus address assignment and reset

VI- COVAL BUS ADDRESS ASSIGNMENT

Standalone secondary module or modules of a “secondary only” island are factory set to address #16 to avoid any address conflict.
User must assign a valid and unique address (#1 to #15) to each secondary module to make them “visible” on the COVAL bus. LEMCOM Manager software or web server can be used to complete this operation.

1- Wire the modules.
Connect secondary module(s) to the master LEMCOM module using M8/M8 female cables.

2- Connect to the master module using LEMCOM Manager software.
Default password: **coval**

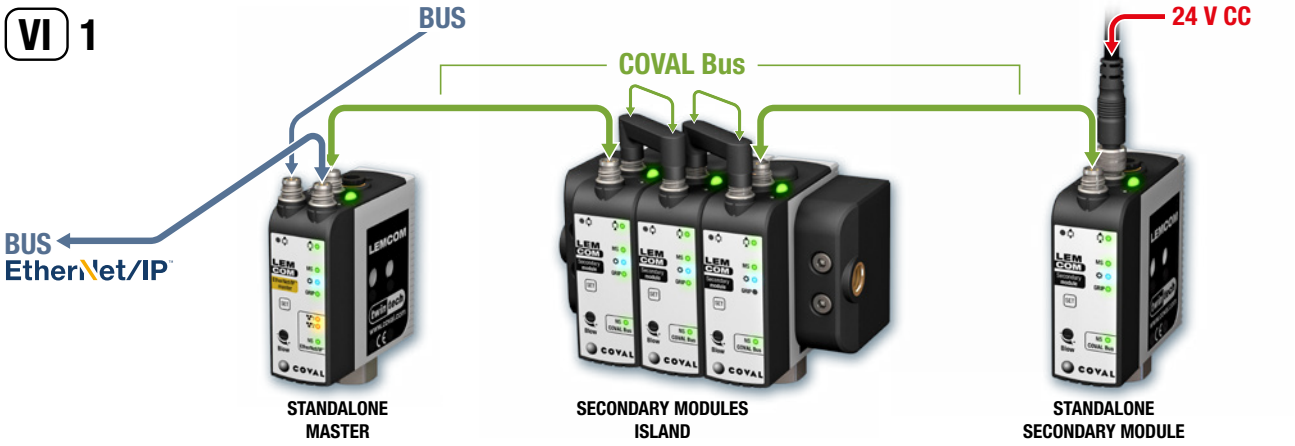
3- Assign an address.
Click on the + button of the first blank slot, then click OK.

4- Follow the instructions.

5- Repeat these steps with a different address for each secondary module that is to be added to the COVAL bus.

NOTES
- Press and hold SET button (on a secondary module) during power-up to reinitialize its address to #16 (release the button when MS LED starts flashing).
- Access to “Configuration Mode” in LEMCOM Manager is password-protected. Default password is : **coval**

VI 1



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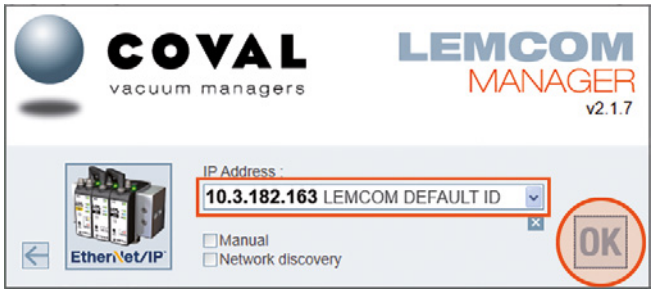

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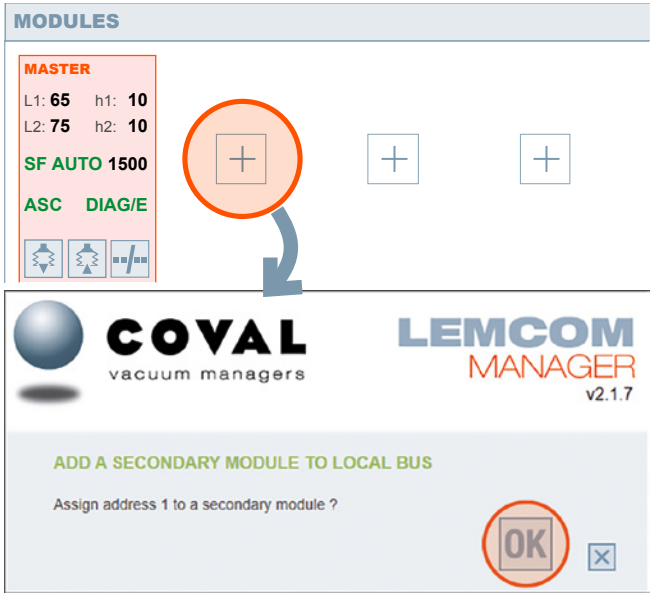

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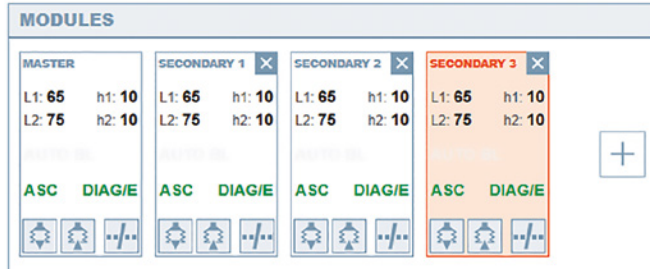


VII 1

Property	Description
Vendor name	COVAL
Vendor ID	1350_D
Device type	43_D
Product name	COVAL LemCom E/IP
Catalog ID	LEMCOM
Request Packet Interval (RPI)	≥ 5 ms

2-1

Assembly instance	Type	Data size (bytes)	Description
101	INPUT	3	Gripping status (2 bytes) Heartbeat (1 byte)
102	INPUT	19	Gripping status (2 bytes) Heartbeat (1 byte) Vacuumlevel (16 bytes)
140	INPUT	34	Heartbeat (1 byte) Unused (1 byte) Island composition (2 bytes) Gripped information (2 bytes) Regulation information (2 bytes) Vacuumlevel-% vacuum (16 bytes) Lost part alarm (2 bytes) Regulation error alarm (2 bytes) 30MCycles alarm (2 bytes) Temperature alarm (2 bytes) Powersupply alarm (2 bytes)
141	INPUT	78	Heartbeat (1 byte) Selected module in instance (1 byte) Island composition (2 bytes) Gripped information (2 bytes) Regulation information (2 bytes) Vacuumlevel-% vacuum (16 bytes) Lost part alarm (2 bytes) Regulation error alarm (2 bytes) 30MCycles alarm (2 bytes) Temperature alarm (2 bytes) Powersupply alarm (2 bytes) ---------- Counter-external vacuum cmd (4 bytes) Counter-internal vacuum cmd (4 bytes) Counter-blow off cmd (4 bytes) Counter-Handled parts (4 bytes) Counter-Lost parts (4 bytes) Counter-ASC regulation (4 bytes) Counter-Regulation errors (4 bytes) Counter-Local bus com error (4 bytes) Counter-Field bus com error (4 bytes) Counter-Power supply error (4 bytes) Power supply (2 bytes) Temperature (2 bytes)

2-2

Assembly instance	Type	Data size (bytes)	Description
100	OUTPUT	4	Vacuum control (2 bytes) Blow-off control (2 bytes)
110	OUTPUT	6	Vacuum control (2 bytes) Blow-off control (2 bytes) Island restart (1 byte) Unused (1 byte)
111	OUTPUT	6	Vacuum control (2 bytes) Blow-off control (2 bytes) Island restart (1 byte) Module selection for diagnostic (1 byte)
112	OUTPUT	74	Vacuum control (2 bytes) Blow-off control (2 bytes) Island restart (1 byte) Settings modification allowed (1 byte) L1 threshold (16 bytes) h1 threshold (16 bytes) L2 threshold (16 bytes) h2 threshold (16 bytes) ASC option (2 bytes) DIAG_ECO option (2 bytes)

3

Assembly instance	Type	Data size (bytes)	Description
160	CONFIG	166	L1 threshold (16 bytes) h1 threshold (16 bytes) L2 threshold (16 bytes) h2 threshold (16 bytes) ASC option (2 bytes) DIAG_ECO option (2 bytes) Max. bounces Nb (16 bytes) DIAG_ECO analysis time (16 bytes) Auto blow (2 bytes) Auto blow duration (32 bytes) Valves status (16 bytes) Custom led mode (16 bytes)

VII- EtherNet/IP™ communication

Please refer to the main user manual (ref. LMEIP-UK-x-1155UM0067) for detailed set-up instructions, data mapping and general recommendations.

1- LEMCOM general properties

With respect to the EtherNet/IP network, the LEMCOM master module is an **EtherNet/IP adapter**.

It receives implicit communication connection requests from an I/O scanner (the Programmable Logic Controller) then produces or consumes its I/O data based on a Requested Packet Interval (RPI) value.

2- I/O assembly instances

Input and output data refer to the master module and to the secondary modules that may be associated with it.
As an example:

- "Vacuum Control" output data consists of 2 bytes and each bit toggles the vacuum of LEMCOM module #0 (master) to #15 (last secondary).
- "Vacuum level" input data consists of 16 bytes and each byte represents the instant vacuum level (%) of LEMCOM module #0 to #15.

For best performance and sufficient diagnostic data, we recommended using I/O assembly instances 140 and 110.

2-1 Input instances (Target > Originator)

Data sent from the LEMCOM island to the controller every 'RPI' ms.
Note: Input instance 141 is designed to be used with output instance 111.

2-2 Output instances (Originator > Target)

Data sent from the controller to the LEMCOM island every 'RPI' ms.

The output instance 112 is designed for specific applications that need to edit the LEMCOM module's parameters directly from the PLC or an EtherNet/IP HMI. It must be used with special care.

In this assembly, the first bit of byte 5 allows or rejects the modification of the LEMCOM module's settings. When it is enabled, the parameters data set defined in bytes 6 to 73 are automatically sent to the LEMCOM master module every 'RPI' ms.
We highly recommend setting the "settings modification allowed" bit to '0' in the PLC's program and only toggling it to '1' when new settings must be applied.

3- Configuration instance

The configuration assembly instance 160 is used to transfer the vacuum settings to all LEMCOM modules of an island (1 to 16 modules). The parameters are sent by the PLC to the master LEMCOM module when the EtherNet/IP communication is established.

Please note that, unlike LEMCOM Manager, which warns the user in case of incorrect parameters, the configuration assembly lets the user send any settings. This may lead to the appearance of warnings on the module's front panels (for example: threshold or hysteresis set to 0).

If the configuration instance is used, please note that any modifications made to the settings using LEMCOM Manager will be overwritten by the data of instance 160 the next time communication is reset.

VIII - CONNECTING TO AN ALLEN BRADLEY PLC

Below you will find two methods used to quickly configure an Allen Bradley controller using RSLogix5000.

A - Setup using LEMCOM Electronic Data Sheet (EDS)

Installing a LEMCOM EDS file for the EtherNet/IP Module to be identified by Rockwell's RSLinx software makes programming easier, since the EDS file describes the objects, attributes and services available in the device.

1- Install Electronic Data Sheet & create a New Module

Download the EDS from the COVAL website:

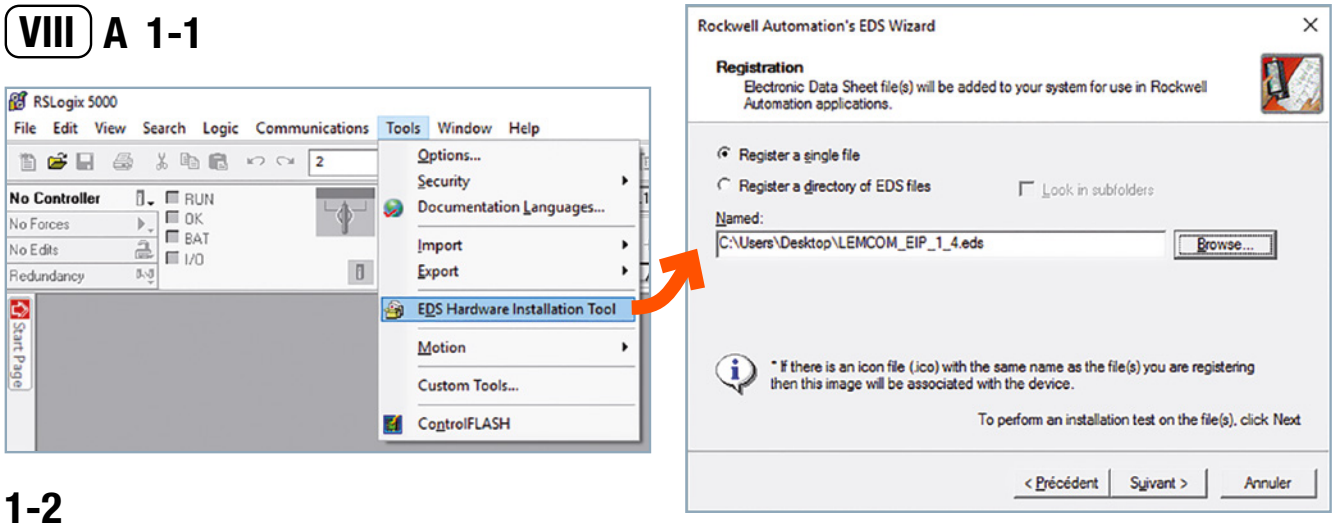
https://doc.coval.com/lemcom/

1-1 In RSLogix5000, go to Tools > EDS Hardware Installation Tool and follow the instructions to import the EDS.

1-2 After defining the controller, right click on the "Ethernet" node below "I/O Configuration" and select "New Module…". Type "LEMCOM" in the filter box of the catalog, select the item that shows up and click on "Create". The window for defining a new module is displayed.

1-3 Fill in the Module properties (Name / Description / IP Address) and the connection settings (I/O assembly instances) according to your needs.

VIII A 1-1



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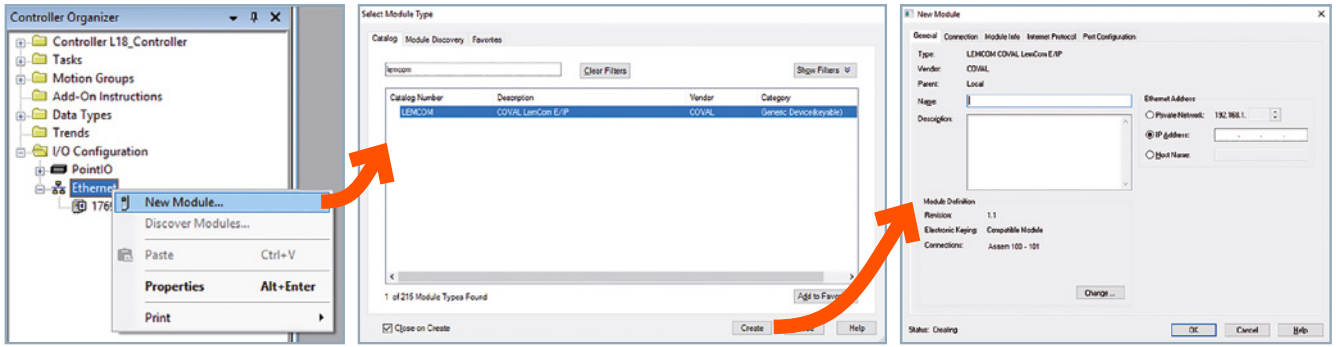

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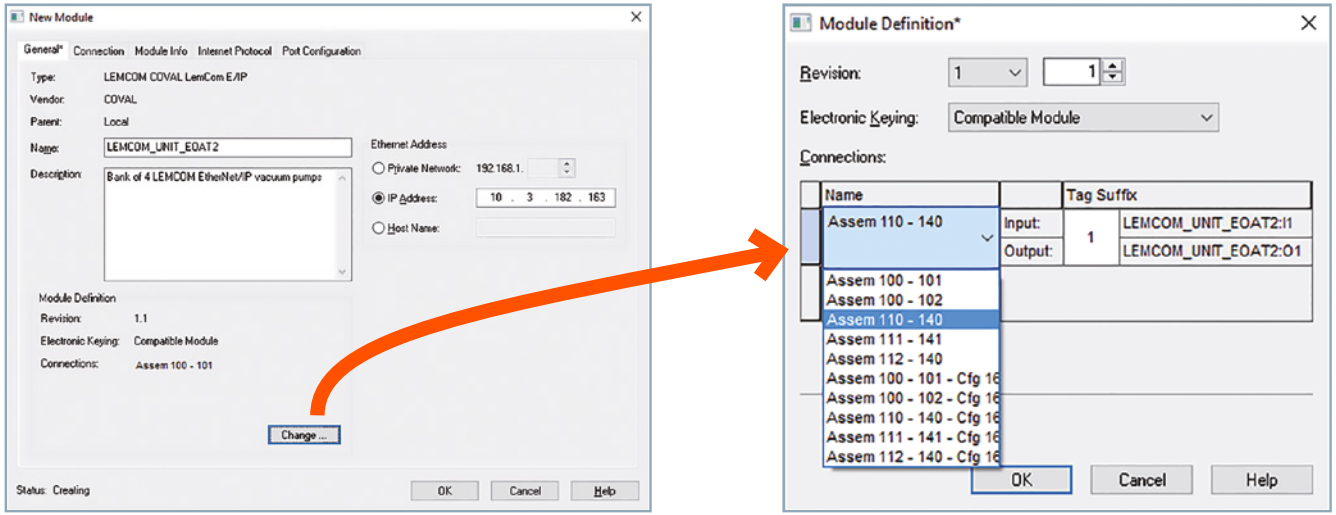

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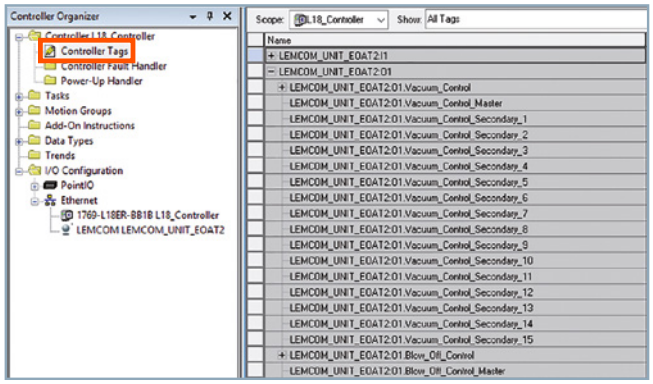

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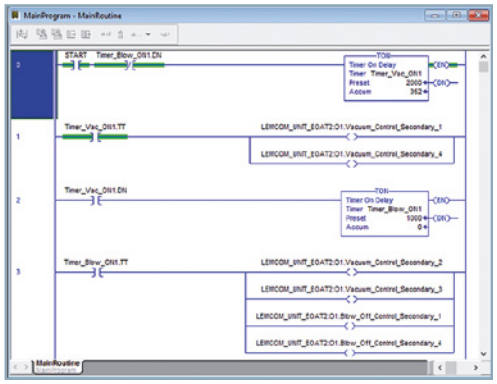
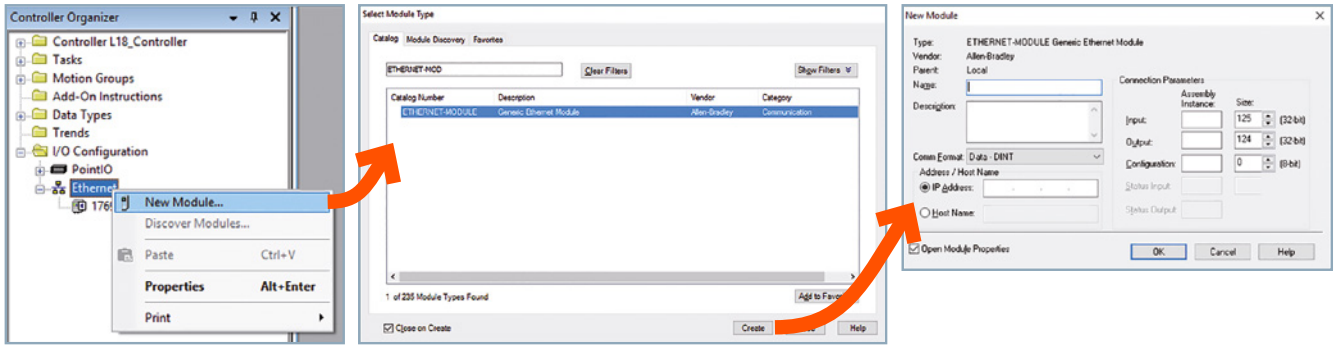


2- Access LEMCOM I/O Data and write the PLC program

2-1 All Input/Output tags are automatically created and are visible in the Controller Tags window of RSLogix5000.

2-2 Write the PLC program that controls vacuum and blow-off, collects gripping status information, instant vacuum level and more.

B 1-1



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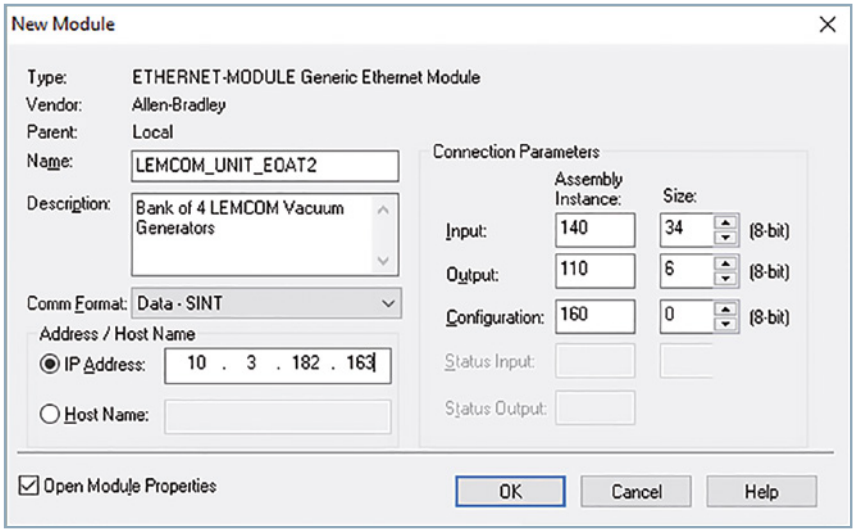


B - Manual setup using Generic Ethernet Module

Connection settings can be manually defined in RSLogix5000 or any other controller/robot software using a Generic Ethernet Device.

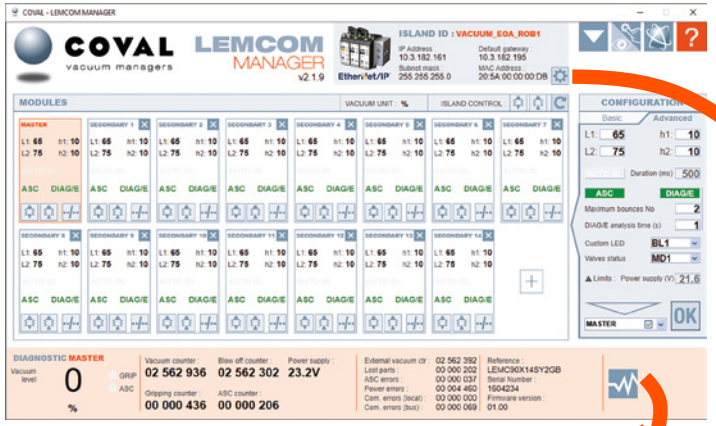
1-1 Add a new Generic Ethernet Module to your project.

1-2 Give a name & description to the module, select the Comm Format SINT, enter LEMCOM's IP address and based on the tables of I/O assembly instances provided above, fill in the connection parameters.

1-3 New I/O tags are created in the Controller Tags window of RSLogix5000. Refer to the main user manual for detailed I/O mapping.

IX A

1



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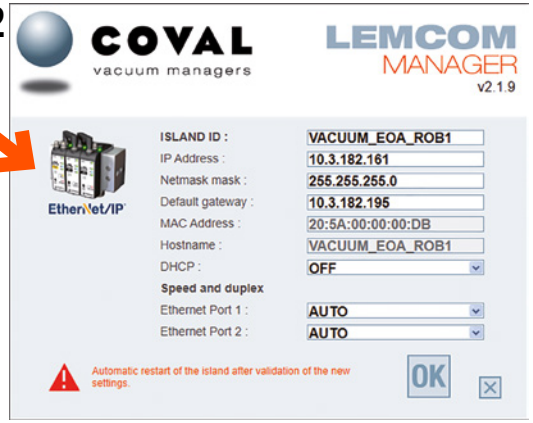

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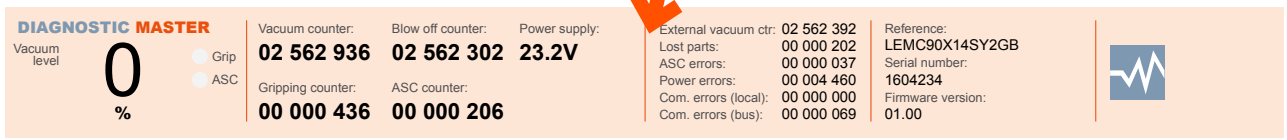

B

IX- Configuration & diagnostics tools

LEMCOM modules can easily be configured, updated, controlled and diagnosed remotely using one of the following tools. This flexibility enables LEMCOM users to adapt their modules to any type of application without needing to perform any operations directly on the vacuum generators.

A- LEMCOM Manager

LEMCOM Manager is an easy-to-use configuration software for LEMCOM vacuum pumps. It allows LEMCOM users to quickly:

- 1- Set vacuum parameters (Air Saving Control, regulation and gripping threshold, etc.)
- 2- Set network settings
- 3- Monitor vacuum, blow-off and gripping cycles, error counters, etc.
- Add, remove or replace secondary module(s) on the COVAL bus
- Import/export settings of a single unit or the whole island
- Export diagnostics data for COVAL technical support
- Update the firmware of master and secondary modules
- And more…

Communication between LEMCOM Manager and the EtherNet/IP™ master LEMCOM module is based on a standard TCP/IP connection (TCP port 65000).

B- LEMCOM Webserver

Embedded web server enabling configuration, update, control and diagnosis of any given LEMCOM island.
No software installation required.

NOTE: all configuration and diagnostic data are also accessible through EtherNet/IP. A dedicated HMI can be developed by controls engineers to give access to LEMCOM settings, counters, alarms, etc. by reading / writing I/O data.

These configuration tools must not be used during production as unexpected hazardous motion of machinery may occur.

Download the latest versions of the Operating instructions, User Manual, Quick Start Guide, LEMCOM Manager software and firmware updates from the COVAL website.

https://doc.coval.com/lemcom/

Do not forget to subscribe to our **LEMCOM Technical Newsletter** to stay informed about new features, firmware updates, tutorials, etc.

https://www.coval-international.com/products/mini-vacuum-pumps-with-fieldbus-communication-lemcom-series-3439.htm

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