COVAL
vacuum managers

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LEMCOM modules
PROFINET

EN

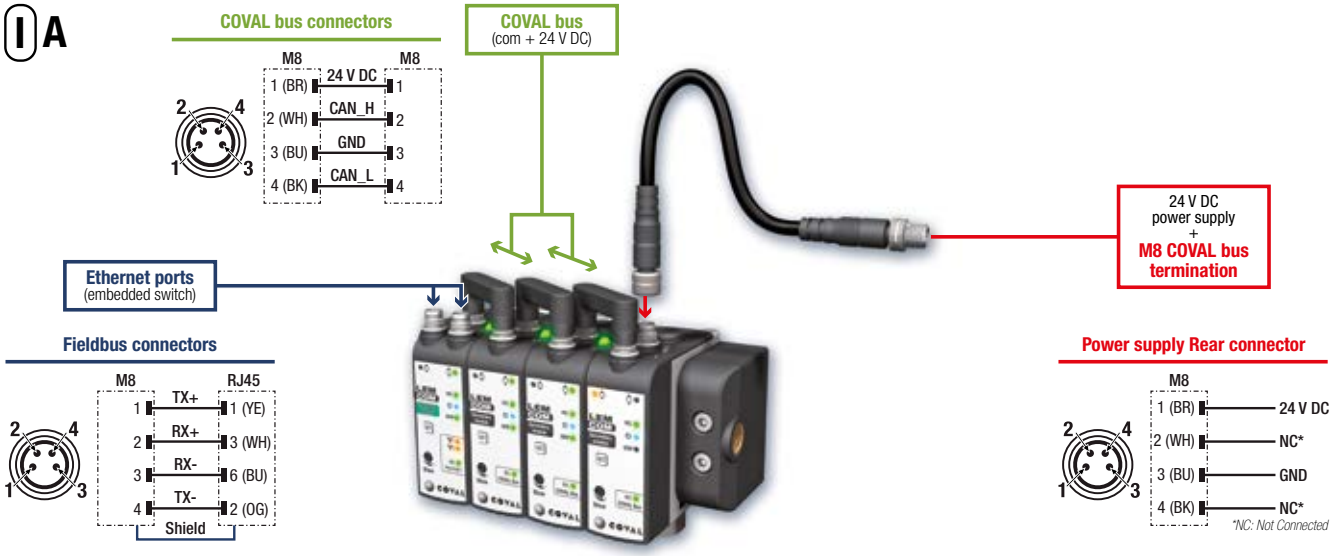
Quick Start Guide

v.03 - 07/2022

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 (PROFINET) 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.**

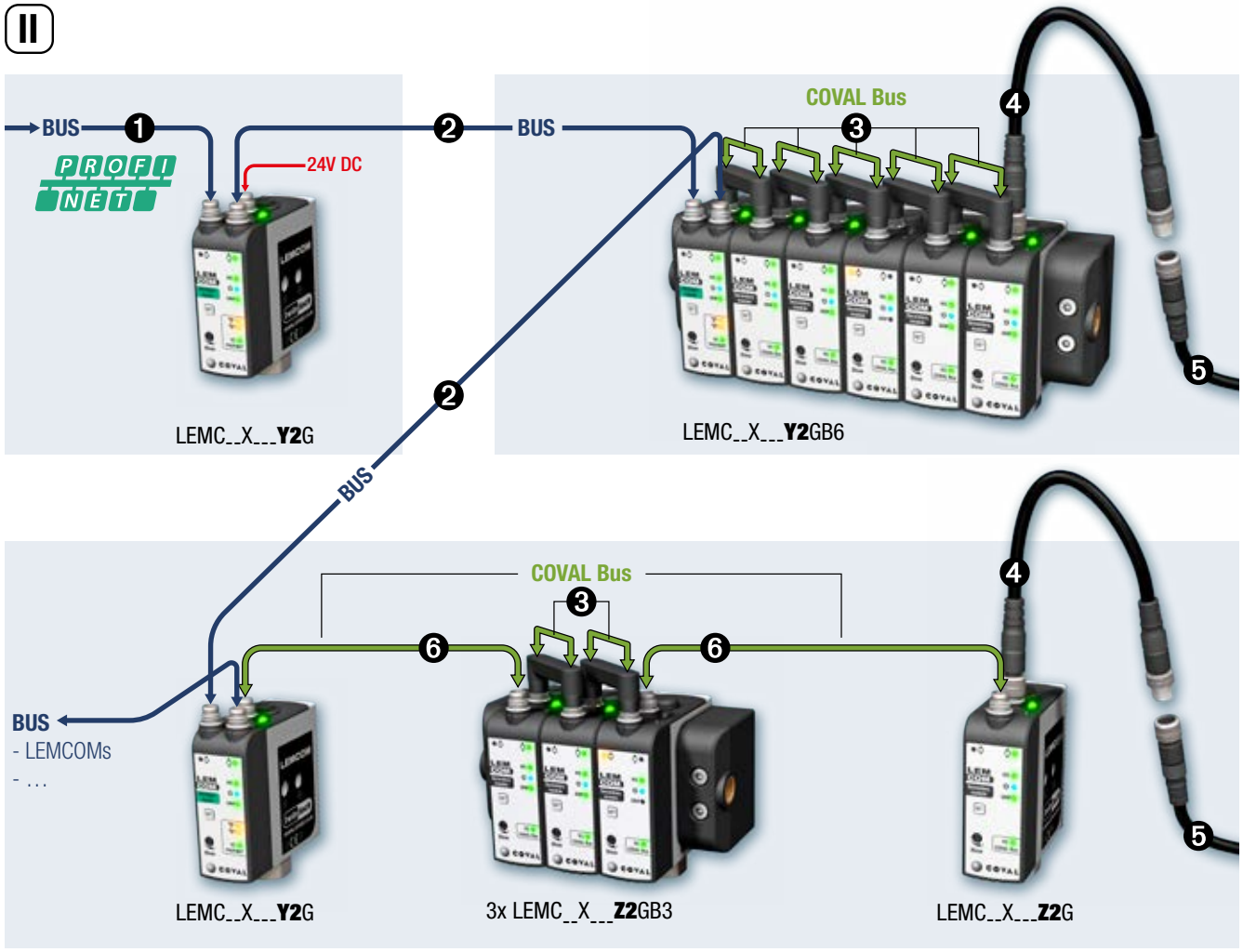
B- Consumption

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.

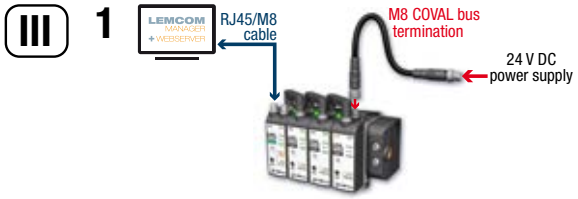
❻ M8/M8 "COVAL bus" cable: M8, straight, female, 4-pin – M8, straight, female, 4-pin

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

Other lengths available upon request.

III- IP SETUP INSTRUCTIONS

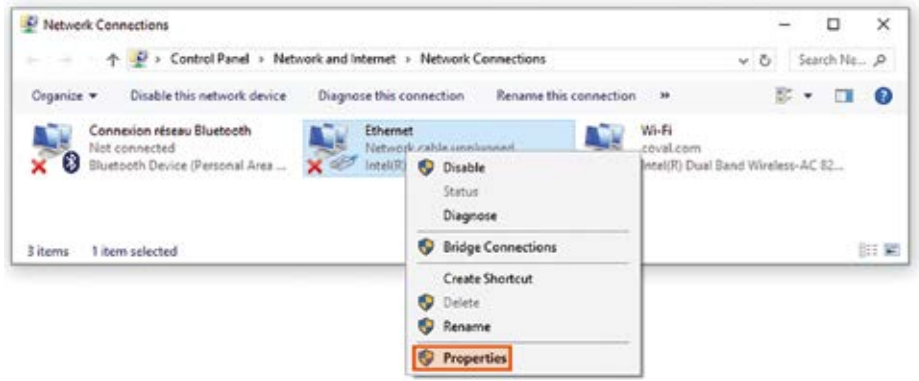
The IP address of the LEMCOM master module is factory set to 10.3.182.163.
In order to use the LEMCOM, its IP address and PROFINET device name must be configured.
The IP address and PROFINET device name of the island can be changed directly in the engineering software of your PLC (e.g. TIA Portal).
The IP address can also be changed in the LEMCOM Manager software by following the procedure below:



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.

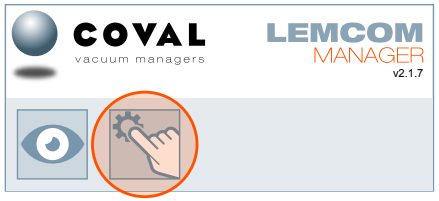
2-1



2-2



3-1



3-2



3-3



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 "PROFINET", then click OK.

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

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 ⚙.

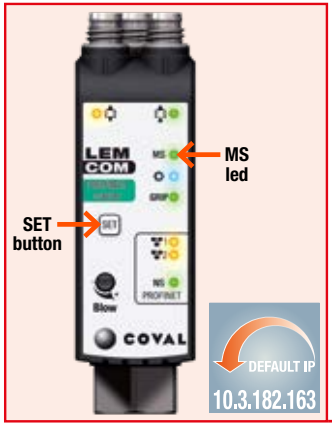
4-2 Set IP address, subnet mask and default gateway.
Click OK. The module restarts with the new settings.

4-1



4-2





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.
→ PROFINET device name is not modified.

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.

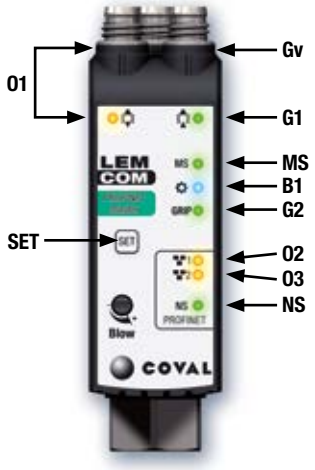
Recommendations
Default vacuum parameters may need to be adjusted to perfectly suit the requirements of your application. If this is the case, we recommend observing the following conditions:
- L2-h2 > L1 → regulation zone should be above the "object gripped" threshold
- h1<L1 → hysteresis should be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

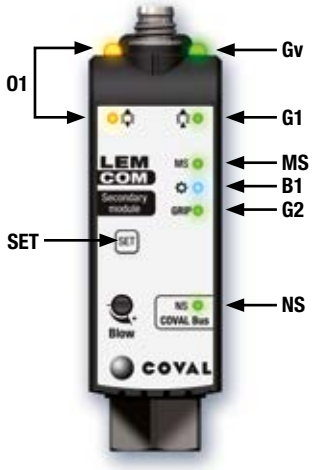
V

V- FRONT PANEL INDICATOR

LEMCOM master PROFINET



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 PROFINET 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**

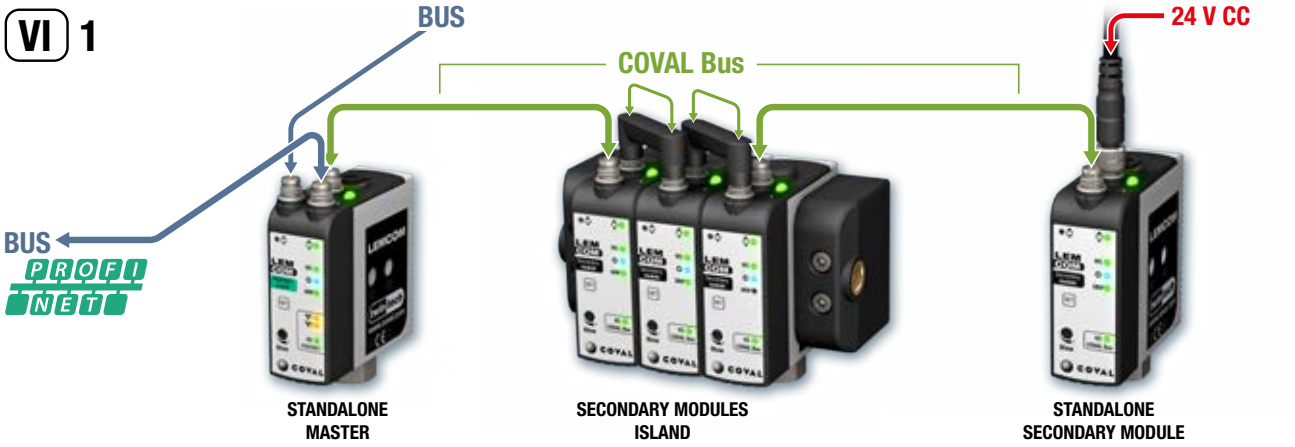
3- Assign an address.
Click on the + button of the first blank slot, then click OK.

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**

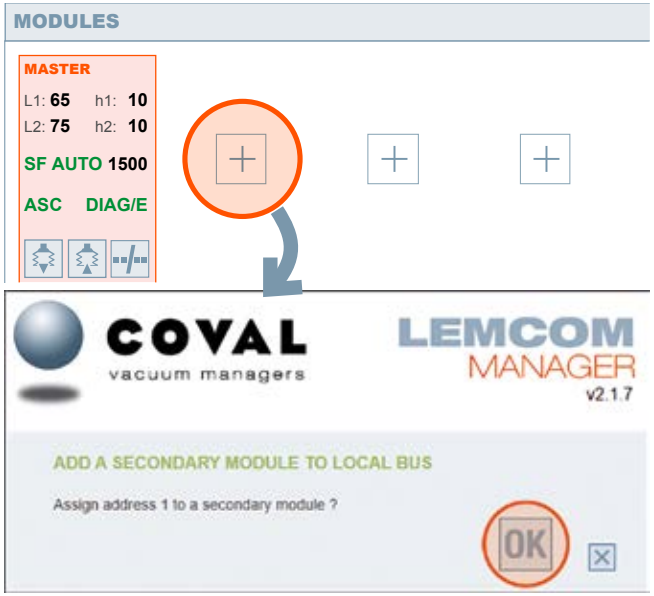
VI 1



2



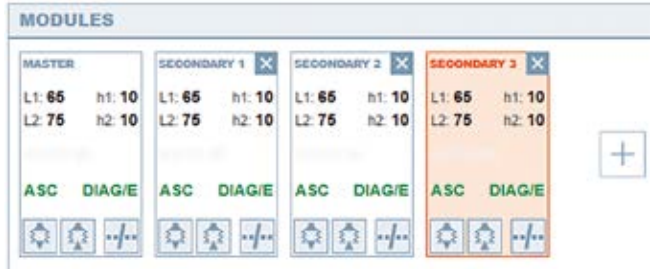
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4



5



VII- PROFINET Communication

According to the PROFINET specifications, the LEMCOM master module is a Peripheral Input/Output Device, i.e. an "IO Device" assigned to a programmable logic controller ("IO Controller"). It receives connection requests from a PROFINET PLC.
As soon as the communication has been established, the PLC and the LEMCOM master module start exchanging IO cyclic data (process data).
Acyclic data ("record data") containing the island's parameters can also be exchanged.

1- IO Cyclic Data

IO Cyclic Data refers to the master module and to its associated secondary modules, if any (VII-1).
For example:

- "Vacuum command" output data is a two-byte bit field in which each bit corresponds to a vacuum command from LEMCOM modules no. 0 (master) to no. 15 (last secondary module).
- "Grip status" input data is a two-byte bit field in which each bit corresponds to a grip status from LEMCOM modules no. 0 (master) to no. 15 (last secondary module).
- "Vacuum level" input data is a sixteen-byte bit field in which each byte corresponds to a vacuum level [in %] from LEMCOM modules no. 0 (master) to no. 15 (last secondary module).

2- Acyclic data (record data)

For record data, use the following structure (VII-2a):

- An array of 16 elements.
- Each element is a 6-byte structure representing the parameters of one module in the island.
- The 6th byte in each element is reserved.

We recommend creating a data block with the attribute "Optimized block access" unchecked (VII-2b).

In order to send parameters to the PROFINET LEMCOM island via the WRREC instruction, use the Record Data Index = 100 (VII-2c).

VII 1

Cyclic data	size (bytes)	Input address (from the PLC point of view)	Output address (from the PLC point of view)
Vacuum command *	2		1..2
Vacuum acknowledge *	2	1..2	
Blow command *	2		3..4
Blow acknowledge *	2	3..4	
Grip status *	2	5..6	
ASC status *	2	7..8	
Grip fault *	2	9..10	
ASC fault *	2	11..12	
Vacuum level (one byte per module)	16	13..28	

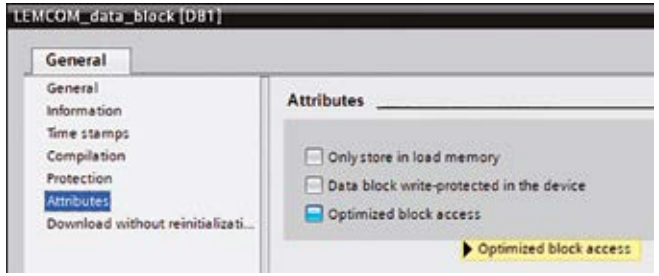
* - 1st byte: LSB = Master module, MSB = secondary module No. 7
- 2nd byte: LSB = secondary module No. 8, MSB = secondary module No.15

2a

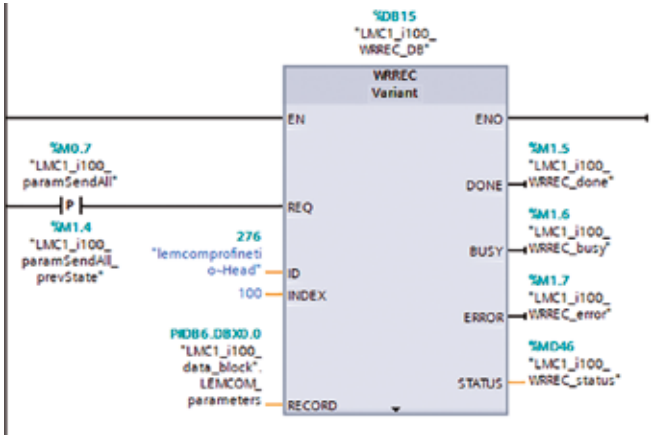
LEMCOM_data_block

	Name	Data type	Offset	Start value
1	Static			
2	modulesParams	Array[0..15] of "LemcomModuleParamDataType"	0.0	
3	modulesParams[0]	"LemcomModuleParamDataType"	0.0	
4	L1	USInt	0.0	66
5	H1	USInt	1.0	10
6	L2	USInt	2.0	77
7	H2	USInt	3.0	11
8	ASC	Bool	4.0	true
9	DIAG_ECO	Bool	4.1	false
10	modulesParams[1]	"LemcomModuleParamDataType"	6.0	
11	modulesParams[2]	"LemcomModuleParamDataType"	12.0	
12	modulesParams[3]	"LemcomModuleParamDataType"	18.0	

2b



2c



VIII - CONNECTING TO THE SIEMENS S7-1200 PLC

This example explains how to configure a PROFINET LEMCOM island using the Siemens S7-1200 programmable logic controller and the Siemens TIA Portal v14:

Before you start

1. Connect the power supply and the compressed air to the LEMCOM island. Connect the island to the PROFINET network (refer to "Operating instructions").

Installing the LEMCOM GSDML file in TIA Portal

2. Open a TIA Portal project with the Siemens PLC already configured. Select the "Project view".
3. Download the GSDML file from the COVAL website.

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

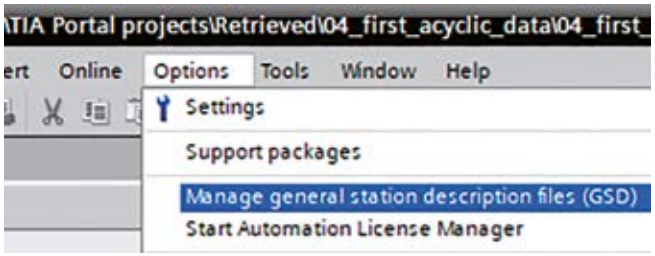
4. Install the up-to-date GSDML file (VIII-5).

When installing, the .bmp file and the .xml file must be in the same folder.

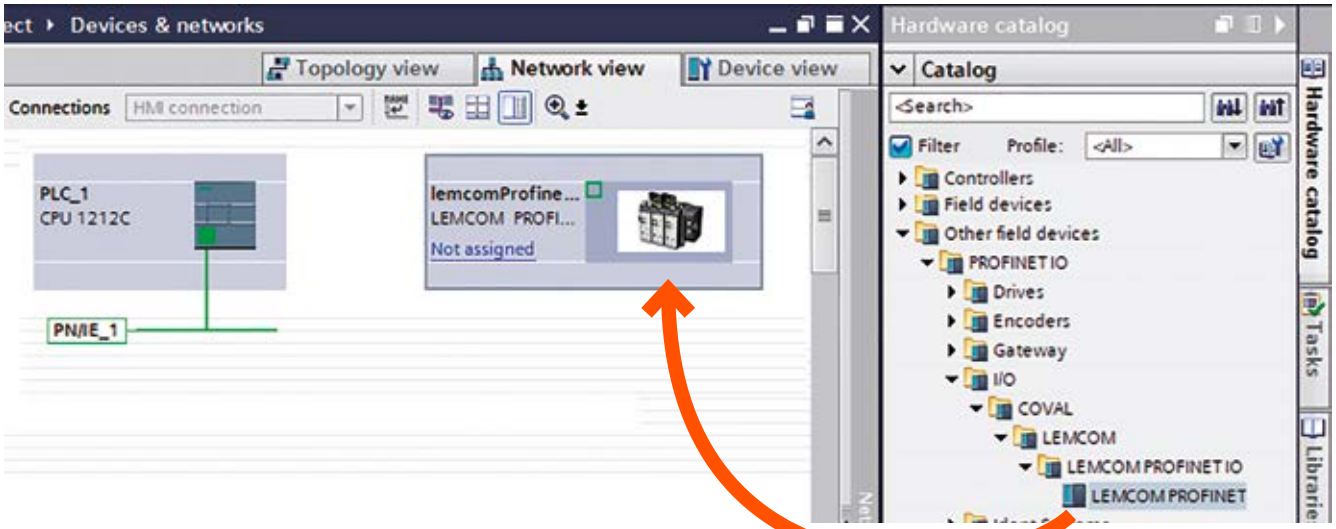
Adding the LEMCOM island to the project, linking the island to the PLC

5. Go to the "Network view". Find the LEMCOM island in the "Hardware catalog", under "Other field devices – PROFINET IO – I/O – COVAL – LEMCOM – LEMCOM PROFINET IO", then drag and drop it to the "Network view". This action creates a "lemcomProfinetIO" object, which represents your island. It will also appear in your "Project Tree", under the "Ungrouped devices" category.
6. Link the island to the PLC (link must be created manually using the mouse in the "Network view").
7. Select the "lemcomProfinetIO" object and go to the "Device view" tab. The device name can be modified, if necessary.

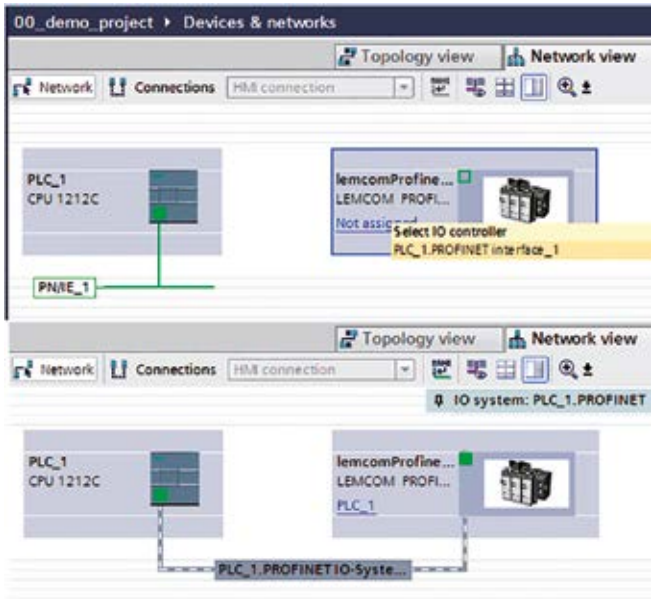
VIII 4



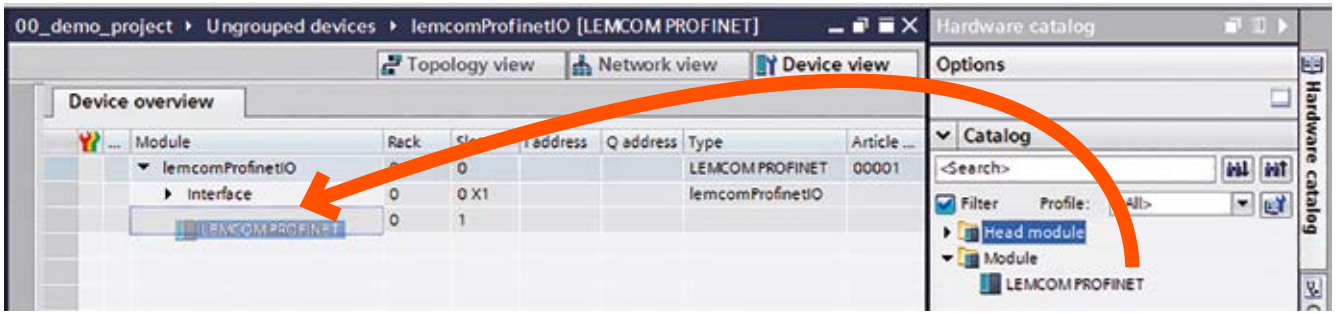
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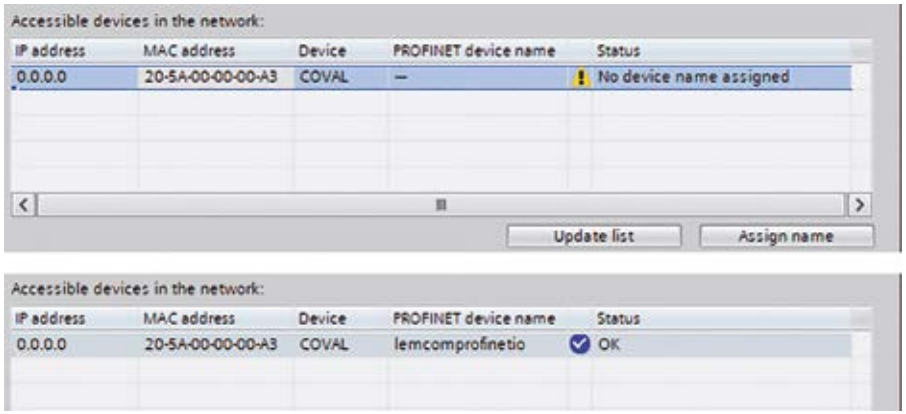
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8



12



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

8. Again, in the "Hardware catalog", find the PROFINET LEMCOM module, then drag and drop it to the "Device view" onto line "Slot 1" of the device.

9. Adjust the IO cyclic data addresses if necessary.

10. Define the network topology in the "Topology view" tab, if necessary.

Assigning the PROFINET device name and the IP address

11. Assign the PROFINET device name to the island: right-click on the island in the "Network view" and choose "Assign device name" in the context menu. Once the device list has been refreshed, select the line with the "COVAL" device type (the device name is still missing). To make sure that you are assigning the name to the right device, you can click on "Flash LED" and check if the blue LED is flashing on the front of the LEMCOM master module of your choice. Click "Assign name" to confirm.

12. Assign an IP address in your network to the LEMCOM master module. This can be done in LEMCOM Manager ("Network settings" menu). It can also be done in TIA Portal: under the "Properties" of the LEMCOM island, on the "General" page, select the "Ethernet address" menu item and enter a valid IP address. Then, open the "Online and diagnostics" page, select the "Functions" menu item, and then "Assign IP address". Clicking the "Accessible devices" button allows you to scan the network. Refresh the list, choose the LEMCOM island, click "Apply" to validate and after the window closes, click "Assign IP address" to confirm.

In order to be able to use third-party configuration software (Primary Setup Tool, LEMCOM Manager, etc.), after assigning the IP address in TIA Portal, choose the option "IP address is set directly at the device".

[Optional step] Testing vacuum/blow commands and vacuum level

13. For testing purposes, you can read/write the IO data, e.g. using a watch/force table. Example:
    - Import the pre-defined PLC Tags: in the "Project tree", go to "PLC Tags", double-click "Show all tags". Right-click the empty table, import the tags from the **LEMCOM_PLC_Tags.xlsx** Excel file ("Import file" menu item). The "PLC Tags" table is filled with the imported tags. Create a new watch/force table. Add the imported tags to the watch/force table. Add the following tags: vacCmd_0_to_7 (vacuum commands for the first eight modules of the island), bloCmd_0_to_7 (blow commands for the first eight modules of the island), vacLev_M (instantaneous vacuum level of the master module), etc. Compile the project and download it to the PLC. "Go online" with the PLC. In the watch/force table, click "Monitor all". Toggle the state of the tags corresponding to the vacuum/blow commands. The respective LEDs light up on the front of the LEMCOM modules. Observe the progress of the instantaneous vacuum level of the modules.

IX A

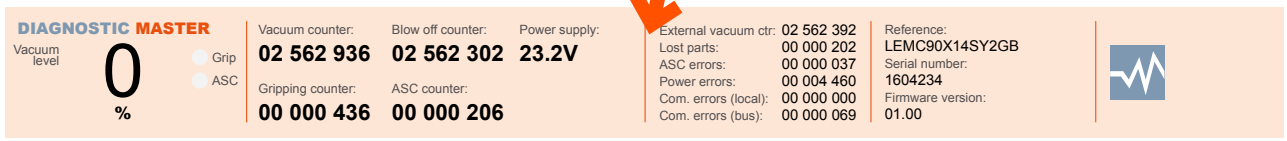
1



2



3



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:

- Set vacuum parameters (Air Saving Control, regulation and gripping threshold, etc.)
- Set network settings
- 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 PROFINET 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: The configuration and diagnostics data can be accessed using PROFINET. A dedicated HMI can thus be developed to give access to the LEMCOM parameters by reading/writing acyclic data (Record 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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