ENGLISH

Ewon Flexy Extension Card FLB 3208 - 4G NA (LTE)

INSTALLATION GUIDE

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1. Preface

1.1. About This Document

This document describes the hardware of the FLB 3208 - 4G NA (LTE) extension card which belongs to the Ewon Flexy family.

The Ewon Flexy family is a range of modular industrial gateways/routers. As its name, Ewon Flexy, suggests, it has been designed to enable numerous different combinations of base units with extension cards.

For additional related documentation and file downloads, please visit www.ewon.biz/support.

1.2. Document History

Version	Date	Description
1.0	2023-01-01	First release
1.1	2023-02-01	Changed: Adding ferrite in FCC Compliance (page 4)
1.2	2024-01-01	Changed: Certification
1.3	2024-03-01	Changed: Part Number (page 8) chapter Added: Hazardous Location - Class 1 Division 2 (page 5) chapter

1.3. Related Document

Document	Author	Document ID
Ewon Flexy - Base Units	HMS Networks	IG-0014-00
Ewon Flexy 205	HMS Networks	IG-0028-00
FAC91201_0000 - 4G Bracket Antenna	HMS Networks	SSH-0300-00

1.4. Trademark Information

Ewon® is a registered trademark of HMS Industrial Networks SA. All other trademarks mentioned in this document are the property of their respective holders.

2. Product Summary

The document describes the hardware of the Ewon® Flexy extension card FLB 3208 - Cellular 4G NA which belongs to the Ewon Flexy family.

This guide also briefly addresses how the extension cards integrate into the Ewon Flexy base units as well as some recommendations on how to mount them.

The Ewon Flexy family is a range of modular industrial gateways/routers. As its name, *Ewon Flexy*, suggests, it has been designed to enable numerous different combinations of base units with extension cards.

The Ewon Flexy base units have their own Installation Guide which can be found on www.ewon.biz/support.

For additional related documentation and file downloads for the Ewon® Flexy extension card FLB 3208 - Cellular 4G NA , please visit www.ewon.biz/support.

2.1. Specifications

Note that the **integrated module** of this extension card is **Telit LE910 C4 NFD**.

WARNING
This device is intended to be used only in fixed applications. The antennas used for this transmitter, must be installed with a safe distance of at least 20 cm from any person and may not be co-located or operating in conjunction with any other antenna or transmitter.

Label	Value(s)	
Bands & Frequencies	LTE - 600MHz (B71), 700MHz (B12, B13, B14), 850MHz (B5), 1700MHz (B4, B66), 1900MHz (B2) 3G - 850MHz (B5), 1700MHz (B4), 1900MHz (B2)	
Tx Output Power	LTE all Bands: Class 3 (0.2W)	
Antennas Connector	Main: Type SMA-F Female Div: Type SMA-F Female	
Antenna[a.] (not included in the delivery)	**Characteristic**	**Value(s)**
	Impedance	50 Ohms
	VSWR	<= 2:1
	Input Power	> 24 dBm average power
	Tightening Torque	0.5 Nm In the absence of a torque wrench, a soft manual tightening is sufficient.

[a.] 4G antenna has to be purchased separately. HMS Industrial Networks SA offers such antenna under *FAC91201_0000* reference.

Absolute maximum antenna gain as per FCC's rules and regulations, 47 CFR:

- B71: 5.63dBi
- B12, B13, B14: 5.94dBi
- B5: 6.12dBi
- B4, B66: 5.00dBi
- B2: 8.01dBi

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	24E	1850.0 - 1910.0	0.297852	1.0 PM	4M14G7W
	27	1710.0 - 1755.0	0.323594	1.0 PM	4M14G7W
	22H	824.0 - 849.0	0.326588	1.0 PM	4M14G7W
	24E	1850.7 - 1909.3	0.27353	1.0 PM	1M10G7D
	24E	1851.5 - 1908.5	0.28642	1.0 PM	2M69G7D
	24E	1852.5 - 1907.5	0.28576	1.0 PM	4M48G7D
	24E	1855.0 - 1905.0	0.27669	1.0 PM	8M93G7D
	24E	1857.5 - 1902.5	0.23496	1.0 PM	13M4G7D
	24E	1860.0 - 1900.0	0.26182	1.0 PM	17M8G7D
	22H	824.7 - 848.3	0.30339	1.0 PM	1M09G7D
	22H	825.5 - 847.5	0.30269	1.0 PM	2M69G7D
	22H	826.5 - 846.5	0.23388	1.0 PM	4M48D7W
	22H	829.0 - 844.0	0.32359	1.0 PM	8M94G7D
	27	699.7 - 715.3	0.29785	1.0 PM	1M09G7D
	27	700.5 - 714.5	0.27479	1.0 PM	2M68G7D
	27	701.5 - 713.5	0.29309	1.0 PM	4M48G7D
	27	704.0 - 711.0	0.25882	1.0 PM	8M94G7D
	27	779.5 - 784.5	0.31333	1.0 PM	4M46G7D
	27	782.0 - 782.0	0.2851	1.0 PM	8M90G7D
	90	790.5 - 795.5	0.27416	1.0 PM	4M47G7D
	90	793.0 - 793.0	0.27416	1.0 PM	8M90G7D
	27	665.5 - 695.5	0.25119	1.0 PM	4M46G7D
	27	668.0 - 693.0	0.24774	1.0 PM	8M90G7D
	27	670.5 - 690.5	0.24889	1.0 PM	13M3G7D
	27	673.0 - 688.0	0.23442	1.0 PM	17M7G7D

2.2. Antenna - FAC91201_0000

For more general & technical information concerning the antennas that can be combined with cellular extension cards, refer to the *Cellular 4G Antenna Accessory - FAC91201_0000* solution sheet.

3. Safety, Environmental & Regulatory Information

3.1. Scope

The present heading addresses Safety, Environmental & Regulatory Information about the Ewon® Flexy extension card FLB 3208 - Cellular 4G NA.

This extension card belongs to the same compliance frame as the base units. In the present case of a telecommunication extension card, additional directives, standards and instructions apply.

3.2. ESD Damage Prevention

WARNING
Always use ESD precautions when handling extension cards and / or opened base unit as they contain parts and assemblies susceptible to being damaged by electrostatic discharge (ESD).

The extension card described in this document is a module exposing both sides of an electronic printed circuit board. Therefore, it is packed in an antistatic ESD bag. In order to avoid ESD damage, the product must be handled with the necessary precaution including:

- Grounded ESD protective work surface
- Individual grounding

3.3. Applicable Directives, Standard and Compliances

The FLB 3208 - Cellular 4G NA extension card inserted in a base unit belongs to class A Information Technology Equipment (ITE).

In a domestic environment, this product may cause radio interference in which case the user may be required to take appropriate measures

3.3.1. Applicable Safety Standards

The FLB 3208 - Cellular 4G NA extension card is in conformity with the following safety standards:

- EN/IEC 62368-1
- UL 62368-1
- CAN 62368-1

3.3.2. FCC Compliance

The FLB 3208 - Cellular 4G NA extension card complies with Part 15B and 27 of the FCC Rules. Operating is subject to the following two conditions:

- This product may not cause harmful interference.
- This product must accept any interference received, including interference that may cause undesired operation.

WARNING
FCC compliance applies only if you place a ferrite (reference: Würth 74271132S) on the *Div* antenna's cable, at 3cm from the SMA connector.

3.3.3. Certifications

The FLB 3208 - Cellular 4G NA extension card has been certified by authorized bodies.

These certificates can be downloaded as PDF files on the Certifications section of Ewon Support website.

3.4. Official Modem Identification

This product contains part identified as follows by national authorities:

- FCC ID: RI7LE910CXNF
- IC: 5131A-LE910CXNF

3.5. Hazardous Locations - Class 1 Division 2

This chapter concerns the FLB3208_00H device.

"**H**" stands for **HazLoc** (*Hazardous Locations* as opposed to *OrdLoc - Ordinary Location*) and refers to **Class 1 Division 2** area.

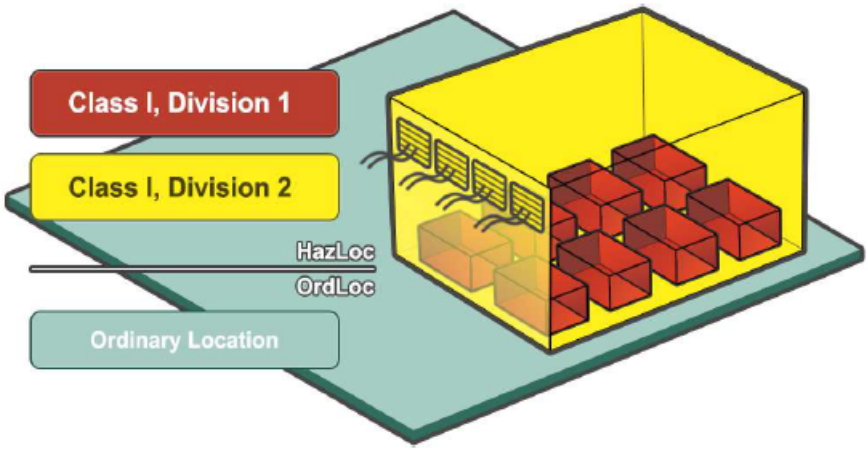
The FLB3208_00H has the same features as the FLB 3208 - Cellular 4G NA extension card (*FLB3208_00*) except it received official certification to be placed and used in a Class 1 Division 2 area.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D OR non-hazardous locations only.

WARNING
EXPLOSION HAZARD: Do not disconnect while the circuit is live or unless the area is free of ignitable concentrations.

To ensure a proper ventilation of the equipment, a free gap of at least 2 cm must be respected in front of all upper and lower ventilation openings of the unit. A free gap of at least 1 cm must be respected on each side of the unit.

- Where can you place and use the FLB3208_00H?
  The FLB3208_00H may be used in the yellow area: Class 1, Division 2.



The standard FLB 3208 - Cellular 4G NA extension card, can only be placed and used in the green area: OrdLoc.

WARNING
None of the FLB 3208 - Cellular 4G NA extension card variant can be placed in the red zone: Class 1, Division 1!

3.6. Environmental Conditions

The equipment operates properly within the following environmental limits if it has been correctly mounted according to our recommendations:

Table 1. Environmental conditions

Operating temperature	-25°C to +60°C
Operating relative humidity	10 to 95% non-condensing
Operating altitude	Up to maximum 2000m
Storage temperature	-30°C to +70°C
Storage altitude	Up to maximum 3000m
Storage humidity	10 to 95% non-condensing

IMPORTANT
If the mounting situation mentioned is not applied, the specified operating temperature must be derated to -25°C to +40°C.

4. Hardware Description

4.1. Mechanical Layout and Interfaces

Table 2. Name and position of the connectors

#	Description
1	SMA-F Female antenna connector
2	SIM card drawer
3	Backplane connector

4.2. Label

The identification label of the FLB 3208 - Cellular 4G NA extension card is placed on the solder side of the PCB.

The different parts of the label are described as follows:

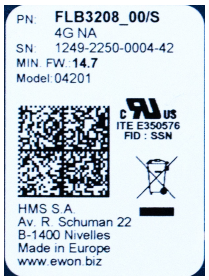


Figure 1. Label example of an FLB 3208 - Cellular 4G NA extension card

Table 3. Label of an FLB 3208 - Cellular 4G NA extension card

Mark	Description
PN	Part Number
SN	Serial Number in the form of *MMMM-YYWW-SSSSPP* • *MMMM*: MTID (product related) • *YYWW*: year and week of production • *SSSS*: sequential manufacturing order • *PP*: product type
Marks	CE, UL, ... logos if applicable

4.3. Part Number

Table 4. Syntax of the part number: **FLYXXXX_00 [Suffix]**

Syntax	Description	Possible value		
FL	*FL* is the prefix for the extensions of the Ewon Flexy family	FL (constant)		
Y	1 alphabetic sign (CAP) Defines the slots of the base module in which the extension card can be inserted	A	2 first slots only	●●○○
		B	2 last slots only	○○●●
		X	Any slots	●●●●
		C	Any slots. Available for Ewon Flexy 205 only.	●●
XXXX_00	The extension card type. The suffix *_00* is used for software options			
[Suffix]= /S	This suffix indicates compliance with the UL/IEC/EN 62368-1 standard.			
[Suffix]= H	This suffix indicates compliance with the UL 121201, 9th Ed., and CSA C22.2 NO. 213-17, 3rd Ed., for usage in Hazardous Locations, Class 1, division 2.			

4.4. Front Panel

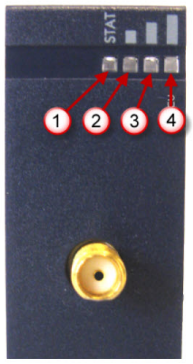


Figure 2. LEDs on the front panel

Table 5. LEDs on the front panel

#	Mark	Description
1	STAT	Tricolor: Red / Orange / Green. Green ON = Modem is online.
2	■	Reception Signal level. Orange ON = level > 1 → poor signal
3	■■	Reception Signal level. Orange ON = level > 10 → signal ok
4	■■■	Reception Signal level. Orange ON = level > 16 → good signal

NOTE
The LEDs represent only the signal level and not the type of technology (LTE, 3G, ...) used to perform a connection.

During the modem boot process, only the first LED *STAT* is steady orange. If it remains orange, it means the modem card was inserted in a wrong slot. This induces a base unit boot error pattern on its *USR* LED as well.

If all signal level LEDs are off, it either means that:

- the modem was not configured;
- the modem configuration is invalid (including wrong PIN-code);
- there is no signal at all (level 0);
- there is a reception error (level 99);

4.5. Antenna Diversity

Antenna diversity is a is wireless scheme that uses - at least - 2 antennas to improve the quality and reliability of a wireless link.

We strongly advise you to use the diversity antenna as it helps the gateway to achieve the maximum network coverage.

The FLB 3208 - Cellular 4G NA extension card provides 2 SMA connectors: *Main* and *Div*.

- **Main**
  Its purpose is to connect the main antenna. It is always mandatory.
- **Div**
  Its purpose is to connect an optional second antenna and take advantage of the antenna diversity feature.
  If not used, it is recommended to place a cap on the diversity antenna port to avoid premature damage for future use. By default, there is already one. You will have to remove the cap if you intend to use the diversity antenna.

Please note that you don't have to activate or deactivate any settings: the *Div* port is always enabled.

NOTE
The second antenna must not be placed in the immediate vicinity of the main antenna.

To improve diversity gain and isolation and reduce mutual interactions, the two antennas should be placed at the as far apart as possible, taking into consideration the available space within the application.

5. Insertion of an Extension Card

5.1. Slot Compatibility

The FLB 3208 - Cellular 4G NA extension card must be inserted in one of the *B* slots of the base unit.

The reference code of the extension cards includes a letter defining their compatibility:

- FL**A** xxxx: designate cards that fit into *A* slots.
- FL**B** xxxx: designate cards that fit into *B* slots.
- FL**X** xxxx: designate cards that fit into any slot.
- FL**C** xxxx: designate cards that fit into any slot of the Ewon Flexy 205.

In addition to the card reference, each type of extension card bears a visual compatibility symbol on its front panel:

Table 6. Slot compatibility for each type of extension card

Design	Slot Type	Flexy 205	Other Flexy
●●○○	A	Any slot	2 first slots
○○●●	B	Any slot	2 last slots
●●●●	X	Any slot	Any slot
●●	C	Any slot	/

→ Ewon Flexy 205

As the Ewon Flexy 205 has room for 2 slots, the type slot compatibility rule doesn't apply. The FLB 3208 - Cellular 4G NA extension card can be inserted in either slot.

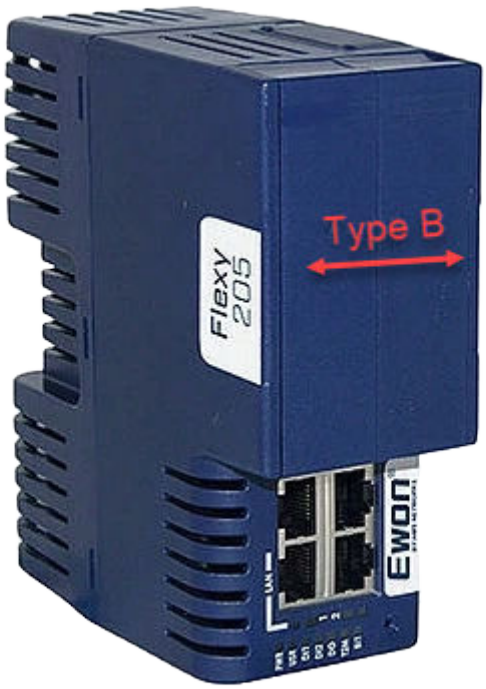


Figure 3. Position of the *B* Slots on an Ewon Flexy 205

→ All other Ewon Flexy

The FLB 3208 - Cellular 4G NA extension card must be inserted in the *B* slots which are the two slots on the far right of all other Ewon Flexy.

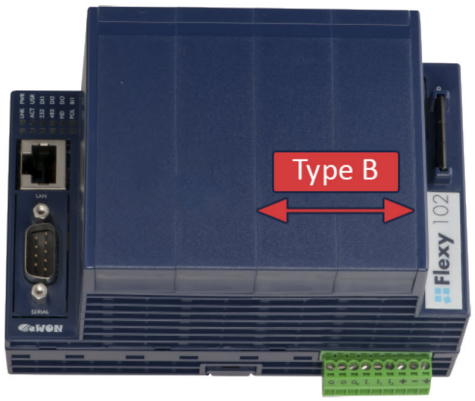


Figure 4. Position of the *B* Slots on all other Ewon Flexy.

WARNING
Cards that fit only in one slot type have a mechanical mistake-proof security to prevent them from being inserted in an incorrect slot type.

5.2. SIM Card Insertion

A SIM card obtained from a wireless phone provider is necessary to communicate through the FLB 3208 - Cellular 4G NA extension card.

The SIM card must be inserted before inserting the extension card in the base unit. There is no external access to the SIM card holder.

The SIM card holder is located on the components side of the extension card.

Proceed as follows to insert the SIM card:

1. Carefully slide the SIM card into the holder, as shown in the picture below.
   Note the position of the cutoff *(1)* of the SIM card.
2. Make sure the card is fully inserted.
   If not, it could damage both the drawer and the SIM card when the extension card will be inserted in the base unit.

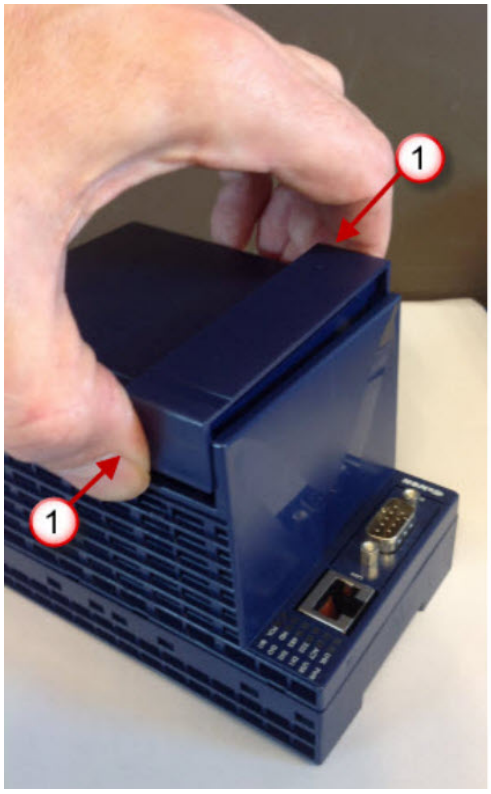
Figure 5. SIM card insertion

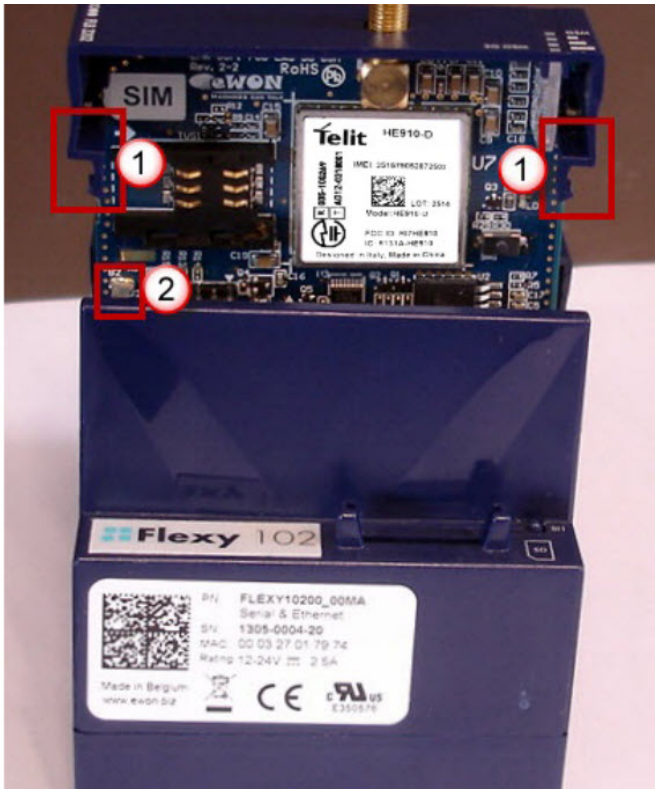
5.3. Extension Card Insertion

Wait 30 seconds after turning off the equipment before inserting (or removing) an extension card to avoid possible damage to the base unit and the extension cards.

To insert the FLB 3208 - Cellular 4G NA extension card in the Ewon Flexy base unit, proceed as follows:

1. Remove the slot filler of the location where the new card will be inserted. To do so, press on both ends of the cover. Note that the hooks are off-centered.





Removal of the slot fillers

1	Hooks to be pressed are off-centered. Press while pulling upwards.
2	This metal tag soldered on the PCB acts as mistake-proof security (mating stop in housing). This mechanism doesn't apply on the Ewon Flexy 205.

2. Insert the extension card carefully and slide it down until the hook clicks. Make sure the card is completely inserted.
   DO NOT insist if a resistance is felt when trying to insert the card. This can occur if the extension card is inserted in a wrong slot type. In such case, check slot compatibility of the relevant extension card.
3. Boot the unit for the inserted extension cards to be detected.
   The web interface of the Flexy base unit has a diagnostic page showing the extension cards in their order of detection (from left to right).

WARNING
If an extension card is inadvertently forced in a wrong slot, the base unit will detect the misplaced card and will not complete its boot process. Therefore, the unit will not be accessible through its LAN interface. The slot error is returned by the *USR* LED (red ON 1sec, OFF 0.5 sec).

5.4. Insertion of Multiple Extension Cards

5.4.1. Power Requirements

The internal power converter of the Ewon Flexy base units has been dimensioned to cover a broad range of different combinations of extension cards.

Users should make sure the total power demand of the extension cards does not exceed the capabilities of the base unit. That is why the notion of *Energy Points* has been introduced.

The *Ewon Flexy - Base Units* installation guide includes a section giving the *Available Energy Points* of each type of base unit.

The power requirements of each extension card is expressed in *Energy Demand Points*. This number is meant to check whether the balance with the *Available Energy Points* of a given base unit with extension cards is OK or not.

The *Energy Demand Points* of the FLB 3208 - Cellular 4G NA extension card is 8.

The *Ewon Flexy - Base Units* installation guide also includes examples of practical power balance calculations.

5.4.2. Software Compatibility

The base unit allows the insertion of multiple extension cards, sometimes of the same type.

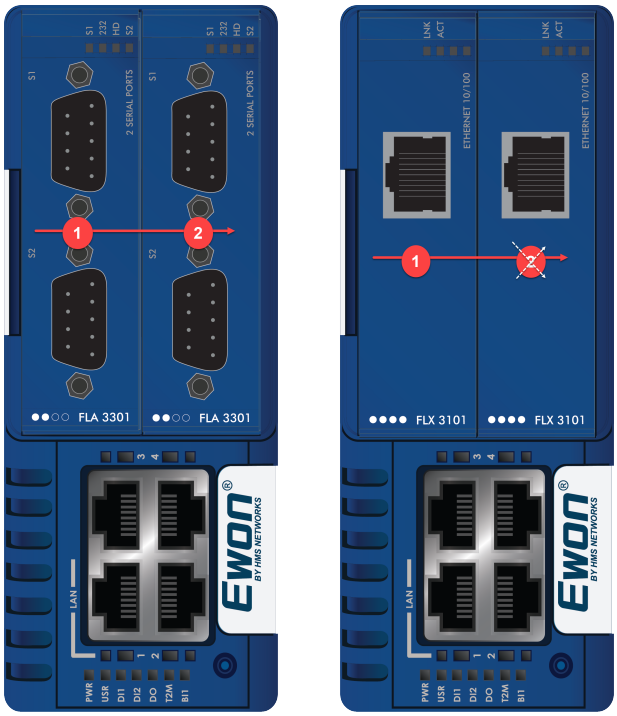
Some configurations including multiple extension cards, even if mechanically acceptable, are not supported by the embedded software. Cards in excess are ignored during the automated detection process which means that the base unit and its running extension cards will operate normally.

The Ewon Flexy firmware currently supports up to 1 FLB 3208 - Cellular 4G NA extension card.

WARNING
Our **Modem Flexy Extension Cards FLB3208, FLB320A, FLB3209, FLB3271** are only supported if the Flexy Base Unit runs the **firmware version 14.8s0** and **higher**.

The ignored card(s) will appear in the *Diagnostic* → *Status* → *System Info* → *System*, but they will not be functional.

Example 1. 2 serial ports vs 2 Ethernet ports



This picture shows an example of a configuration that would be OK mechanically and power-wise but would not be supported by the firmware.

During the boot process, the first 2 serial port extension cards are detected and both can be used.

In the case of 2 single Ethernet cards, these 2 cards are also detected, but the second Ethernet card is not supported by the firmware and cannot be used.

The presence of this *ignored* card in the base unit does not alter the operation of the base unit itself nor does it alter its *accepted* extension cards.

5.4.3. Detection Order

The boot sequence of the base unit includes an automated detection of the inserted extension cards. This detection is done sequentially, slot per slot starting from left to right (when holding the base unit with its logo on the right side).

6. Card Detection on Embedded Web Page

The Ewon Flexy extension cards require no software configuration. They are automatically detected by the base unit when the device boots.

6.1. Connect to Web Interface

To connect to the web interface of your Ewon device, proceed as follows:

1. Configure the network parameters to set the computer that will be linked to your Ewon device on the same IP range than the LAN interface of this Ewon device.
2. Connect the PC to one of the LAN port of the Ewon device once both devices are in the same IP range.
3. Open an Internet browser.
4. Access the homepage of the Ewon device by typing the LAN IP address in the URL field.
   Default IP address is 10.0.0.53.
   A dialog box will pop-up asking for credentials. Default ones are:
   - login: adm
   - paddword: adm

WARNING
For security reasons, changing the default password *adm* is an absolute requirement. To change it, from the menu bar, click on *Setup* → *Users* and double click on the *adm* entry to edit and save its password.

6.2. Card Detection on Embedded Web Page

The Ewon Flexy extension cards require no software configuration. They are automatically detected by the base unit when the device boots.

6.3. Modem Information in Information Page

Extended information about the modem - including manufacturer, type and modem firmware version - is available in the *Info* page.

WARNING
Our **Modem Flexy Extension Cards FLB3208, FLB320A, FLB3209, FLB3271** are only supported if the Flexy Base Unit runs the **firmware version 14.8s0** and **higher**.

The path to the Info page is *Diagnostic* → *Status* → *System Info* → *Info*.

Appendix A.

1. Isolation Scheme

1.1. Ewon Flexy base unit

Table A.1. Isolation scheme for all Ewon Flexy base units

	Flexy 201	Flexy 202, 203	Flexy 205
Connector shielding	Earth connected		
Ethernet signals	Isolated from DGNG with a transformer		
MPI / serial ports	/	Isolated from PGND only	/

WARNING
Serial ports GND = DGND

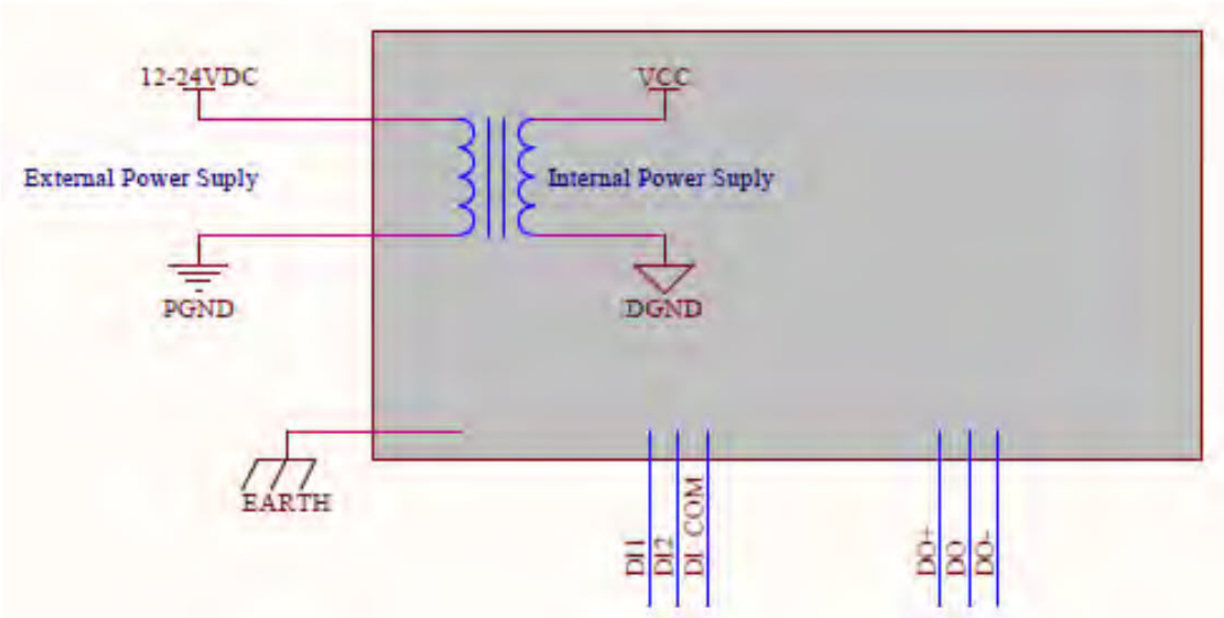


Figure A.1. Graphical representation of Ewon Flexy's isolation scheme

Based on the above picture:

- External and internal power supplies are isolated from each other (1.5kV)
- DI signals: isolated from DO signals, PGND and DGND (optocoupler)
- DO signals: isolated from DI signals, PGND and DGND (optocoupler)
- Earth is isolated from external and internal power supplies

1.2. FLB 320x - Cellular

DGND = GND RF from SMA connector

WARNING
Avoid external connections between GND RF and Earth.

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