GEFRAN

G3-JNC3 / G3-JNC4

G-Mation G3 – Ethercat Junction

USE AND INSTALLATION MANUAL

G3-JNC3 code F099392
G3-JNC4 code F095040
code: 80677 - Ver 1.0 - 01-2025 - ENG

CONTENTS AND INDICES

1. PREFACE

1.1. Warnings and safety

Although all the information in this document has been carefully checked, Gefran S.p.A. cannot be held liable for the possible presence of errors, or for damage to persons or property due to improper use of this manual.
Gefran S.p.A. also reserves the right to make changes to the content and form of this document and to the features of the devices it describes at any time without prior notice.

The devices described in this manual must be installed by qualified technicians, following current laws and regulations and in accordance with the instructions given in this manual.
If the card is used in applications with risk of injury, or of damage to machinery or materials, it must be combined with auxiliary alarm devices. It is advisable to provide for the possibility of checking alarm activation also during normal operation.

Before interacting with the card, the operator must be adequately instructed in the system operation, emergency, diagnostics and maintenance procedures.

1.2. Typographical conventions used in the manual

Pay attention when the following symbols are found in the manual.

Indicates particularly important information relevant to correct product operation or safety, or provides instructions that must be strictly followed

Highlights a risk condition for the installation technician or user due to hazardous voltage levels

Identifies an action that is possible / permitted

Identifies an action that is NOT possible / NOT permitted

1.3. EtherCAT declaration

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

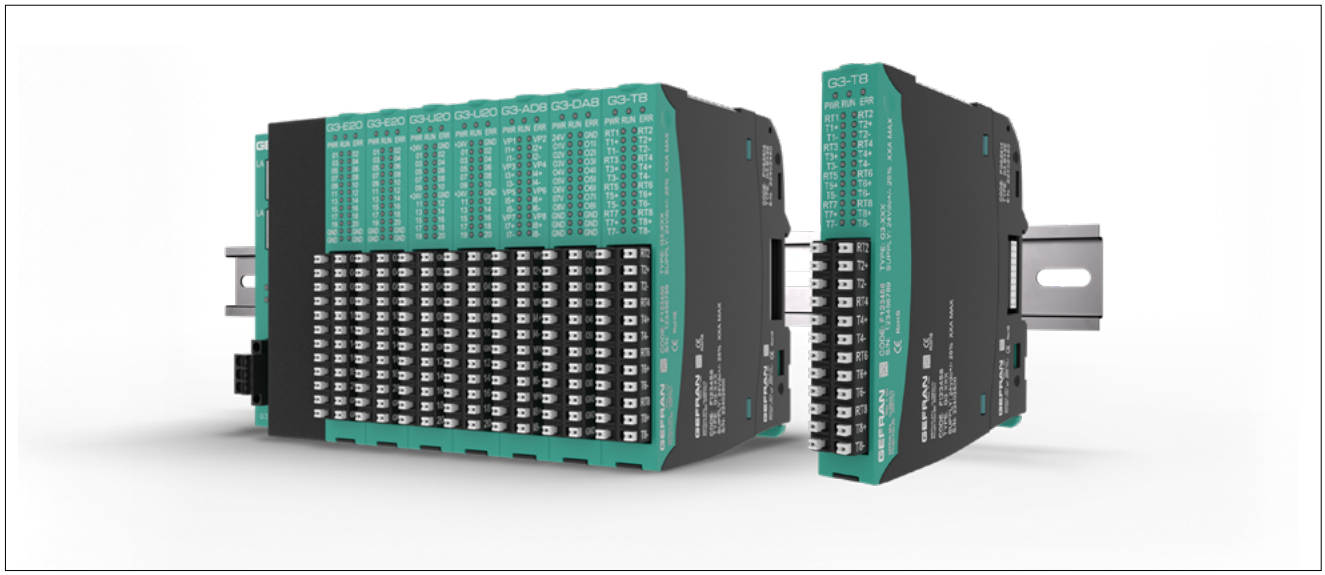
2. G-MATION G3 PLATFORM

2.1. System

G-Mation G3 is a modular IO system based on EtherCAT technology. EtherCAT provides a maximum of 65535 addressable modules.
A G3 rack of I/Os is composed of the system coupler, G3-ECAT, with a number of I/O boards on the right side as desired according to system needs and up to a maximum of 20.
The G3-ECAT module provides power supply for 20 boards.

If a number of boards greater than 20 is necessary, the power supply module G3-PWR must be inserted between the 20nd and 21st boards.

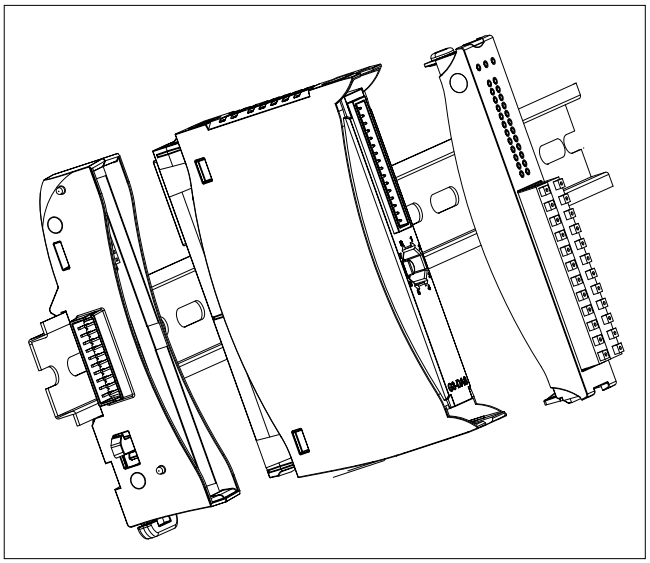
The boards are designed for coupling on a 35 mm DIN rail and the lateral coupling with the rack takes place by sliding to the left (refer to paragraph “2.6. DIN rail mounting” on page 13).

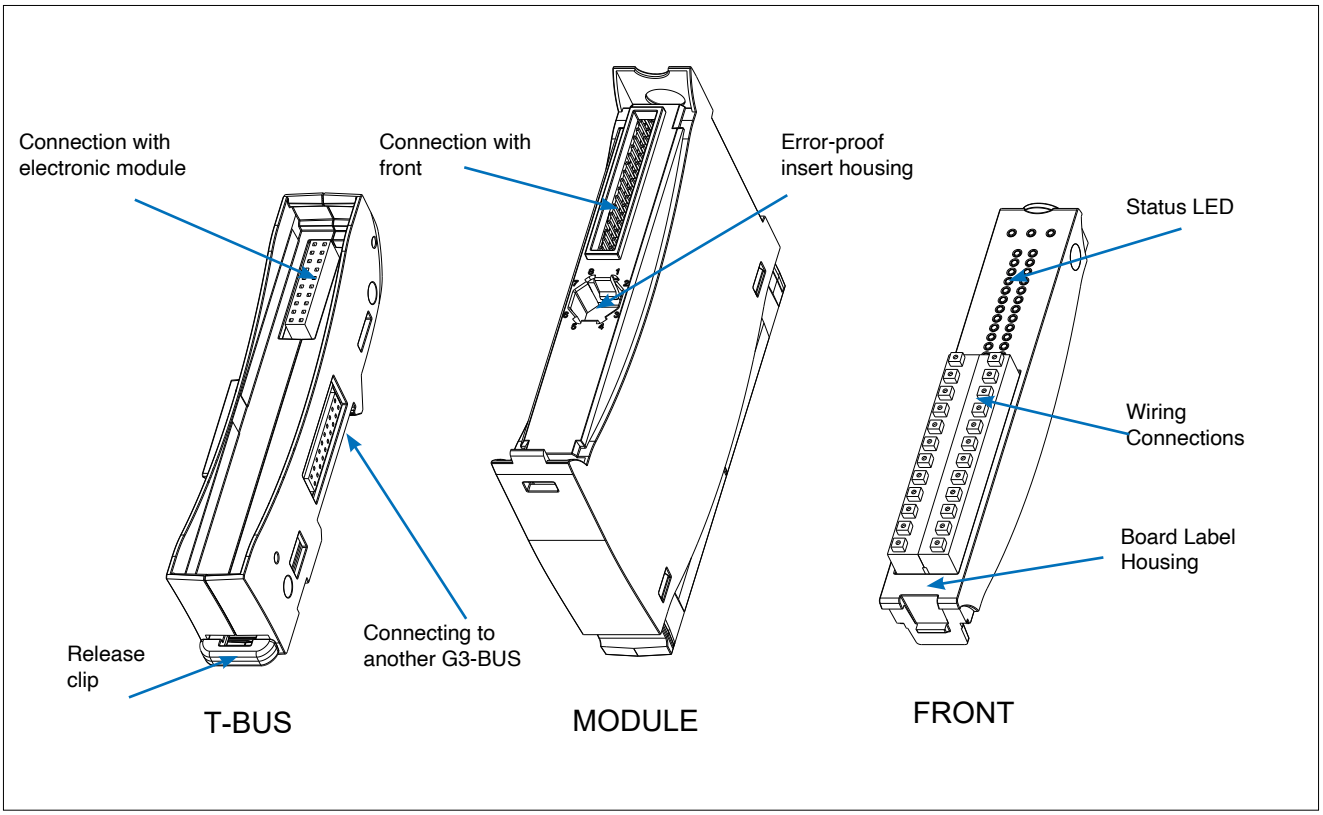


2.2. Board modularity

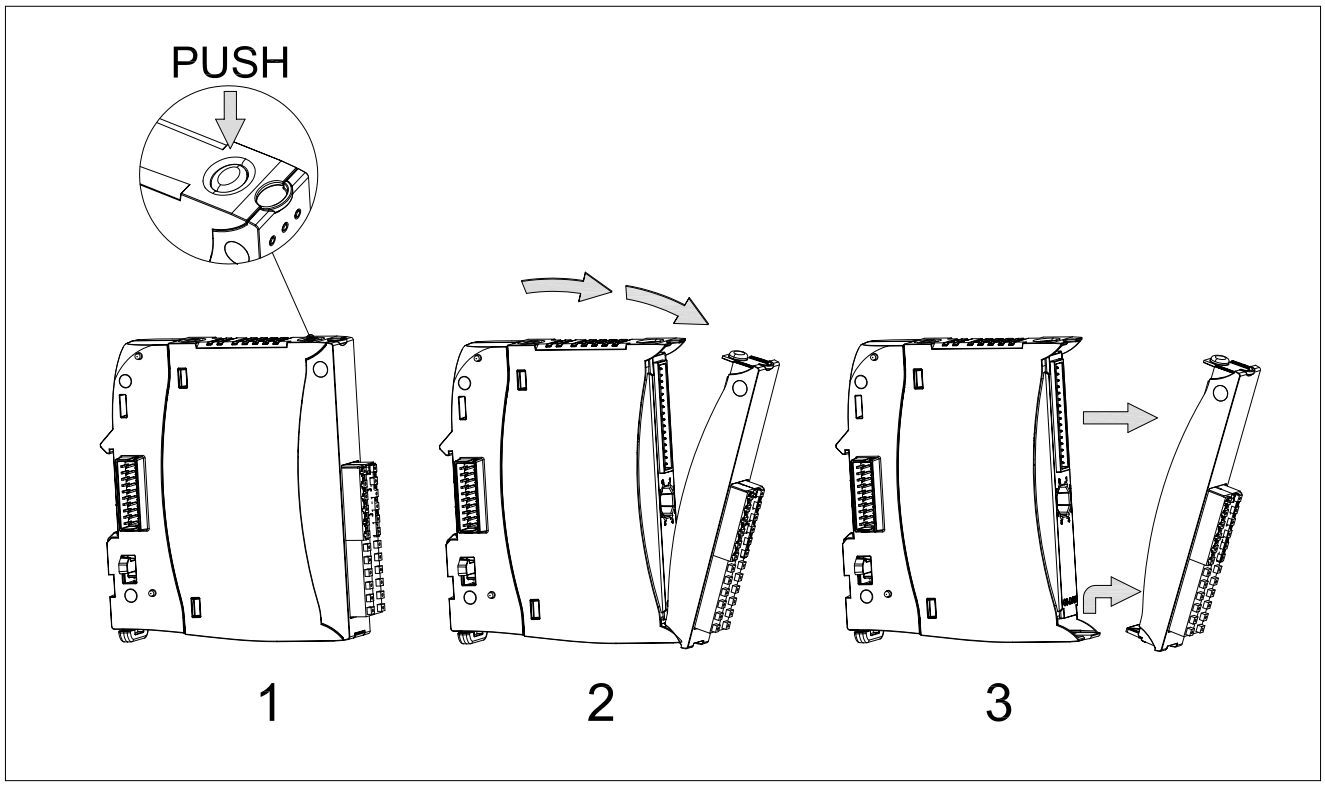
Each I/O board consists of three parts:

- **The base module:** it is the module that guarantees coupling with the din rail and bus transmission between one board and the next. It is called G3-BUS (F092614) and is common to all boards.
- **Electronics:** is the module that contains all the electronics dedicated to managing board I/Os. It is proprietary to each board.
- **The front:** it is the module that houses the push-in connector for the wiring and the front LEDs. It is proprietary to each board

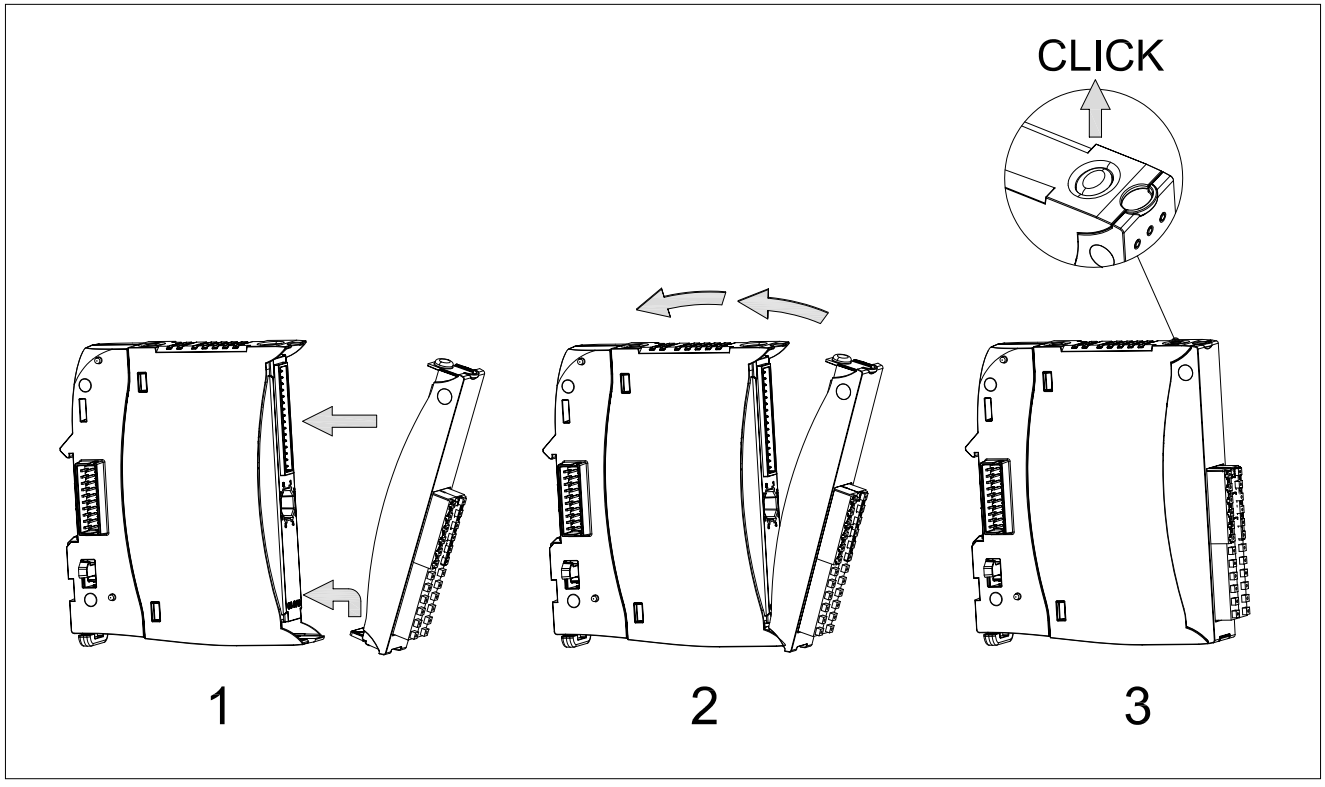




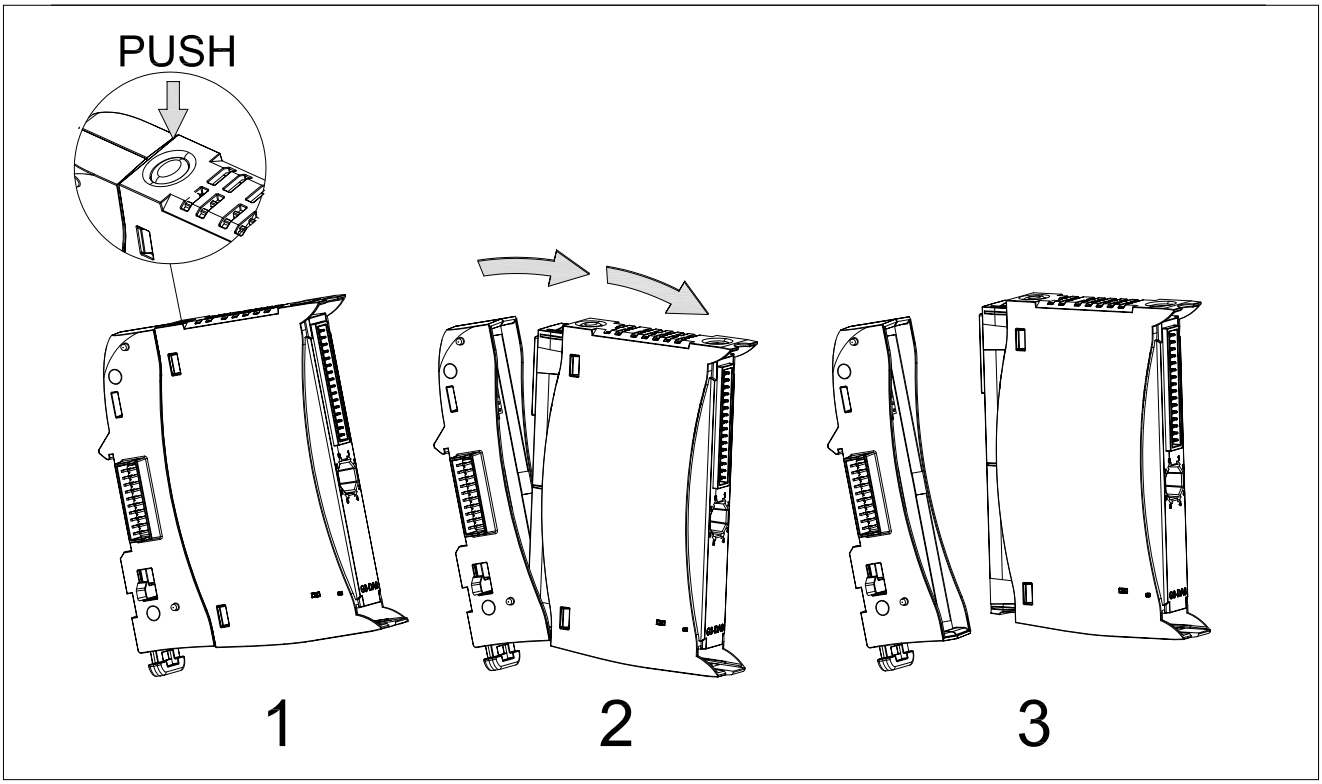
The coupling and uncoupling between the different parts is possible without the use of tools, using only your hands. The movement is constrained in such a way as to be easy and to prevent alignment errors that could compromise the connections.
Press the upper button as shown in the figure and pull the board down in the indicated direction to remove the front module.



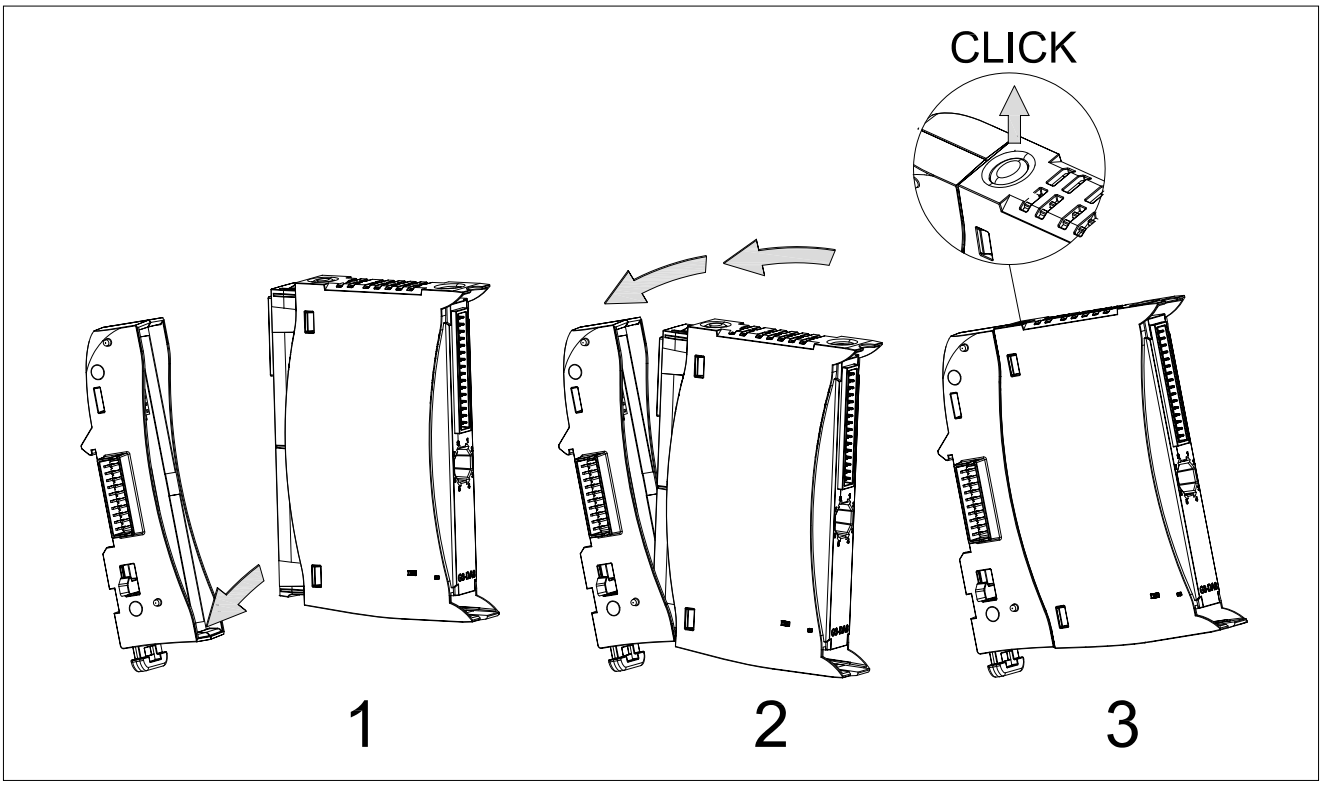
To re-couple the module, first place the lower part inside the constrained housing of the electronic part and then push the front until you feel the upper button couple.



The electronic part can be detached from the base both with the front connected and without. To release the electronic part press the upper button as shown in the figure and pull the board down in the indicated direction.

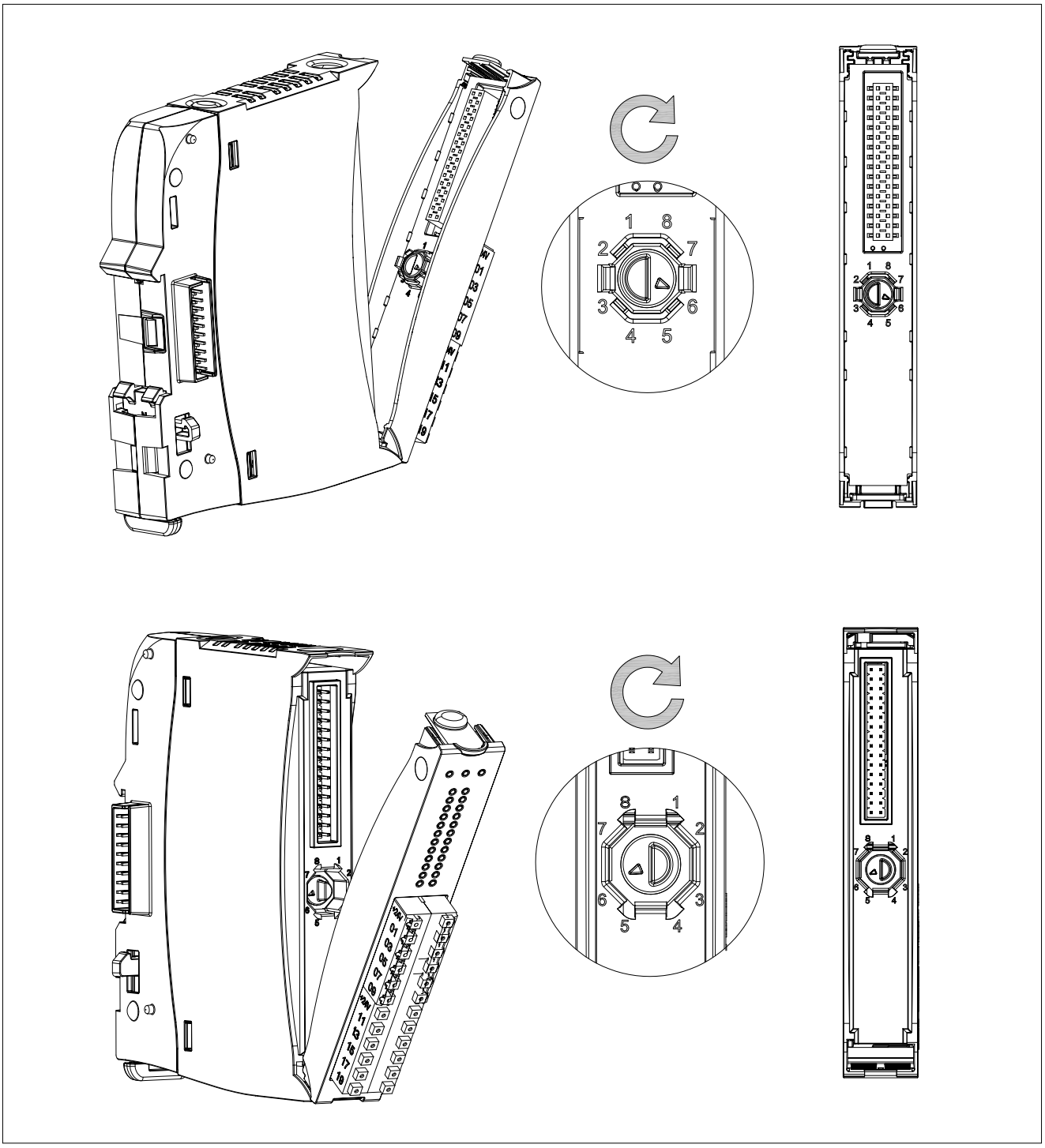


To re-couple the electronics, first place the bottom part inside the constrained housing of the base and then push the board until you feel the upper button couple.

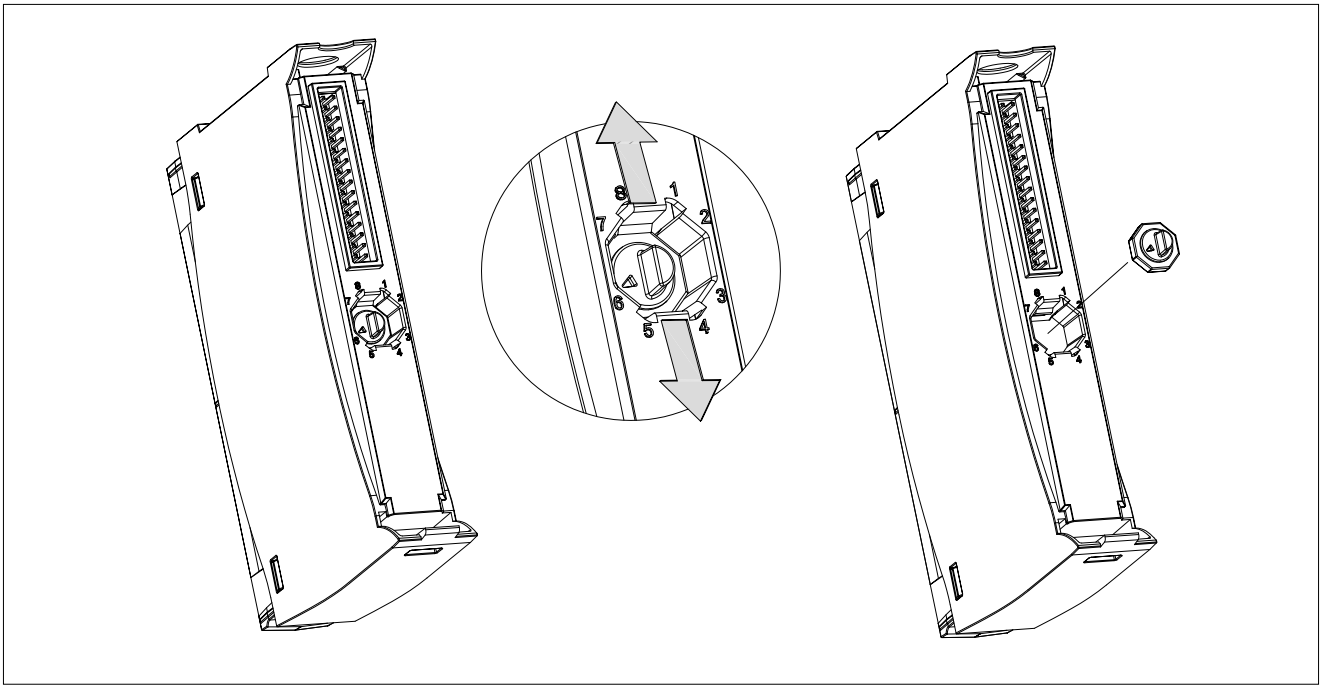


2.3. Front polarisation

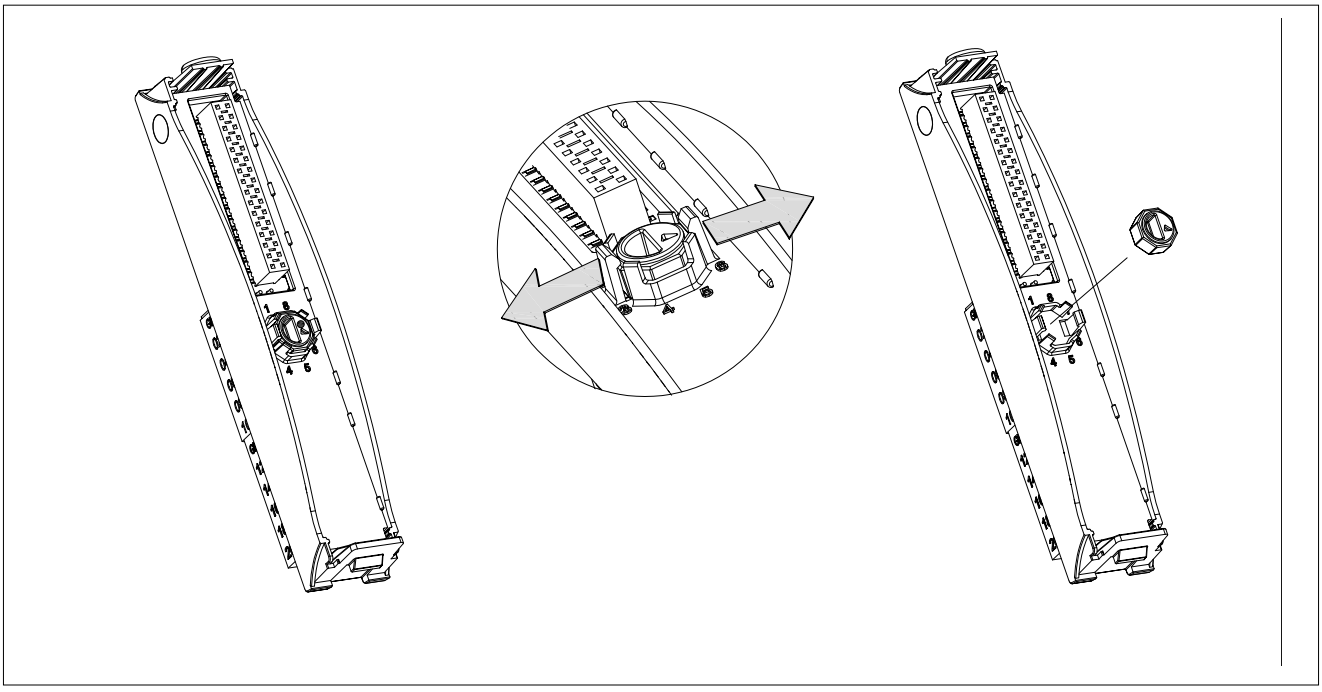
A polarisation system is provided that allows you to associate a front to your board to avoid board and front positioning errors.
A kit of male-female coupled octagonal-shaped inserts may be provided as an accessory.
The figures on the insert are available in different versions so as to cover a wide range of combinations.
There is a housing for the male insert and one in the front for the female insert in the electronic part.



The insert must be mounted with the aid of tweezers and can be rotated in eight different positions.
Proceed as shown in the figure by grasping the insert with tweezers to insert or remove the insert from the electronic board.



Proceed as shown in the figure by grasping the insert with tweezers to insert or remove the insert from the front module.

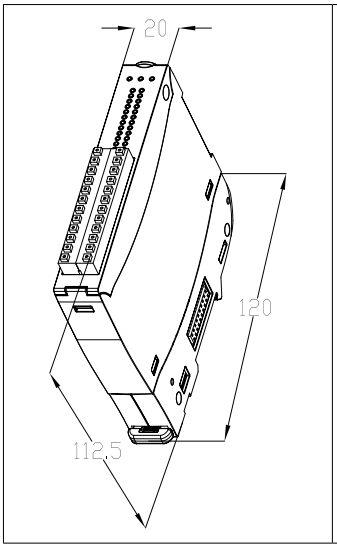


Once inserted, the inserts can be extracted and rotated as desired.

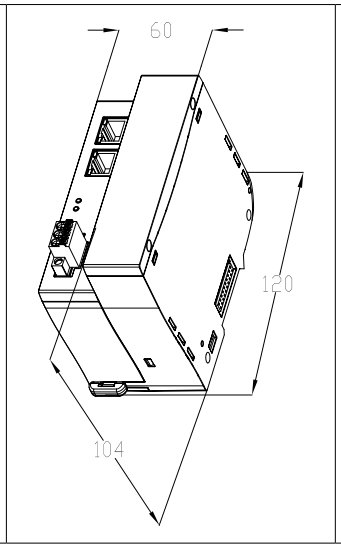
2.4. Mechanical dimensions

The mechanical dimensions of the product, without the DIN rail, may be seen in the image below.

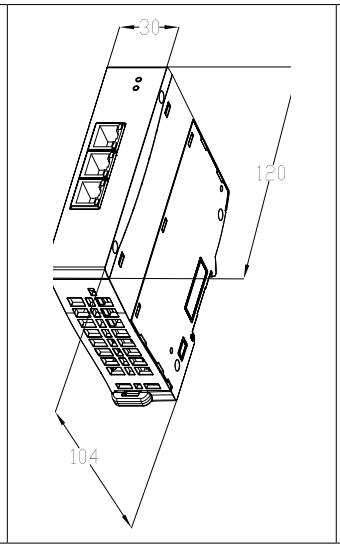
Full G3-xxxx Board



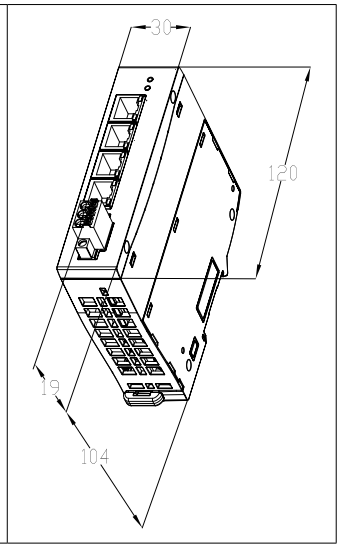
G3-ECAT hub head



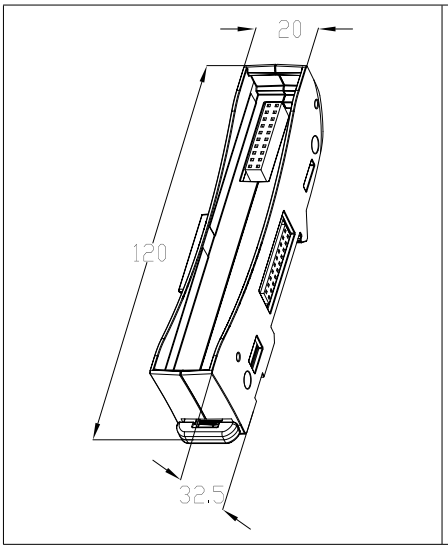
G3-JNC3



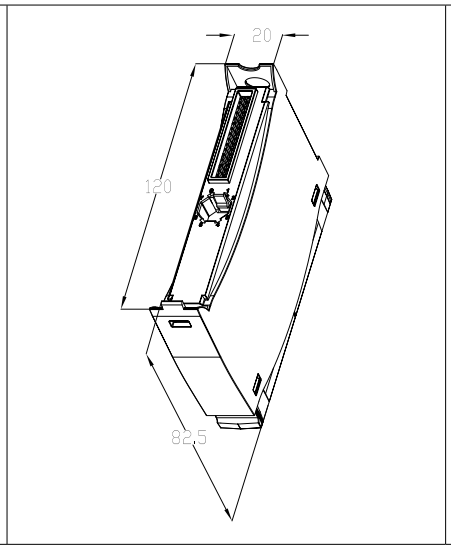
G3-JNC4



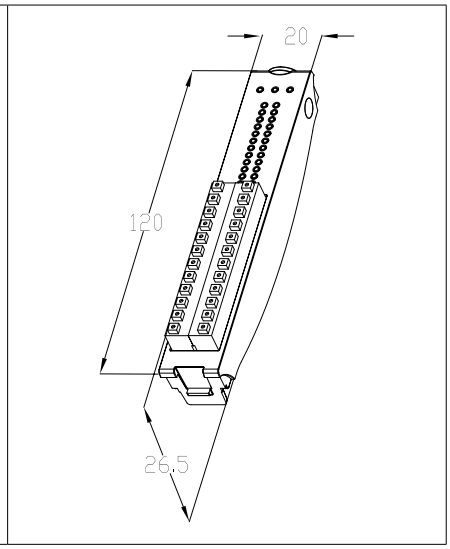
G3-BUS Base



G3-xxxx E Electronic board



G3-xxxx F Front



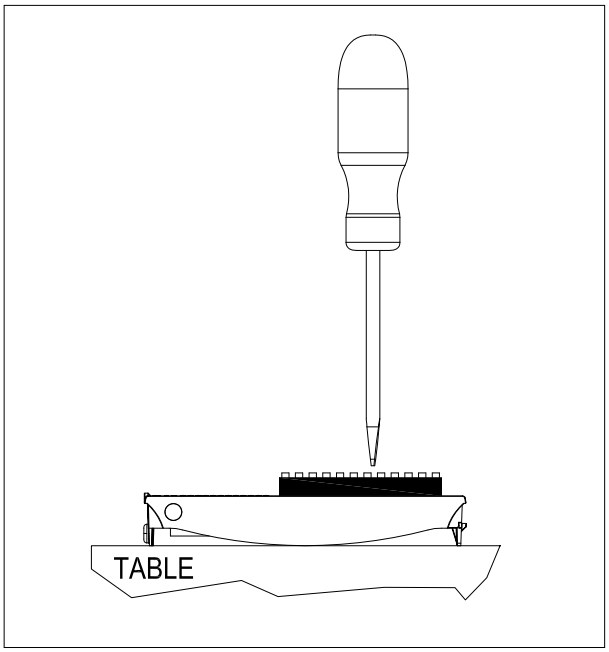
2.5. Front connector wiring

The connector can be wired both with the front coupled with the module and with the front detached from the module.
The front connector can be placed on a bench to facilitate wiring.
For wiring, both the use of NON terminated flexible electrical wire and flexible electrical wire terminated with a TIP are allowed.
Use unipolar flexible electric wire with maximum section of 1.50 mm² (AWG 16) with 8 - 9 mm strip length.
If a TIP is used, use a model with a section appropriate to the wire used and with a length of 8 - 9 mm.

To connect the wire **without TIP:**
press the button with a screwdriver insert the wire into the seat release the button.

To connect the wire **with TIP:**
push the tip directly into the seat
To disconnect the wire:
press the button with a screwdriver pull out the wire/tip
release the button

A pressed flexible wire can be used as an alternative to the TIP.

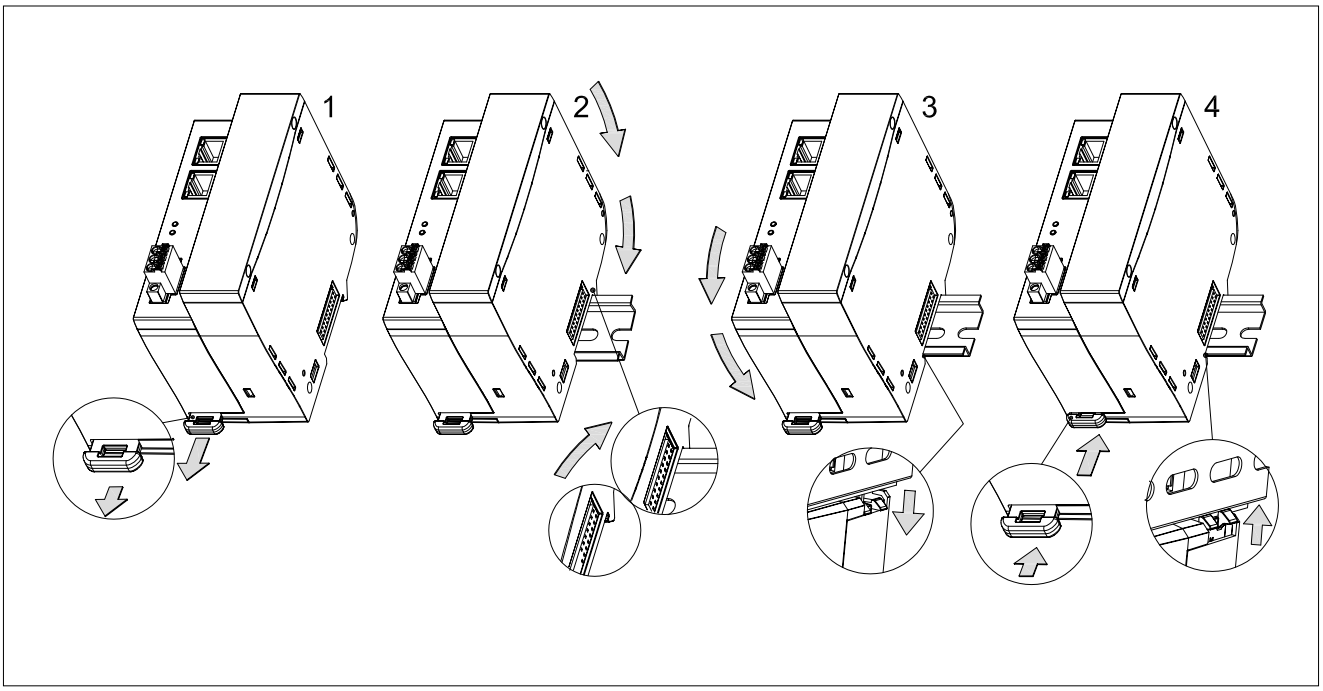


It is recommended NOT TO WELD the electric wire.
Minimum temperature rating of the cable to be connected to the field wiring terminals, 85 °C

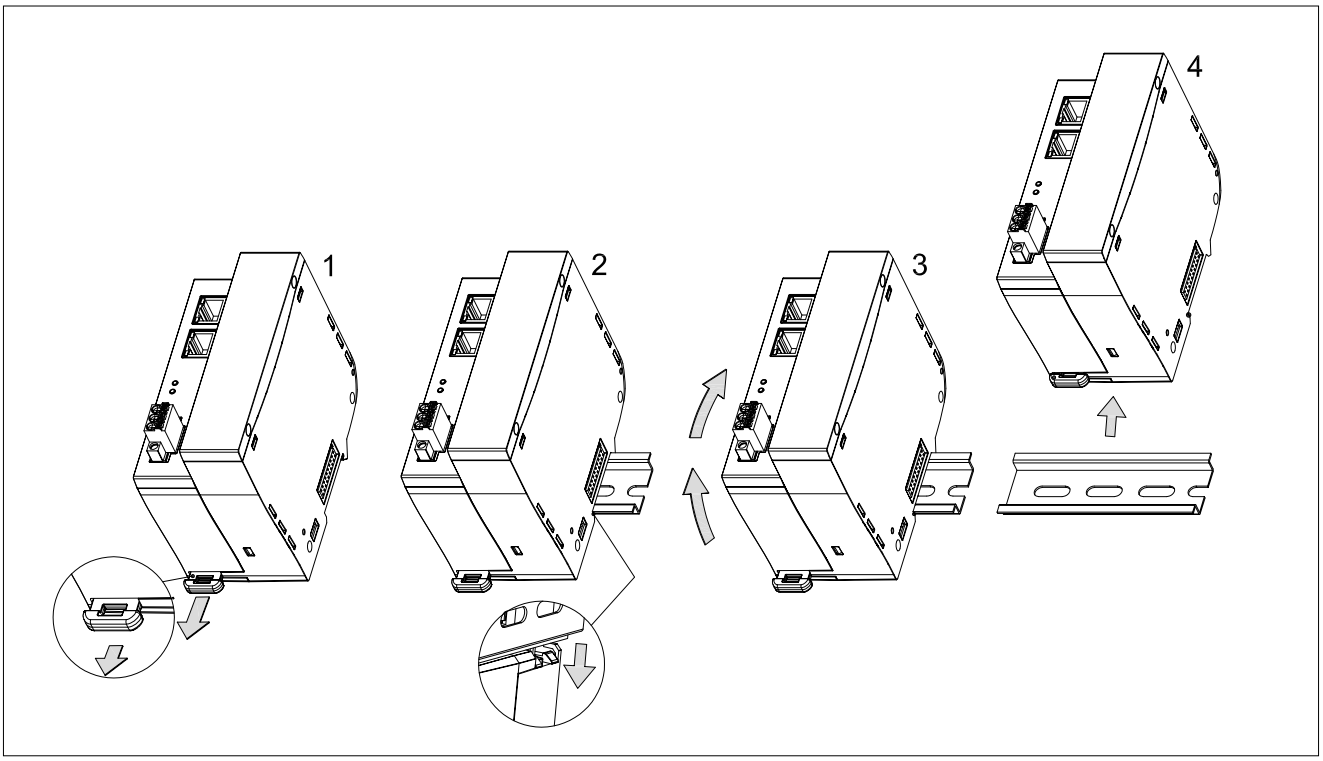
2.6. DIN rail mounting

2.6.1. G3-ECAT

To mount the G3-ECAT to the din bar, unclip the lower clip and leave it in the open stable position. Enter the top of the latch on the rail, rotate the board and place it on the DIN rail. Raise the lower clothespin slightly to free it and allow it to be hooked to the bar even in the lower part.

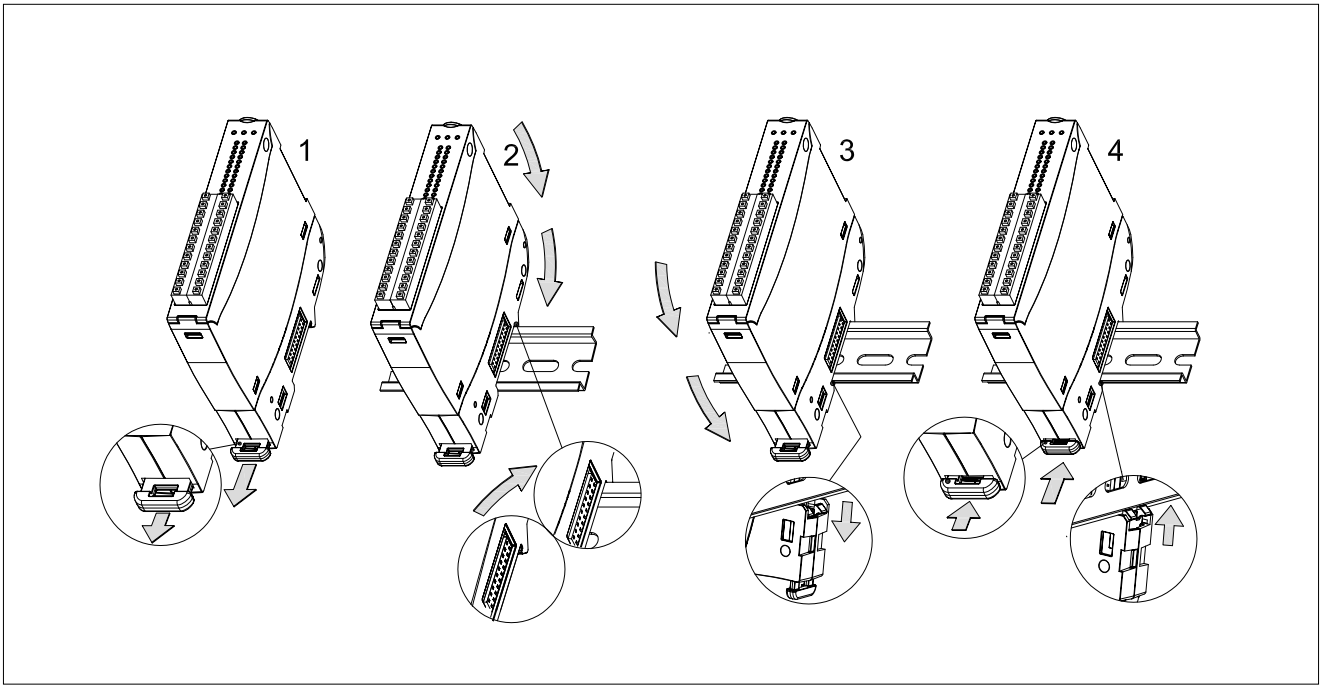


To remove the head the hub from the DIN rail, release the lower clip by slightly levering with a screwdriver and turn the board to release it.

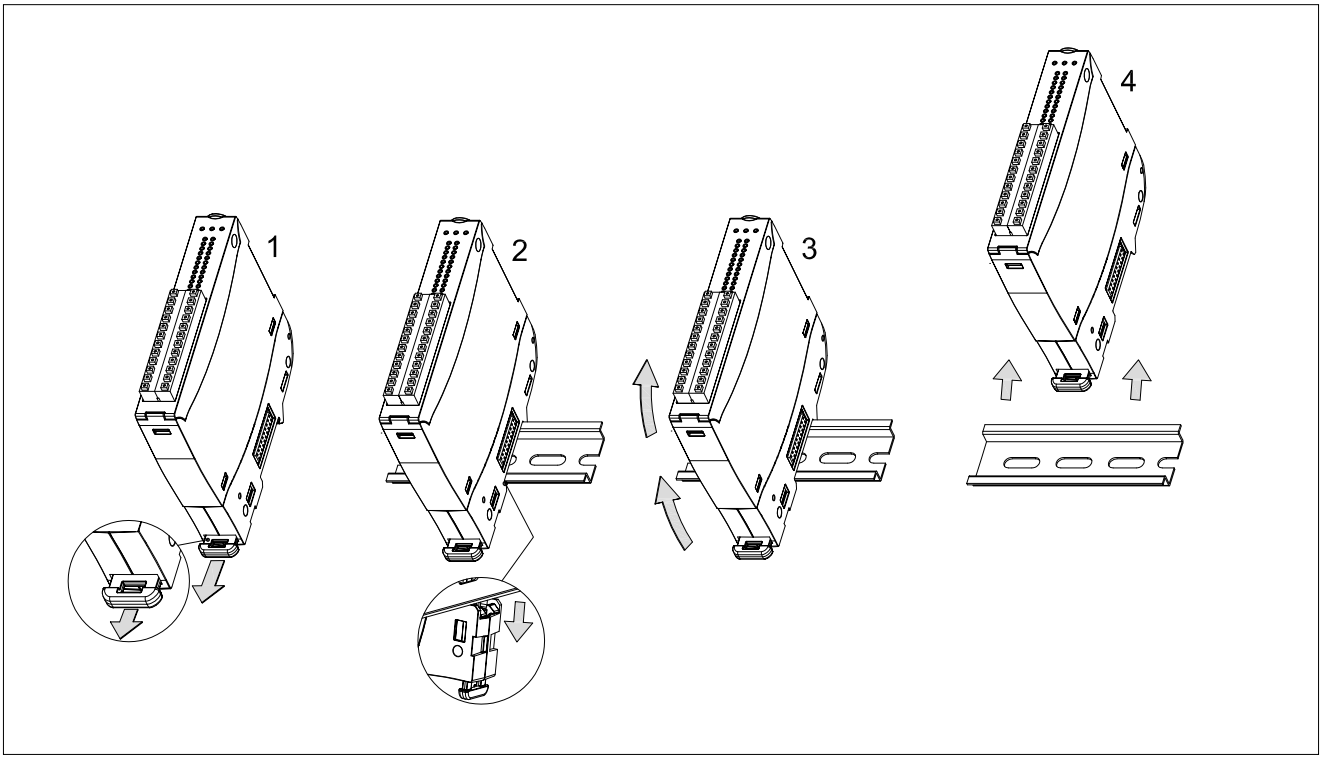


2.6.2. G3-xxxx (all models unless otherwise specified)

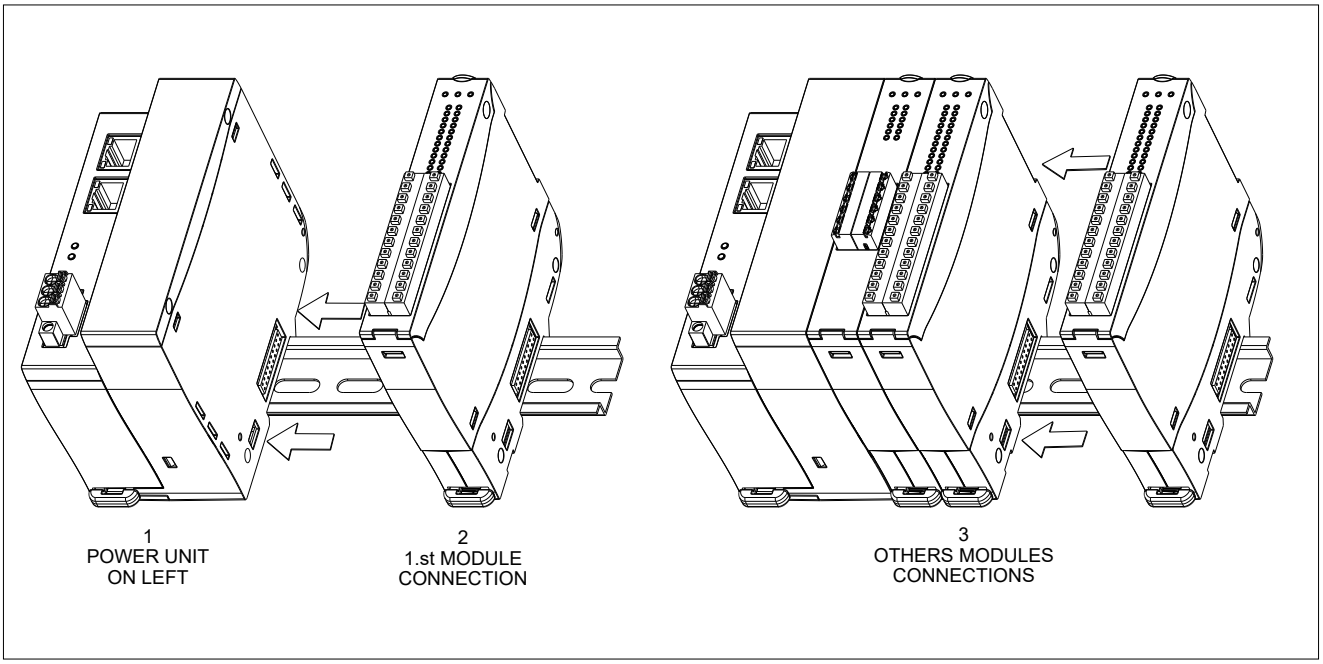
To mount the module to the din rail, unclip the lower clip and leave it in the open stable position. Insert the part top of the hook on the rail, rotate the board and place it on the DIN rail. Raise the lower clothespin slightly to free it and allow it to be hooked to the bar even in the lower part.

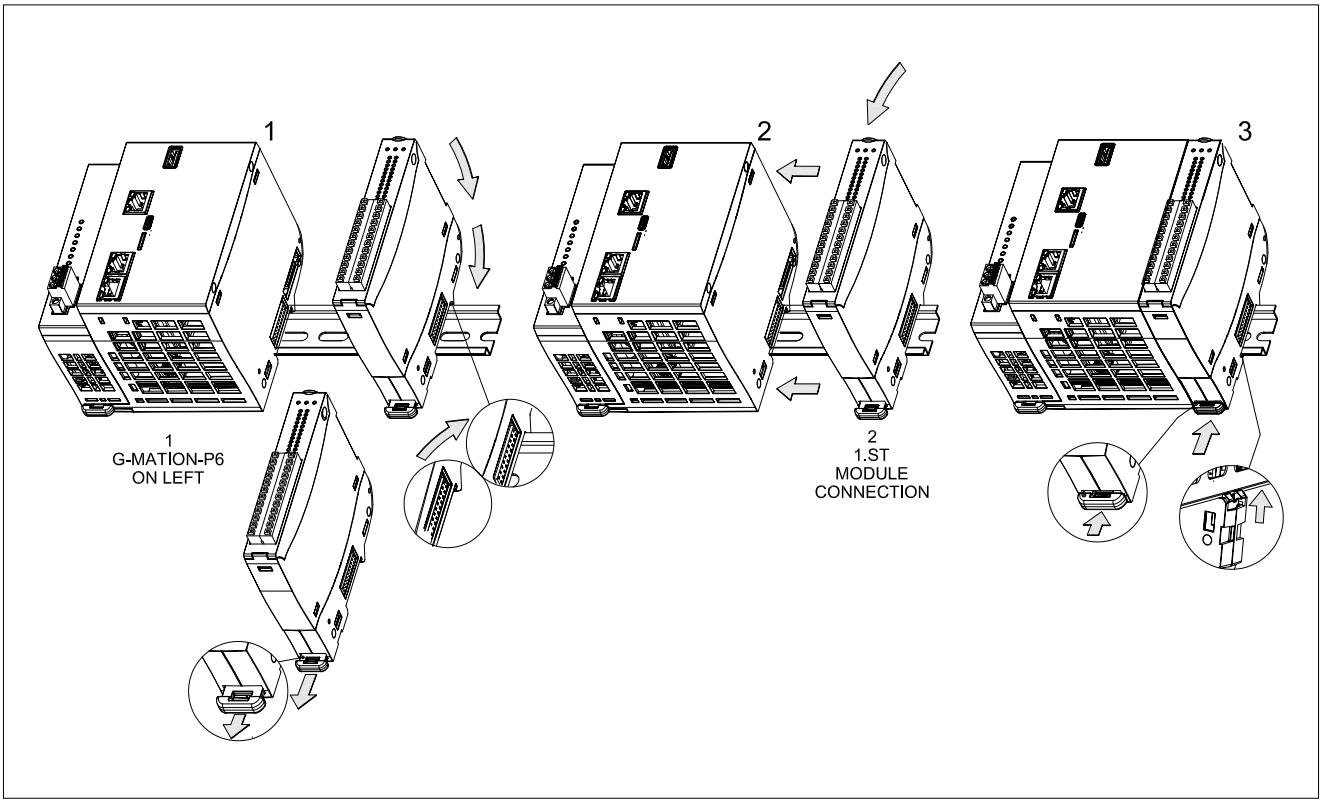


Remove the board from the DIN rail, release the lower clip using a screwdriver to lever it slightly, and turn the board to release it.

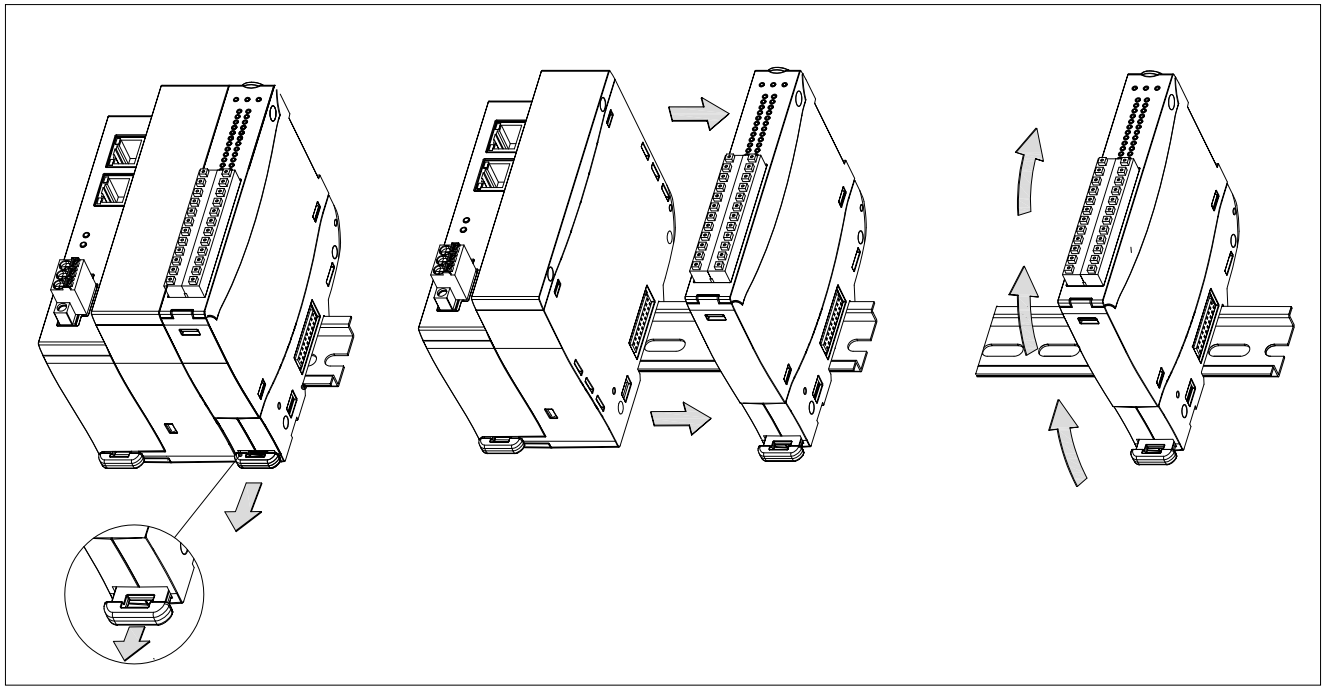


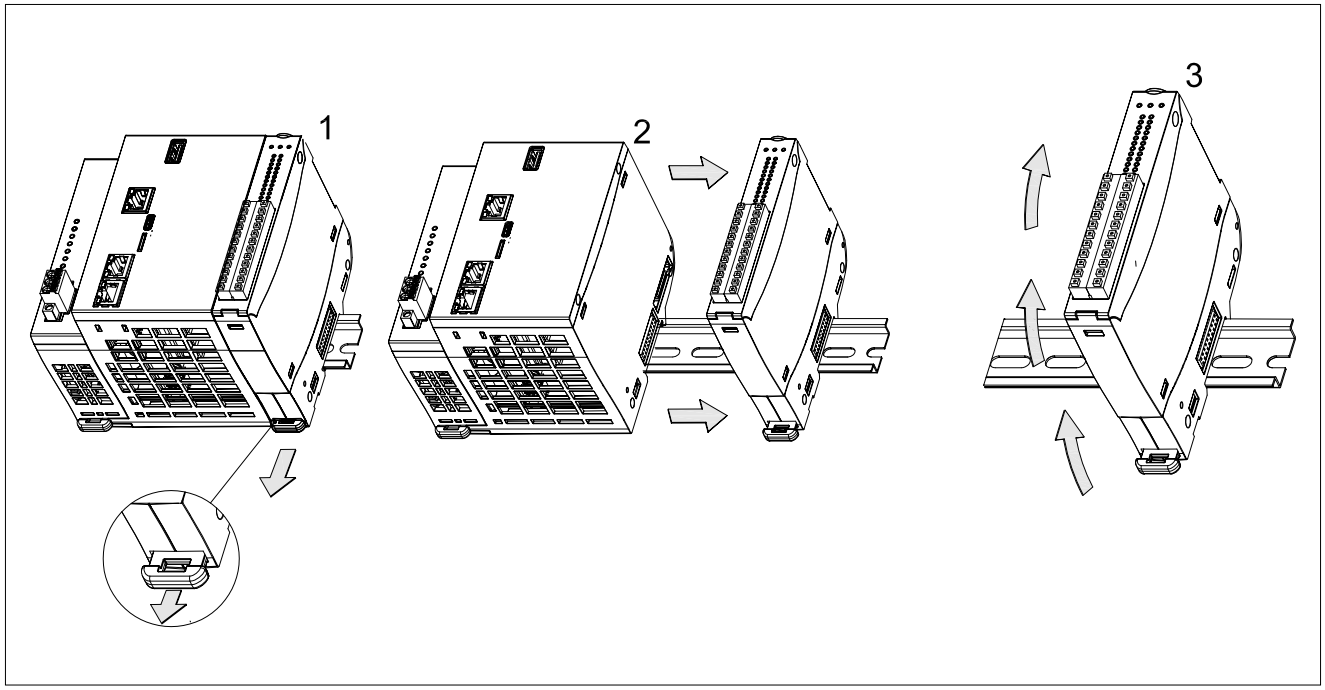
Once the board has been coupled, it is possible to secure the lower clip in the stable released position and slide it longitudinally on the rail until it is coupled to the previous board.





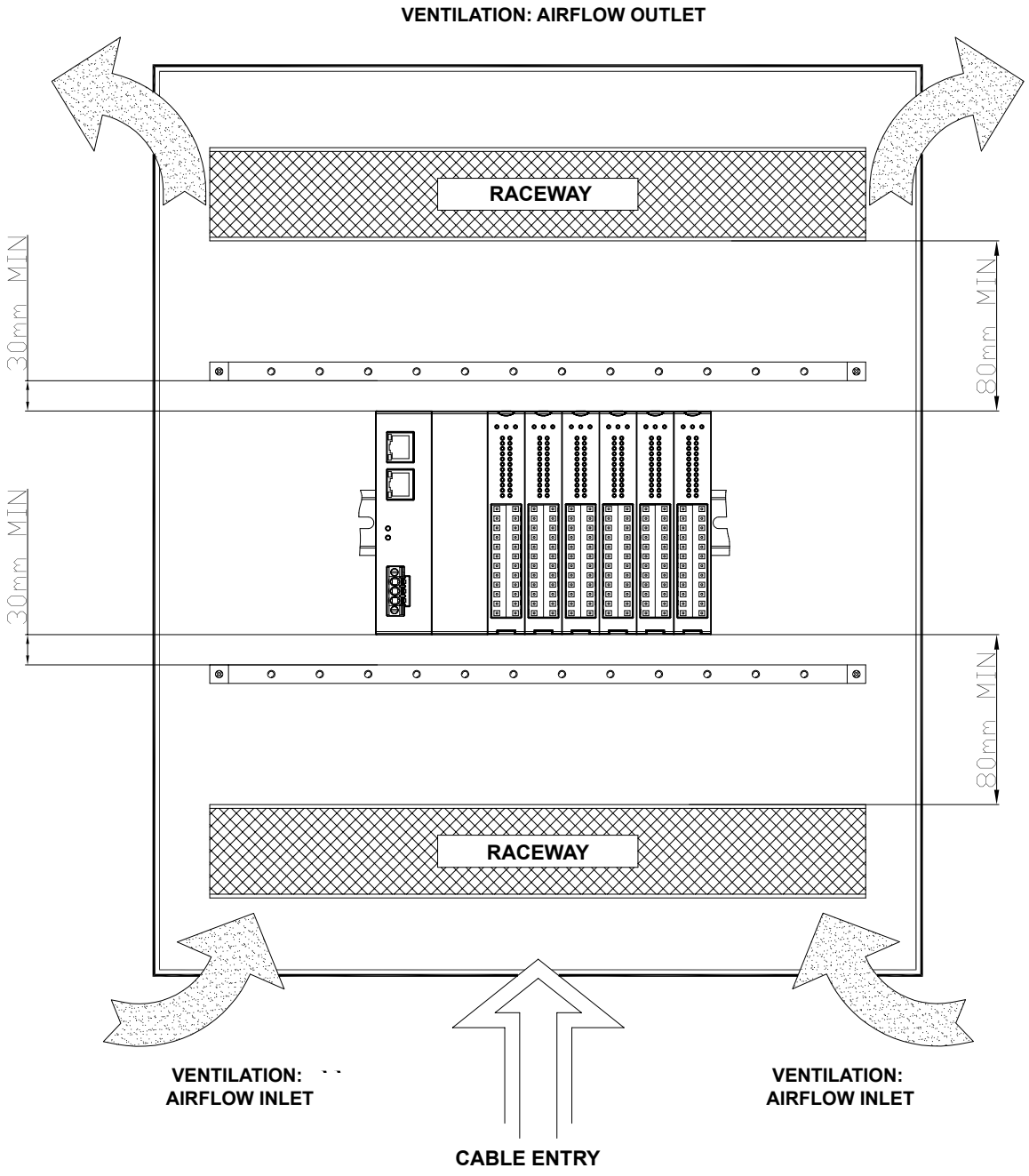
Once coupled, reinsert the lower clip so that the coupling with the DIN rail and the left board is firm and maintained by the force of the internal spring.
To release the board from the rack, use the lower clip and lock it in the stable released position. Slide the board to the right to separate it from the rack. Use the lower clip again and pull it so that you can lift the board from the din r.





2.7. Positioning

For the installation into an electrical cabinet of a G3 I/O rack, the ventilation distances as defined in the figure must be respected underlying.



3. TECHNICAL SPECIFICATIONS

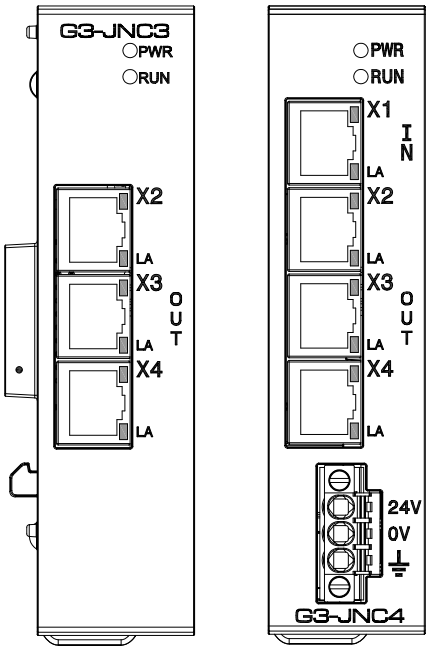
3.1. Board equipment

Different topologies for EtherCAT networks can be configured with **G3-JNC** junction modules.: Linear, Star, Tree.
All I/O modules connected to the G3-JNC are visible to the master as independent and separate Ethercat nodes. The G3-JNC module supports Distributed Clock operation and Cable Redundancy.

The modules are available in two formats:
- The G3-JNC3 module consists of 3 RJ45 ports and an interface to the G-Mation G3 system bus. System bus is the input port, while the others allow to connect new Ethercat devices to those present in the bus. The G3-JNC3 module does not require external power.
- The G3-JNC4 module is a stand-alone Ethercat switch consisting of 4 RJ45 ports. It allows to create complex network topologies and requires an external power supply of 24Vdc±25%, 150mA max.

TECHNICAL DATA	
RJ45 ports	3
Input port	Directly connected with bus G-Mation G3
Fieldbus connection	IN / OUT standard RJ45 connectors. Use minimum Cat 5E Shielded STP cable for 100m maximum cable length
Power supply	From G3-ECAT or G3-Px modules, it doesn't need any external power supply connection
Power dissipation	1,2 W, ±5%
G3-JNC3 – ET1100 port map	IN G3-BUS → PORT 0 X2 → PORT 1 X3 OUT → PORT 2 X4 → PORT 3
G3-JNC4	
Power supply	24VDC ± 25% 3A max; 32V max tension
Power dissipation	1,8 W, ±5%
RJ45 ports	4
Fieldbus connection	IN / OUT standard RJ45 connectors. Use minimum Cat 5E Shielded STP cable for 100m maximum cable length
Protection	Reverse polarity
G3-JNC4 – ET1100 port map	IN X1 → PORT 0 X2 → PORT 1 OUT X3 → PORT 2 X4 → PORT 3
MECHANICAL DATA	
Dimensions	120x110x30mm
Weight	150g
Protection level	IP20 For UL: not UL evaluated. Open type device
Attachment	mechanically snaps onto DIN rail
Connettors	RJ45 + 3 pole 5.08 pitch removable connector (G3-JNC4 only)
ENVIRONMENTAL CONDITIONS	
Working temperature	-10...55°C
Storage temperature	-20...70°C
Humidity	max. 90% Rh not condensing
Pollution degree	2
Maximum altitude	2000 m

3.2. Meaning of LEDs

	ACRONYM	COLOR	LED STATUS	MEANING
MODULE DIAGNOSTICS 	**PWR**	YELLOW	OFF	no power supply
			ON	power supply present
	RUN	GREEN	OFF	**INIT** or **BOOT** status
			Blinking: 2.5 Hz (Slow blinking)	**PreOperational** status
			Single Flash: on 200 ms off 1000 ms (Single Flash)	**SafeOP** status
			Flickering: 10 Hz (Fast flickering)	**BOOT** status
			ON	**Operational** status
	Note		There is a yellow LED that is always off in RJ45 connectors as it is not used by the Ethercat protocol.	

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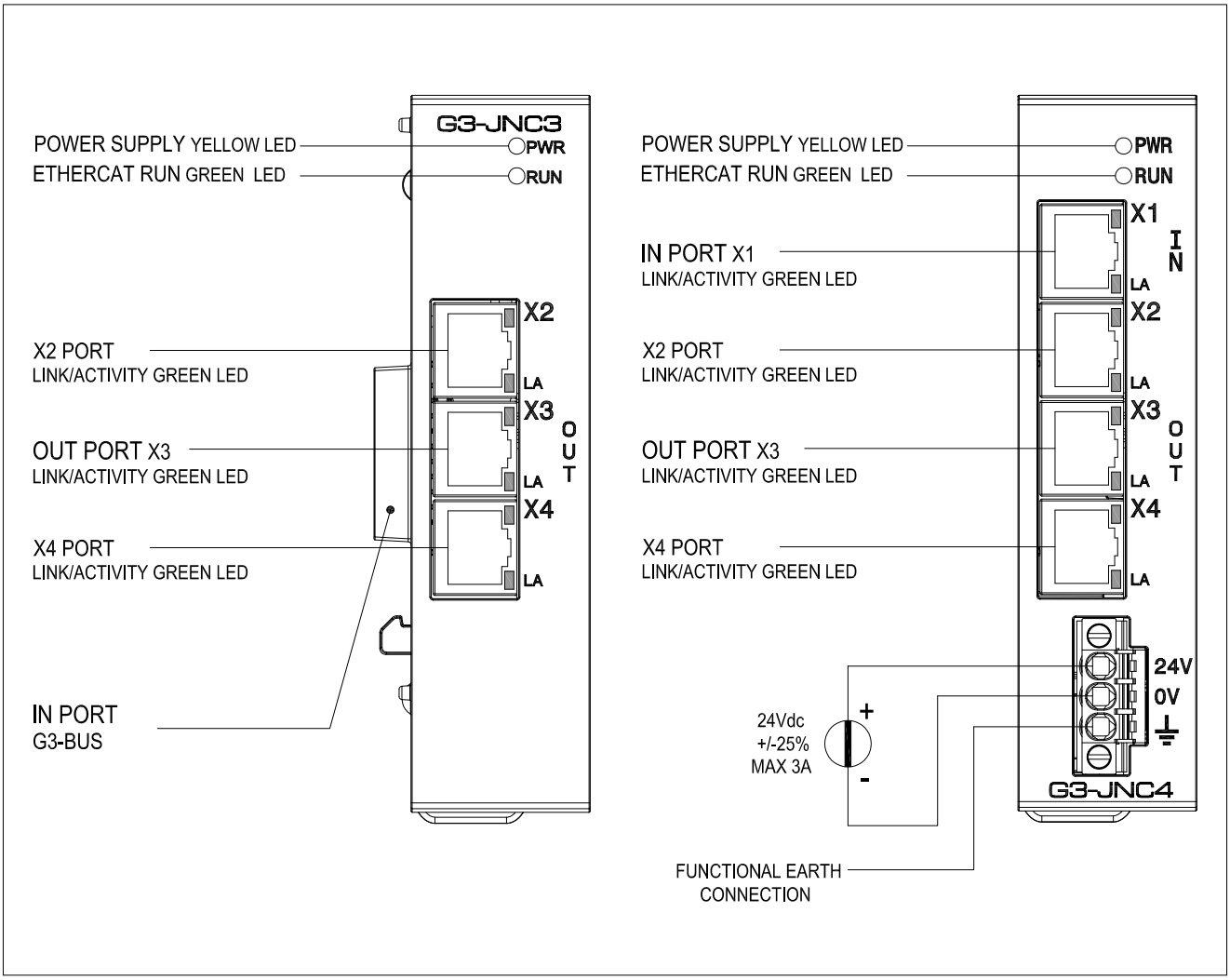
3.3. Connections

3.3.1. Front connections



3.3.2. Power wiring

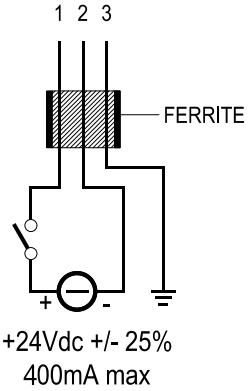
The G3-JNC4 module must be connected to a 24 V DC power supply. The same 24 VDC power supply unit can power more than one device.

Make sure that the current supplied by the power supply unit is greater than the sum of the maximum current absorbed by all connected devices.

Use single-pole flexible electric wire with 0.75 .. 1.50 mm² section and 8 .. 9 mm strip length to wire the POWER SUPPLY (24V/0V).

Use YELLOW/GREEN unipolar flexible electric wire with 1.0 .. 1.50 mm² section and 8 .. 9 mm strip length for PE wiring.

Since the device is not equipped with a circuit breaker, one must be plugged in upstream, with a protective fuse. The switch must be located in the immediate vicinity of the device and must be easily accessible by the operator. For the 24 Vdc power supply, use a separate line from the one used for electromechanical power devices such as relays, contactors, solenoid valves, etc. In case there are large variations in the mains voltage, use a voltage stabilizer. In the vicinity of high-frequency generators or arc welders, use suitable mains filters.



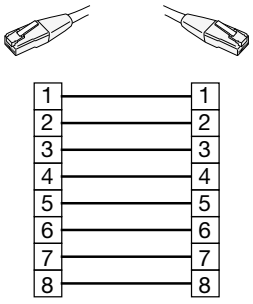
Connect the power cords to the power connector.

Fit the ferrite core, supplied with the product, as close to the device as possible to limit the susceptibility of the device to electromagnetic disturbances. The 24 Vdc power cords must follow a path separated from the plant or machine power cables..

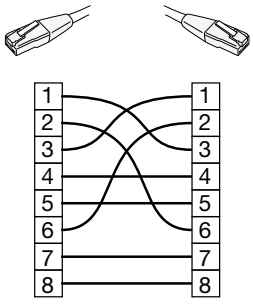
Caution: GROUND the product through the power clamp using a section cable as per the previous indication. Make sure the connection is efficient. A missing or inefficient ground connection can cause the device to operate unstable, due to excessive environmental disturbances. In particular, check that:

- the voltage between ground and earth is < 1 V;
- the ohmic resistance is < 6 Ω.

3.4. EtherCAT network wiring



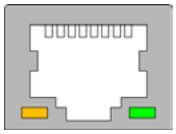
Cablaggio diritto



Cablaggio incrociato

The Ethercat network with standard RJ45 connectors that have the metal body to have, once the cable has been stapled, the GROUND connection of the screen. The module accommodates both the wiring version STRAIGHT that the wiring CROSSED version. For network cabling, use standard ethernet cable. shielded with minimum CAT5e category. The maximum length of the cable between one node and the next is of max 100 m.

Caution: Do not run the Ethercat cable next to wires to avoid interference in data transmission.



Pin	Denomination	Description
1	TX+	Data transmission +
2	TX-	Data transmission -
3	RX+	Data receiving +
4		
5		
6	RX-	Data receiving -
7		
8		

3.5. Resource software management

G3-JNC3 and G3-JNC4 are Ethercat Junction modules and they don't have objects, have NO OBJECTS. The ESI file describes the type of Ethercat connections and contains basic INFORMATION such as the VENDOR.

The ESI files called:

Gefran G3-JNC3 Vxx and **Gefran G3-JNC4 Vxx** where xx is the version.

The file is available on the Gefran WEBSITE (www.gefran.com)..

3.5.1. Module Objects

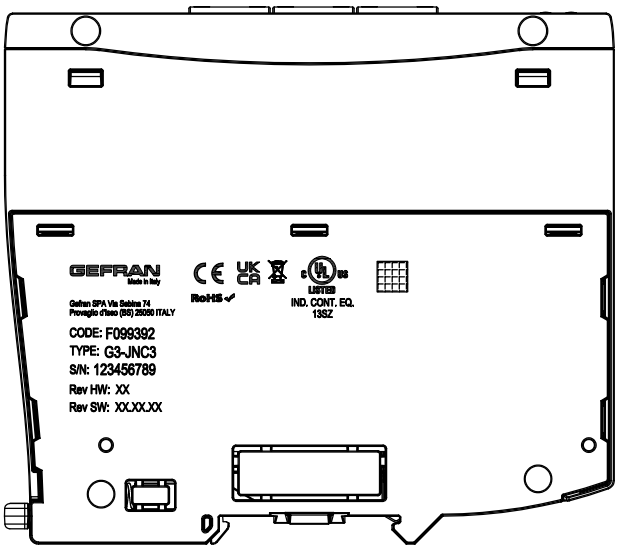
There are no objects for the G3-JNC3 module and for the G3-JNC4 module.

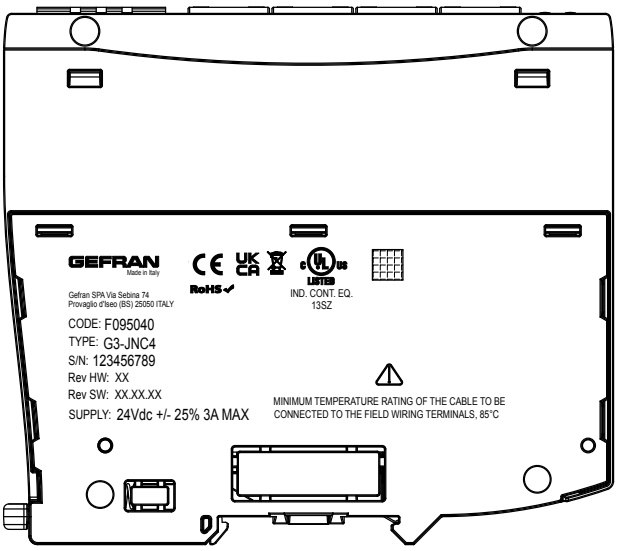
4. ACRONYM AND ORDER CODE

MODULE	ORDER CODE
G3-JNC3	F099392
G3-JNC4	F095040

5. MARKING

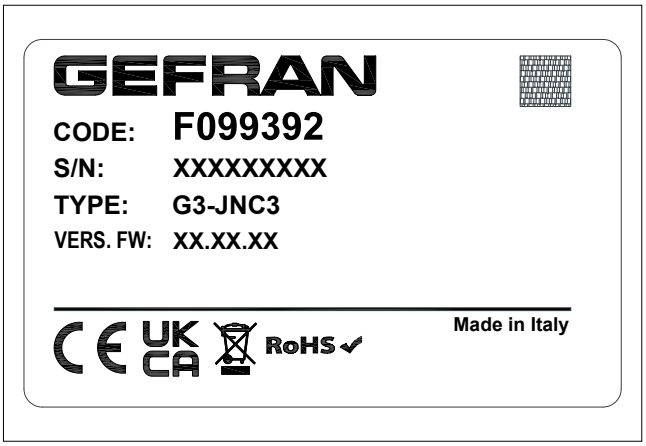
Every module contain the datas of every module part and the full module.

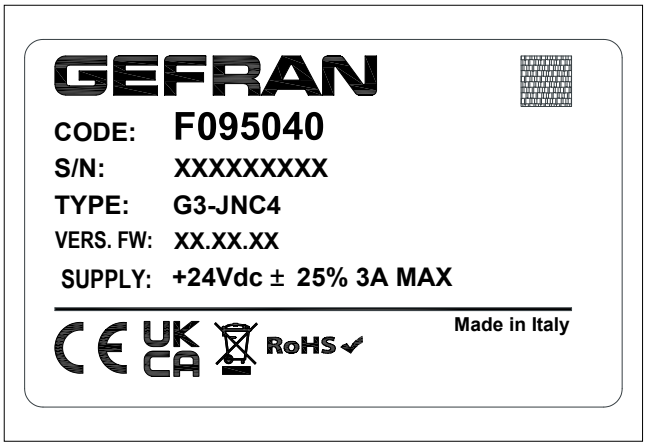




The following information may be found on the label:

- CODE: product code
- S/N: product serial number
- TYPE: product name / description
- HW: hardware version 1 .. 99
- SW: software version 1.0.0 .. 99.99
- GEFRAN logo
- certifications
- logo specifying product disposal





This symbol present on the product label stands for further indications on product manual. For correct and sale installation, follow the instructions and observe the warnings contained in this manual. No hazards shall arise by any reasonably foreseeable misuse in a way not intended, and not described in this manual. The complete manual is available for download from the website www.gefran.com. UL file number E-198546.

Certifications

CE	This device conforms to European Union Directive 2014/30/EU and 2014/35/EU as amended with reference to generic standards: **EN 61000-6-2** (immunity in industrial environment) **EN 61000-6-4** (emission in industrial environment) - **EN 61010-1** (safety regulations).
cULus	cULus listed, Conformity UL61010-1 - File: E198546

6. DISPOSAL

The product must be disposed of in accordance with the regulations in force.
Some of the components used in the devices can cause damage to the environment if incorrectly disposed.

Pursuant to art. 26 of Legislative Decree 14 March 2014, no. 49 “Implementation of Directive 2012/19/EU on waste from electrical and electronic equipment (WEEE)”.

The symbol showing a crossed-out wheeled bin on equipment or its packaging indicates that the product must be collected separately from other waste at the end of its useful life.

By collecting the disused equipment separately, it can be recycled, treated or disposed of in an environmentally friendly manner, thus helping to prevent the environment and public health from being affected negatively and enabling reuse and/or recycling of the materials forming the equipment.

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