GEFRAN

G-Mation P6

Modular in-panel PLC

USE AND INSTALLATION MANUAL

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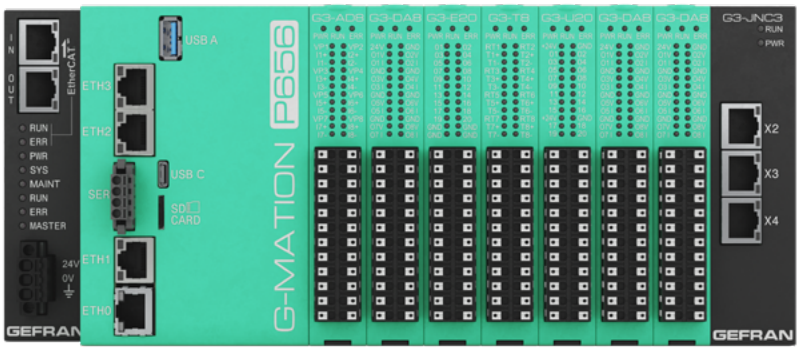


WARNING!

This manual must be available to persons interacting with the devices described here.
Always make sure you have the latest version of the manual, which can be freely downloaded from the GEFRAN website (www.gefran.com).
The extended version of the documentation presented here is also available online at https://wiki.gefran.com/wiki/g-mation-eng/ or by scanning the QR code

Installers and/or maintainers are obliged to read this manual and to scrupulously follow the instructions contained therein and in the annexes thereto, since GEFRAN shall not be liable for any damage caused to persons and/or property, or suffered by the product itself, if the conditions described below are not complied with

SOMMARI ED INDICI

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.

1.3. EtherCAT declaration

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

1.4. Glossary

Bootloader	A programme that loads the PLC in the boot phase.
Checksum	Sequence of bits used for verify the integrity of a file.
COBID	Communication OBject IDentifier, 11- bit identifier of a CAN frame.
MD5	Algorithm used to calculate the file checksums.
PDO	Process Data Object.
SDO	Service Data Object.
Watchdog	HW or SW supervision system that recovers temporary and brief system malfunctions.

2. G-MATION P6 CONTROLLER

2.1. The G-Mation platform

Gefran's G-Mation platform offers an advanced solution for industrial automation.
At its heart is the 'G-Mation P6' PLC, a **high performance** realtime controller offering industrial **edge computing** capabilities.

Designed from the beginning for **cybersecurity**, the G-Mation P6 integrates **Docker** technology to deploy new applications quickly and securely, even on machines already installed in the field.

The controller offers a **webserver** where all pages and dashboards for interaction with different users can be hosted. The web-based visualisation technology guarantees a modern and intuitive user experience, together with great flexibility in the number and format of displays on any device equipped with a browser.

G-Mation P6 is a dual **Ethercat** master with redundancy and distributed clock.

The modular PLC is expandable with **G-Mation G3** cards via the proprietary Ethercat-based G-BUS connector.
Complex star and tree topologies can be realised using the G3-JNC modules.

Programming is done with a single development tool: **GF_PROJECT**, which, through the five standard IEC61131-3 languages and a powerful graphic editor, allows complete and rapid management of the application software.

A series of specific **application TEMPLATES** for the **PLASTICS** and **THERMAL TREATMENT** sectors are also available for immediate use and easy customisation.

2.2. Architecture

2.2.1. Docker technology

The P6 series supports installation of Docker applications to install additional functionality to new and existing machines, without impacting PLC performance and without the need to modify the machine software.

Docker technology allows applications to directly access the resources of the controller or connected devices, integrating the edge directly into the machine.

Monitoring of production indices, control of energy consumption, advanced diagnostics, utilities for tooling and maintenance, digital twin, predictive maintenance, are just a sample of the potential.

2.2.2. Remote Assistance

Secure VPN tunnell for remote assistance and remote monitoring. G-Mation P6 allows connection to the Gefran cloud through a simple docker application that can be installed at any time.

SECURE VPN TUNNELING

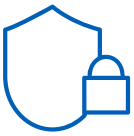
Once connected, the machine will also benefit from OTA updates and fleet management policies..

2.2.3. Secure data acquisition, analysis and transmission

The PLC acquires data and process states directly from the field and makes them securely available to remote systems (Edge or Cloud) for processing by systems such as AI or MES. This is all thanks to the implementation of communication standards such as MQTT and OPC UA and supports systems to buffer data for transfer to the cloud.

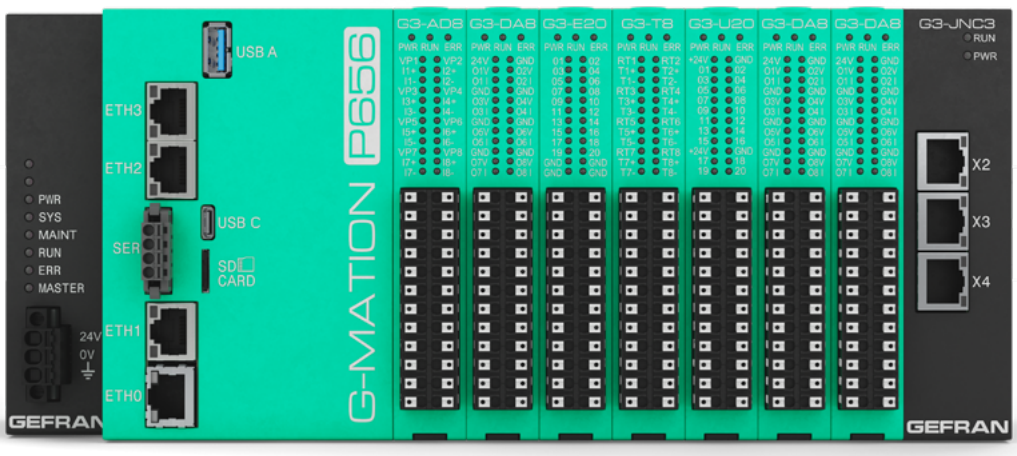
2.2.4. Cyber Security

The G-MATION platform plays a key role in cybersecurity, securing communication channels both in the cloud and with other machines, and advanced user management allow the controller and all devices in the machine network to be protected.



G-MATION is designed in accordance with the latest standards and allows the user to achieve the Security Level required by the application, while maintaining basic functionality such as monitoring, remote assistance and updating

For more on docker technology, protocols and cyber security, please refer to the online documentation at https://wiki.gefran.com/wiki/g-mation-eng/ or scan the QR code



2.2.5. Ethercat

The G-Mation P6 controller integrates a dual ethercat master with redundancy and distributed clocking. All tree and star topologies are allowed.

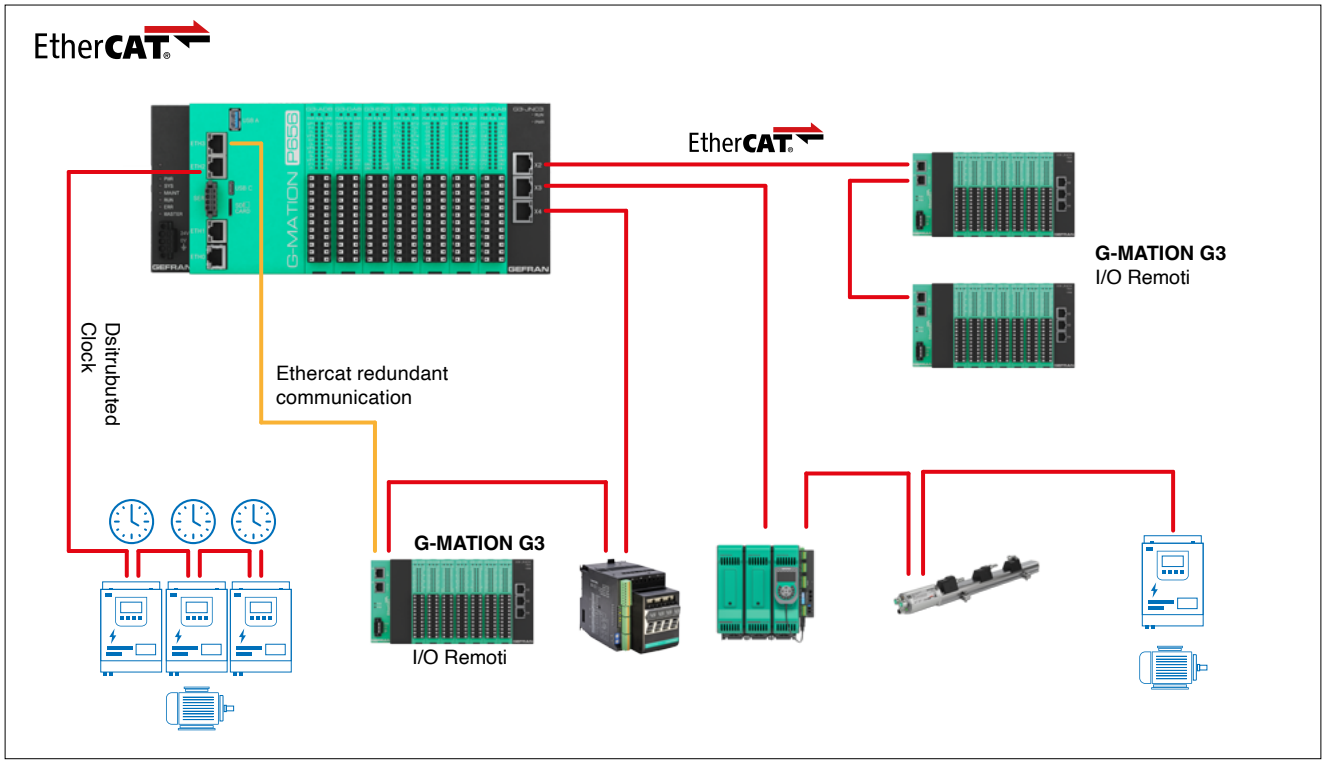


Figure 1 - Example of Ethercat architecture

2.2.6. Can Open

The G-Mation P6 controller can be equipped with a CANOpen port. In the CANOpen network, the P6 CPU can be Master or Slave.

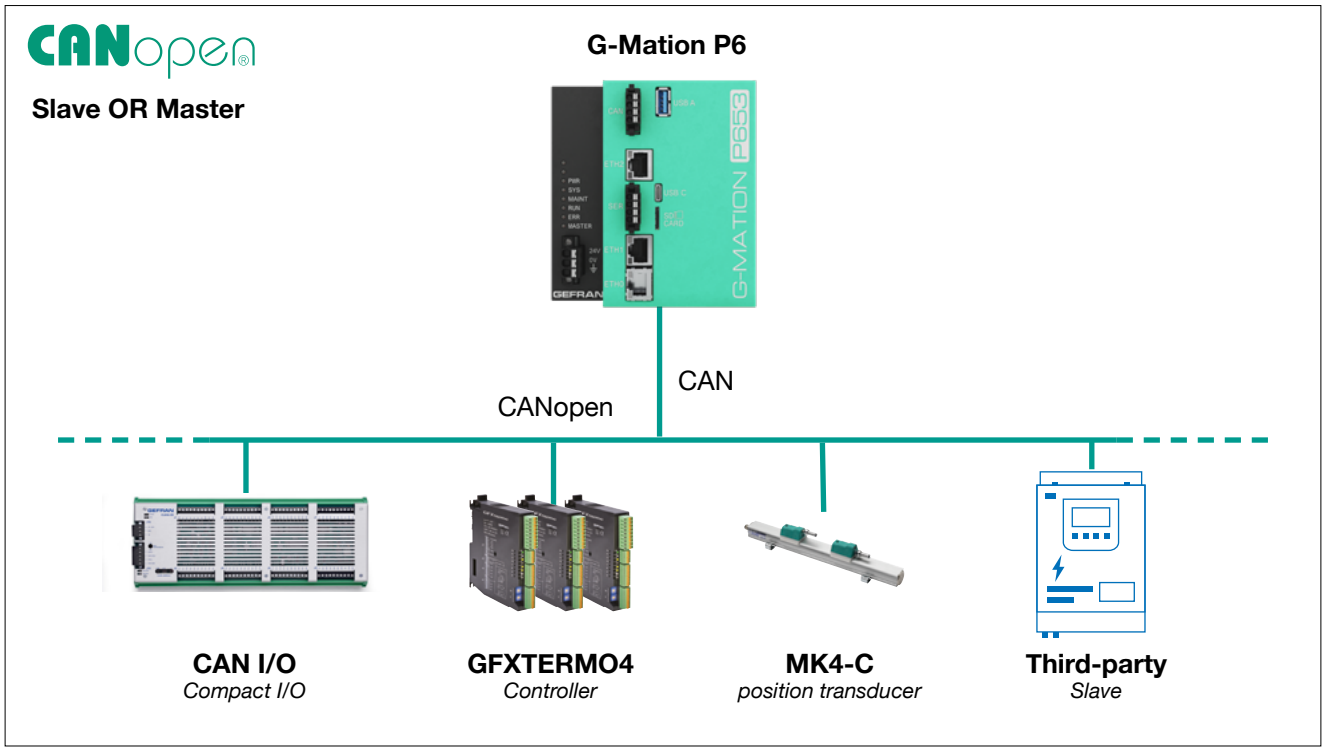


Figure 2 - Example of architecture with CAN (CANopen)

2.2.7. Modbus TCP

The G-MAtion P6 controller can easily interface with other CPUs or company systems in Modbus TCP and be both client and server.

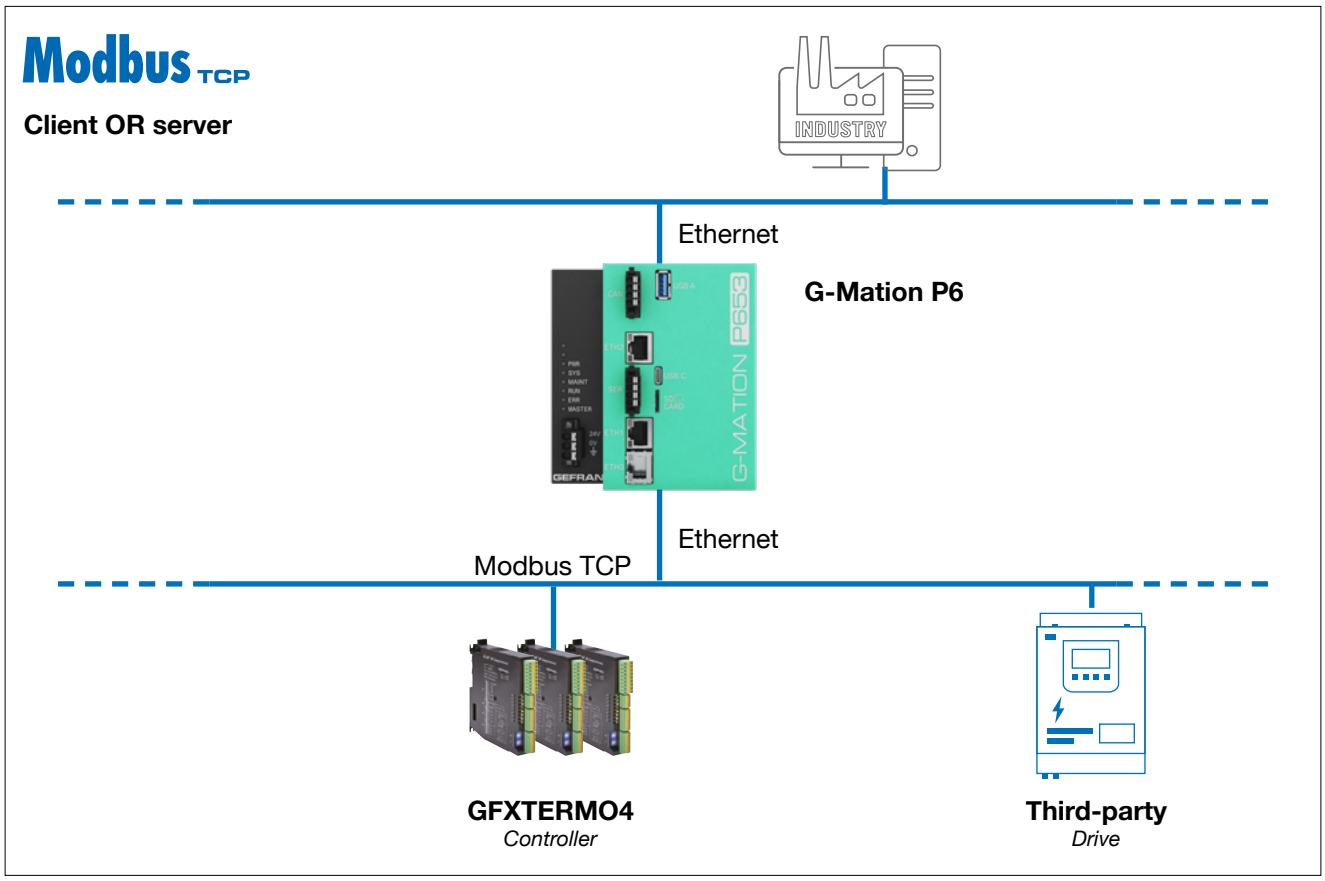


Figure 3 - Example of architecture use with Ethernet - Modbus TCP

2.2.8. Modbus RTU

The G-Mation P6 controller is compatible with RS485-based Modbus RTU communication.
It can act as both Master and Slave.

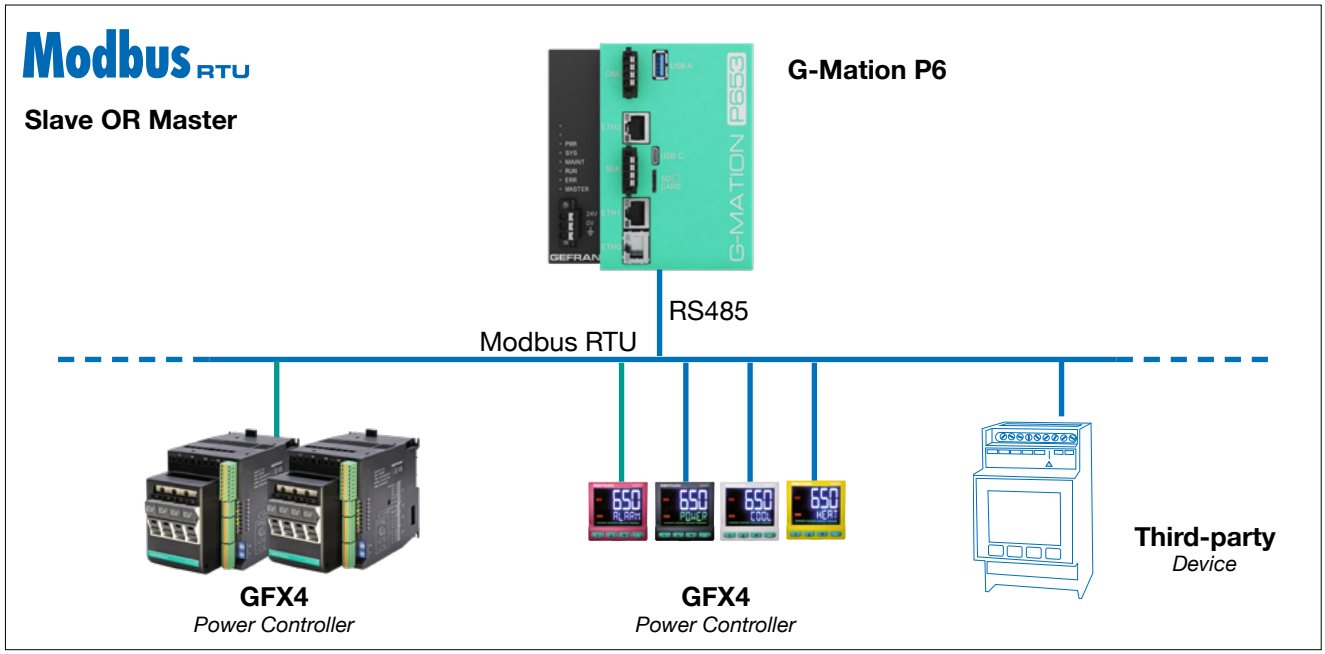


Figure 4 - Example of architecture with Modbus RTU (RS485)

2.3. General power supply

The system is powered by ONE (1) power supply unit as shown in Figure 5.

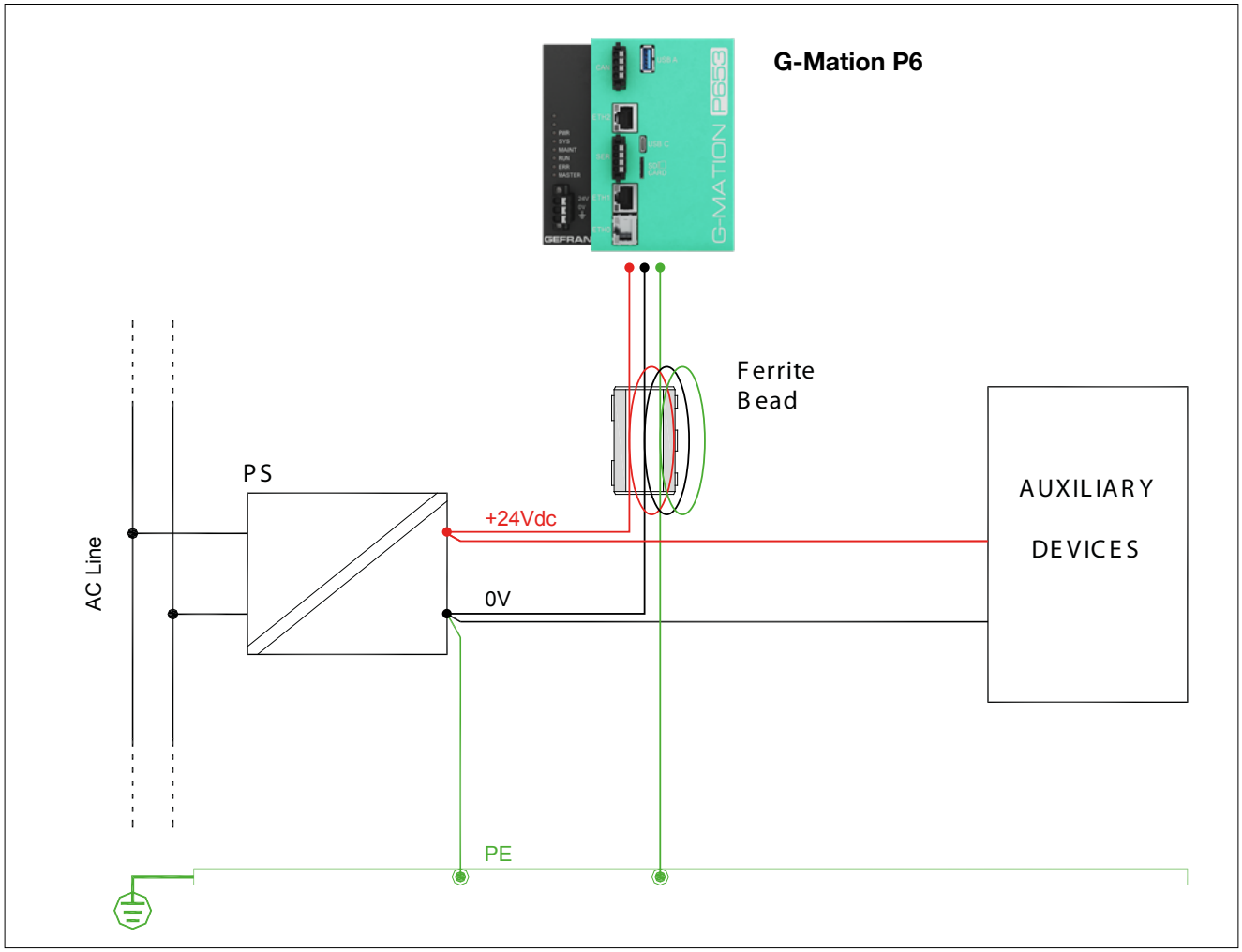


Figure 5 - Power Supply Configuration

For proper system supply, ensure that:

- The power supply is of the necessary power to support the system and further resources connected to it.
- Connect the GND of the power supply to earth (PE) with a direct wire and as short as possible.
- Connect the earth terminal of G-Mation P6 to earth (PE) with a direct wire and as short as possible.
- Insert the supplied ferrite into the power supply as close as possible to the G-Mation P6 control panel, taking care to loop all three cables (+24Vdc, 0V and PE) around the ferrite.

The system power line must follow a different route from the system and machine power cables.

Attention:the temperature of the compartment containing the indoor controller must never exceed 55 °C..

Attention: The +24Vdc supply line must be protected by a UL fuse according to JDDZ (Cartridge Fuses, Nonrenewable). Pro

Attention: Ensure that the earth connection is efficient. A missing or inefficient earth connection may render the operation of the device unstable due to excessive environmental disturbances. In particular, check that:

- the voltage between ground and earth < 1 V;
- the ohmic resistance is < 6 Ω.
- the electrical wire as short as possible and without curls

2.4. Programming tools

2.4.1. GF_PROJECT

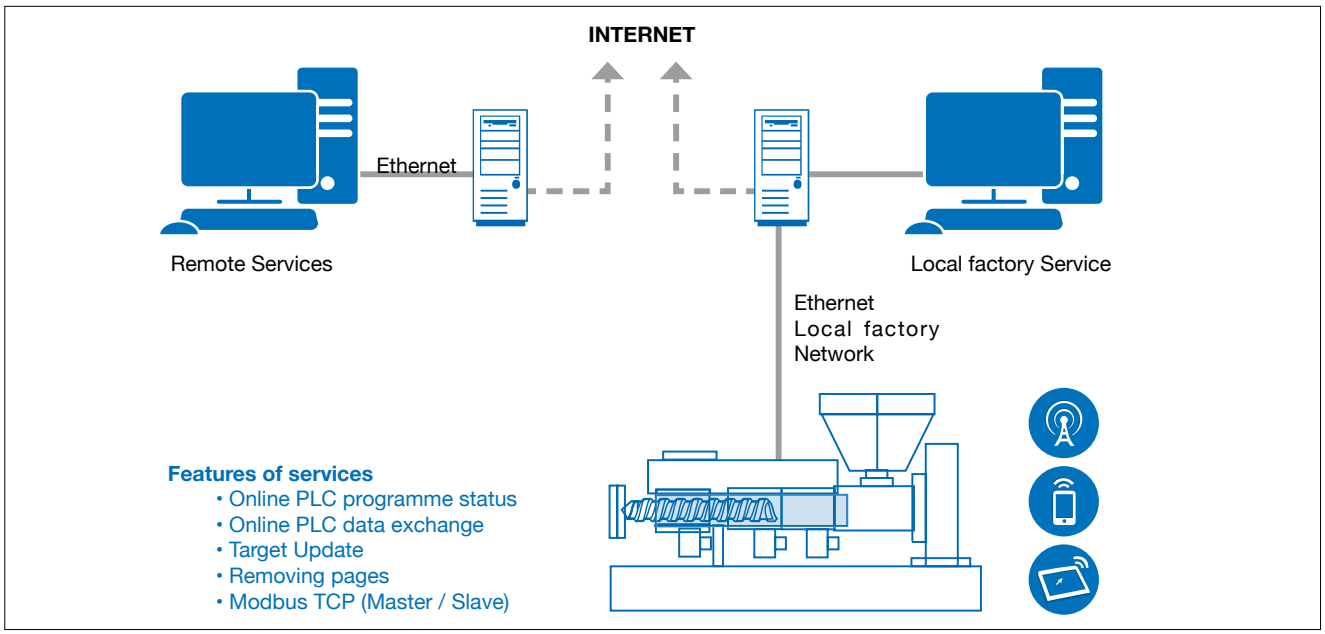
GF_Project is integrated development environment (IDE) for real-time control applications Gefran programmable automation devices.
GF_Project includes a series of tools for the development of different application solutions and those design phases such as maintenance or application software integration, testing and commissioning.

GF_Project able to:

- develop automation solutions while safeguarding the investment in application configuration and reducing time to market;
- realise applications for a complete control ofmachines and plants and the configuration of the graphical interface part;
- develop multi-platform solutions;
- reduce learning time, allowing guided development and eliminate configuration errors by exploiting graphical configuration;
- easily reuse parts of pre-existing designs;

GF_Project consists of integrated software modules, which through specific functionalities, allow an easy and intuitive configuration of an automation project:

- PROJECT MANAGEMENT: the system structure with a graphical visualisation allows each individual project module to be managed in a dedicated manner;
- HARDWARE CONFIGURATION: enables the configuration of field buses and all devices in the system architecture their operation;
- CONTROL: enables the definition of the automation solution according to IEC61131 programming languages (LD, ST, IL, SFC, FBD);
- CODE LIBRARY: the Gefran Function Block library provides configuration support thanks to Gefran's know-how in industrial applications. A series of dedicated FB (Function Block) and F(Function) libraries with specific functions allow the user simple and rapid software integration, reducing development and debugging time;
- OPERATOR INTERFACE: realisation in graphical mode of various user interface pages necessary for the developed application;
- DIAGNOSTICS: using GF_Project it is possible to connect to the device that will host the application to debug the programme and upload updates
- CONNECTIVITY: the environment supports the latest connectivity services to implement remote management or support services;



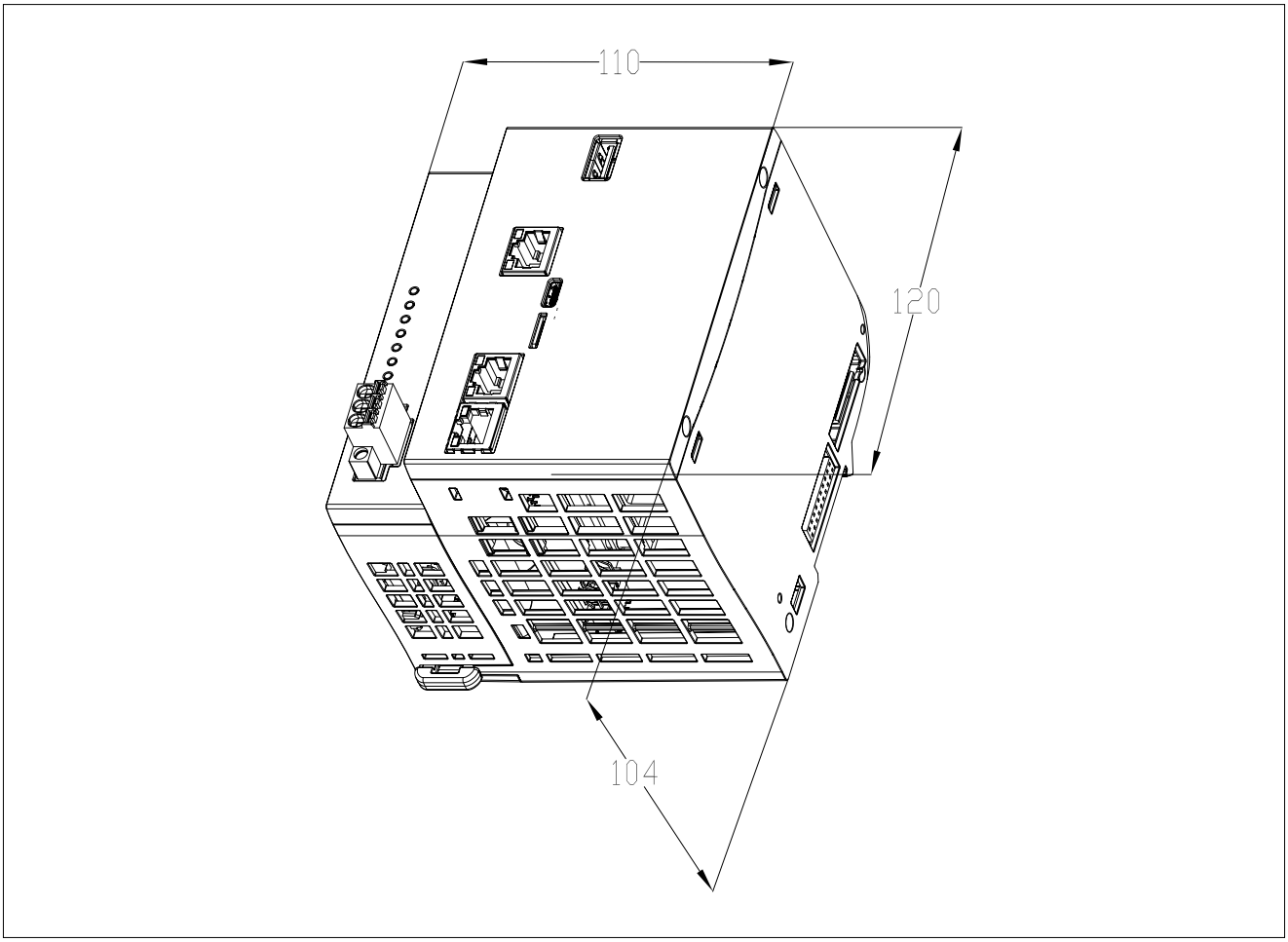
GF_Project supports the programming of the GMation P6 product and comes as a compatible installer for Windows PCs: once installed, it will be possible to install the software licence and use all the intended functionalities Please refer to the GF_Project manual for its use.

2.4.2. System Requirements

	Minimum	Recommended
Operating system	Windows 7 (64 bit)	Windows 10 (64 bit) / Windows 11
Processor	Intel Celeron1.5 GHz	Intel Core i5 2,5 Ghz or higher
RAM	8 GB	16 GB or higher
Free Hard Disk Space	8 GB	16 GB or higher
Graphic resolution	SXGA (1280 x 1024 pixel)	FHD (1920x 1080 pixel)
Ethernet port	1 RJ45	1 RJ45
USB port	1 USB 2.0	1 USB 2.0

3. TECHNICAL DATA

3.1. Dimensions



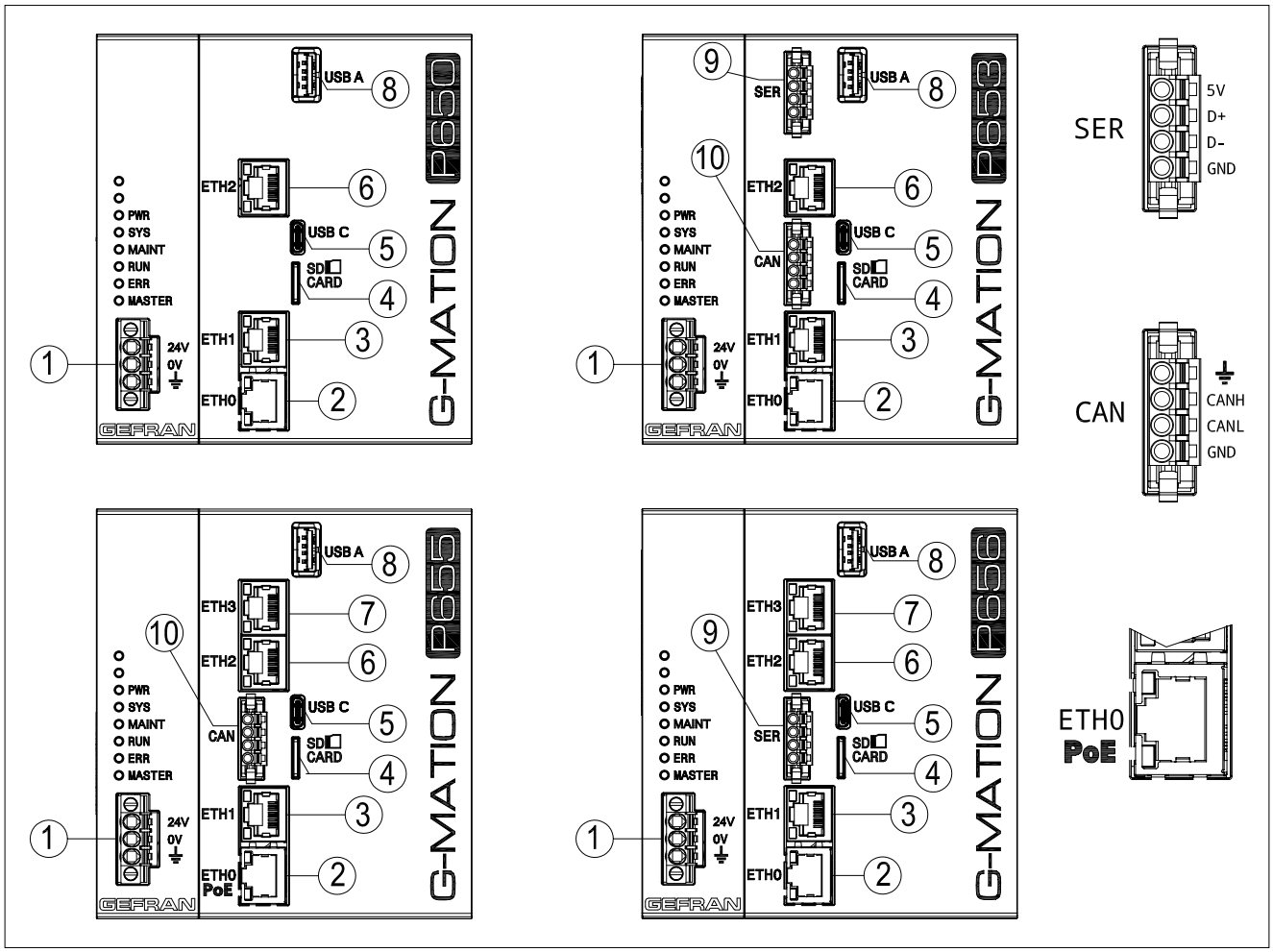
3.2. Dotazioni device

POWER SUPPLY	
Working power	24 VDC ±25%
Current consumption (24 VDC)	7A max
Power dissipation	18 W, ±5%
Protection	Polarity inversion, short circuit on output power ports PoE, G3-BUS, and fast expansion
Connection	3-pole removable polarized connector, screw terminals, max cable section 2,5 mm^2
Overvoltage category	II
Means of Protection	Class III
MECHANICAL DATA	
Dimensions	120x110x20 mm
Weight	709 g (Full Options)
Protection level	IP20 For UL: not UL evaluated. Open type device
Attachment	Mechanically snaps onto DIN rail
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

CONNECTIONS	
Ethernet ports (ETHx)	Number of channels: max 6, of which one could be PoE and 2 ports dedicated for Slave RTE; Connector: RJ45 Speed: 10 / 100 / 1000 Mbit/s Indicators: Green LED link (Link/Act for EtherCAT), yellow LED data
PoE port (ETH0 - optional)	Compatibile with IEEE802.3bt class 6 max 60W
RS485 port (SER - optional)	Optoisolated Connector: 4-pole 3.81mm pitch spring. Speed: 9.6kbit/s … 115kbit/s Terminations and polarization: externally insertable, 5V available on connector
CAN port (CAN - optional)	Optoisolated Connector: 4-pole 3.81mm pitch spring Speed: 20, 50, 100, 125, 250, 500, 1000 kbit/s, default 500 kbit/s. Termination: external”
USB port	Number of ports: max 2 Connector: 1 x type A e 1 x type C. Standard: USB 3.0 Protection: overload
G3-BUS port	Number of ports: 1 to manage up to 20 G3-I/O modules. Connector: Gefran G-BUS port Communication : Ethercat Protection: short circuit and overload
PROTOCOLLI DI COMUNICAZIONE	
Ethernet	FTP (File Transfer Protocol), SFTP Modbus TCP/IP Master/Slave OPC UA Client/Server, Metodi, Pub/Sub, Companion Spec. HTML5, Web Server MQTT Double Ethercat Master with DC and redundancy RTE Slave: - Ethercat - Ethernet IP - Profinet
CAN	CANopen Master
Modbus	Modbus RTU Master/Slave
ELEMENTI DI VISUALIZZAZIONE	
Diagnostics	8 bi-color LEDs for CPU state diagnostics, PLC and specific for RTE slave
MICROPROCESSOR	
Type and frequency	ATOM x6414RE 1.5 GHz quad core
MEMORY	
System	4GB, DRAM tipo DDR 4
Mass storage	32 GB memoria Flash
Mass extension:	Slot Micro SD Card
INSTALLATION AND CONNECTIONS	
Use single-pole flexible electric wire with 0.5 .. 2.50 mm² section and 8 .. 9 mm strip length to wire the POWER SUPPLY.	
For network cabling, use standard ethernet cable, shielded (UTP) with minimum CAT5e category	
⚠	Cabinet temperature must never exceed 55°C
⚠	On 24Vdc power supply a protective fuse must be provided. The fuse must be Listed (JDDZ/7), Class CC, No time delay, rated 12A, minimum 125Vdc

3.3. Connections

3.3.1. Inputs, doors and signalling

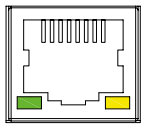


N.	Description	Connector / indicator	Notes
1	24 VDC power supply input ± 25%	Removable polarised terminal block	
2	Ethernet port with PoE option	RJ45	Optional PoE function
3	Ethernet port	RJ45	
4	Micro SD Card Slot	Micro SD	
5	USB Type-C port	USB Type C	Only for data storage
6	Ethernet port	RJ45	
7	Ethernet port	RJ45	Opzionale
8	USB Type-A port	USB Type A	Only for data storage
9	RS485 port	Conn. 3-pin Push In	Optional
10	CAN port	Conn. 3-pin Push In	Optional

3.3.2. USB (Type A)
The USB port allows the connection of external USB 3.0-compliant devices with Type A connector.

3.3.3. USB (Type C)
The USB port allows the connection of external USB 3.0-compliant devices with Type C connector.

3.3.4. Ethernet
The Ethernet port allows the controller to be connected to a computer or company LAN or, if the product has the option, to an ETHERCAT network.



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

The connection cable to be used, straight or cREDver, depends on the type of device to be connected. For example, a crossover cable must be used to directly connect a PC.

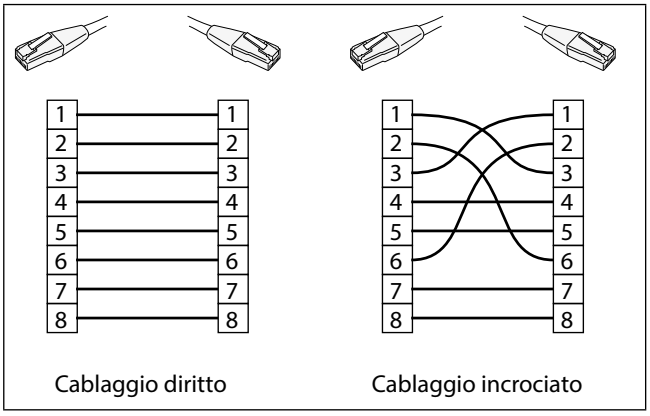
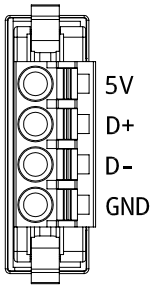


Figure 6 - Straight and crossover Ethernet cables

For connection, use a CAT6 UTP cable or higher; for ETHERCAT only, a CAT5e cable can also be used.
The maximum length of the Ethernet cable is 100 metres.
Do not run the Ethernet cable next to the machine's power cables, to avoid interference in data transmission.
The RJ45 socket is equipped with two LEDs. When the connection Ethernet is active the green LED remains on; when there is data transmission the yellow LED flashes.
Power Over Ethernet functionality in the ETH0 connector is optional.
No special cables are required, the power supply is provided on all four wire pairs, according to the IEEE802.3bt class 6 standard (max. 60W).
It can be used to connect PSD (Power Supplied Devices) PoE devices that support this standard.

3.3.5. RS485
The RS485 port is optional. As the RS485 port is opto-isolated, there is no need to disconnect power to the in-panel controller and the device to be connected before connecting them.



Pin	Name	Description
1	5V	+5V power supply
2	D+	Data +
3	D-	Data -
4	GND	0V power supply

Attention: Do not connect any wires other than those described.

The RS485 connection can be used successfully over long distances and in environments with many disturbances.
Maximum cable length is a function of speed of transmission, as shown in the graph below connector is optional.

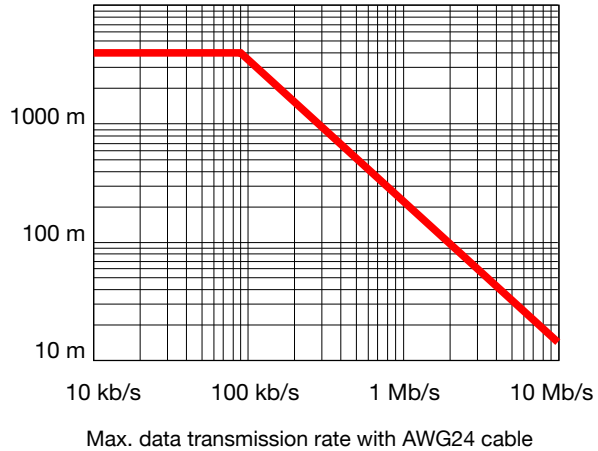


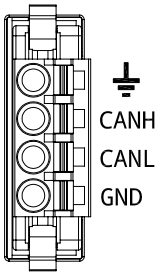
Figure 7 - Straight and crossed Ethernet cables

Attention: The RS485 port is equipped with internal pull-up and pull-down resistors (resistor 100 kΩ,
1/16 W, 1%).

Attention: If the CPU module is the last or first device on the RS485 line, the termination (resistor 120 Ω, ¼ W, 5%) must be inserted between line D+ and line D-. Remember that the RS485 must be terminated at both ends.

3.3.6. CAN

The CAN port is optional. Connect the cable for the CAN field bus. The CAN bus is used to connect CANopen-compliant devices to the controller.
Since the CAN port is opto-isolated, there is no need to remove power from the device before connecting it. Always use an approved cable when wiring the line.



Pin	Name	Description
1	EARTH	Earth Line
2	CANH	CAN-High (CAN +)
3	CANL	CAN-Low (CAN -)
4	GND	0V power supply

Attention: Do not connect any wires other than those described.

Attention: If the CPU module is the last or first device in the CAN line, the termination (resistor 120, ¼ W, 5%) must be inserted between the CANH line and the CANL line. Remember that the CAN bus must be terminated at both ends.

3.3.7. Micro SD port

The Micro SD port allows the insertion of Micro SD flash drives.
SD to store data and applications.

3.4. ASSEMBLY AND INSTALLATION

3.4.1. Assembly

Attention:: The bracket on which the indoor controller is to be mounted must have the following features:

- be sufficiently rigid and robust to support the device and not bend during use;
- be between 1 and 6 mm thick, to enable the device to be attached with the supplied clamps.

3.4.2. Protection against the infiltration of water

The indoor panel controller offers an IP20 degree of protection.
If need to use the product in environments that require a higher degree of protection than IP20, this must be ensured by the cabinet that houses the product itself.

3.4.3. Vibrations

The indoor panel controller can withstand vibration:

- 5 to 9 Hz: sinusoidal 3.5 mm constant;
- 10 to 150 Hz: sinusoidal with acceleration equal to 1 G.

Should the device be mounted on a support that exceeds these limits, a vibration suspension and damping system should be provided

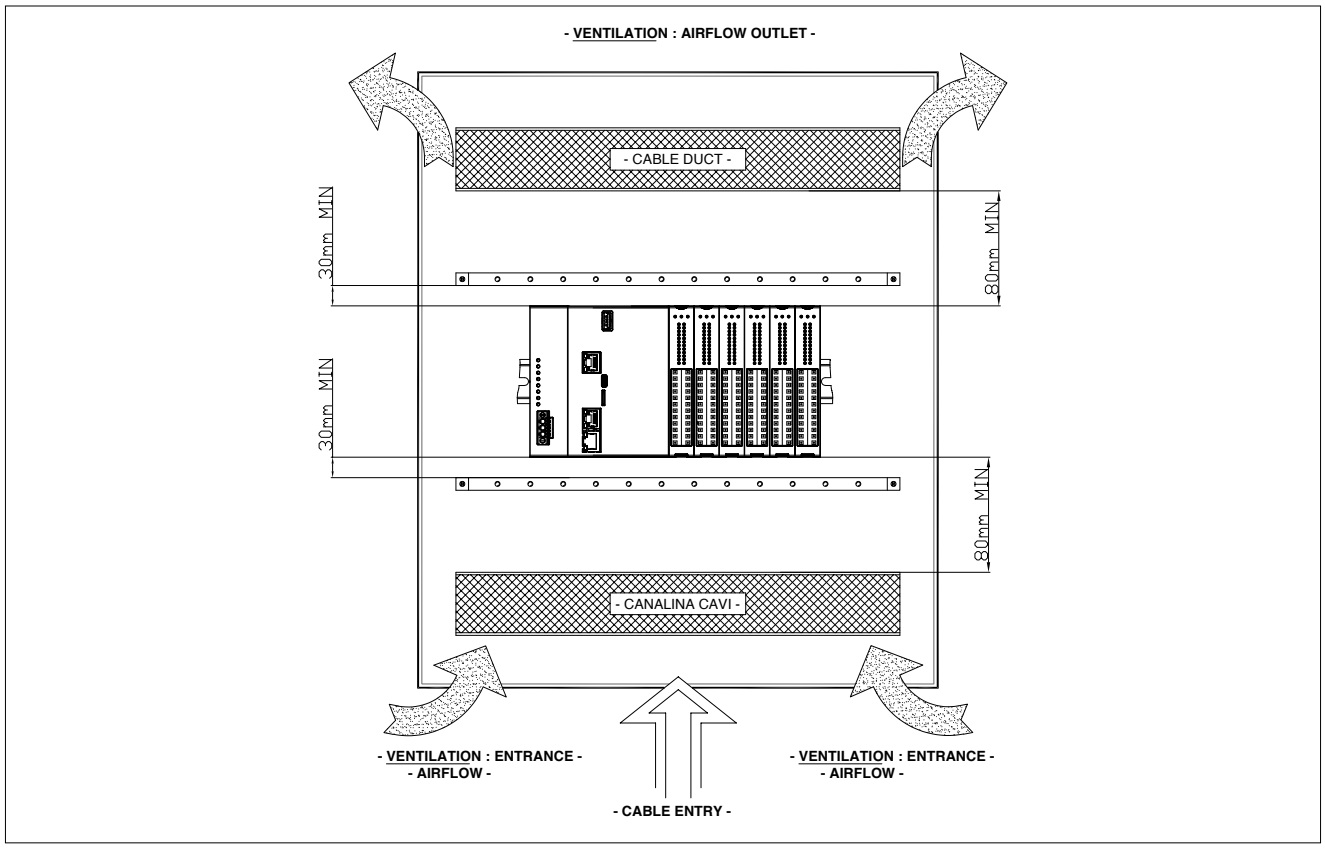
3.4.4. Minimum spaces for ventilation

The temperature of the compartment containing the indoor controller must not exceed 55 °C in any case.

3.5. Positioning

The indoor panel controller must be positioned to ensure the following conditions:

- there must be no sudden changes in temperature;
- there must be a low explosion risk: it can be connected to elements operating in environments with a hazardous atmosphere (flammable or explosive) only through appropriate and suitable types of interfaces, which comply with current safety standards;
- low presence of magnetic fields



3.6. G-Mation P6 Module Installation

The G-Mation P6 can be installed on a 35 mm DIN rail by performing the following steps (reference Figure 8):

1. Pull the fastening tab outwards
2. Snap the module onto the DIN rail
3. Slightly press the module against the DIN rail until it is fully seated
4. Push the retaining tab inwards, thus locking the module to the DIN rail

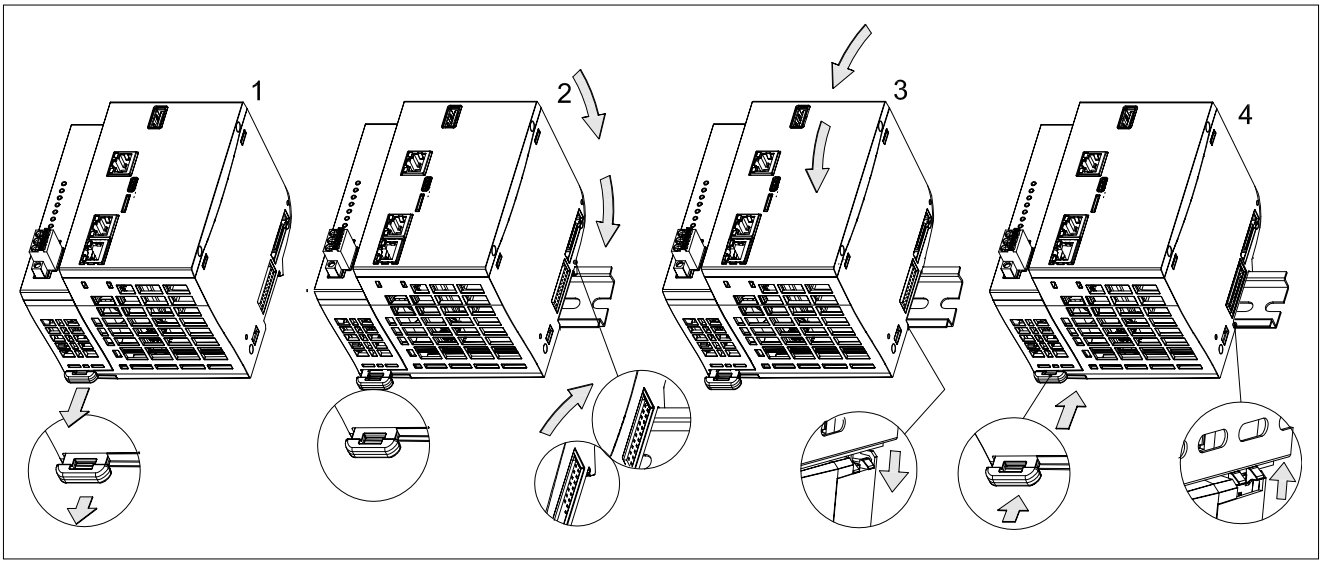


Figure 8 - G-Mation P6 DIN rail installation

3.7. G3-IO Module Installation

To add a G3-IO module, follow the steps below:

1. Pull the retaining tab of the G3-IO module outwards and snap it onto the DIN rail
2. Press the G3-IO module lightly against the DIN rail until it is fully seated and then push it against the GMation P6 module until the G-BUS port is fully inserted
3. Push the retaining tab the G3-IO module inwards, thus locking the module to the DIN rail

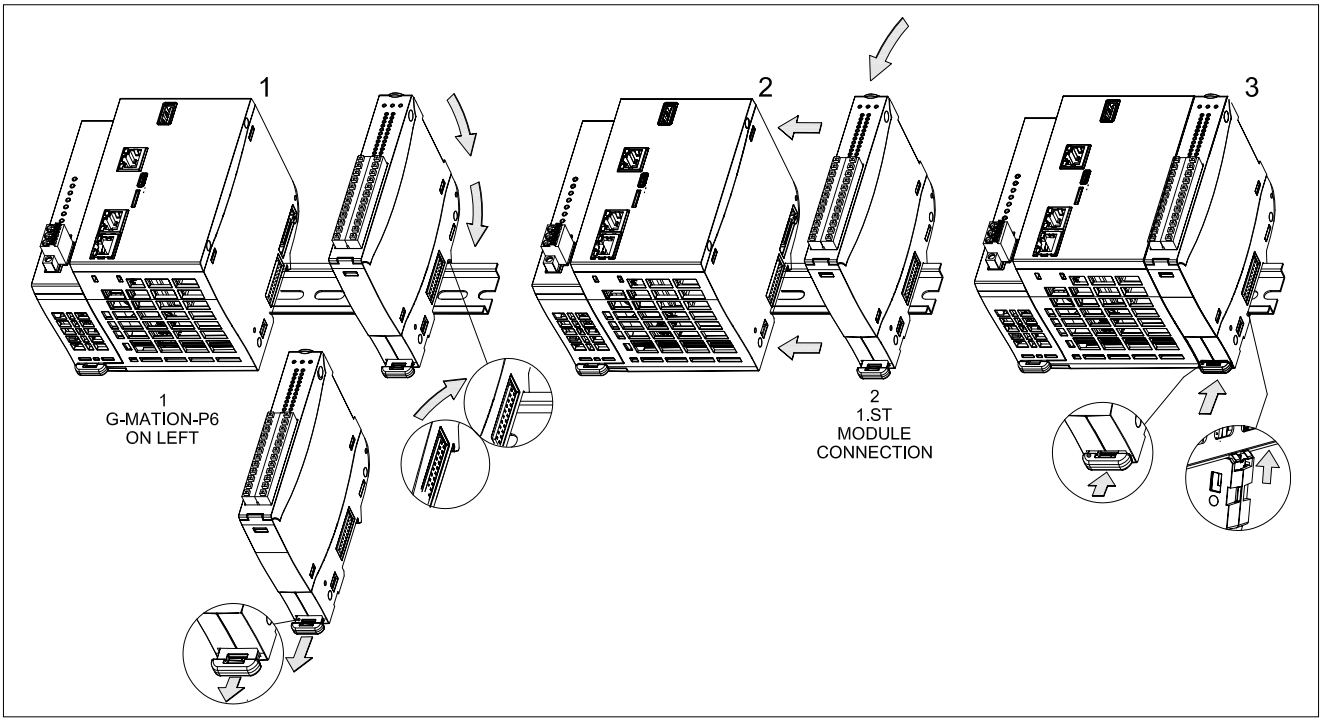


Figure 9 - G3-IO module installation

3.8. G3-IO Module Disassembly

To dismantle a G3-IO module, follow the steps below:

1. Pull the G3-IO module fixing tab outwards
2. Push the G3-IO module to the right until the G-BUS port is completely disconnected
3. Pull the G3-IO module off the DIN rail by levering as shown

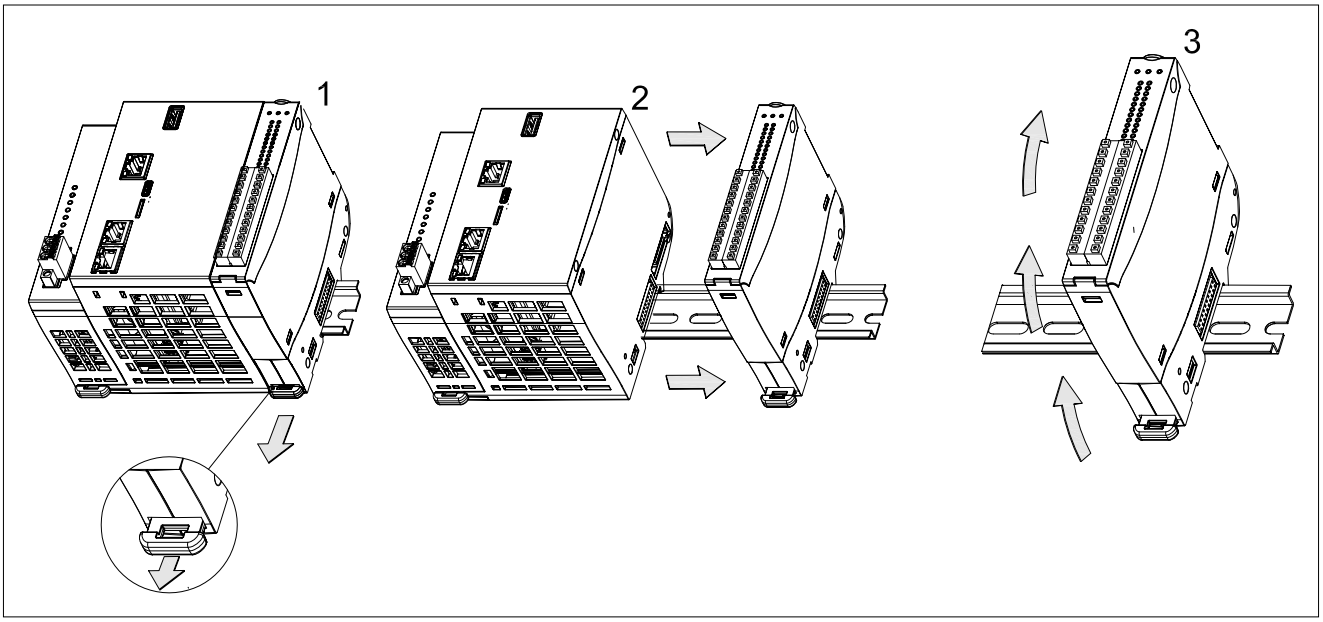


Figure 10 - Disassembling the G3-IO module

4. CYBER SECURITY

The integration of IT (Information Technology) cybersecurity principles into OT (Operational Technology) systems is essential to protect programmable automation controllers (PLCs) from increasingly sophisticated threats. This chapter provides high-level overviews of best practices for securing OT networks, drawing on standards such as IEC 62443 and established architectures.

For more detailed and specific information Gefran's GMation automation platform, please refer to the online documentation at https://wiki.gefran.com/wiki/g-mation-eng/ or scan the QR Code

4.1. Risk assessment

Risk assessment is the starting point for protect an OT system.
It serves to identify vulnerabilities, estimate the possible damage of an attack and define priorities for action. A continuous assessment allows defences to be adapted to new threats.
It is the responsibility of end user of the machine or plant to determine the level of safety required by its industrial application. In particular, the risk assessment must be carried out according to the criticality of the industrial process in question.
In the assessment, the following must be evaluated:

- **PLC and connected devices:** Configurations, firmware, services and software in use.
- **OT network:** Topology, segregation (e.g. firewall, VLAN), entry and exit points.
- **Interfaces with IT and third parties:** Connections with corporate networks and suppliers, Cloud applications.
- **Operational processes:** Access, backup and incident response policies.

(the list identifies the main elements of an industrial application, but it is not necessarily exhaustive)

The procedure can be summarised in these points:

1. **Inventory**: Create a list of hardware and software assets.
2. **Analysis**: Identifying vulnerabilities and potential threats.
3. **Risk assessment**: Estimating the probability and the impact of threats.
4. **Action Plan**: Implement countermeasures and priorities for critical areas.
5. **Monitoring**: Repeat the assessment regularly to ensure continuous updating.

4.2. Network segregation

The segregation of networks is essential to contain threats and protect OT systems. IEC 62443 promotes the 'zones and conduits' model, which divides the network into segments with defined security levels and strictly controls the traffic between them. Some basic concepts:

- **Creation of security zones:**
  dividing the OT network into isolated segments, each with a specific level of protection based on the criticality of the processes and devices included.
  For example, devices with critical and closely interconnected functions, such as PLCs, Edge Controllers and HMIs, should be placed in areas of equal security or grouped in the same area to ensure uniform protection. Communications between these zones and others (e.g. company servers or less critical devices) must be via secure conduits.
- **Conduits**:
  The conduits act as controlled communication channels between zones, implementing firewalls, gateways and other solutions to limit access and the type of traffic allowed.

Advice on how to proceed:

1. **Isolating OT networks from IT networks:**
2. Limit direct connections and use a DMZ (Demilitarised Zone) as a buffer between the two.
3. Segmenting within the OT network: - Create VLANs or use internal firewalls to separating critical processes.
   - Limiting traffic between segments to only necessary communications.
4. Strict control of access points:
   - Minimise the number of inputs into the OT network.
   - Implement authentication and monitoring mechanisms for each remote access.

The segregation of networks ensures that any attack or malfunctioning remains confined to a specific area, reducing the risk of large-scale disruptions.

4.3. Network Security

- **Activate Firewalls with customised rules:** Block all communication and allow only traffic necessary for operations
- **Keeping VPNs up-to-date:** Ensuring secure remote access.
- **Equip themselves with IDS (Intrusion Detection System) or IPS IDS (Intrusion Prevention System):** Install software in company servers or insert dedicated HW devices to detect and block malicious traffic specific to control systems.

4.4. User Management

- **Stratification and diversification of roles** Implement an access hierarchy based on the principle of least privilege, limiting authorisations to only those activities that are essential for each user or device.
- **Credentials Management** Use complex and regularly updated passwords. Avoid generic accounts and prefer named accounts with secure authentication.

4.5. Training and Awareness:

- **Continuous training**: Ensure that staff are adequately trained in cybersecurity practices and updated on new threats.
- **Threat Awareness:** Promoting a culture of safety within of the organisation, making all employees aware of risks and good safety practices.

4.6. Protection of devices

- **PLC hardening:** Disable unnecessary ports and services.
- **Regular updates:** Apply security patches to devices and software.
- **Physical protection:** Place the devices in closed and protected cabinets.

4.7. Data confidentiality and integrity

- **Confidentiality:** Before decommissioning a device, be sure to securely erase all data.
- **Integrity:** Verify the authenticity of configuration files by means of hashes or digital signatures..

4.8. Managing malfunctions or persistent attacks

- Implement incident response plans that include rapid system recovery.
- Continuously monitor the network abnormal activity.
- • Regularly test backup and recovery procedures.

5. COMMISSIONING

5.1. Preliminary Actions

The commissioning of the G-Mation P6 requires the following elements to be available:

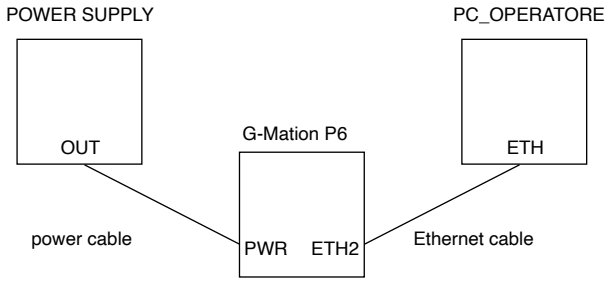
-) G-Mation P6: Gefran production device;

-) PC_Operator: Windows personal computer equipped with a web browser;

-) Power supply: bench power supply 0-24Vdc 0-3A;

-) Power cable: power cable between power supply and G-Mation P6;

-) Ethernet connection cable: Ethernet connection cable between PC_Operator and G-Mation P6;



Commissioning the G-Mation P6 requires the following steps to be carried out in sequence:

-) Power supply, commissioning: operations required for the first start-up of the device;

-) Connection, commissioning: operations required for the first connection to the device;

-) Authentication, commissioning: operations required for initial authentication to the device;

-) Configuration, commissioning: operations required for initial device configuration;

-) Programming, commissioning: operations required for initial device programming (GF_ Project required)

Below are the details of the preliminary actions to be carried out on the G-Mation P6 device:

POWER SUPPLY, COMMISSIONING

Description: Implement power supply of the GMation P6 according to the 'General Power Supply' section in this user manual.

Once the power interface is wired and voltage is supplied, the preliminary operation can be completed.

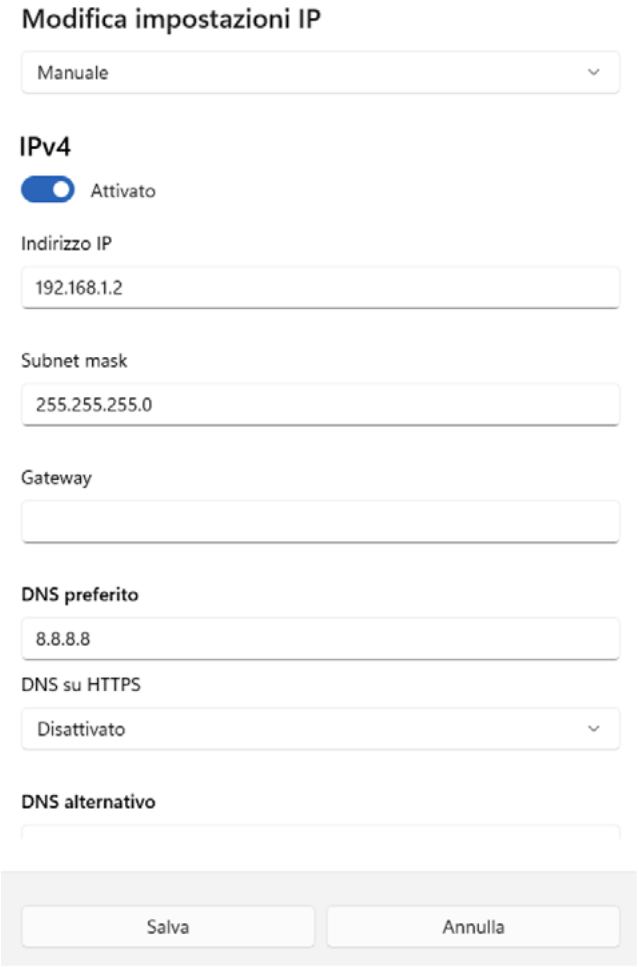
Prerequisites: G-Mation P6, suitable power supply and power cable;

Note: Once the G-Mation P6 has been correctly powered up, the LED_PWR on the front panel will be and green; as soon as the system is available for user functionality, the LED_SYS will automatically turn green (typically a few seconds after power-up);

CONNECTION, COMMISSIONING

Description: Preliminary actions on the G-Mation P6 are performed through a web application residing on the device itself. By directly connecting the PC_Operator with the ETH2 front port of the G-Mation P6 via an Ethernet cable, the connection can be established to configure the system.

Considering that the PC_Operator is a Windows computer, the following configuration of the ETH2-connected network card of the G-Mation P6 is recommended. The configuration is implemented in the "Network and Internet Settings" path of the PC_Operator.



The use of the ping service between the PC_Operator and the address 192.168.1.1 makes it possible to verify the correct establishment of the point-to-point connection between the two devices.

Once the correct connection between PC_Operator and G-Mation P6 has been verified, the preliminary operation can be completed.

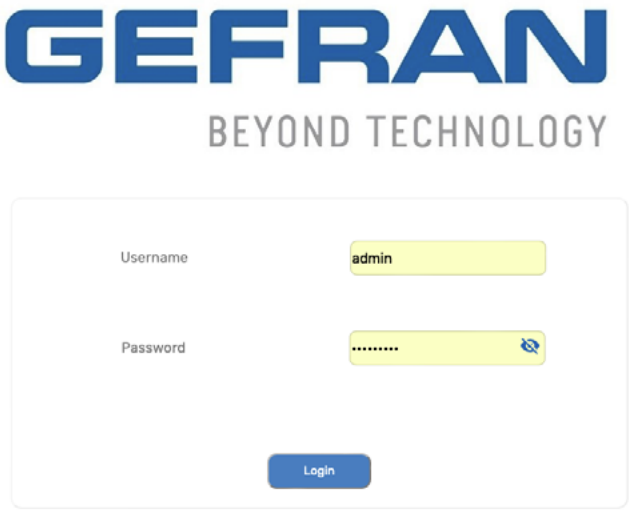
Prerequisites: the system must be powered, see 'Power Supply, Commissioning';

Note: Once the connection between the PC_Operator and the configuration ETH2 port of the G-Mation P6 has been correctly established, the signal LEDs on the RJ45 connector on the front of the G-Mation P6 itself will light up.

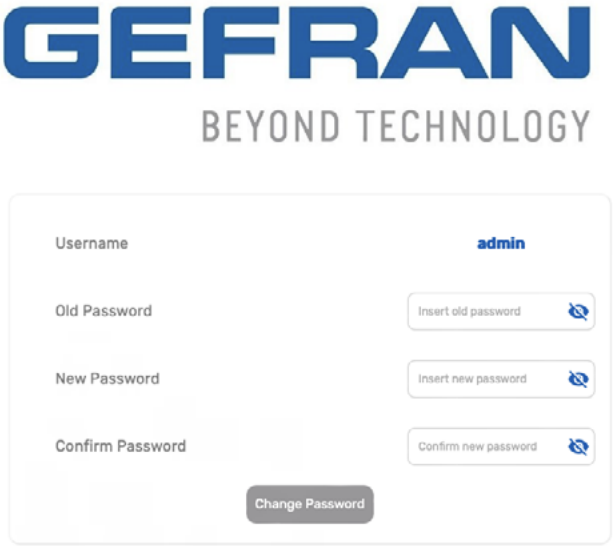
AUTHENTICATION, COMMISSIONING

Description: By connecting from the PC_Operator's web browser to the default configuration address (192.168.1.1), it is possible to access the device management section via credentials:

login: admin
password: Admin123@



Once you have entered your default credentials and pressed 'Login', the system will automatically ask you to change your default password via the following screen:



Once the password change procedure has been completed, the first authentication phase to the device can be completed.

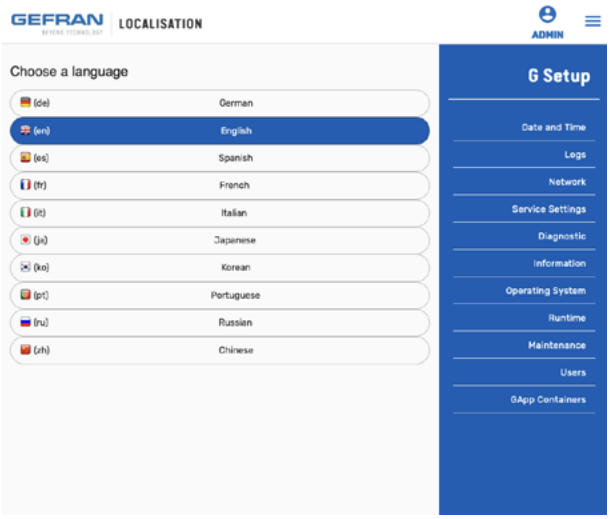
Prerequisites: the system must be powered, (see "Power supply, commissioning"); in addition, the system must be reachable at the default network address 192.168.1.1 (see "Connection, commissioning")

Notes: Once the G-Mation P6 has been correctly powered, the LED_PWR on the front panel will be on and red; during the system start-up phase, the LED_SYS on the front panel will be and red; as soon as the system is available for user functionality, the LED_SYS will automatically turn green

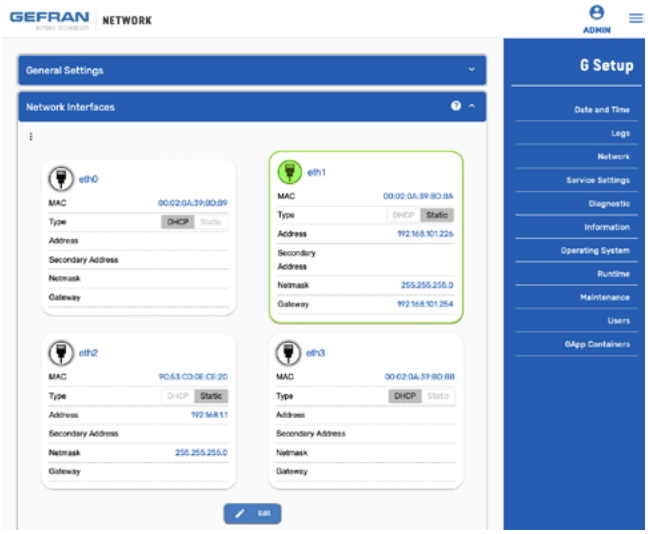
CONFIGURATION, COMMISSIONING

Description: Preliminary actions on the G-Mation P6 can be performed through the web application called GSetup on the device. By accessing GSetup (see previous sections) the operator is able to perform the following operations:

-) configuration of the language used to display the GSetup texts available in the 'Localisation' section;

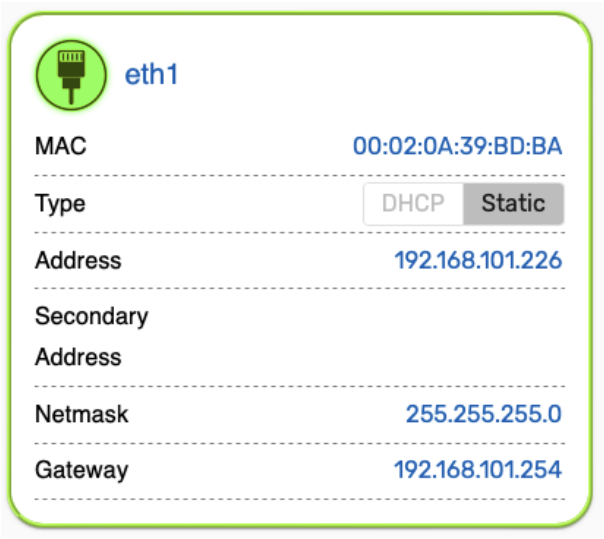


-) configuration of the different system ports used by the G-Mation P6-based automation solution available in the 'Network' section;



Depending on the ordering model of the G-Mation P6, three or four Ethernet ports will be displayed; for each Ethernet port, a summary panel containing the following data is displayed:

- communication port name (consistent with the serigraphy on the front of the G-Mation P6);
- MAC address;
- enabling/disabling DHCP on the port;
- IP address;
- netmask;
- gateway address;
- port icon signalling connected with the green-coloured box..



Prerequisites:the system must be powered, (see "Power supply, commissioning"); in addition, the system must be reachable at the default network address 192.168.1.1 (see "Connection, commissioning")

Note: See the 'LOCALISATION' and 'NETWORK' sections in this manual for more in-depth use of GSetup in terms of language configuration and interface port configuration;

PROGRAMMING, COMMISSIONING

Description: The commissioning sequence is completed with the programming of the automation solution on the G-Mation P6. The realisation of the automation solution and the programming of the GMation P6 are based on the use of the "GF_Project" development environment version 6.0.0 or higher.

Prerequisites: the system must be powered, (see 'Power supply, commissioning'); in addition, system ports must be correctly configured according to the automation solution to be implemented (see 'Configuration, commissioning')

Note: Refer to the GF_Project manual for details on how to implement the automation solution and the procedure for programming the G-Mation P6 with the resulting solution;

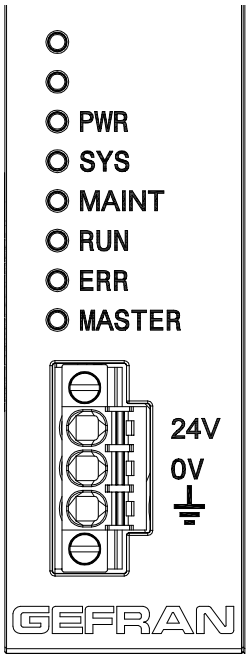
For further information, please refer to the online guide at https://wiki.gefran.com/wiki/g-mation-eng/ or scan the QR code

6. MAINTENANCE AND DIAGNOSTICS

Detailed diagnostics are available in the webserver integrated. Please refer to the specific manual.

https://wiki.gefran.com/wiki/g-mation-eng/ or by scanning the QR code

6.1. Local LED diagnostics



LEDs are installed on the front of the G-Mation P6 to indicate different operating or alarm conditions to the operator.
Each LED is identified by the serigraphy on the front of the G-Mation P6, the colour of the light emitted and the status of the light itself (OFF off, ON on, BLINK_SLOW slow flashing with sequence 1s on and 1s off, BLINK_FAST fast flashing with sequence 0.250s on and 0.250s off)

SERIGRAPHY	LED COLOUR	STATUS	DESCRIPTION
PWR	N/A	OFF	The power supply of the G-Mation P6 is not present.
PWR	GREEN	ON	The power supply of the G-Mation P6 is present

SERIGRAPHY	LED COLOUR	STATUS	DESCRIPTION
SYS	N/A	OFF	The G-Mation P6 system is not started.
SYS	RED	ON	The G-Mation P6 system is starting up.
SYS	RED	BLINK_SLOW	The G-Mation P6 system finished booting from the system recovery partition.
SYS	GREEN	ON	The G-Mation P6 system finished booting from the main system partition.

SERIGRAPHY	LED COLOUR	STATUS	DESCRIPTION
MAINT	N/A	OFF	There are no active service reports.
MAINT	RED	ON	BSP update in progress
MAINT	GREEN	ON	BSP update completed (restart follows)
MAINT	GREEN	BLINK_FAST	Running autoexec script from USB

SERIGRAPHY	LED COLOUR	STATUS	DESCRIPTION
RUN	N/A	OFF	The IEC-61131 PLC is not active.
RUN	RED	ON	The IEC-61131 PLC is in <fault> state. The runtime software component detects an error condition which not allow execution of the PLC programme.
RUN	RED	BLINK_SLOW	The IEC-61131 PLC is in a <stopped on breakpoint> state. The runtime software component detects a conditional blocking condition of the PLC programme execution caused by a breakpoint in the operation sequence.
RUN	GREEN	ON	The IEC-61131 PLC is in <running> state. The runtime software component detects a condition correct execution of the PLC programme.
RUN	GREEN	BLINK_SLOW	The IEC-61131 PLC is in a <stopped> state. The runtime software component detects a stop condition required outside the execution of the PLC programme.

SERIGRAPHY	LED COLOUR	STATUS	DESCRIPTION
ERR	N/A	OFF	The execution of the automation programme does not detect any errors.
ERR	RED	ON	The execution of the automation programme detects an error of <program runtime error>. The runtime software component detects an error condition related to a particular programme instruction.
ERR	RED	BLINK_SLOW	The execution of the automation programme detects a condition of <overtime>. The runtime software component detects an overrun condition in the synchronisation timing of the various tasks of the PLC programme.
ERR	RED	BLINK_FAST	The execution of the automation programme detects an error of <program not valid or not present>

SERIGRAPHY	LED COLOUR	STATUS	DESCRIPTION
MASTER	N/A	OFF	The primary EtherCAT master and the secondary EtherCAT master are not active on the system.
MASTER	GREEN	ON	Both EtherCAT masters (primary and secondary) are active on the system.
MASTER	GREEN	BLINK_SLOW	Only the primary EtherCAT master is active on the system.
MASTER	GREEN	BLINK_FAST	Only the secondary EtherCAT master is active on the system.
MASTER	RED	ON	An anomaly was detected in EtherCAT network of both EtherCAT masters and it is recommended to consult the diagnostics to find the cause of the problem.
MASTER	RED	BLINK_SLOW	An anomaly was detected in the primary master’s EtherCAT network and it is recommended to consult the diagnostics to find the cause of the problem.
MASTER	RED	BLINK_FAST	A fault has been detected in the EtherCAT network of the secondary master and it is recommended to consult the diagnostics to find the cause of the problem.

7. ORDERING CODES

G-Mation P6 - [ ] - [ ] - [ ] - [ ] - [ ]

CPU	
Atom 1,9 GHz quad core	**6**
Atom 1,5 GHz quad core	**5**
Atom 1,2 GHz dual core	**4**

Ethernet ports, SER, CAN	
3xETH	**0**
3xETH + CAN + SER	**3**
'4xETH + CAN	**5**
'4xETH + SER	**6**

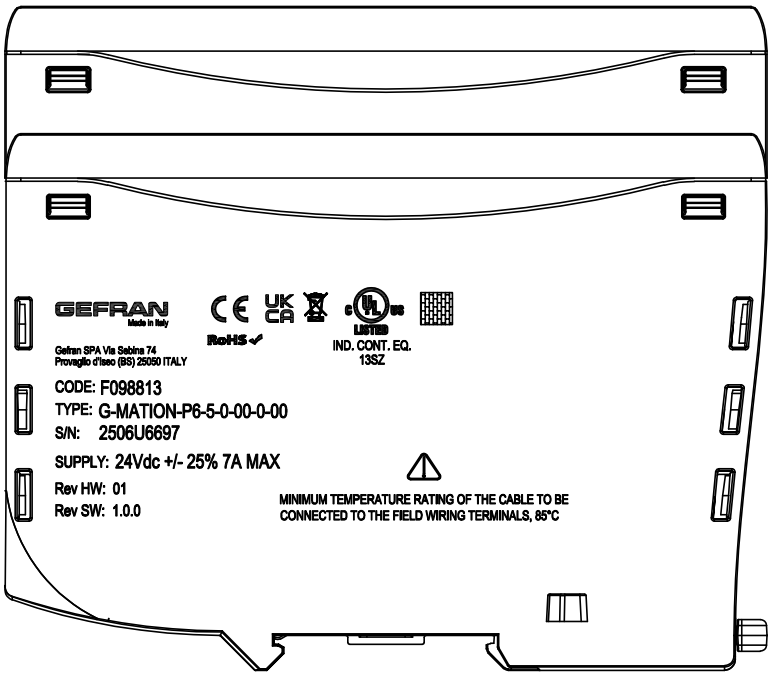
SLAVE RTE	
None	**00**
Ethercat	**EC**
Profinet	**PN**
Ethernet IP	**EI**
Multi-Protocollo	**RT**

SW	
00	RESERVED

POE	
0	Without POE
P	With POE

Code	Order code	Description
F098813	**G-MATION-P6-5-0-00-0-00**	CPU Intel Atom 1,5 GHz quad core, 3 ETH ports
F098814	**G-MATION-P6-5-0-00-P-00**	CPU Intel Atom 1,5 GHz quad core, 3 ETH ports, POE
F098815	**G-MATION-P6-5-3-00-0-00**	CPU Intel Atom 1,5 GHz quad core, 3 ETH ports, CAN ports, RS485 porta
F098816	**G-MATION-P6-5-3-00-P-00**	CPU Intel Atom 1,5 GHz quad core, 3 ETH porta, CAN porta, RS485 porta, POE
F098817	**G-MATION-P6-5-5-00-0-00**	CPU Intel Atom 1,5 GHz quad core, 4 ETH porta, CAN porta,
F098818	**G-MATION-P6-5-5-00-P-00**	CPU Intel Atom 1,5 GHz quad core, 4 ETH porta, CAN porta, POE
F098819	**G-MATION-P6-5-6-00-0-00**	CPU Intel Atom 1,5 GHz quad core, 4 ETH porta, RS485 porta
F098820	**G-MATION-P6-5-6-00-P-00**	CPU Intel Atom 1,5 GHz quad core, 4 ETH porta, RS485 porta, POE

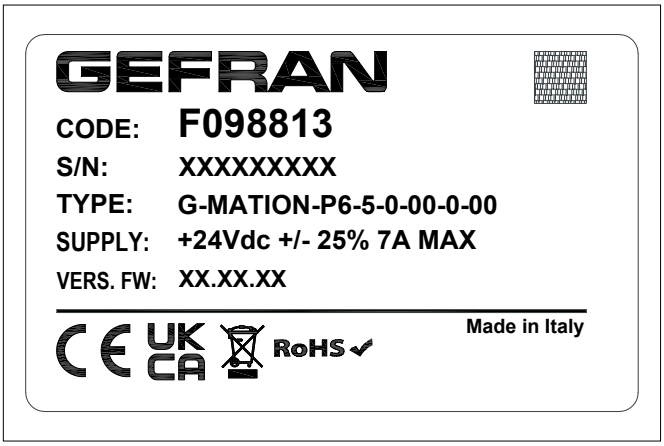
8. MARKING



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

- 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	The product complies with: - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances: **EN 63000:2018** - European Directive **2014/30/EU** with reference to generic standards: **EN 61000-6-2** (industrial immunity) - **EN 61000-6-3** (residential emissions) - **EN 61010-1** (safety) - Product standard: **EN 61131-2** The declaration of conformity is available on the GEFRAN website: www.gefran.com
c UL us	Conformity UL61010-1

9. 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.

GEFRAN