GEFRAN

GF_VEDO EL35CT-EL57CT

INSTALLATION AND OPERATION MANUAL

Code **80951C** / Edition **04** - **03-2010**

GENERAL INDEX

IMPORTANT

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PREFACE

This manual provides a detailed description of the main technical data of the various versions of Gefran's product.
The following information is indispensable for the correct use of the product: proper wiring, correct jumper settings and the correct connection to external devices.
Keep in mind that most of the hardware options can be configured via software by means of the setup data stored in the eeprom. As a result, there are just a few options solely for hardware, which significantly simplifies configuration of the product.

Graphic symbols

Graphic symbols are used to differentiate among the types and importance of the information in these Instructions and to facilitate the reader's understanding.

Indicates the contents of the various sections of the manual, general warnings, notes, and other important points.

Indicates a particularly delicate situation that could affect the safety or good operation of the product, or an instruction that must absolutely be followed in order to prevent hazardous situations.

Indicates a risk to the user's safety due to the presence of high voltage at the specified points.

Indicates a suggestion (based on the experience of GEFRAN Technical Personnel) that could be very useful under certain circumstances.

Information of a general and applicative nature.

Important notes for product safety and reliability.

Indicates a reference to Detailed Technical Documents available on GEFRAN's website: **www.gefran.com**

1 • PRELIMINARY INSTRUCTIONS

This section contains information and warnings of a general nature which should be read before proceeding with terminal installation, configuration and use.

General description

The operator terminals are a compact and low-cost solution for machine control.
A single product integrates machine cycle control [SoftPLC] and graphic page display [SCADA], allowing quick and low-cost creation of many automation solutions.

The operator terminals creates the machine/operator interface by means of LCD monitor, touch-screen, and a wide variety of peripheral I/Os.
The operator terminals are applied mainly to machine control for packaging, metals, wood and plastic applications. This Installation Guide describes the main characteristics of the operator panels and refers to the following models:

GF_VEDO EL35CT	operator interface with 3.5” color touch-screen LCD TFT Ethernet port, integrated I/Os [optional], Fieldbus port [optional], USB port [optional]
GF_VEDO EL57CT	operator interface with 5.7” color touch-screen LCD TFT Ethernet port, integrated I/Os [optional], Fieldbus port [optional], USB port [optional]

Preliminary warnings

Read the following preliminary warnings before installing and using the operator terminals. Doing so makes start-up quicker and lets you avoid some problems that might be mistaken for malfunctions or limitations of the terminal.

• Immediately after unpacking the product, make a note of the order code and the other identification data given on the label affixed to the outside of the container and copy them to the table below.
These details must always be kept close at hand and referred to the personnel involved in the event of help from Gefran Customer Service Assistance.

SN:	.....	(Serial no.)
CODE:	.....	(Finished product code)
TYPE:	.....	(Order Code)
SUPPLY:	.....	(Type of electrical power supply)
VERS:	.....	(Software version)

• Check that the terminal is in perfect condition and was not damaged during shipment. Make sure that the package also contains the fastening accessories.
Any inconsistencies, omissions or evident signs of damage should be reported immediately to your Gefran sales agent.
• Check that the order code corresponds with the configuration requested for the application the terminal is needed for, referring to Section: “Technical - Commercial Information”.

Example: GF_VEDO - 35CT - LX0 - S1 - C1 - U - G

- Model: 35CT
- Operating System: Linux
- Peripherals: RS485 serial
  CANopen
  USB
- Lexan: standard Gefran

Consult the section “Installation and Connection” before installing the terminal on the machine control panel or host system Consult the section “Sales Information” for the order code. Users and/or system integrators who want more detailed information on serial communication between standard PCs and/or Gefran Industrial PCs and Gefran Programmable Instruments may access the various Technical Reference Documents in PDF format available on Gefran’s website: www.gefran.com.
In the event of presumed instrument malfunction, before contacting Gefran Technical Service Assistance, refer to the Troubleshooting Guide given in Section "Maintenance", and if necessary refer to the F.A.Q. Section (Frequently Asked Questions) on the Gefran Web Site www.gefran.com

This section contains the instructions necessary for correct installation of the terminals into the machine control panel or the host system and for correct connection of the controller power supply, inputs, outputs and interfaces.

Before proceeding with installation read the following warnings carefully!
Remember that lack of observation of these warnings could lead to problems of electrical safety and electromagnetic compatibility, as well as invalidating the warranty.

Electrical power supply

- the terminal is NOT equipped with an On/Off switch: the user must provide a two-phase disconnecting switch that conforms to the required safety standards (CE marking), to cut off the power supply upstream of the terminal.
  The switch must be located in the immediate vicinity of the terminal and must be within easy reach of the operator.
  One switch may control more than one terminal
- if the terminal is connected to NOT isolated electrical equipment (e.g. thermocouples), the earth connection must be made with a specific conductor to prevent the connection itself from coming directly through the machine structure.
- if the terminal is used in applications with risk of damage to persons, machinery or materials, it is essential to connect it up to auxiliary alarm equipment. It is advisable to make sure that alarm signals are also triggered during normal operation. The terminal must NOT be installed in flammable or explosive environments; it may be connected to equipment operating in such atmospheres only by means of appropriate and adequate types of interface, conforming to the applicable safety standards.

Notes Concerning Electrical Safety and Electromagnetic Compatibility:

CE MARKING: EMC Conformity (electromagnetic compatibility)
in accordance with Directive 2004/108/CE.
The terminals are mainly designed to operate in industrial environments, installed on the switch boards or control panels of productive process machines or plants. As regards electromagnetic compatibility, the strictest generic standards have been adopted, as indicated in the table below.
BT Conformity (low voltage) in accordance with Directive 2006/95/CE.

EMC conformity has been tested with the following connections.

EMC EMISSION		
Generic standards emission standard for industrial environment	EN 61000-6-4	Generic norm
Emission enclosure	CISPR-11	Class A

Table 1 - EMC Emission

EMC IMMUNITY		
Programmable Controllers	EN 61131-2	Product Standard
ESD immunity	EN 61000-4-2	± 4 kV contact discharge ± 8 kV air discharge
RF interference immunity	EN 61000-4-3	10 V/m amplitude modulated 80 MHz-1 GHz 10 V/m amplitude modulated 1.4 GHz-2 GHz
Radiofrequency interference	EN 61000-4-6	3 V/m amplitude modulated 0.15 MHz-80 MHz
Burst immunity	EN 61000-4-4	± 2 kV power line ± 1 kV signal line
Pulse immunity	EN 61000-4-5	0,5 kV common mode
Magnetic fields immunity	EN 61000-4-8	100 A/m
Voltage dips, short interruptions and voltage immunity tests	EN 61000-4-11	100%U, 10ms

Table 2 - EMC Immunity

LOW VOLTAGE DIRECTIVE SAFETY		
Low voltage directive safety	EN 61010-1	

Table 3 - LVD Safety

Instrument power supply

Installation categoryII and pollution degree 2.

- The power supply to the electronic equipment on the switchboards must always come directly from an isolation device with a fuse for the instrument part.
- The electronic instruments and electromechanical power devices such as relays, contactors, solenoid valves, etc., must always be powered by separate lines.
- When the electronic instrument power supply is strongly disturbed by voltage problems from power units or motors, an isolation transformer should be used for the controllers only, earthing the screen.
- It is essential that the plant has a good earth connection:
  - the voltage between neutral and earth must not be >1V
  - the resistance must be < 6Ω;
- If the mains voltage fluctuates strongly, use a voltage stabilizer.
- In the proximity of high frequency generators or arc welders, use adequate mains filters.
- The power supply lines must be separate from the instrument input and output ones.

Inputs and outputs connection

- To connect the analogue inputs, strain gauge, linear, (TC, RTD) the following is necessary:
  - physically separate the input cables from those of the power supply, the outputs and the power connections.
  - use woven and screened cables, with the screen earthed in one point only.
- To connect the control outputs, alarm (contactors, solenoid valves, motors, fans, etc.), fit RC groups (resistance and condensers in series) in parallel to the inductive loads that operate in Alternating Current.
  (Note: all the condensers must conform to VDE (class X2) standards and withstand a voltage of at least 220V AC. The resistances must be at least 2W).
- Fit a 1N4007 diode in parallel with the coil of the inductive loads that operate in Direct Current.

GEFRAN S.p.A. declines all responsibility for any damage to persons or property caused by tampering, neglect, improper use or any use which does not conform to the characteristics of the controller and to the indications given in these Instructions for Use.

Prescription UL

- Operating surrounding air temperature rating of 50°C
- For use on a flat surface of a type 1 enclosure

Dimensions

All measurements are expressed in mm, with tolerance of ± 0.5.

GF_VEDO EL35CT dimensions

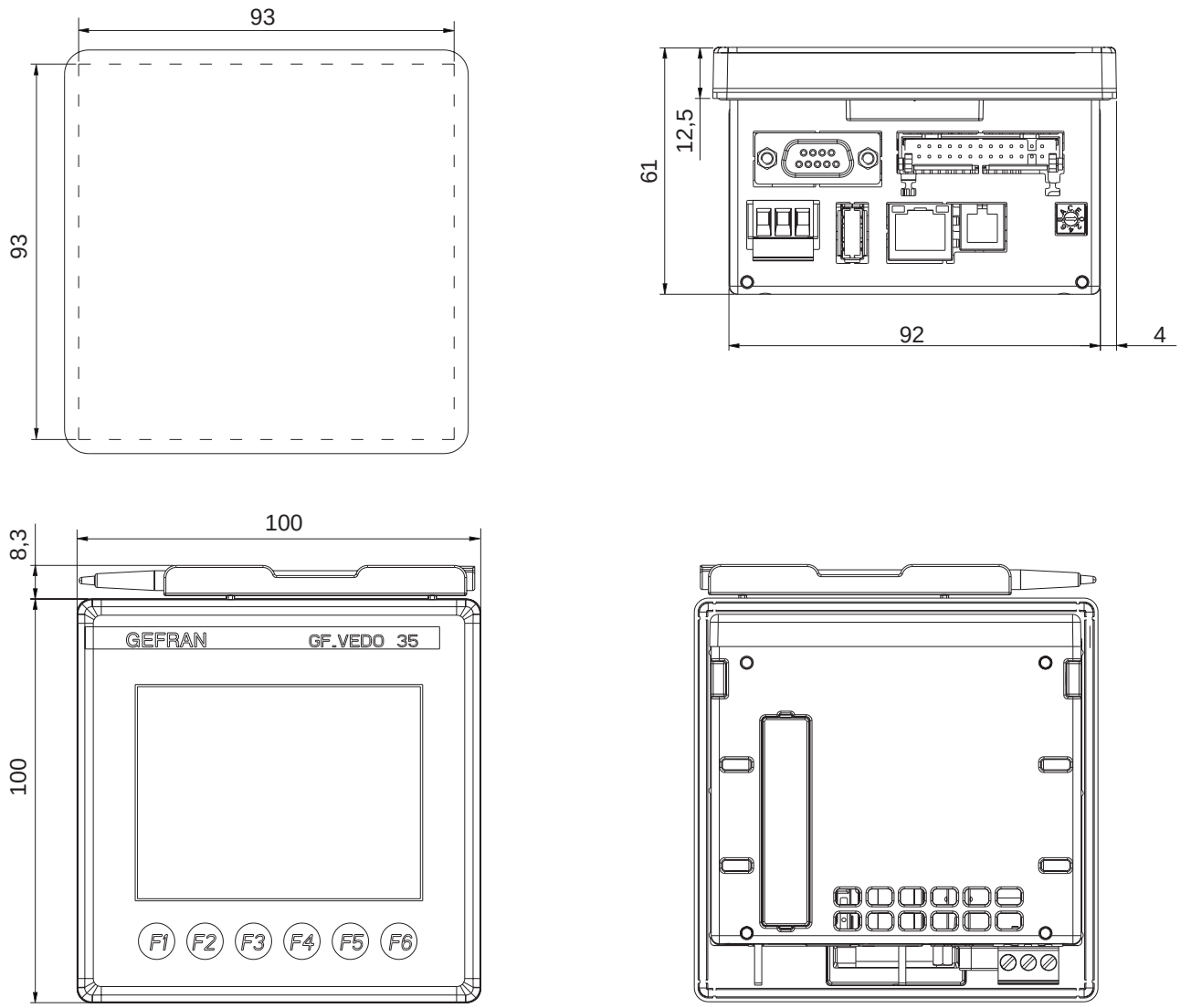


Fig. 1 - Dimensions and cut-out GF_VEDO EL35CT

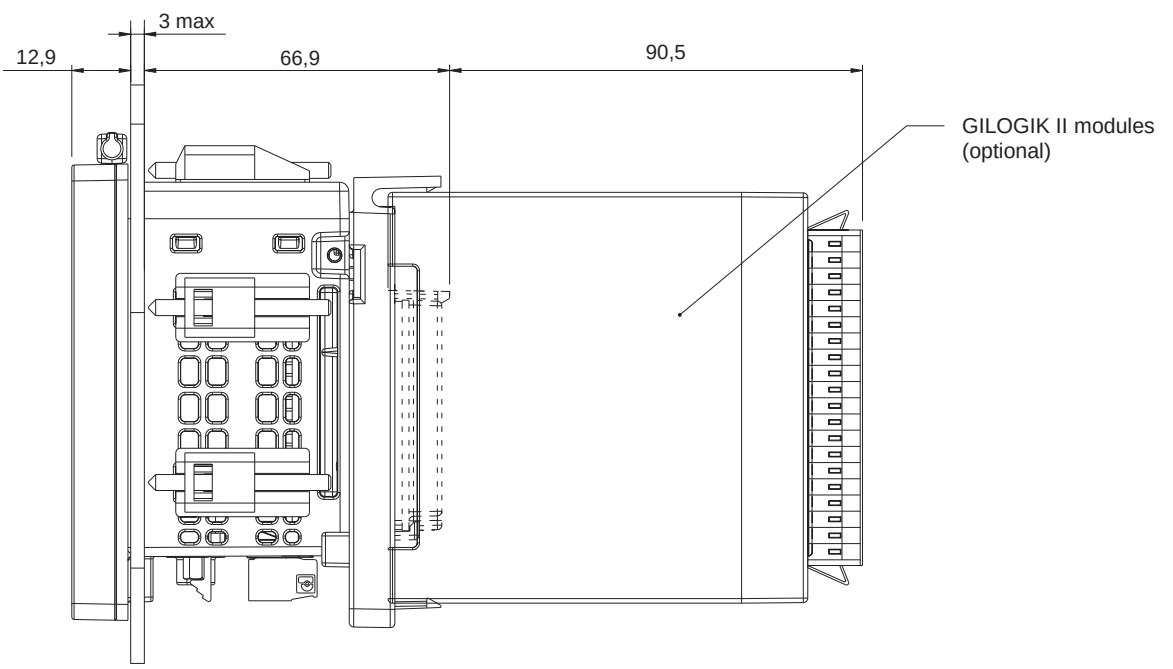


Fig. 2 - Dimensions GF_VEDO EL35CT

GF_VEDO EL57CT dimensions

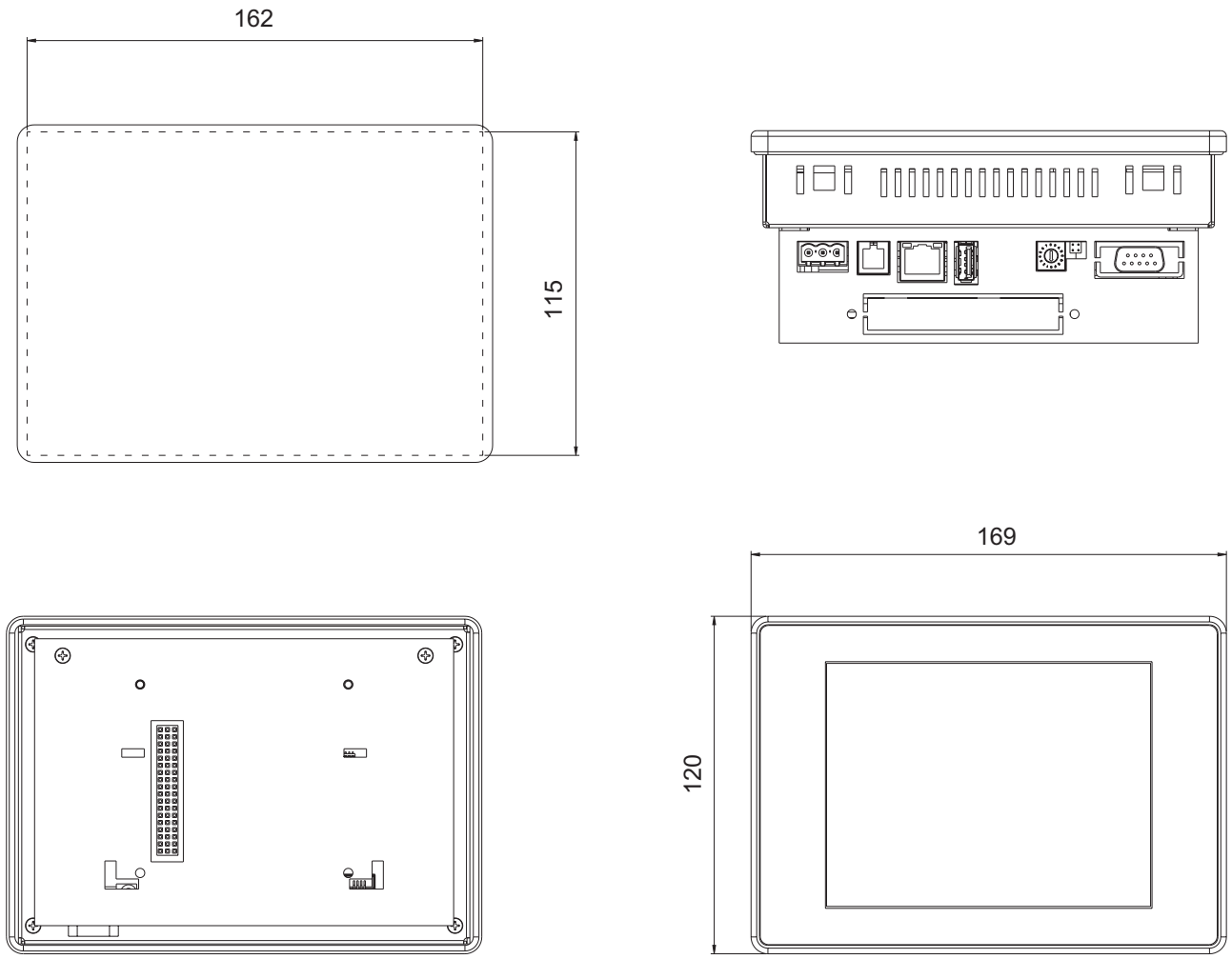


Fig. 3 - Dimensions and cut-out GF_VEDO EL57CT

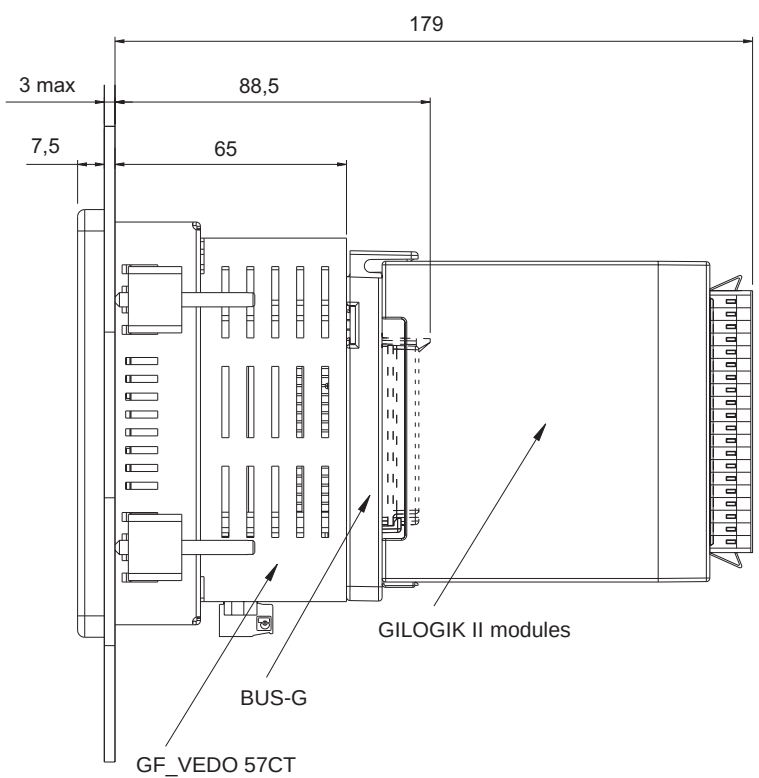


Fig. 4 - Dimensions GF_VEDO EL57CT

Panel mounting

GF_VEDO EL35CT and GF_VEDO EL57CT panels are designed for front panel installation.
After making the opening shown on the template drawing, fasten the terminal with the blocks required and supplied with the product.

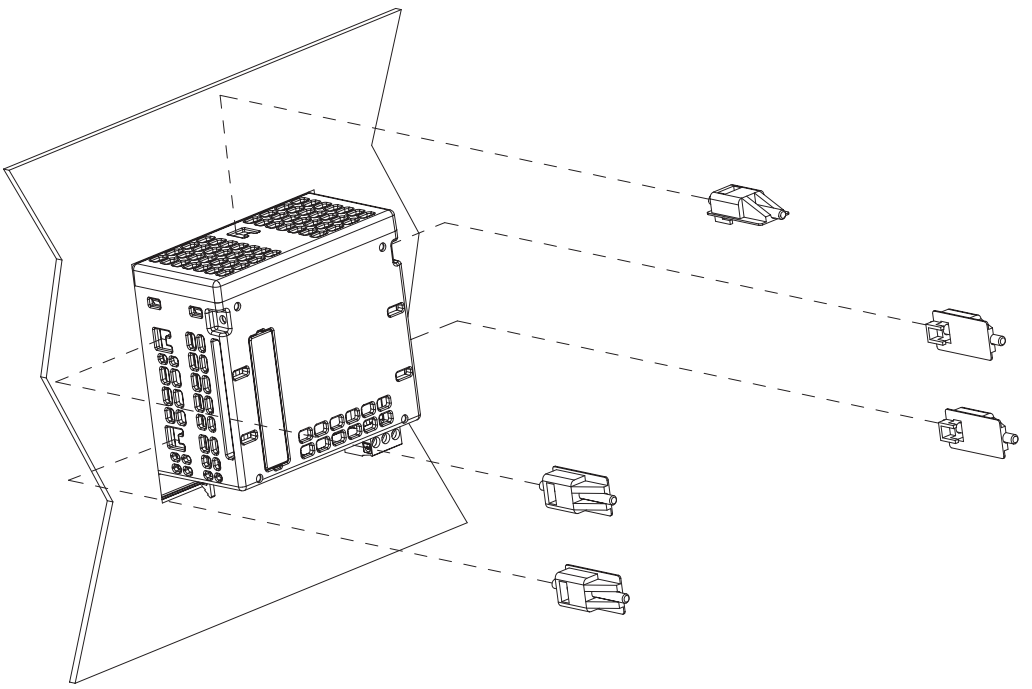


Fig. 5 - Panel mounting GF_VEDO EL35CT

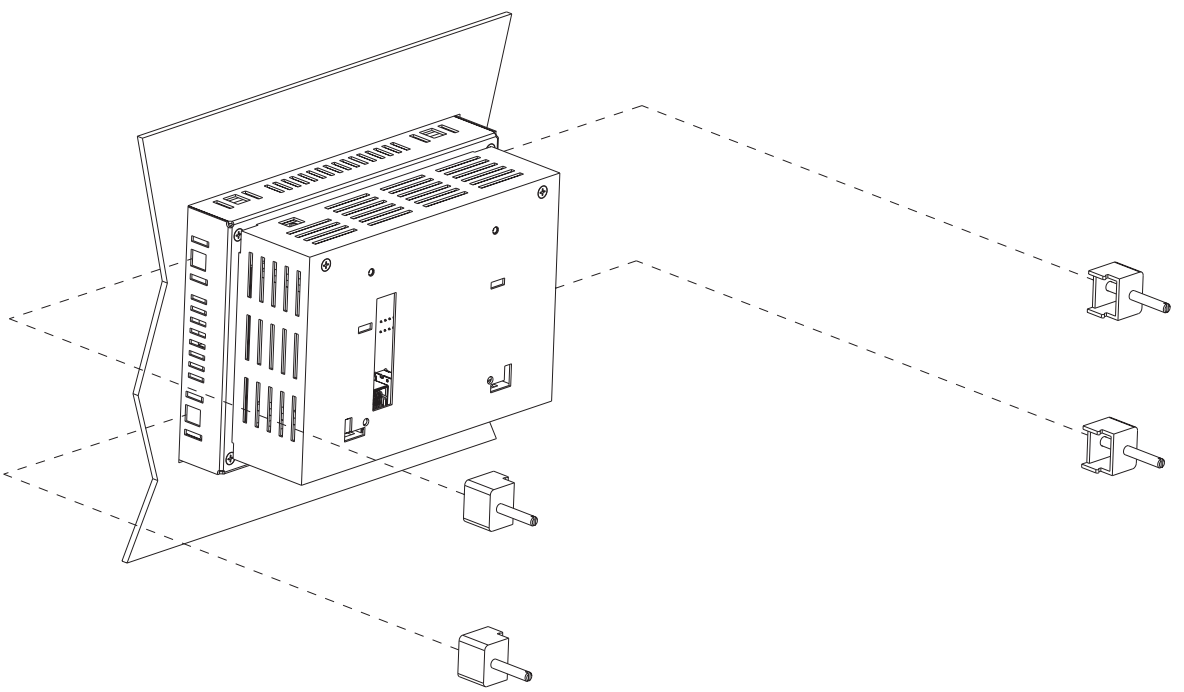


Fig. 6 - Panel mounting GF_VEDO EL57CT

To maintain IP65 protection level during panel installation, pay attention to the following points:

- make the edges of the hole for the panel perfectly smooth and flat
- tighten each fastening screw

The terminals also have an O-Ring inserted at the rear of the display frames.

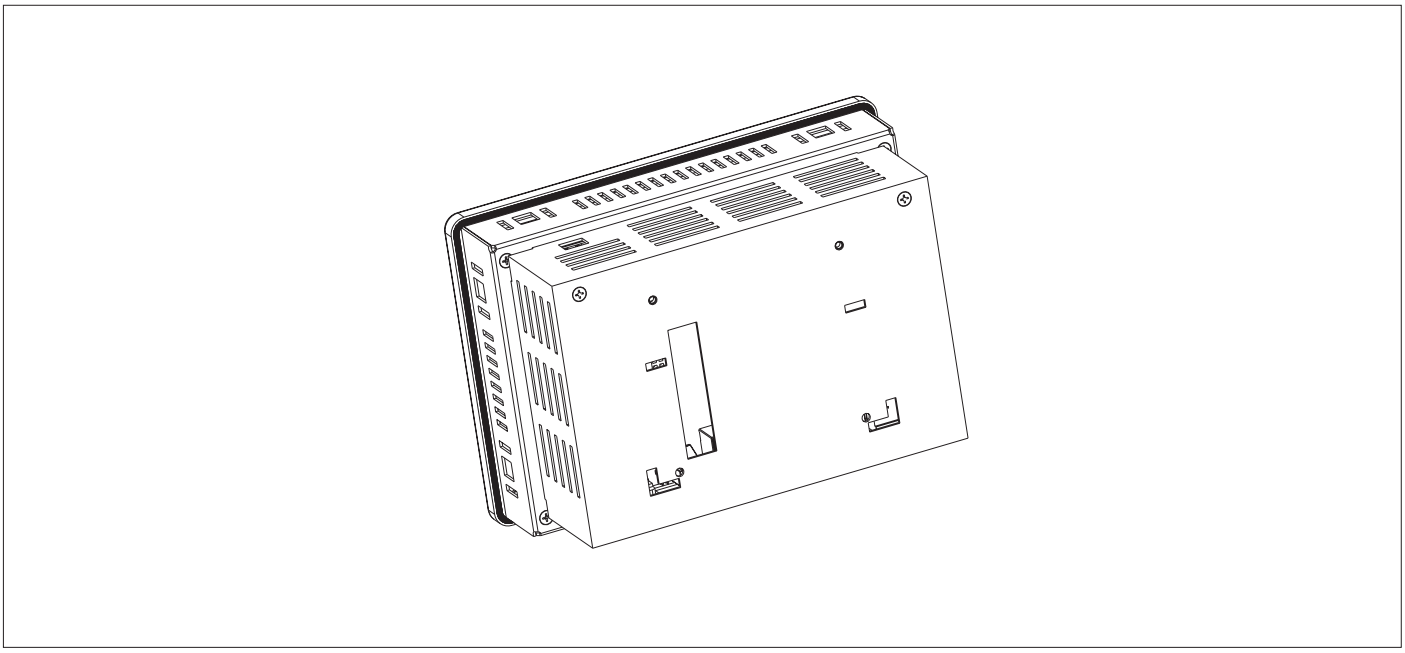


Fig. 7 - O-Ring on GF_VEDO EL57CT terminals

Cleaning the device

Clean the device only with a soft cloth and non-abrasive neutral soap. Do not use solvents.

3 • TECHNICAL SPECIFICATIONS

3.1 Display

35CT: 3.5” color LCD TFT (Thick Film Transistor) display
57CT: 5.7” color LCD TFT (Thick Film Transistor) display

3.2 CPUs and Memories

The terminals are equipped with EP9307 processors with ARM9 core.
Memories: 64MB FLASH mass, 64MB DRAM system, 256KB cache.

3.3 Supported Operating Systems

The terminal is supplied with the operating system Linux

3.4 Keyboard

The GF_VEDO EL35CT terminal has a 6-key keyboard integrated in the lexan front panel.

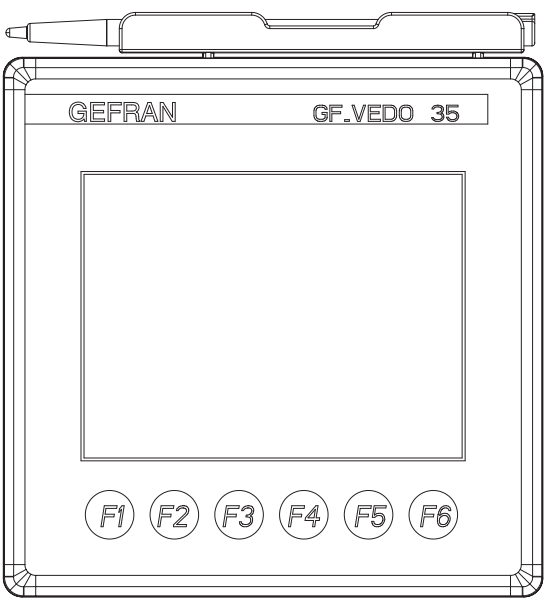


Fig. 8 - Integrated keyboard on GF_VEDO EL35CT terminals

3.5 User connections

The user connections specified on Table 4 are made at the bottom by means of Gefran standard and custom connectors.

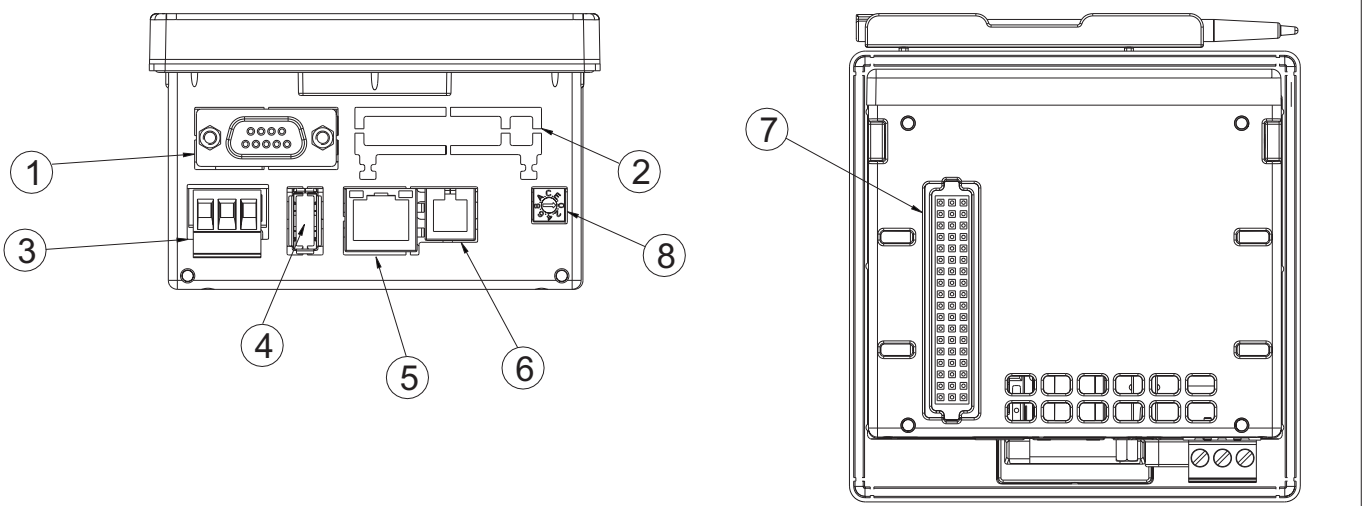


Fig. 9 - GF_VEDO EL35CT connector

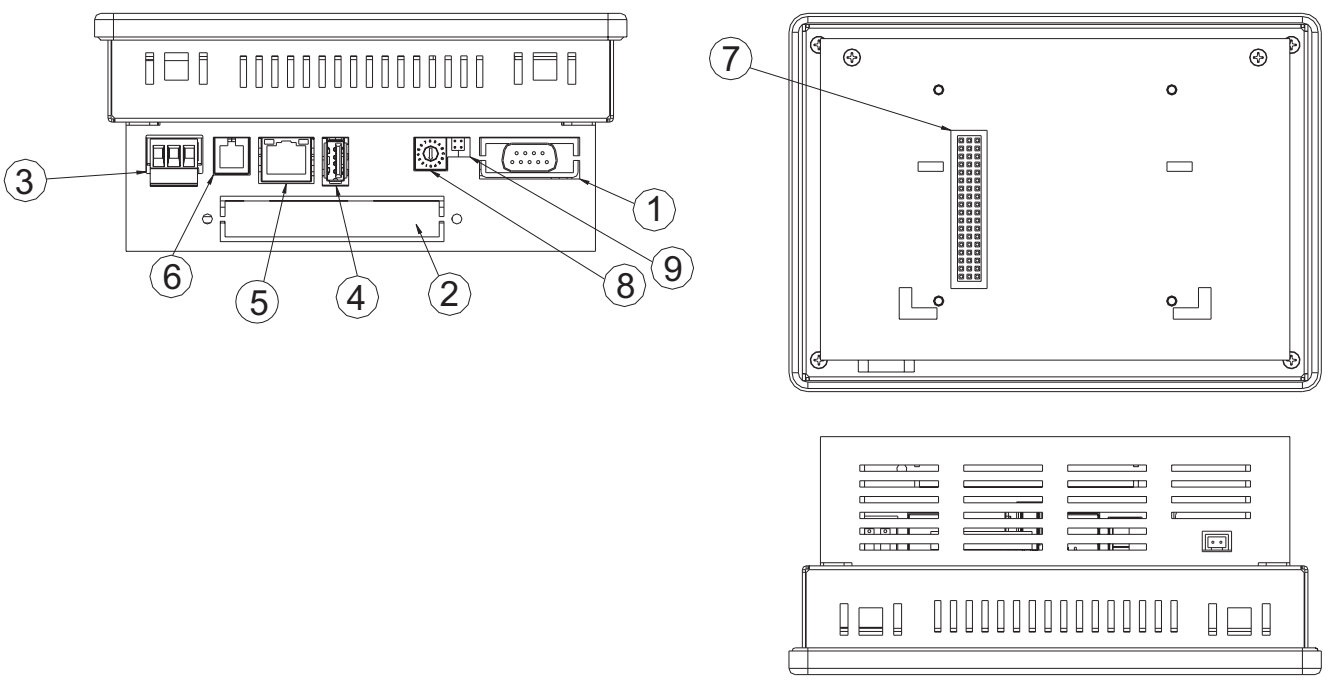


Fig. 10 - GF_VEDO EL57CT connector

Name	Description
1	CANopen
2	Reserved for future use
3	Power supply
4	USB
5	Ethernet 10/100
6	RS485 serial
7	BUS-G
8	Rotary-switch
9	Enabling battery

Table 4 - Terminals connector description

3.5.1 Power supply port

The internal power supply (24Vdc, -15% +20%) is galvanically isolated and protected against polarity reverses and short circuits. The panel has a power terminal. The connector diagram is shown in Figure 11.

Note:

check that the power supply is able to deliver the power needed for correct operation of the device.

The device must always be grounded. Grounding helps limit the effects of electromagnetic noise on the control system. All electronic devices of the control system must be grounded. Ground the devices in a manner conforming to applicable standards and regulations.

Max consumption GF_VEDO EL35CT:

- (without integrated I/O) 240mA, 5W
- (with integrated I/O) 360mA, 7W

Max consumption GF_VEDO EL57CT:

- (without integrated I/O) 480mA, 8.5W
- (with integrated I/O) 490mA, 9W

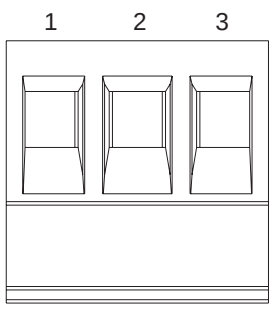


Fig. 12 - Power supply connector

Pin	Name	Description
1	+24 VDC	Positive feed
2	0 V	GND
3	GND	Ground

To limit susceptibility to noise of the GF_VEDO EL57CT terminal, you have to install an electromagnetic emission suppression core as shown in figure.

This component, supplied with the product, is a ferrite core coated in plastic for round section wires.

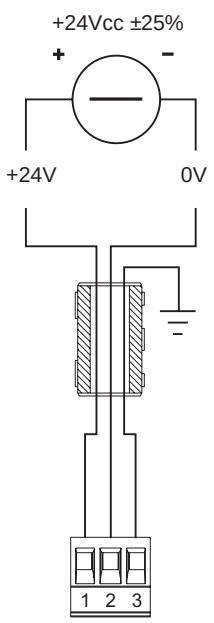


Fig. 12 - Inserting cores in the power supply lines of GF_VEDO EL57CT terminals

3.5.2 RS-485 port

The terminal uses the RS-485 port to dialog according to OSI specifications at the physical level defined by standard EIA-485.
The RS-485 port is optically isolated and allows dialog from 9.6 kBaud to 115 kBaud via an RJ10 4p4c connector (Registered Jack type 10 with 4 positions and 4 contacts).
Signal assignment is shown in Table 5.

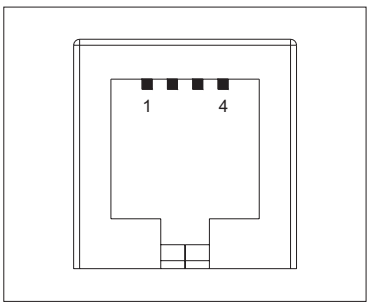


Fig. 13
RJ10 connector of the RS-485 port

Pin	Name	Description
1	GND	-
2	Tx/Rx +	Data reception/transmission (A+)
3	Tx/Rx -	Data reception/transmission (B-)
4	+V (reserved)	-

Table 5
Signal assignment of the RS-485 port

3.5.3 Ethernet port

The terminal uses Ethernet port to dialog via IEEE 802.3 Ethernet protocol.
The Ethernet port can dialog at 10/100 Mbps using an 8-pin RJ45 connector with LED.
We recommend an Ethernet Base-T with braided leads (CAT. 6).
The wiring scheme must conform to standard TIA/EIA-T568-A. Signal assignment is shown in Table 6.

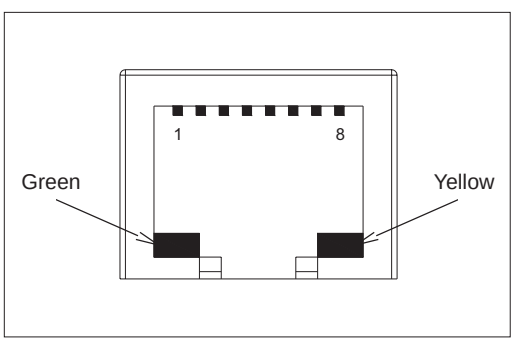


Fig. 14
Ethernet port connector

Pin	Name	Description
1	TX_D+	Transmit data +
2	TX_D-	Transmit data -
3	RX_D+	Receive data +
4	N.C.	Not connected
5	N.C.	Not connected
6	RX_D-	Receive data -
7	N.C.	Not connected
8	N.C.	Not connected

Table 6
Signal assignment of the Ethernet port

Led	Color	Description
Sx	Green	Link
Dx	Yellow	Data

The terminals let you set the Ethernet node ID via a user-accessible 16-position rotary switch.

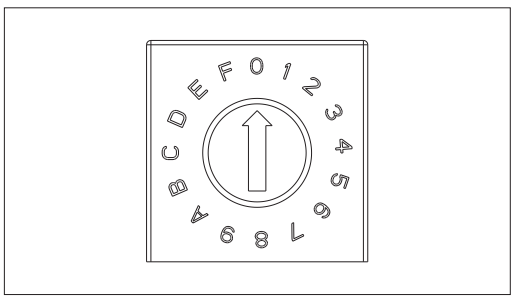


Fig. 15
Rotary switch for setting Ethernet node ID

3.5.4 USB port

The USB port dialog via USB (Universal Serial Bus) serial communication standard.
The terminals support version USB 2.0.
The USB port connector is type USB-A (4 pins). Signal assignment is shown in Table 7.
Voltage for VBUS is +5V with maximum current of 500mA.
Signals D+ and D- refer to the two (pseudo) differential data communication lines.

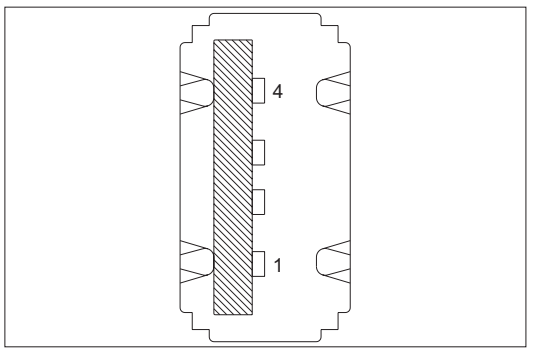


Fig. 16
USB port connector

Pin	Description
1	VBUS
2	D-
3	D+
4	GND
Shell	SHIELD

Table 7
Signal assignment of the USB port

3.5.5 CAN - CANopen port

The optional CAN port lets terminal dialog via the serial standard (ISO 11898-1 of 2003) for the CAN (Controller Area Network) field bus, also known as CAN-bus.
The GF_VEDO EL35CT implements the CANOpen Layer 2 standard.
The CAN port is optically isolated and uses a 9-pin (male) D-sub connector.
Signal assignment is shown in Table 8.

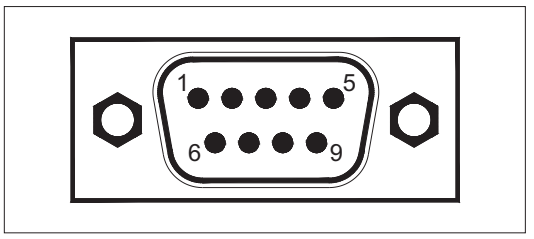


Fig. 17
CAN port connector

Pin	In/Out	Code	Description
1	-	-	-
2	O	CAN_L	CAN Low
3	O	CAN_GND	CAN Ground
4	-	-	-
5	-	EARTH	Ground
6	-	-	-
7	O	CAN_H	CAN High
8	-	-	-
9	-	-	-

Table 8
Signal assignment of the CAN port

The communication cable to be used depends on the type of device to be connected.

3.5.6 CAN - DeviceNet port

DeviceNet is a CAN-based communication network in which components from many manufacturers can be installed quickly and simply.
It is a handy solution for connecting low level peripherals in the network.
The structure lets you connect up to 64 devices (including masters) in a single network.

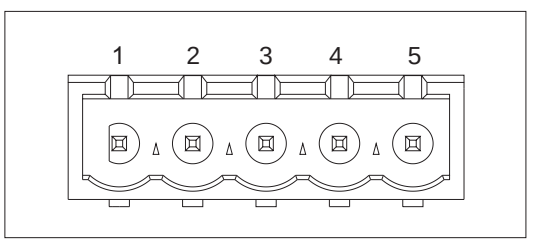


Fig. 18
DeviceNet port connector

Pin	Name	Description
1	CAN_GND	Negative
2	CAN_L	Low signal
3	SHIELD	Shield
4	CAN_H	High signal
5	-	-

Table 9
Signal assignment of the DeviceNet port

3.5.7 Battery

The terminals contains a 3V 65mA/h rechargeable lithium battery to maintain data in static RAM and to run the clock when the terminals are not powered by the grid.
The battery can be enabled or disabled on the model GF_VEDO EL57CT by inserting a jumper in the appropriate position.

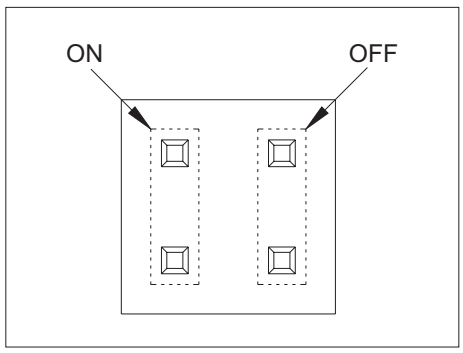


Fig. 19
Battery connector

3.5.8 Configuration

The GF_VEDO EL35CT and GF_VEDO EL57CT terminals can be configured with a specific menu.
The user accesses the menu by pressing keys F1 and F6 on the GF_VEDO EL35CT (when requested during terminal startup) or by setting the rotary-switch to position “F”.
The menu is divided into the following sections:

- *Touch Screen Calibration* (F3): touch-screen calibration program, launched by pressing key F3 on the GF_VEDO EL35CT or by starting up the terminal with the rotary-switch in position “E”
- *Pointer Device Selection*: lets you select the pointer device used by the terminal: USB mouse or touch-screen (mutually exclusive)
- *Date and Time*: lets you set the system date and time
- *Network Configuration*: network configuration menu: IP address, Gateway and Subnet Mask
- *Security*: lets you access the page to enable/disable network services, USB key, and user program launch.

3.6 BUS-G expansion Bus

The BUS-G expansion lets you use the L-BUS4 back-plane.

L-BUS4 module (optional)

This module has to be ordered separately.

It is a 4-slot back-plane that supports a maximum of 4 GILOGIK II I/O modules.

Run the following procedure after this module is installed:

- Shut down the system by detaching it from the outside power source
- Insert the module in its connector as shown in the drawing
- Switch on the system

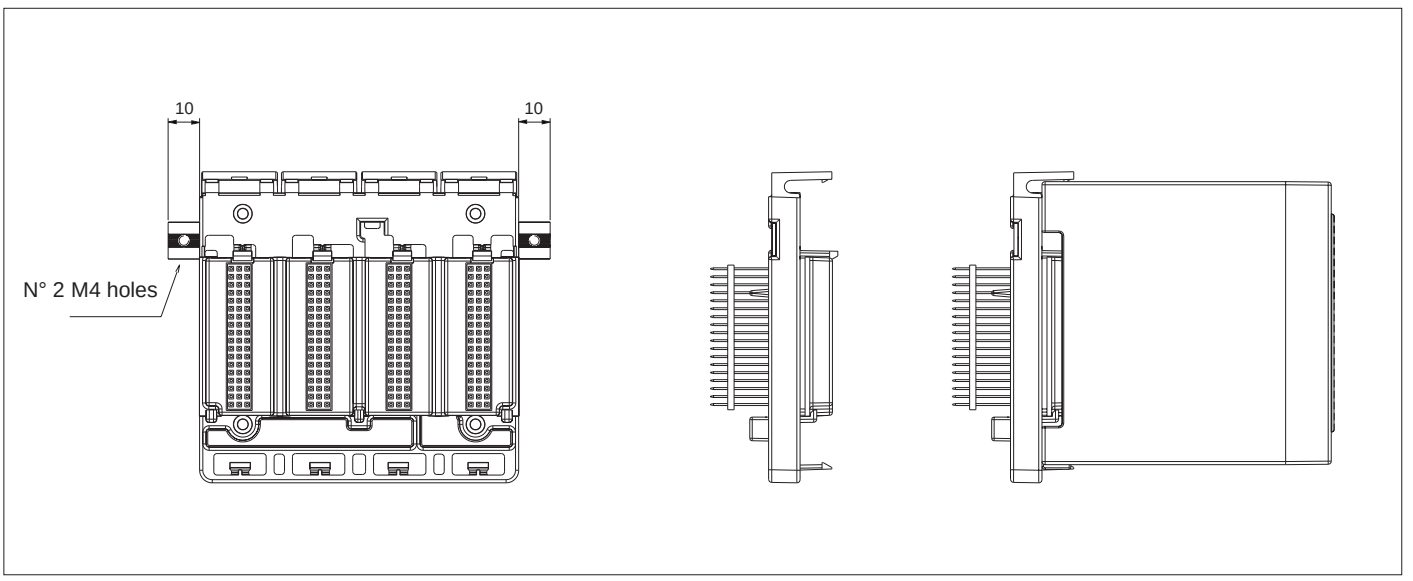


Fig. 20 - L-BUS4 modul

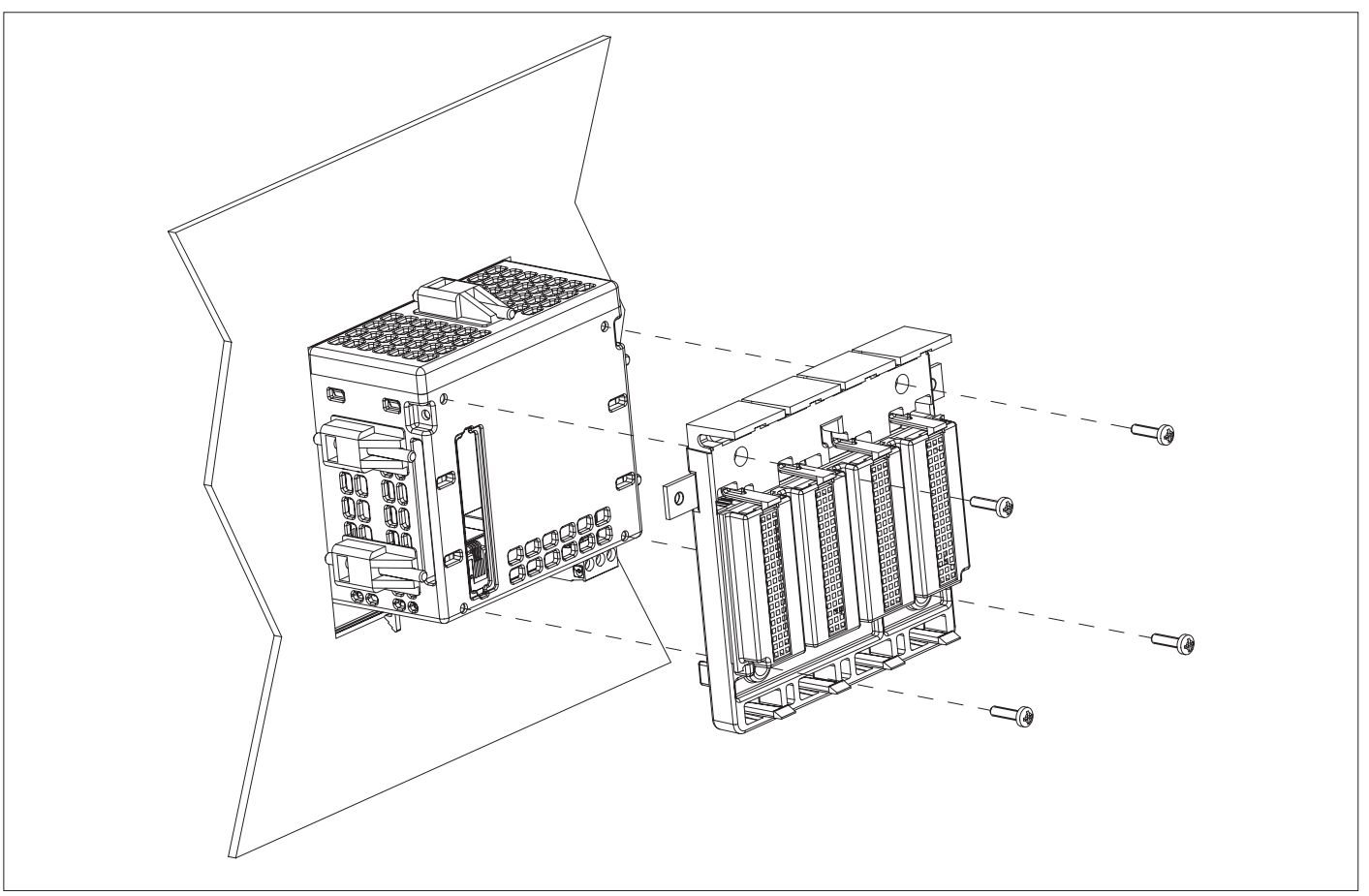


Fig. 21 - L-BUS4 mounting on GF_VEDO EL35CT

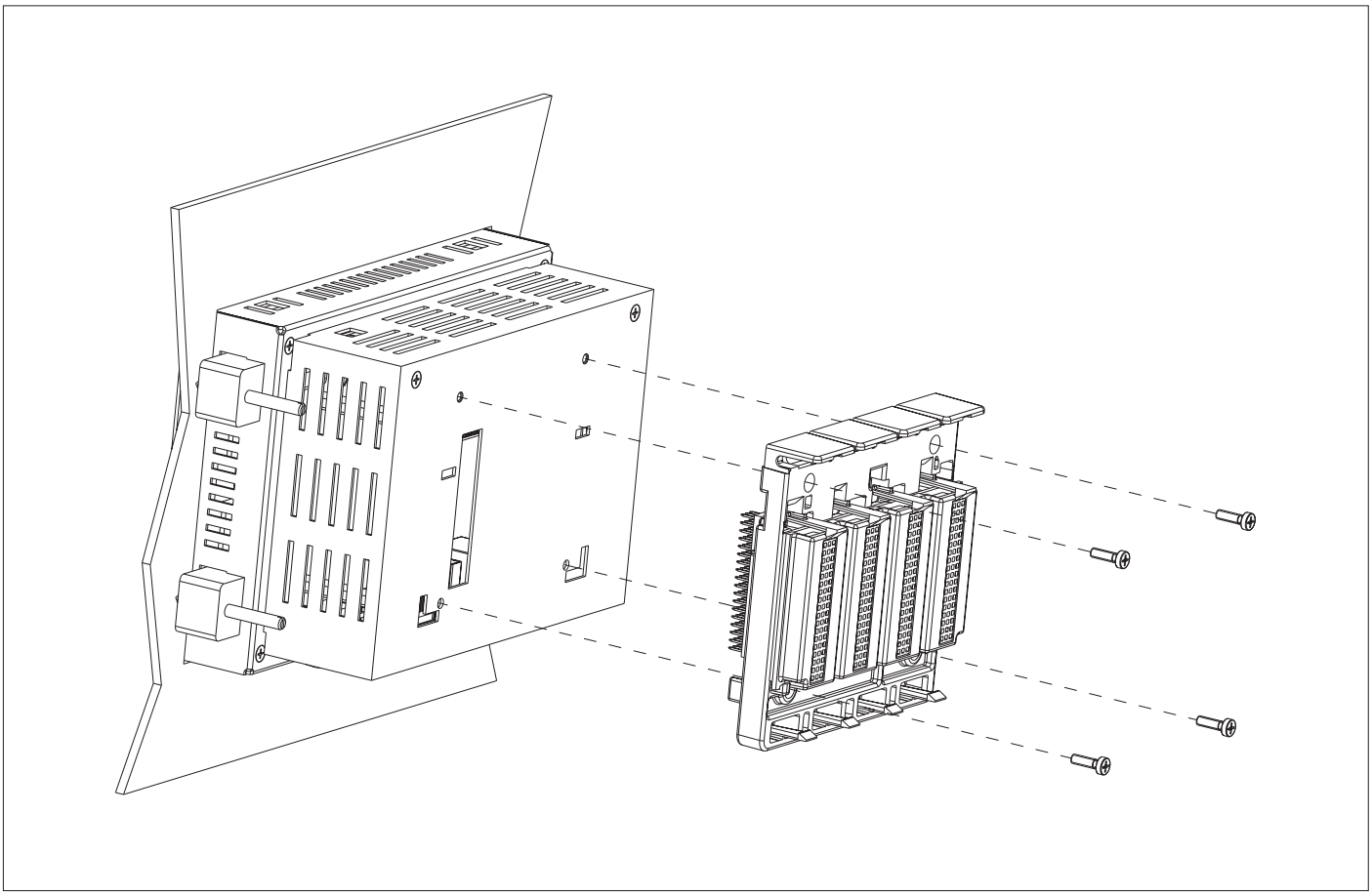


Fig. 22 - L-BUS4 mounting on GF_VEDO EL57CT

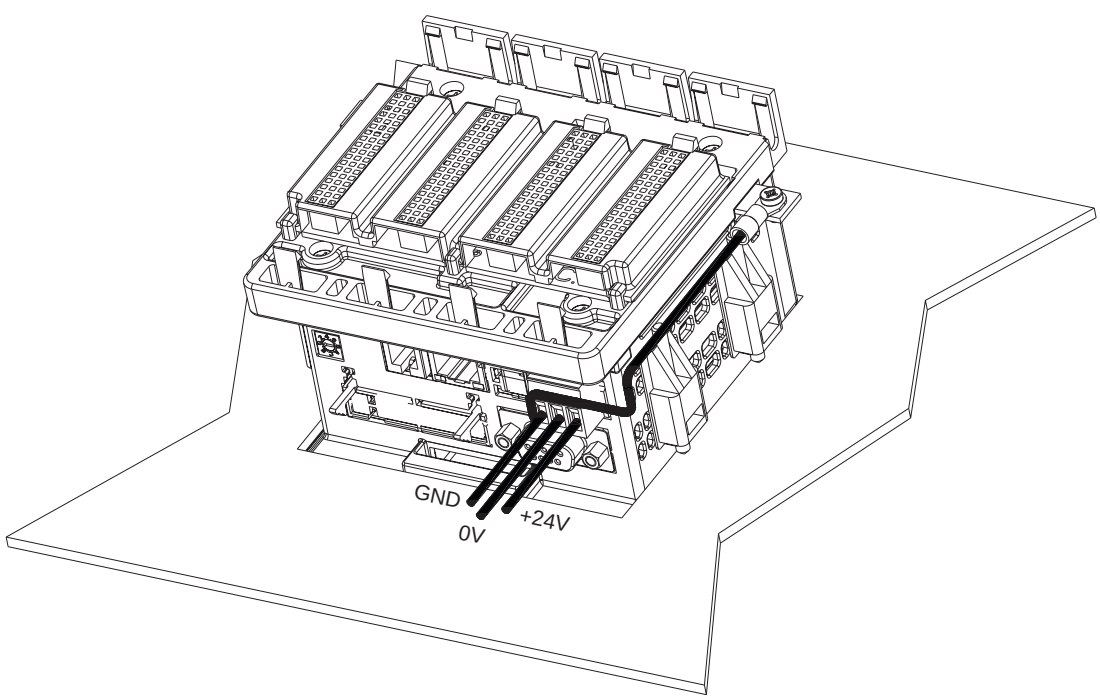


Fig. 23
Ground connection on GF_VEDO EL35CT

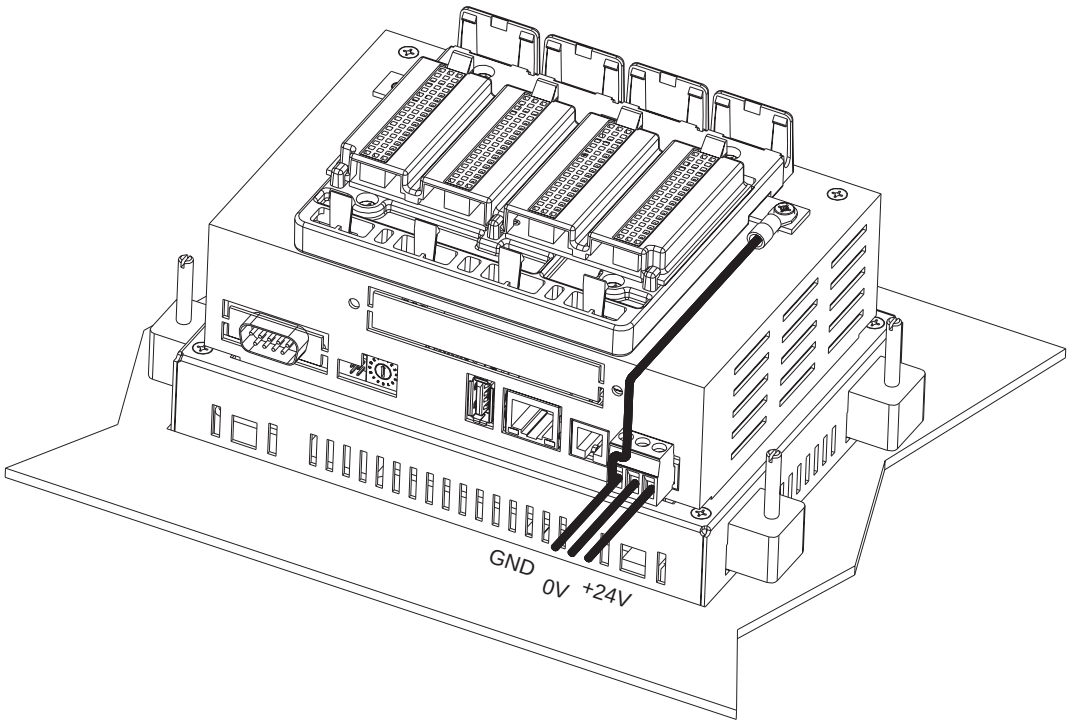


Fig. 24
Ground connection on GF_VEDO EL57CT

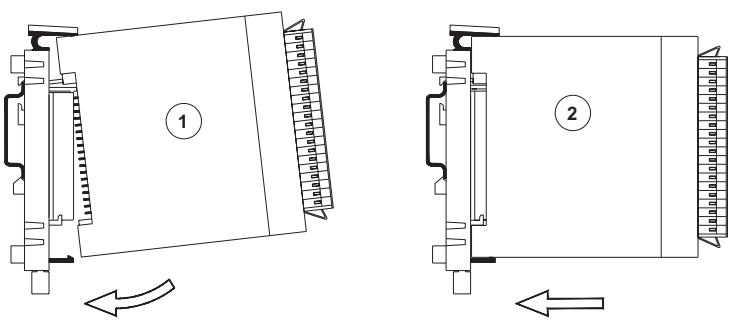


Fig. 25
Assembling GILOGIK II modules

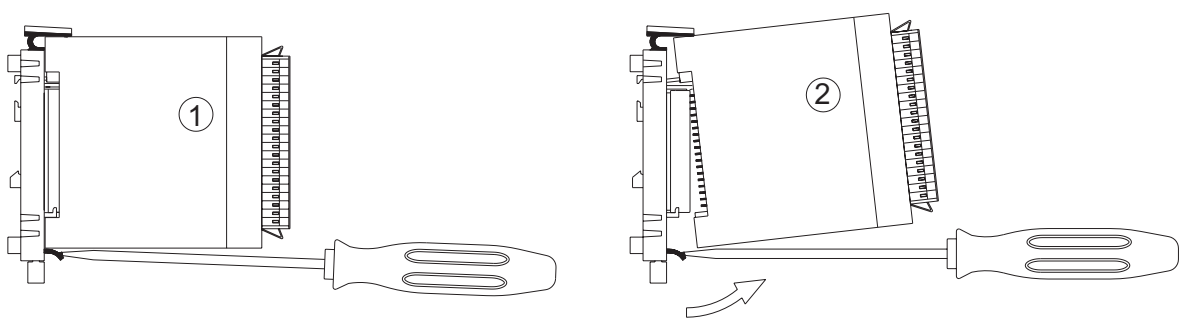


Fig. 26
Disassembling GILOGIK II modules

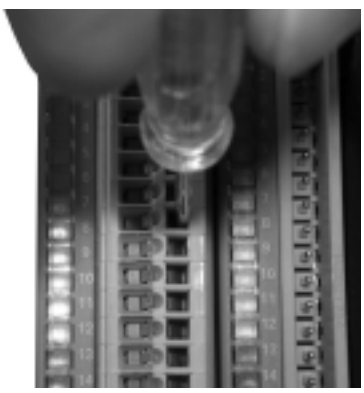
Wiring the module

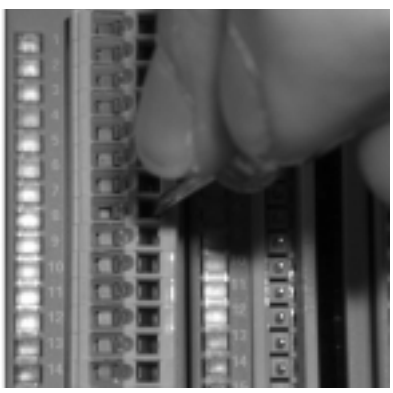
Tools needed: screwdriver with max. 2.5 mm blade.

All of the connectors to wire are screwless. The wires are attached and removed as follows:

1. expose the wire to be connected
2. insert the screwdriver in the slot

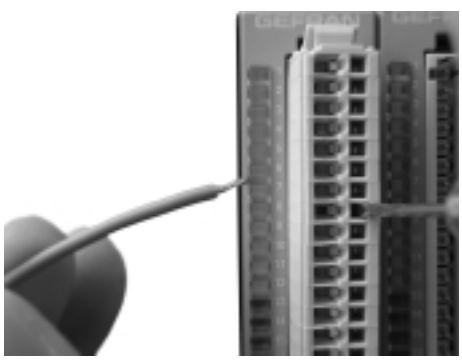
3. open the lock spring by pressing and levering with the screwdriver



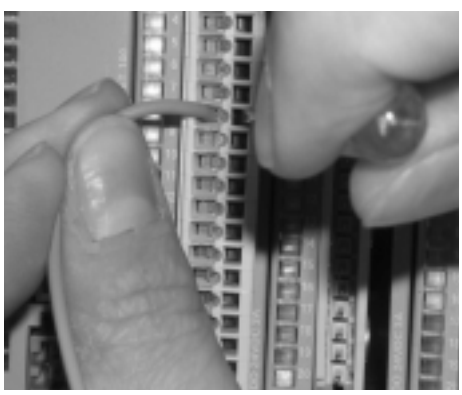


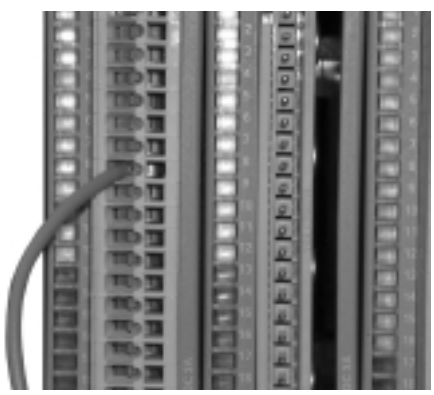
4. insert the wire in the slot with the open spring

Strip the wires for a maximum of 7mm; do not attach a lug or solder the wires. Do not use rigid wire



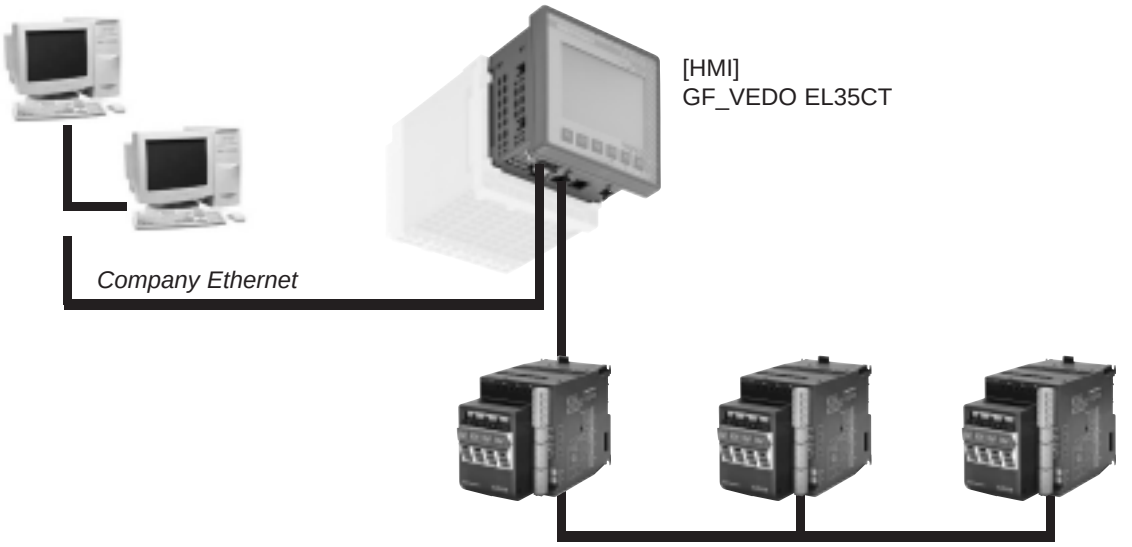
5. insert the wire and return the spring to its original position



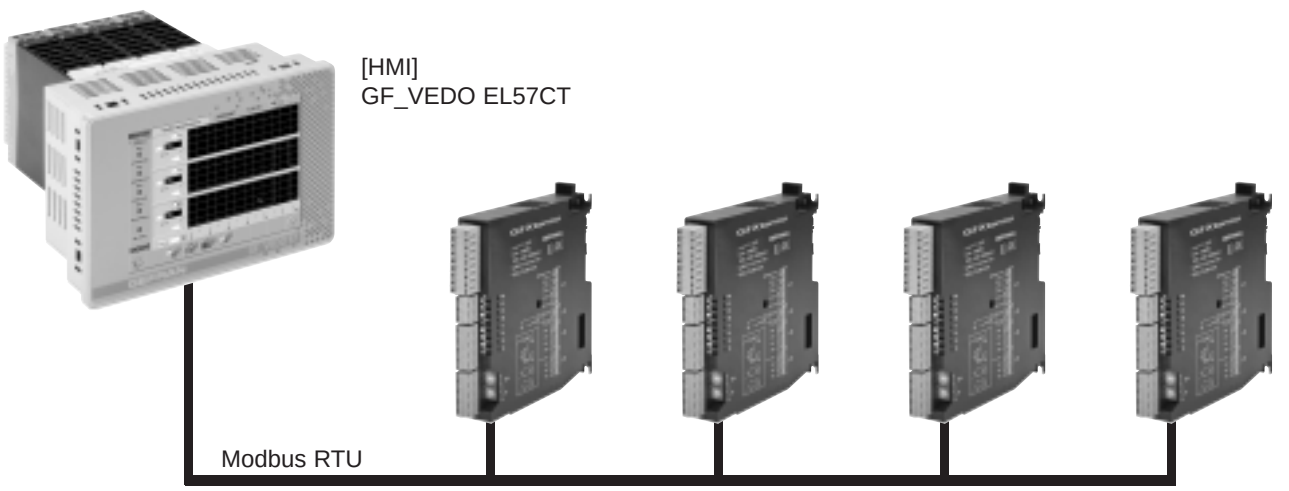


4 • CONNECTION EXAMPLES

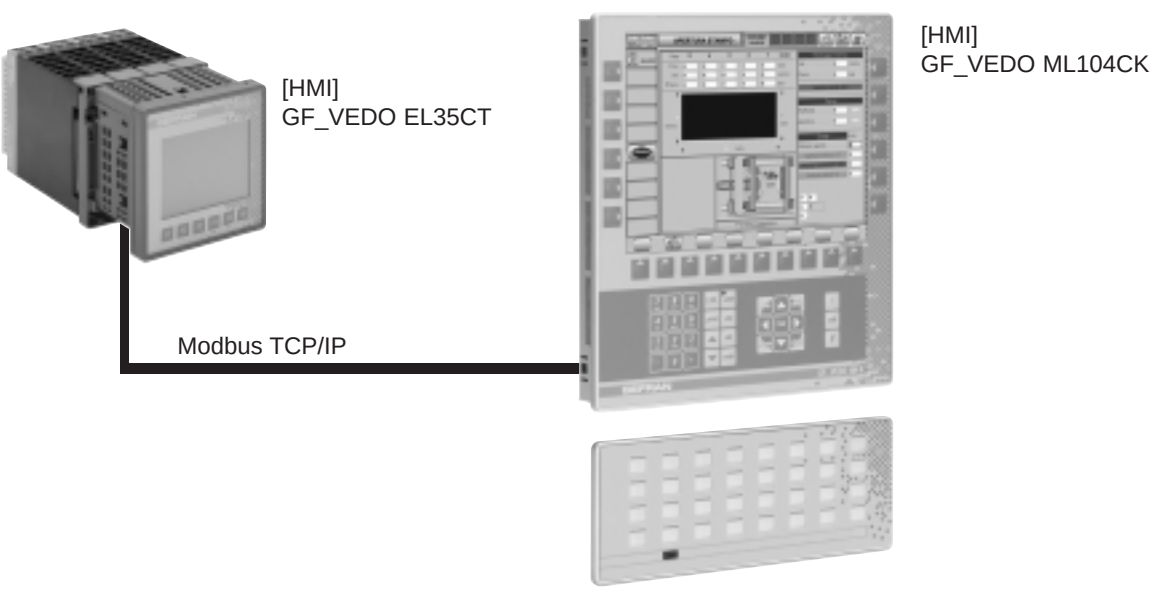
Example 1



Example 2



Example 3



5 • SUMMARY OF CHARACTERISTICS

Model	GF_VEDO EL35CT	GF_VEDO 57CT
Power supply		
Power supply	24Vdc, ±25% (3-pin screw-type female connector)	
Max consumption		
without integrated I/O	240mA, 5W	480mA, 8,5W
with integrated I/O	360mA, 7W	490mA, 9W
Protection	Against reversed polarity	Against reversed polarity and overcurrents on input circuit
Battery	3V 65mA/h rechargeable Lithium Manganese Dioxide (ML2032T6) Life without power supply > 7500 h; expected life > 7 years; low voltage signal	
Display		
Type	TFT Colors	TFT Colors
No. colours	262k	262k
Size	3.5”	5.7”
Display area	70.08x52.56 mm	117.2x88.4 mm
Resolution	320x240	320x240
Luminosity	400 cd/m^2	500 cd/m^2
Contrast	400:1	400:1
Backlighting	6 LEDs white	18 LEDs white
Visual angle O/V	75° / 55°-75°	75° / 60°-75°
Keyboard		
No. keys	6	-
Operating	> 3M operations	-
Touch Screen		
Type	4 wires resistance	
Life	>1M operations	
Controller	integrated	
Processor		
Type	EP9307 Cirrus Logic	
Frequency	200MHz	
Core	ARM9	
Memory		
System (DRAM)	64MB	
User (SRAM)	256KB	
Mass (FLASH)	64MB	
Peripherals		
ETH port	Ethernet 10/100 Mbps (RJ45 with LED)	
RS-485 port	RS485 optoisolated from 9.6 to 115kBaud (RJ10)	
USB port	USB 2.0 Host (500mA) (connector: 4-pin type A)	
CAN [CANopen] port	Optoisolated 20k...1Mbit/s (D-Sub 9 PM)	
BUS-G	Parallel bus for GILOGIK II modules	
Operative Systems	Linux	
Various		
RTC hardware clock	Clock/calendar with buffer battery	
Faceplate protection	IP65 (IEC 529)	
Certifications	CE, UL	
Dimensions		
Faceplate (mm)	100x100x64	169x120x76
with GILOGIK II modules	100x100x171	169x120x187
Drilling (mm)	93x93	162x115
Max panel thickness (mm)	4	3
Weight (Kg)	0,4	0,8
with 4 GILOGIK II modules	1	1.4
Mechanics		
Vibrations	10 ... 57Hz 0,075 mm peak 57 ... 150Hz, 1G (IEC 68-2-6)	
Shock	50g, 11 ms, 3 pulses for axis (IEC 68-2-27)	
Protection	Faceplate IP65 (IEC 529)	
Operating/Storage condition		
Operating temperature	0 ... +50°C (IEC 68-2-14)	
Storage temperature	-20° ... +70°C (IEC 68-2-14)	
Operating and storage humidity	5 ... 95% RH non-condensing (IEC 68-2-3)	

Table 10 - Summary of characteristics

6 • TECHNICAL/COMMERCIAL INFORMATION

This section contains information regarding the Controller order codes and the main accessories available.

As stated in the Preliminary Warnings of these Instructions for Use, correct interpretation of the Controller order code allows the hardware configuration for the controller to be identified immediately and so it is essential to quote the order code each time the Gefran Customer Care Service is contacted for assistance with any problems.

Order code

GF_VEDO □ □ □ □ □ □

MODEL	
3,5” color display + touch screen	35CT
5,7” color display + touch screen	57CT

OPERATING SYSTEM	
Linux	LX0

EXPANSION 1	
None	00
RS485 serial	S1

EXPANSION 2	
None	00
CANopen	C1

EXPANSION 3	
None	0
USB	U

LEXAN		
Gefran	G	
Neutral	N	1)

(1) Kindly contact GEFRAN for information on available codes.

Accessories:

F041993 . . . . . L-BUS4 4-slot back-plane module, supports a maximum of 4 GILOGIK II I/O modules