# FREE Evolution - FREE Panel

## Hardware Guide

**eliwell**

**by Schneider Electric**

## Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

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# SAFETY INFORMATION

## Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to inform of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a 'Danger' or 'Warning' safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards.
Obey all safety messages that follow this symbol to avoid possible injury or death.

## ⚠ DANGER

**DANGER** indicates a hazardous situation which, if not avoided, **will result** in death or serious injury**.**

## ⚠ WARNING

**WARNING** indicates a hazardous situation which, if not avoided, **could result** in death or serious injury.

## ⚠ CAUTION

**CAUTION** indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

## *NOTICE*

*NOTICE* is used to address practices not related to physical injury.

**PLEASE NOTE**
Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by Eliwell for any consequences arising out of the use of this material.
A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

**Qualified Personnel**
Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product.
The qualified person must be able to detect possible hazards that may arise from parameterization, modifying parameter values and generally from mechanical, electrical, or electronic equipment. The qualified person must be familiar with the standards, provisions, and regulations for the prevention of industrial accidents, which they must observe when designing and implementing the system.

# Permitted use

This product is used to control HVAC-related and pumping applications.

For safety reasons, the device must be installed and used in accordance with the instructions provided. In particular, parts carrying dangerous voltages must not be accessible under normal conditions.

The device must be adequately protected from water and dust with regard to the application, and must only be accessible using tools (with the exception of the front panel).

The device is also suitable for use in household and commercial refrigeration appliances and/or similar equipment and has been tested for safety aspects in accordance with the harmonized European reference standards.

# Prohibited use

Any use other than that expressed above under Permitted use is strictly prohibited.

The relay contacts supplied are of an electromechanical type and subject to wear. Functional safety protection devices, specified in international or local standards, must be installed externally to this device.

# Liability and residual risks

Eliwell liability is limited to the proper and professional use of this product under the guidelines contained in the present and other supporting documents, and does not extend to damages caused by (but not limited to):

- Unspecified installation/use and, in particular, in contravention of the safety requirements of established legislation or specified in this document;
- Use on equipment which does not provide adequate protection against electrocution, water and dust in the actual installation conditions;
- Use on equipment which allow access to dangerous parts without the aid of a keyed or tooled locking mechanism;
- Installation/use on equipment which does not comply with established legislation and standards.

# Disposal

The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal.

# Product Related Information

| ⚡ ⚠ **DANGER** |
|:---|
| **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH** |
| • Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires. |
| • Always use a properly rated voltage sensing device to confirm the power is removed. |
| • Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit. |
| • Use only the specified voltage when operating this equipment and any associated products. |
| **Failure to follow these instructions will result in death or serious injury.** |

This equipment has been designed to operate outside of any hazardous location.
Only install this equipment in zones known to be free of hazardous atmosphere.

| ⚠ **DANGER** |
|:---|
| **POTENTIAL FOR EXPLOSION** |
| Install and use this equipment in non-hazardous locations only. |
| **Failure to follow these instructions will result in death or serious injury.** |

| ⚠ **WARNING** |
|:---|
| **LOSS OF CONTROL** |
| • The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart. |
| • Separate or redundant control paths must be provided for critical control functions. |
| • System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link. |
| • Observe all accident prevention regulations and local safety guidelines.[1] |
| • Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

(1) For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems" or their equivalent governing your particular location.

| ⚠ **WARNING** |
|:---|
| **UNINTENDED EQUIPMENT OPERATION** |
| • Only use software approved by Eliwell for use with this equipment. |
| • Update your application program every time you change the physical hardware configuration. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

# ABOUT THE BOOK

## Document Scope

This document describes the **FREE Evolution / Panel logic controllers** and accessories

including installation and wiring information.

Use this document to:
- Install and operate your **FREE Evolution / Panel logic controller**.
- Connect the **FREE Evolution / Panel logic controller** to a programming device equipped with **FREE Studio Plus** software.
- Interface the **FREE Evolution / Panel logic controller** with I/O expansion modules, HMI and other devices.
- Familiarize yourself with the **FREE Evolution / Panel logic controller** features.

NOTE: Read and understand this document and the related documents before installing, operating, or maintaining your controller.

## Validity Note

This document has been updated for the release of EcoStruxure Machine Expert - HVAC V1.6.0.
The characteristics of the products described in this document are intended to match the characteristics that are available on www.eliwell.com. As part of our corporate strategy for constant improvement, we may revise the content over time to enhance clarity and accuracy. If you see a difference between the characteristics in this document and the characteristics on www.eliwell.com, consider www.eliwell.com to contain the latest information.

## Related Documents

| Title of Documentation | Reference number |
|---|---|
| User Guide FREE Advance | 9MA10265 (ENG) 9MA00265 (ITA) |
| User Guide FREE Smart - SKP SKW | 9MA10251 (ENG) 9MA00251 (ITA) |
| User Guide FREE Evolution - FREE Panel | 9MA10252 (ENG) 9MA00252 (ITA) |
| User Guide XVD | 9MA10254 (ENG) 9MA00254 (ITA) |
| FREE Studio Plus software HelpOnLine Manual | 9MA10256 (ENG) |
| FREE Advance 28/42 I/O – Instruction Sheet | 9IS54473 |
| FREE Evolution 27 I/O – Instruction Sheet | 9IS54403 |
| FREE Panel 3 I/O Instruction Sheet | 9IS54404 |
| FREE EVS Plugin – Instruction Sheet | 9IS54405 |
| FREE EVK1000 – Instruction Sheet | 9IS54408 |

You can download these technical publications and other technical information from our website at:

www.eliwell.com

## Cybersecurity

For information on cybersecurity go to Recommended Cybersecurity Best Practices.

## Information on Non-Inclusive Terminology

As part of a group of responsible, inclusive companies, we are updating our communications and products that contain non-inclusive terminology. Until we complete this process, however, our content may still contain standardized industry terms that may be deemed inappropriate by our customers.

# CHAPTER 1

## Introduction

## 1.1. General description of FREE Evolution / Panel

The **FREE Evolution / Panel** is a **Eliwell** range of programmable controller, suitable for managing a wide range of HVAC/R and many other applications, from the simplest to the most complex.

In this manual, the photos and drawings are intended to show the **FREE Evolution / Panel** programmable controller (and other Eliwell devices) and are for illustrative purposes only. The relative sizes and proportions may not be indicative of actual dimensions nor to scale. In addition, any wiring diagrams or electrical schematics are to be considered as simplified renditions and not literal representations thereof.

### 1.1.1. FREE Evolution / Panel offer

The **FREE Evolution / Panel** offer is made of:

- **FREE Evolution**
- **FREE EVK1000**
- **FREE Panel**

| FREE References | Description |
|---|---|
| EVD7500/C/U | FREE Evolution Display 27 I/Os, Modbus |
| EVD7500/C/U/SSR | FREE Evolution Display 27 I/Os Modbus, 2 SSR |
| EVC7500/C/U | FREE Evolution Blind 27 I/Os, Modbus |
| EVE7500 | FREE Evolution expansion 27 I/Os |
| EVE4200 | FREE Evolution expansion 14 I/Os |
| EVK1000 | FREE Evolution Display Graphic |
| EVP3300/C | FREE Panel 3 I/Os, MB & BACnet |
| EVP3500/C/RH | FREE Panel 3 I/Os RH, MB & BACnet |
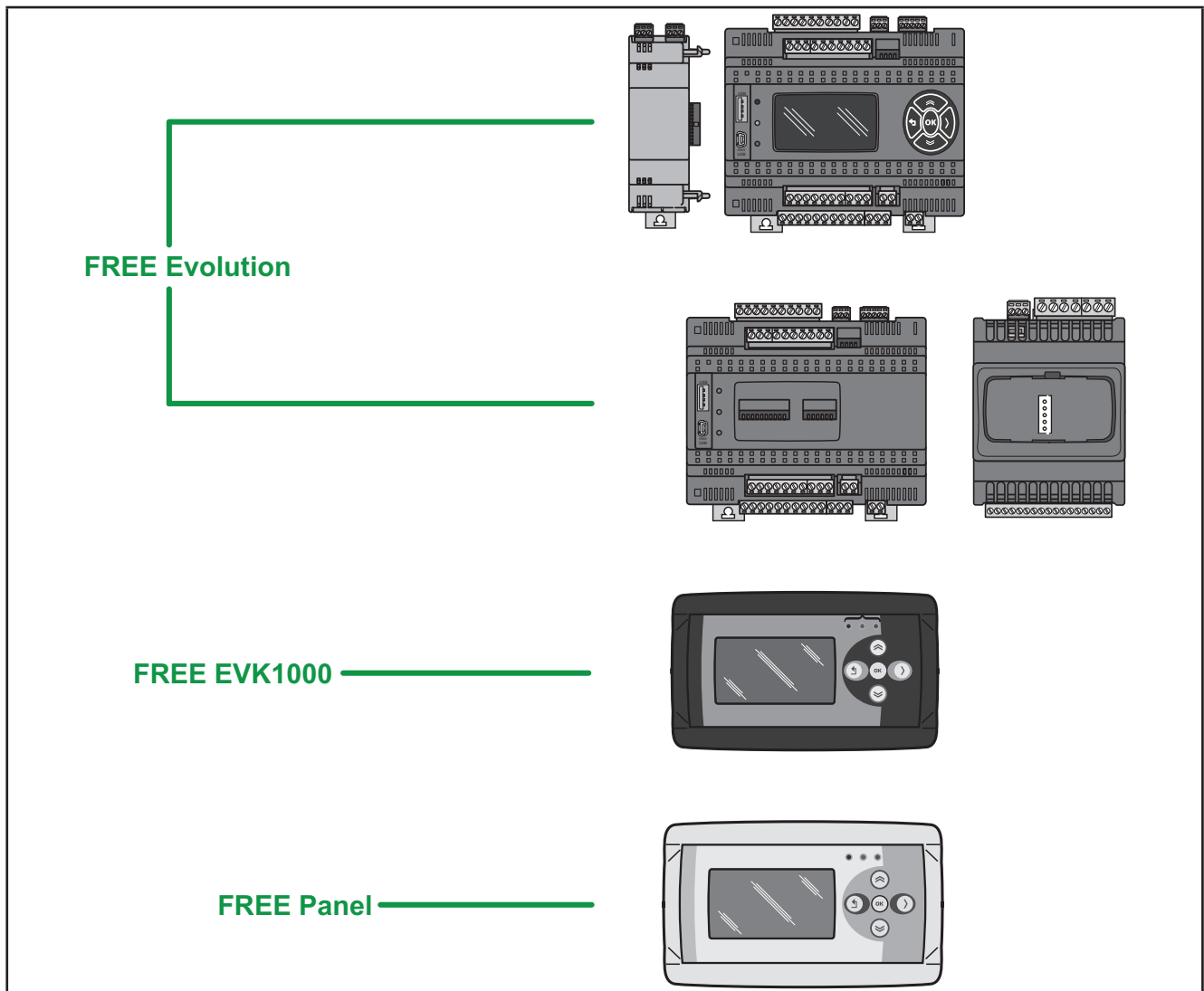
**Fig. 1.** FREE Evolution / Panel

**FREE Evolution** delivers performance in terms of memory, connectivity and user interface as well as straightforward programming, maintenance and servicing.

The references are available as 8DIN rail-mounted versions, which saves time in terms of wiring. The 8DIN format provides extra flexibility and easy installation.

A wide range of 2DIN rail mounted Communication modules allow integration with industrial systems, BMS and Ethernet networks.
Lastly, ratiometric pressure sensors and displays can also be connected with no need for further serial interfaces.

**FREE Panel** can be used as a system controller, with gateway functions; used in combination with the **FREE Evolution** and the **FREE Smart** or third-party controllers, it delivers performance in terms of memory, connectivity and user interface as well as straightforward programming, maintenance and servicing.

**FREE Panel** is designed for panel mounting, and can also be wall-mounted using a special backplate, available as an accessory.

**FREE Panel** can be used to:

• manage a local menu created with the **FREE Studio Plus** User Interface;

• manage up to 10 remote menus, created with the **FREE Studio Plus** User Interface and uploaded from the respective **FREE Evolution** devices connected to the network;

• share network variables (binding).

In association with the **FREE Evolution** hardware, there is also the **FREE Stu**d**io Plus** development tool to program and customize new programs for many HVAC- and pumping-related applications.

The use of several different programming languages in accordance with IEC61131-3 regulations makes it possible to develop new algorithms or programs, which can then be uploaded to the **FREE Evolution / Panel** modules via PC or (only for DIN rail mounted **FREE Evolution / Panel** controllers) USB memory key.

## Web functionalities

The **FREE Evolution / Panel** also features web functionalities, offering makers of machinery and systems integrators remote access. Having a web-based connection in machines reduces support and maintenance by minimizing call-out charges. End users also benefit, as they can monitor their own systems both locally and from distance, using the graphics interface of any browser.

Main web functionalities

- Web-based access.

- Remote reading and support.

- Local and remote system control, including alarms management.

- Preventive and predictive maintenance.

- Email alarm alerts.

Care must be taken and provisions made for use of this product as a control device to avoid inadvertent consequences of commanded machine operation, controller state changes, or alteration of data memory or machine operating parameters.

| ⚠ WARNING |
|---|
| **UNINTENDED EQUIPMENT OPERATION** |
| • Configure and install the mechanism that enables the remote HMI local to the machine, so that local control over the machine can be maintained regardless of the remote commands sent to the application. |
| • You must have a complete understanding of the application and the machine before attempting to control the application remotely. |
| • Take the precautions necessary to assure that you are operating remotely on the intended machine by having clear, identifying documentation within the application and its remote connection. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

# CHAPTER 2
# Mechanical installation

## 2.1. Before Starting

Read and understand this chapter before beginning the installation of your system. The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only you, the user, machine builder or integrator, can be aware of all the conditions and factors present during installation and setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used. When selecting automation and control equipment, and any other related equipment or software, for a particular application, you must also consider any applicable local, regional or national standards and/or regulations. Pay particular attention in conforming to any safety information, different electrical requirements, and normative standards that would apply to your machine or process in the use of this equipment.

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### ⚠ WARNING

**REGULATORY INCOMPATIBILITY**

Be sure that all equipment applied and systems designed comply with all applicable local, regional and national regulations and standards.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

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## 2.2. Disconnecting Power

All options and modules should be assembled and installed before installing the control system on a mounting rail, into a panel door or onto a mounting surface. Remove the control system from its mounting rail, mounting plate or panel before disassembling the equipment.

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### ⚡ ⚠ DANGER

**HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is removed.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

**Failure to follow these instructions will result in death or serious injury.**

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## 2.3. Programming Considerations

The products described in this manual have been designed and tested using Eliwell programming, configuration and maintenance software products.

| ⚠ WARNING |
|---|
| **UNINTENDED EQUIPMENT OPERATION**<br>• Only use software approved by Eliwell for use with this equipment.<br>• Update your application program every time you change the physical hardware configuration.<br>**Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

## 2.4. Operating Environment

This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere.

| ⚠ DANGER |
|---|
| **POTENTIAL FOR EXPLOSION**<br>Install and use this equipment in non-hazardous locations only.<br>**Failure to follow these instructions will result in death or serious injury.** |

| ⚠ WARNING |
|---|
| **UNINTENDED EQUIPMENT OPERATION**<br>Install and operate this equipment according to the conditions described in the General Specifications.<br>**Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

## 2.5. Installation Considerations

| ⚠ WARNING |
|---|
| **UNINTENDED EQUIPMENT OPERATION**<br>• Use appropriate safety interlocks where personnel and/or equipment hazards exist.<br>• Install and operate this equipment in an enclosure appropriately rated for its intended environment.<br>• Power line and output circuits must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.<br>• Do not use this equipment in safety-critical machine functions.<br>• Do not disassemble, repair, or modify this equipment.<br>• Do not connect any wiring to reserved, unused connections, or to connections designated as No Connection (N.C.).<br>• Do not mount devices in extremely damp and/or dirt-laden areas.<br>**Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

**NOTE**: JDYX2 or JDYX8 fuse types are UL-recognized and CSA approved.

For mechanical dimensions, see **4.6. Mechanical dimensions on page 74**.

The **FREE Evolution / Panel** logic controllers are intended for DIN rail mounting, panel mounting or wall mounting.

Care must be taken to avoid damage from electrostatic sources when handling this equipment. In particular exposed connectors and, in some cases, exposed printed circuit boards are vulnerable to electrostatic discharge.

| ⚠ **WARNING** |
|---|
| **UNINTENDED EQUIPMENT OPERATION DUE TO ELECTROSTATIC DISCHARGE DAMAGE** |
| • Keep equipment in the protective conductive packaging until you are ready to install the equipment.<br>• Only install equipment in approved enclosures and / or locations that prevent casual access and provide electrostatic discharge protection.<br>• Use a conductive wrist strap or equivalent field force protective device attached to an earth ground when handling sensitive equipment.<br>• Always discharge yourself by touching a grounded surface or approved antistatic mat before handling the equipment. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

## 2.6. EVD / EVC / EVE installation

The equipment is intended for 8DIN rail mounting (refer to **Fig. 2 on page 19** and **Fig. 3 on page 20**).
For DIN rail installation, follow the steps described below:

1. Move the two clip-on locks to their standby position (use a screwdriver to press against the relative compartments).

2. Install the device on the DIN rail.

3. Press on the clip-on locks to put them into the locked position.

4. Once assembled on the DIN rail, the clip-on locks must be turned downwards.
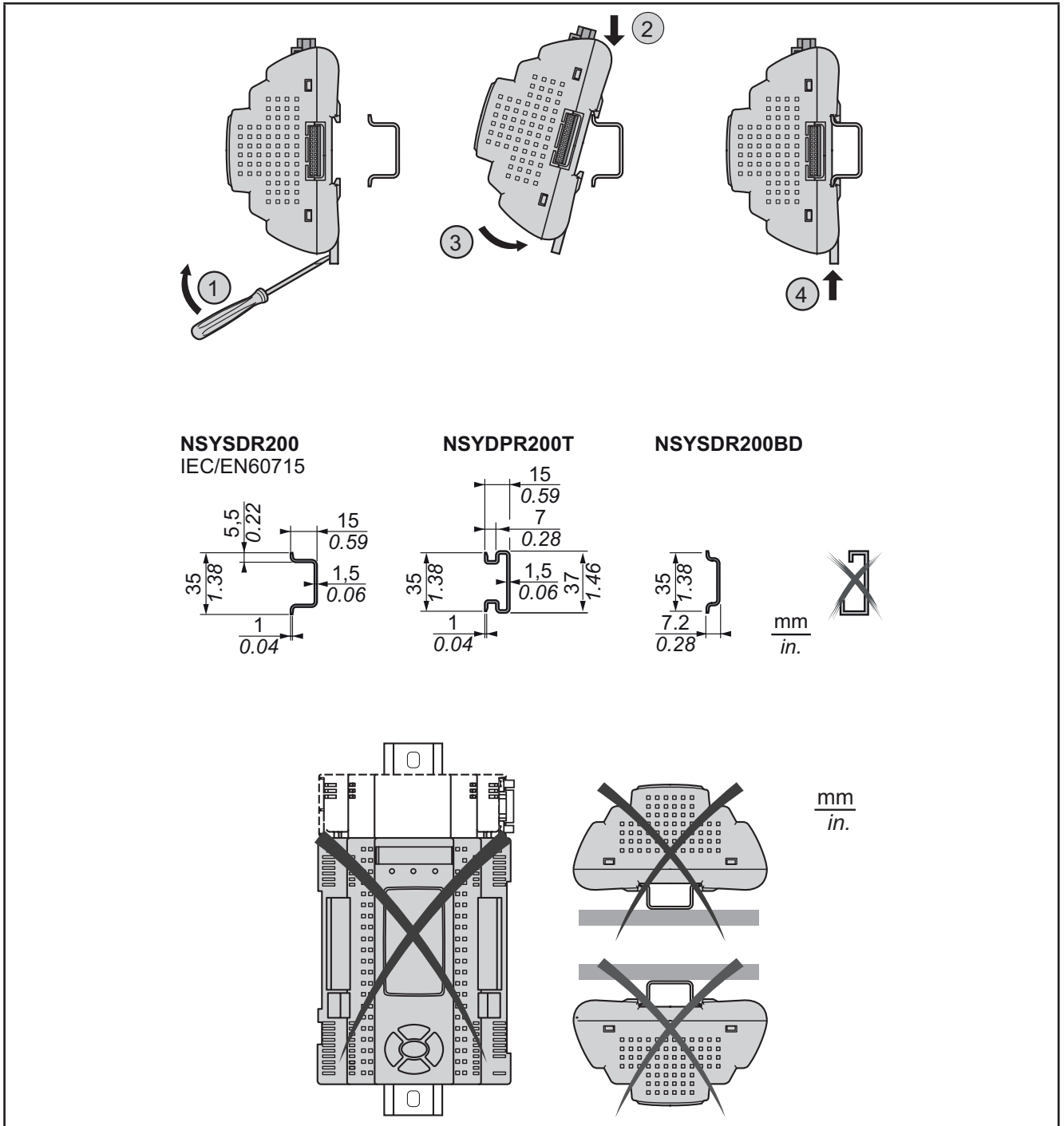


**Fig. 2.**      Mounting
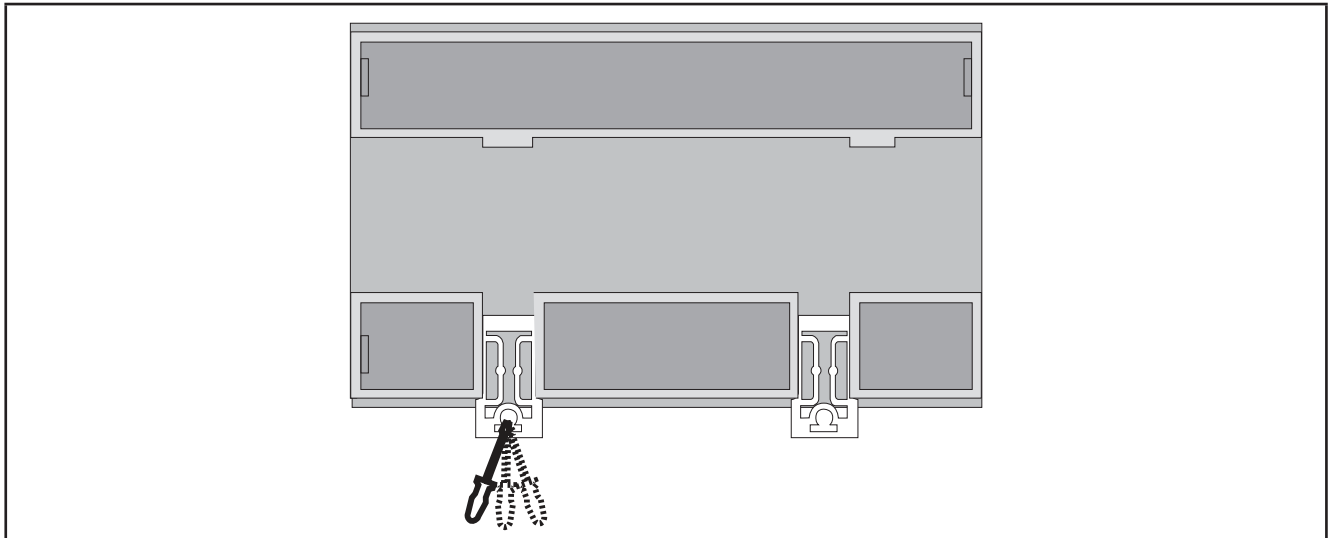
**Fig. 3.** Details of clip-on locks

The **FREE Evolution logic controller** has been designed as an IP20 product and must be installed in an enclosure. Clearances must be respected when installing the product.

There are 3 types of clearances between:

- The **FREE Evolution** and all sides of the cabinet (including the panel door).
- The **FREE Evolution** terminal blocks and the wiring ducts. This distance reduces electromagnetic interference between the controller and the wiring ducts.
- The **FREE Evolution** and other heat generating devices installed in the same cabinet.

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## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Place devices dissipating the most heat at the top of the cabinet and ensure adequate ventilation.
- Avoid placing this equipment next to or above devices that might cause overheating.
- Install the equipment in a location providing the minimum clearances from all adjacent structures and equipment as directed in this document.
- Install all equipment in accordance with the specifications in the related documentation.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

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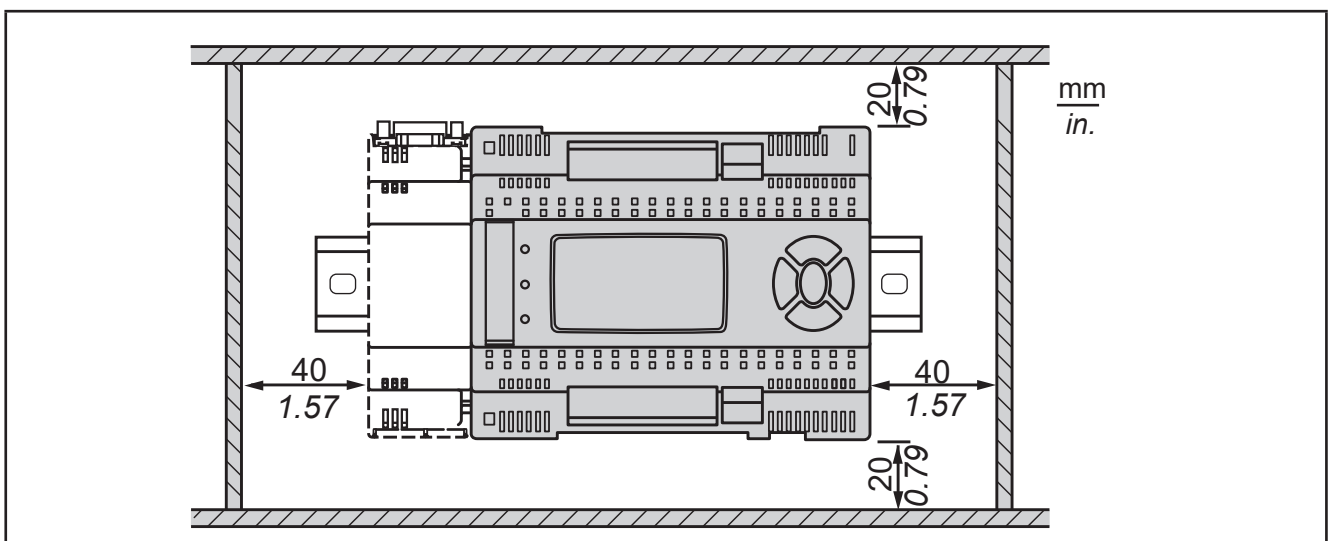


**Fig. 4.** Clearances

## 2.7. Assembling the EVS Communication modules

Communication modules are 2DIN modules that connect to an **EVD / EVC** controller (refer to **Fig. 5 on page 21** and **Fig. 6 on page 21**).

To assemble **EVS** to **EVD / EVC**, follow the steps described below:

1. Remove the door (if present) on the left side of the **EVD / EVC** controller by using fingers or a screw-driver.

2. Anchor **EVS** to the **EVD / EVC** controller.

• via the Communication module connector, behind the removable door.

• with the fixing screws to which the Communication module is anchored to.
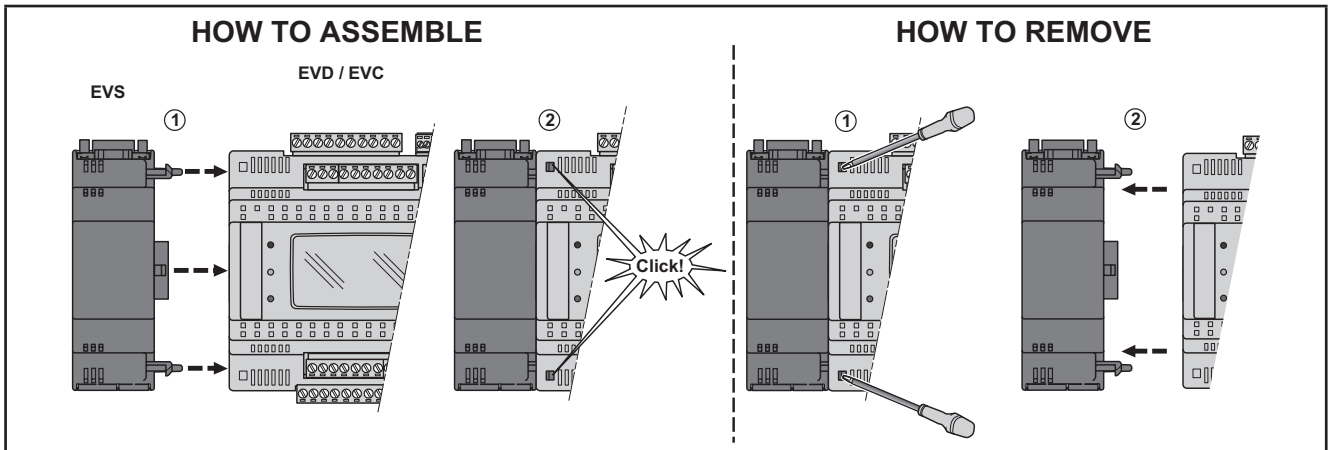


**Fig. 5.**    Assembling the EVS Communication modules

Follow the instructions below to install it on DIN rail:

1. Move the clip-on locks (two for **EVD / EVC**, one for **EVS**) to its standby position (use a screwdriver).

2. Install **EVD / EVC** + **EVS** on the DIN rail.

3. Press the clip-on locks which will go to the closing position.

4. Once the "BASE" is mounted on the DIN rail, the clip-on locks must be turned downwards.
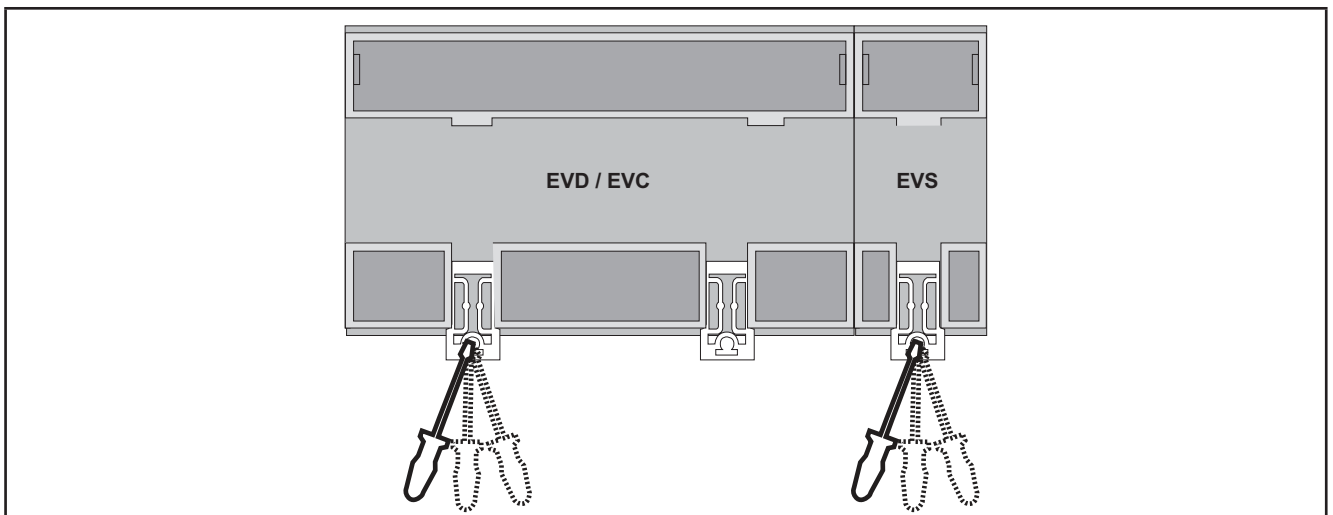


**Fig. 6.**    Details of clip-on locks

## 2.8.  Assembling the FREE Panel or FREE EVK1000

### 2.8.1.  Panel mounting

The equipment is intended for panel mounting (refer to **Fig. 7 on page 22**).

The following figures show **FREE Panel** mounting; same steps are required for **FREE EVK1000** mounting.

For panel mounting, follow the steps described below:

1.  Cut from the panel a 138 x 68 mm rectangular opening.

2.  Drill, at the specified spacing, 4 holes in the panel that the controller is to be mounted on or two holes, of diameter 2.7 mm.

3.  Insert the device, fixing it with the screws.

4.  Press the front of the **FREE Panel** to close.
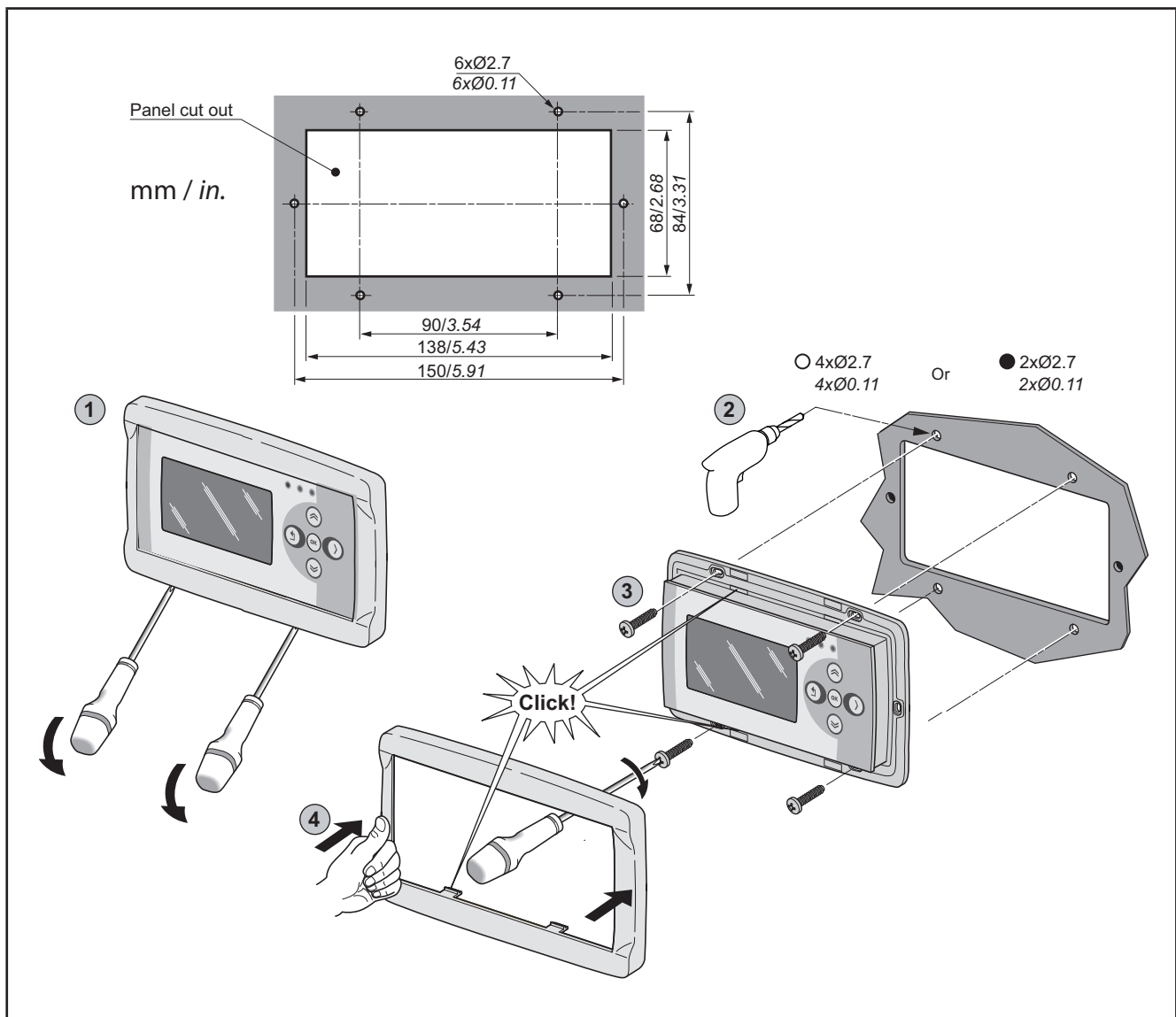


**Fig. 7.**     Assembling the FREE EVK1000 or FREE Panel

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## 2.8.2. Accessories for Wall mounting

The equipment is also intended for wall mounting (refer to **Fig. 8 on page 23**).
Contact the **Eliwell** Sales Department for wall-mounting accessories.

1.  Drill 4 holes of diameter 4.2 mm in the wall at the specified spacing to fix the backplate.

2.  Use the two side slots, one at the bottom and one at the top, under the pre-formatted removable doors, preventing the opening of holes in the wall.

3.  Insert the backplate, fixing it with the screws.

4.  Insert the device, fixing it with the screws.

5.  Press the front of the **FREE Panel** to close.
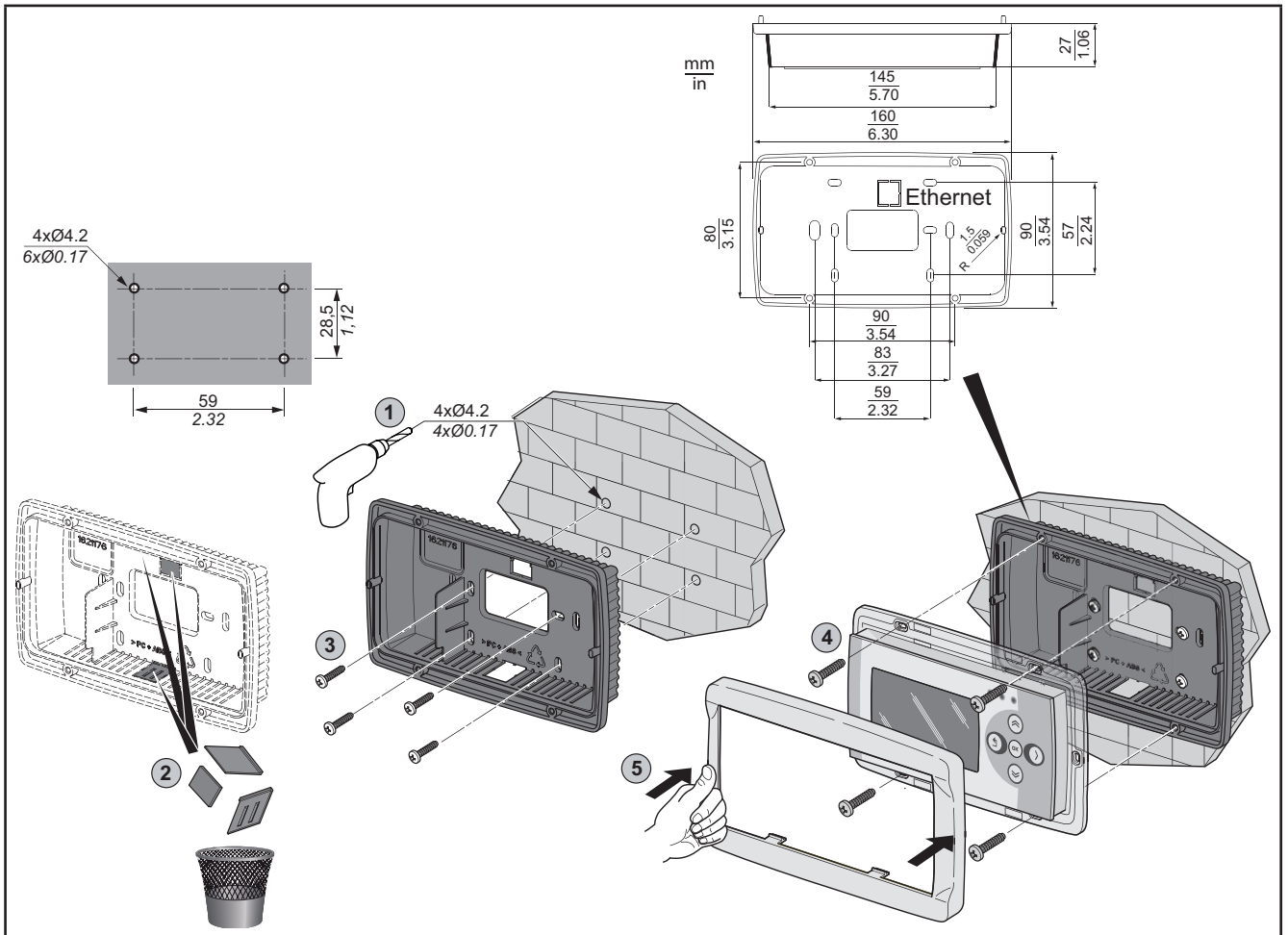


**Fig. 8.**    Accessories for Wall mounting

| Reference | Description |
|---|---|
| **EVA00WMRC0000** | White backplate kit for wall mounting |
| **EVA00WMRC0001** | Black backplate kit for wall mounting |
| 4 backplates per package. ||

# CHAPTER 3

# Electrical connections

## 3.1. Wiring Best Practices

The following information describes the wiring guidelines and associated best practices to be respected when using the **FREE Evolution Logic Controller**.

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### ⚡ ⚠ DANGER

**HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires.
- Always use a properly rated voltage sensing device to confirm the power is removed.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

**Failure to follow these instructions will result in death or serious injury.**

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### ⚠ WARNING

**LOSS OF CONTROL**

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.[1]
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

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[1] For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems" or their equivalent governing your particular location.

## 3.1.1. Wiring Guidelines

The following rules must be applied when wiring a **FREE Evolution logic controllers**:

- I/O and communication wiring must be kept separate from the power wiring. Route these two types of wiring in separate cable ducting.

- Verify that the operating conditions and environment are within the specification values.

- Use proper wire sizes to meet voltage and current requirements.

- Use copper conductors (required).

- Use twisted pair, shielded cables for analog, and/or fast I/O.

- Use twisted pair, shielded cables for networks, and fieldbus.

Use shielded, properly grounded cables for all analog and high-speed inputs or outputs and communication connections. If you do not use shielded cable for these connections, electromagnetic interference can cause signal degradation. Degraded signals can cause the controller or attached modules and equipment to perform in an unintended manner.

┌─────────────────────────────────────────────────────────────────────────┐
│                          ⚠ **WARNING**                                    │
├─────────────────────────────────────────────────────────────────────────┤
│ **UNINTENDED EQUIPMENT OPERATION**                                        │
│  • Use shielded cables for all fast I/O, analog I/O and communication signals. │
│  • Ground cable shields for all analog I/O, fast I/O and communication signals at a single point [1]. │
│  • Route communication and I/O cables separately from power cables.       │
│  • Make connections as short as possible and do not wind them around electrically connected parts. │
│ **Failure to follow these instructions can result in death, serious injury, or equipment damage.** │
└─────────────────────────────────────────────────────────────────────────┘

[1] Multipoint grounding is permissible if connections are made to an equipotential ground plane dimensioned to help avoid cable shield damage in the event of power system short-circuit currents.
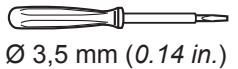
**NOTE**: Surface temperatures may exceed 60 °C. Route primary wiring (wires connected to power mains) separately and apart from secondary wiring (extra low voltage wiring coming from intervening power sources). If that is not possible, double insulation is required such as conduit or cable gains.

## 3.1.2. Rules for Removable Screw Terminal Block

The following table presents the cable types and wire sizes for a **5.08** or **5.00 pitch** removable screw terminal block:

| $\frac{mm}{in.}$ 7 / 0.28 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| mm² | 0.2…2.5 | 0.2…2.5 | 0.25…2.5 | 0.25…2.5 | 2 x 0.2…1 | 2 x 0.2…1.5 | 2 x 0.25…1 | 2 x 0.5...1.5 |
| AWG | 24…14 | 24…14 | 22...14 | 22…14 | 2 x 24…18 | 2 x 24…16 | 2 x 22…18 | 2 x 20...16 |

| Ø 3,5 mm (0.14 in.) | C | N•m | 0.5...0.6 |
|---|---|---|---|
| | | lb-in | 4.42...5.31 |
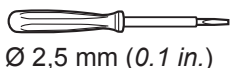
**Fig. 9.**     Pitch 5.08 mm (0.20 in.) or 5.00 mm (0.197 in.)

The following table presents the cable types and wire sizes for a **3.81** or **3.50 pitch** removable screw terminal block:

| $\frac{mm}{in.}$ 9 / 0.35 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| mm² | 0.14…1.5 | 0.14…1.5 | 0.25…1.5 | 0.25…0.5 | 2 x 0.08…0.5 | 2 x 0.08…0.75 | 2 x 0.25…0.34 | 2 x 0.5 |
| AWG | 26…16 | 26…16 | 22…16 | 22...20 | 2 x 28…20 | 2 x 28…20 | 2 x 24…22 | 2 x 20 |

| Ø 2,5 mm (0.1 in.) | C | N•m | 0.22...0.25 |
|---|---|---|---|
| | | lb-in | 1.95...2.21 |

**Fig. 10.**     Pitch 3.81 mm (0.15 in.) or 3.50 mm (0.14 in.)

# ⚡ ⚠ DANGER

**LOOSE WIRING CAUSES ELECTRIC SHOCK**

Tighten connections in conformance with the torque specifications.

**Failure to follow these instructions will result in death or serious injury.**

# ⚠ DANGER

**FIRE HAZARD**
- Use only the correct wire sizes for the current capacity of the I/O channels and power supplies.
- For 2 A - relay output wiring, use conductors with a cross section at least equal to 0.5 mm$^2$ (AWG 20) and a temperature rating at least equal to 80 °C (176 °F).
- For 3 A - relay output wiring, use conductors with a cross section at least equal to 1.5 mm$^2$ (AWG 16) and a temperature rating at least equal to 80 °C (176 °F).
- For common conductors of 8 A - relay output wiring, or greater than 3 A - relay output wiring, use conductors with a cross section at least equal to 2.0 mm$^2$ (AWG 12) and a temperature rating at least equal to 80 °C (176 °F).

**Failure to follow these instructions will result in death or serious injury.**

## 3.1.3. Protecting Outputs from Inductive Load Damage

If your controller or module contains relay outputs, these types of outputs can support up to 250 Vac (240 Vac if SSR). Inductive damage to these types of outputs can result in welded contacts and loss of control. Each inductive load must include a protection device such as a peak limiter, RC circuit or flyback diode. Capacitive loads are not supported by these relays.

# ⚠ WARNING

**RELAY OUTPUTS WELDED CLOSED**
- Always protect relay outputs from inductive alternating current load damage using an appropriate external protective circuit or device.
- Do not connect relay outputs to capacitive loads.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Depending on the load, a protection circuit may be needed for the outputs on the controllers and certain modules. Inductive loads using DC voltages may create voltage reflections resulting in overshoot that will damage or shorten the life of output devices.

# ⚠ CAUTION

**OUTPUT CIRCUIT DAMAGE DUE TO INDUCTIVE LOADS**
Use an appropriate external protective circuit or device to reduce the risk of inductive direct current load damage

**Failure to follow these instructions can result in injury or equipment damage.**

Choose a protection circuit from the following diagrams according to the power supply used. Connect the protection circuit to the outside of the controller or relay output module.

**Protective circuit A**: this protection circuit can be used for both AC and DC load power circuits.
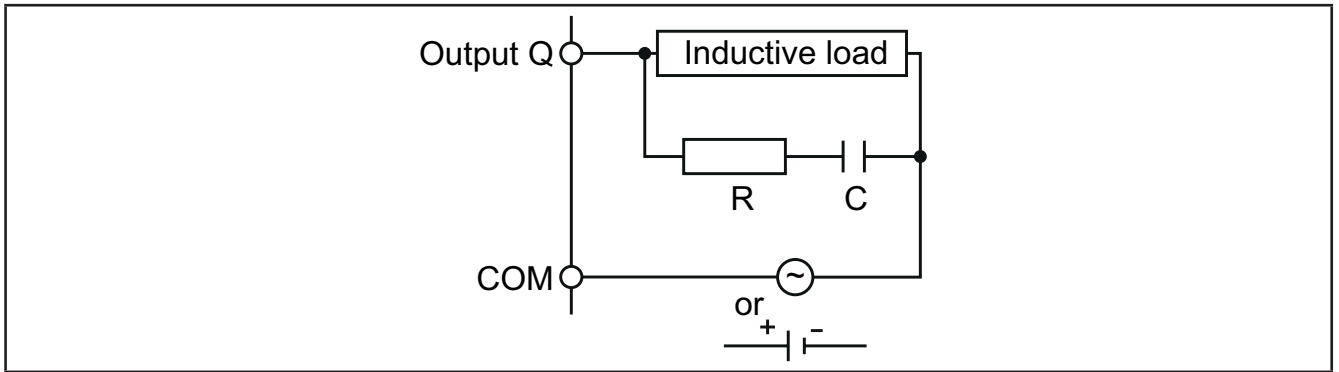

**Fig. 11.**    Protective circuit A

**C** Value from 0.1 to 1 µF
**R** Resistor of approximately the same resistance value as the load

**Protective circuit B**: this protection circuit can be used for DC load power circuits.
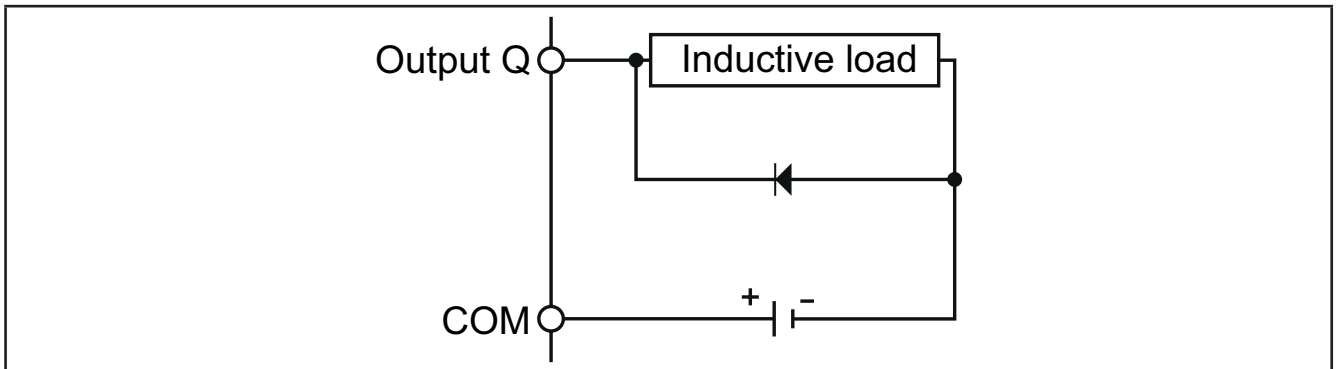

**Fig. 12.**    Protective circuit B

Use a diode with the following ratings:
· Reverse withstand voltage: power voltage of the load circuit x 10.
· Forward current: more than the load current.

**Protective circuit C**: this protection circuit can be used for both AC and DC load power circuits.
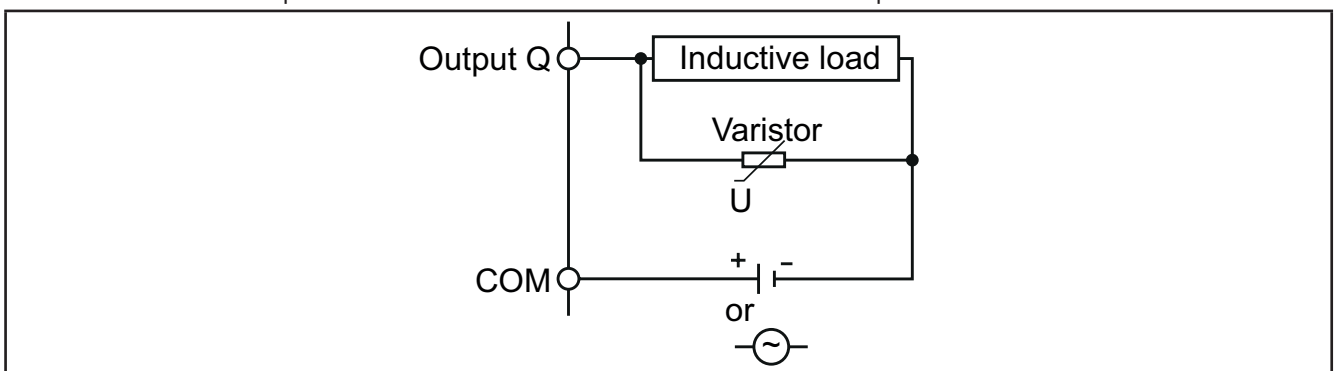

**Fig. 13.**    Protective circuit C

In applications where the inductive load is switched on and off frequently and/or rapidly, ensure that the continuous energy rating (J) of the varistor exceeds the peak load energy by 20 % or more.

**NOTE**: Place protection devices as close to the load as possible.

### 3.1.4. Special handling considerations

Care must be taken to avoid damage from electrostatic sources when handling this equipment. In particular exposed connectors and, in some cases, exposed printed circuit boards are vulnerable to electrostatic discharge.

| ⚠ **WARNING** |
| --- |
| **UNINTENDED EQUIPMENT OPERATION DUE TO ELECTROSTATIC DISCHARGE DAMAGE** |
| • Keep equipment in the protective conductive packaging until you are ready to install the equipment. |
| • Only install equipment in approved enclosures and / or locations that prevent unauthorized access and provide electrostatic discharge protection. |
| • Use a conductive wrist strap or equivalent field force protective device attached to an earth ground when handling sensitive equipment. |
| • Always discharge yourself by touching a grounded surface or approved antistatic mat before handling the equipment. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

### 3.1.5. Analog Inputs-Probes

Temperature probes have no connection polarity and can be extended using a normal bipolar cable.

| ⚠ **WARNING** |
| --- |
| **UNINTENDED EQUIPMENT OPERATION DUE TO CONNECTION** |
| • Apply power to all externally powered devices after applying power to the **FREE Evolution** logic controllers. |
| • Signal leads (probes, digital inputs, communication and the electronic supply) must be routed separately from power cables. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

| *NOTICE* |
| --- |
| **INOPERABLE EQUIPMENT** |
| Verify all wiring connections before applying power. |
| **Failure to follow these instructions can result in equipment damage.** |

**NOTE:** The extension of the probes influences the electromagnetic compatibility (EMC) of the equipment.

**NOTE:** Connection polarity must be correctly respected for probes which need a specific polarity.

### 3.1.6. Serial connections

|  | The reference has on-board serial |
| --- | --- |
| **FREE Evolution** | CAN, RS485, USB |
| **FREE Panel** | CAN, RS485, ETHERNET |

Pay special attention when connecting serial lines. Miswiring may lead to inoperable equipment.

| *NOTICE* |
| --- |
| **INOPERABLE EQUIPMENT** |
| • Do not connect equipment that communicate using RS485 serial to CAN terminals. |
| • Do not connect CAN equipment to RS485 terminals. |
| **Failure to follow these instructions can result in equipment damage.** |

Communication modules **FREE EVS** provide additional serial ports for integration with industrial systems, BMS and Ethernet. Controller serials are defined as "on-board" (OB) whereas serials on **FREE EVS** are referred to as Communication modules (PI, stands for "Plug In").

## CAN Expansion Bus

- Use a shielded and "**twisted pair**" cable with two 0.5 mm$^2$ section conductors (AWG 22), plus braid such as Belden cable reference 3105A (characteristic impedance 120 Ω) with PVC sleeve, nominal capacity between conductors 36 pF/m, nominal capacity between conductor and shielding 68 pF/m.

- Always follow regulations applicable to the routing and connection of cables. Make certain that data transmission circuits are properly separated from power lines.

- For connections over longer distances, it is better to end the line with resistors on both ends, inserting the two **R TERM** jumpers (available on the terminal strip next to the CAN Expansion Bus as the default configuration).

- The maximum distance depends on the baud setting (see the following table).

| kb/s (kbaud) | On-board CAN (m) - FREE Evolution | CAN Communication module (m) |
|:---:|:---:|:---:|
| 50 | 1000 | 1000 |
| 125 | 500 | 500 |
| 250 | 200 | 250 |
| 500 | 30 | 60 |

- CAN Expansion Bus is used to communicate with **FREE EVK1000** terminal and **FREE EVE** terminal.

## RS 485

- Use a shielded and "**twisted pair**" cable with two 0.5 mm$^2$ section conductors (AWG 22), plus braid such as Belden cable reference 3105A (characteristic impedance 120 Ω) with PVC sleeve, nominal capacity between conductors 36 pF/m, nominal capacity between conductor and shielding 68 pF/m. Alternatively use a shielded and "**twisted pair**" cable with two 0.5 mm$^2$ section conductors (AWG 20), plus braid such as Belden cable reference 8762 with PVC sleeve, nominal capacity between conductors 89 pF/m, nominal capacity between conductor and shielding 161 pF/m. See EN 50174 standard on IT cabling for indications on how cables should be routed.

- Always follow regulations applicable to the routing and connection of cables. Make certain that data transmission circuits are properly separated from power lines.

- RS 485 network up to 1200 m in length with a maximum of 32[1] devices can be connected directly to the controller.
    [1] Example of **FREE Evolution** Modbus Slave with single Master supervisor.
    This length can be extended and the number of devices for each channel increased using appropriate repeater modules.

- Single terminal strip with 3 conductors: use all 3 conductors ("+", "-" for the signal and "GND" for the braid).

- Attach the 120 Ω 1/4 W resistors between the "+" and "-" terminals of the interface and the last controller in each branch of the network.

- Maximum settable speed 115200 baud.

- RS 485 physical layer can be used for Modbus SL, as well as for BACnet MS/TP communication.
  Concurrent communication of different protocols on the same serial port is **NOT** allowed.

Pay special attention when connecting serial lines. Miswiring may lead to inoperable equipment.

| *NOTICE* |
|---|
| **INOPERABLE EQUIPMENT** |
| Do not communicate through Modbus SL and BACnet MS/TP simultaneously on the same line. |
| **Failure to follow these instructions can result in equipment damage.** |

## Ethernet

The Ethernet connection of the Communication module **EVS ETH / EVS ETH + RS485** allows the **FREE Evolution** logic controller to communicate on an Ethernet network using TCP/IP protocol, whereas **FREE Panel**, with its embedded Ethernet, does **NOT** require an Ethernet Communication module.

The connection allows:

- connection of different controllers and/or applications exchanging variables and/or parameters (network).
- connection of a supervision system using Modbus TCP/IP protocol.
- connection of an IEC 61131-3 **FREE Studio Plus** development system.
- connection on device on a BACnet/TCP network, with B-AAC profile

Concurrent communication on different protocols using the same Ethernet port is allowed.

The Ethernet connector shield is internally connected to the earth of the equipment and therefore to the reference of the input and output channels.

## USB

There are 2 USB connectors placed on the upper-left side of the **FREE Evolution** controller (in the front view) (see **Fig. 14 on page 30**).
- USB Type A is a connector for USB memory key.
- USB Type mini-B is used for programming purposes.
  The components required for **FREE Evolution** USB mini-B are: TCSXCNAMUM3P or BMXXCAUSBH018.

| USB | PURPOSE | NOTE |
|---|---|---|
| **Type A** (**HOST**) | Used to connect a USB memory key when downloading the application. This should be done from the controller keypad (**FREE EVD** references) or from the **FREE EVK1000** (**FREE EVC** reference). | - |
| **Type mini-B** (**DEVICE**) | Used to connect **FREE Evolution** to a PC via mini-B USB cable for debugging, commissioning, downloading, uploading with **FREE Studio Plus**. The operations can be done from PC or another device. | Compatible with the following operating systems: <br>• Windows 8 / 8.1, 64-Bit <br>• Windows 10, 64-Bit <br><br>The driver is supplied with the **FREE Studio Plus** software. |
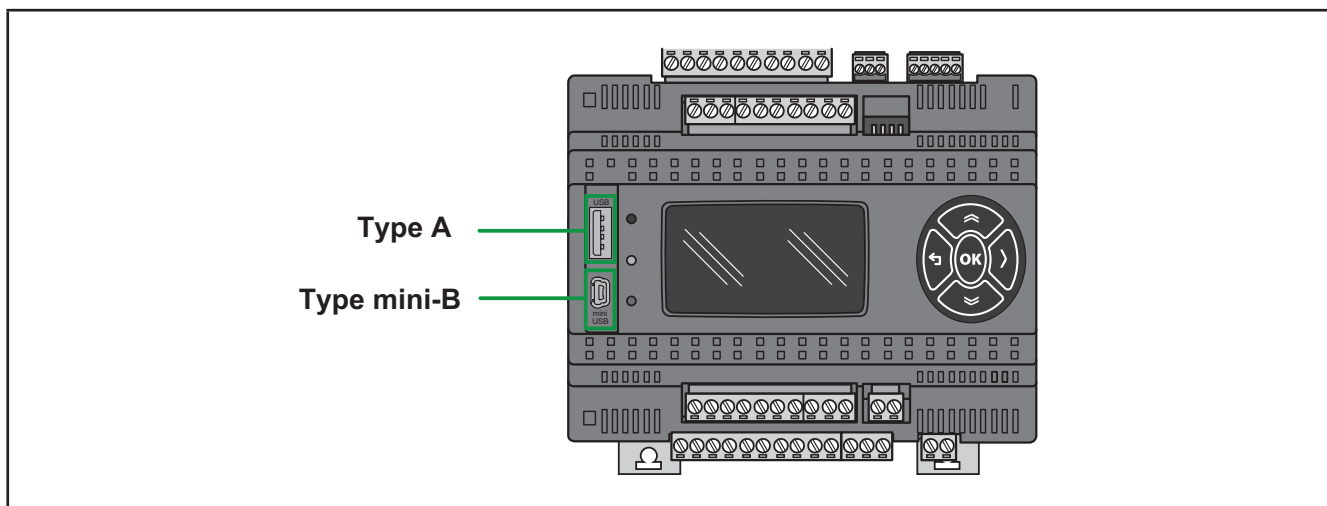


**Fig. 14.**    FREE Evolution: type A USB and type mini-B USB

## 3.2. Wiring diagrams

Miswiring irreversibly damages the **FREE Evolution**.

| *NOTICE* |
|---|
| **INOPERABLE EQUIPMENT**<br>Verify all wiring connections before applying power.<br>**Failure to follow these instructions can result in equipment damage.** |

### 3.2.1. FREE Evolution wiring diagram
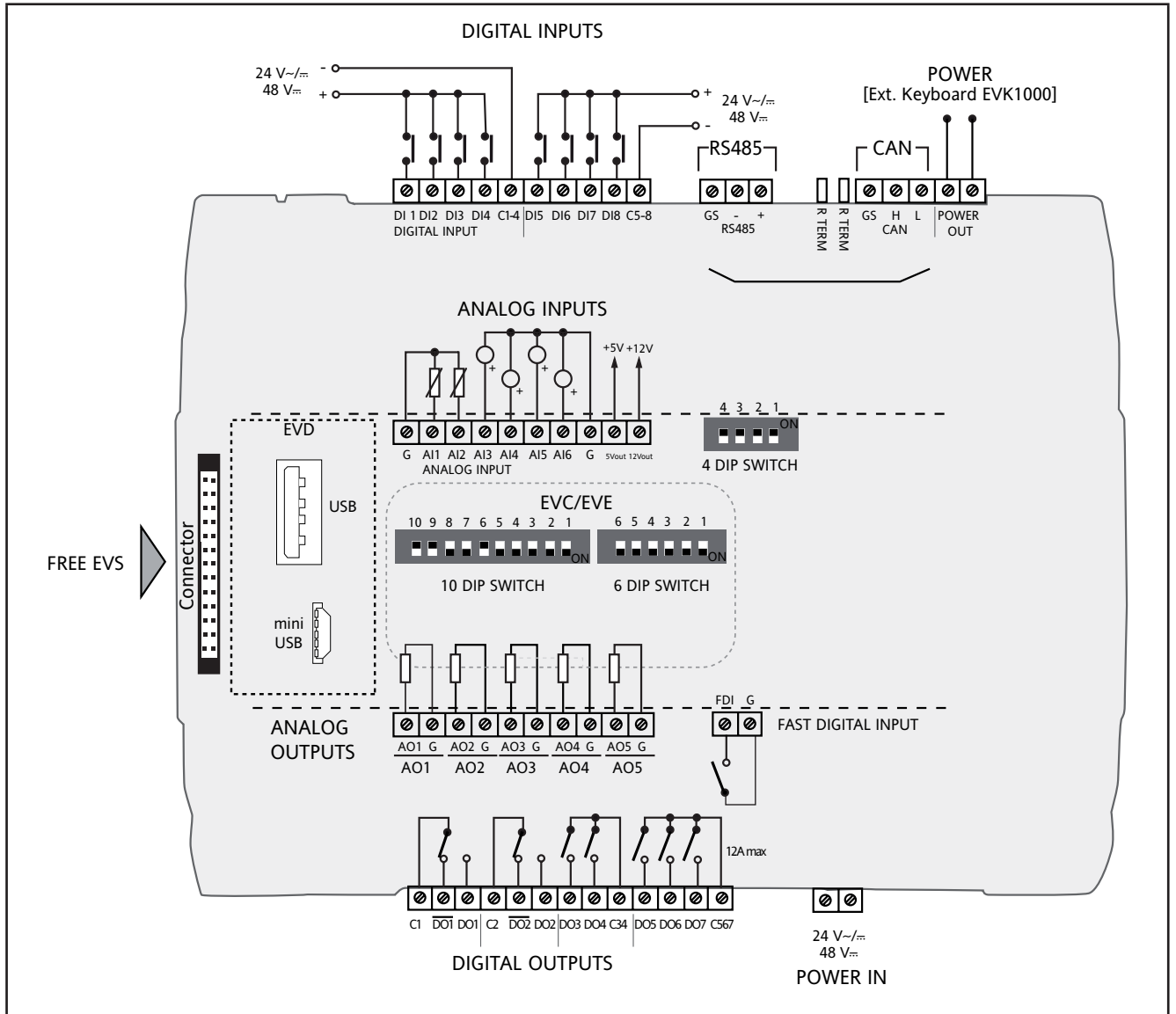


**Fig. 15.** FREE Evolution wiring diagram

## Connector Labels Related To FREE Evolution

| | LABEL | DESCRIPTION | NOTES |
|---|---|---|---|
| **DIP SWITCH** | **4 DIP SWITCH** | 4-position selectors (Dip Switches) | Dip Switches default OFF |
| | **6 DIP SWITCH** | 6-position selectors (Dip Switches) | Dip Switches default OFF<br>**EVC /EVE7500** reference |
| | **10 DIP SWITCH** | 10-position selectors (Dip Switches) | Dip Switches located behind the panel |
| **POWER SUPPLY** | **POWER IN** | +24 Vac/dc or +48 Vdc power supply | - |
| | **POWER OUT** | +24 Vac/dc or +48 Vdc power supply | **POWER [Ext. Keyboard EVK1000]**<br>output for display |
| **ANALOG OUTPUTS** | **AO1…AO5** | Analog outputs 1...5 | See **CHAPTER 4 Technical data on page 65** for further details |
| | **G** | 0 V signal ground | |
| **DIGITAL OUTPUTS** | **C1 DO1 $\overline{\text{DO1}}$** | SPDT Relay 1 | DO1 is the normally open side, $\overline{\text{DO1}}$ is the normally closed side |
| | **C2 DO2 $\overline{\text{DO2}}$** | SPDT Relay 2 | DO2 is the normally open side, $\overline{\text{DO2}}$ is the normally closed side |
| | **DO3 DO4** | Relay output 3-4<br>also available as SSR outputs | - |
| | **C34** | Common for digital outputs 3-4 | |
| | **DO5 DO6 DO7** | Relay output 5-6-7 | |
| | **C567** | Common for digital outputs 5-6-7 | 12 A max |
| **CAN** | **GS H L** | Isolated CAN serial<br>**GS** ground serial isolated from **G** | **R TERM** termination resistors for CAN |
| **RS485** | **GS - +** | Isolated RS485 serial<br>**GS** ground serial isolated from **G** | Apply 120 Ω termination resistors |
| **DIGITAL INPUTS** | **DI1...DI4** | Digital inputs 1...4 | - |
| | **C1-4** | Common for digital inputs 1...4 | |
| | **DI5...DI8** | Digital inputs 5...8 | |
| | **C5-8** | Common for digital inputs 5...8 | |
| **FAST D.I.** | **FDI** | Fast digital input | Pulse/frequency counter up to 1 kHz |
| | **G** | 0 V signal ground | |
| **ANALOG INPUTS** | **AI1...AI6** | Analog inputs | - |
| | **G** | 0 V signal ground | |
| **SENSOR POWER SUPPLY** | **12Vout** | 12V output for analog inputs | |
| | **5Vout** | 5V output for ratiometric analog inputs | |

## 3.2.2. EVE4200 wiring diagram
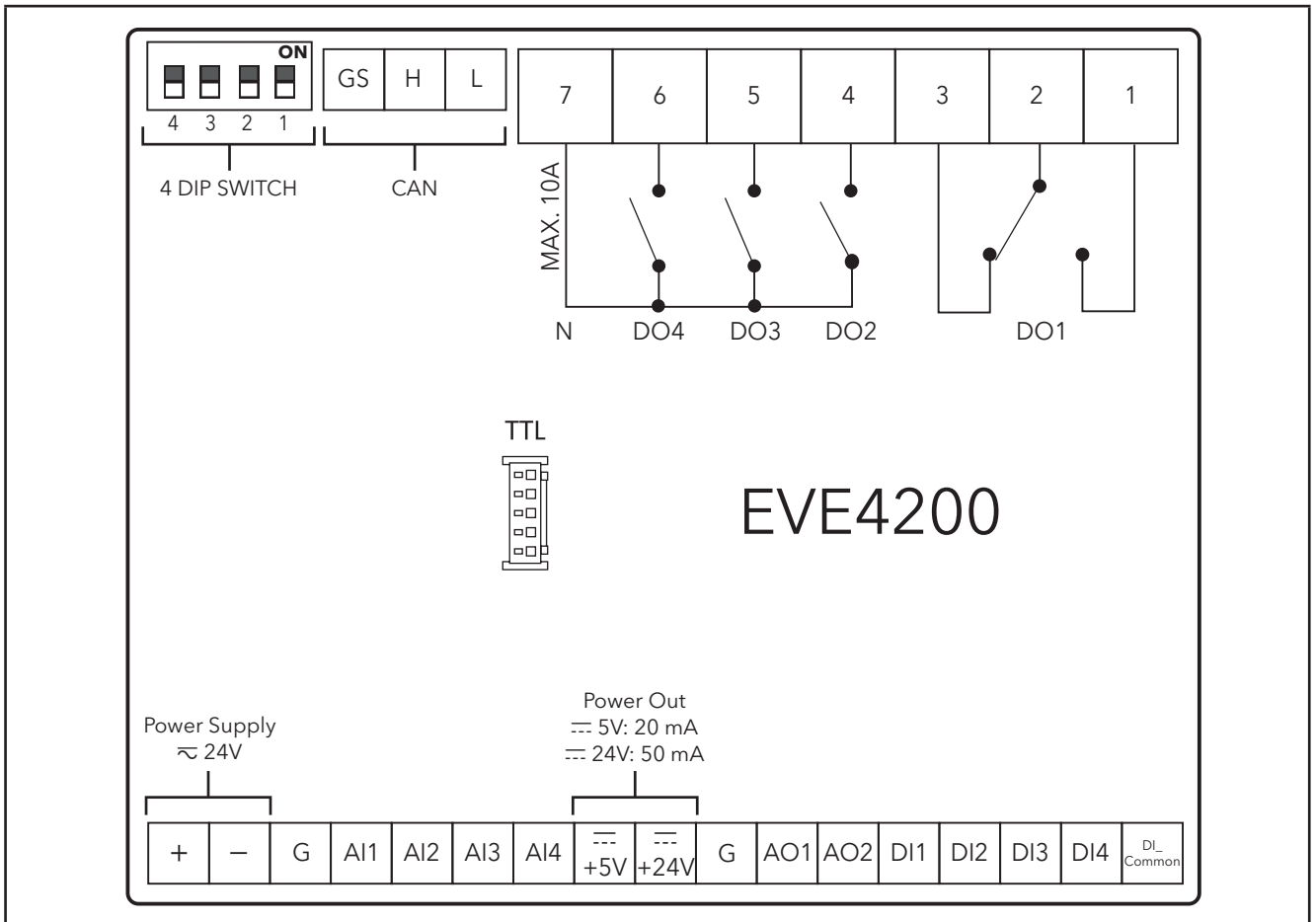


**Fig. 16.** EVE4200 wiring diagram

## Connector Labels Related To EVE4200

| | LABEL | DESCRIPTION | NOTES |
|---|---|---|---|
| **DIP SWITCH** | **4 DIP SWITCH** | 4-position selectors (Dip Switches) | Dip Switches default OFF |
| **POWER SUPPLY** | **+ / -** | +24 Vac/dc power supply | - |
| **ANALOG OUTPUTS** | **AO1, AO2** | Analog outputs 1 and 2 | See **CHAPTER 4 Technical data on page 65** for further details |
| | **G** | 0 V signal ground | |
| | **+24V** | Power Out +24 Vdc output | |
| | **+5V** | Power Out +5 Vdc output | |
| **DIGITAL OUTPUTS** | **1-2-3** | SPDT Relay output **DO1** | **1** is the normally open side, **3** is the normally closed side |
| | **4-5-6** | SPST Relay output 2-3-4 **DO2 DO3 DO4** | - |
| | **7** | Common for relay outputs 2-3-4 **N** | 10 A max |
| **CAN** | **GS H L** | Isolated CAN serial **GS** ground serial isolated from **G** | Dip Switches **3-4** termination resistors for CAN |
| **DIGITAL INPUTS** | **DI1...DI4** | Digital inputs 1...4 | - |
| | **DI_Common** | Common for digital inputs 1...4 | |
| **ANALOG INPUTS** | **AI1...AI4** | Analog inputs | - |
| | **G** | 0 V signal ground | |

## 3.2.3. Examples of analog input connection (FREE Evolution only)

### Example: NTC/Pt1000 probe connection

- Analog inputs AI1…AI6 are available for NTC
- Analog inputs AI3…AI6 are available for NTC/Pt1000
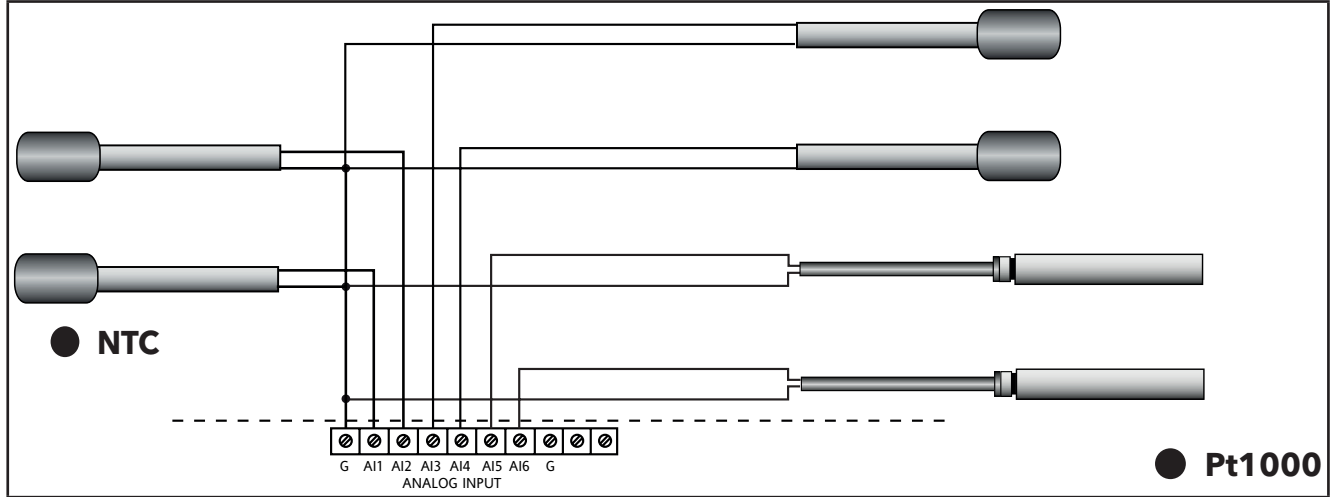


**Fig. 17.** NTC/Pt1000 probe connection

### Example: 0-10 V transducer connection

Analog Inputs AI3…AI6 are available for 0-10 V transducer connection
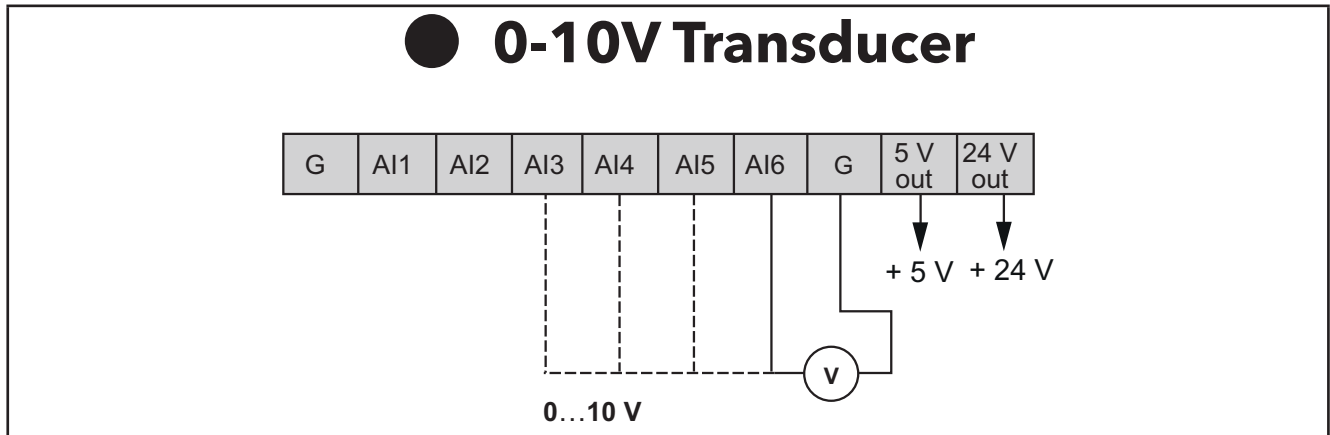


**Fig. 18.** 0-10 V transducer connection

### Example: Digital Input Connection (through analog input terminal)
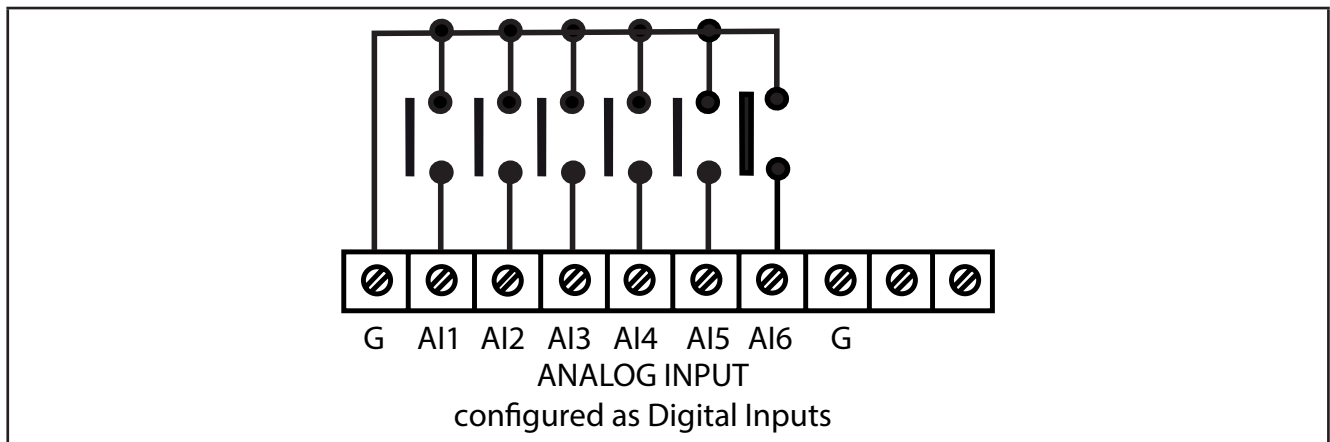


**Fig. 19.** Analog Inputs configured as Digital Inputs

## Example: 4...20 mA pressure transducer connection

Analog Inputs AI3…AI6 are available as 4...20 mA pressure transducer connection.

In the case of a generic 3-wire transducer, connect the  0 V reference wire (ground if so indicated by the transducer manu-facturer) to terminal GND and the transducer power supply to **12 Vdc** screw terminal.

| NOTICE |
|---|
| **INOPERABLE EQUIPMENT**<br>Verify all wiring connections before applying power.<br>**Failure to follow these instructions can result in equipment damage.** |



| FREE Evolution | Three-wire 4...20 mA transducer | Two-wire 4...20 mA transducer |
|---|---|---|
| **G** | G | - |
| **AI3 AI4 AI5 AI6** | SIG | SIG |
| **12Vout** | Transducer Power Supply | Supply |
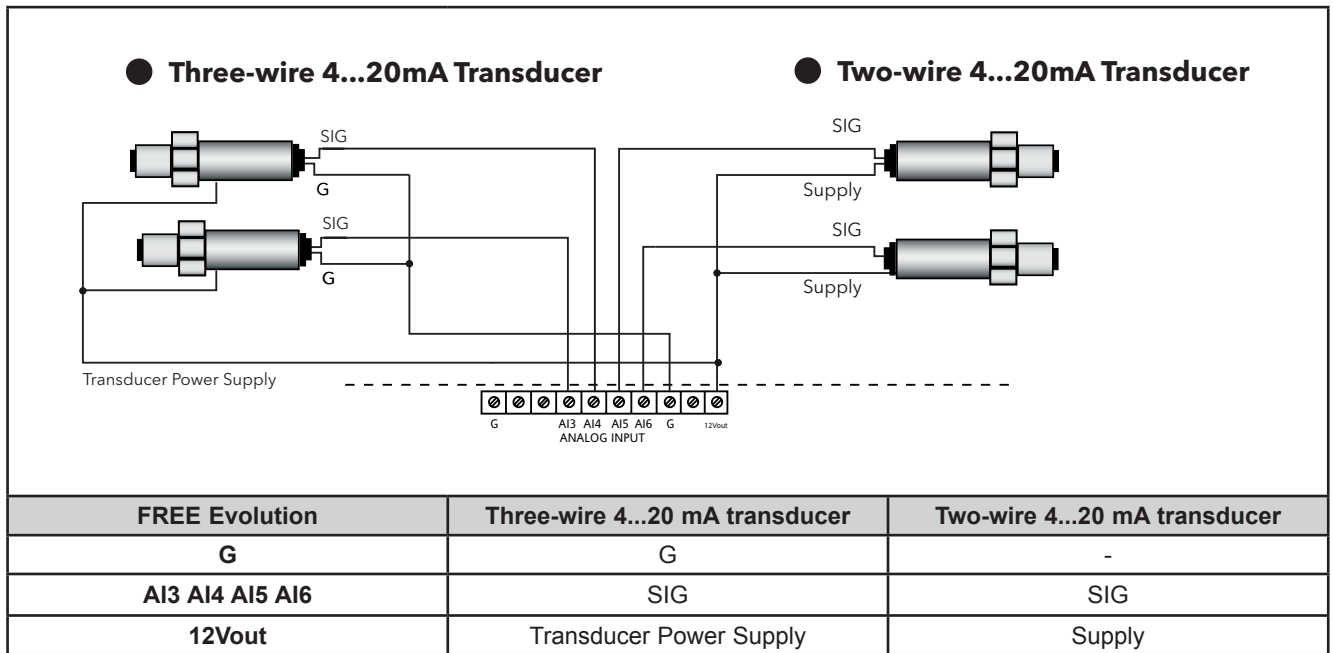
**Fig. 20.**    4...20 mA pressure transducer connection

## Example: ratiometric transducer connection

Analog Inputs AI3…AI6 are available as ratiometric transducer connection



| FREE Evolution | R 0/5V transducer |
|---|---|
| G | GND |
| AI3 AI4 AI5 AI6 | SIG |
| +5 Vout | +5 Vdc |
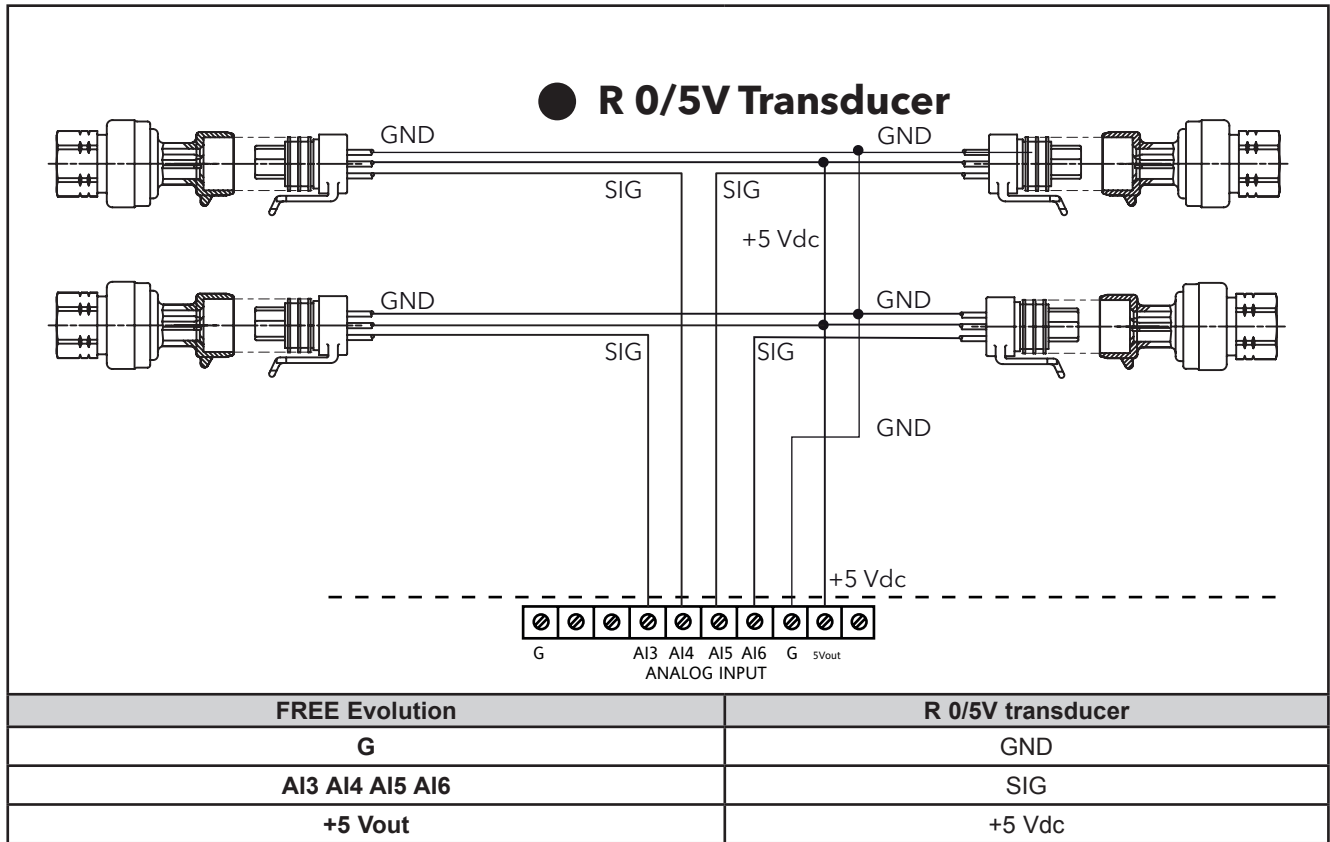
**Fig. 21.** Ratiometric transducer connection

## Example: fan module connection

• 5 available analog outputs: AO1…AO5
• Example diagram with 4 ...20mA or 0-10V fan module
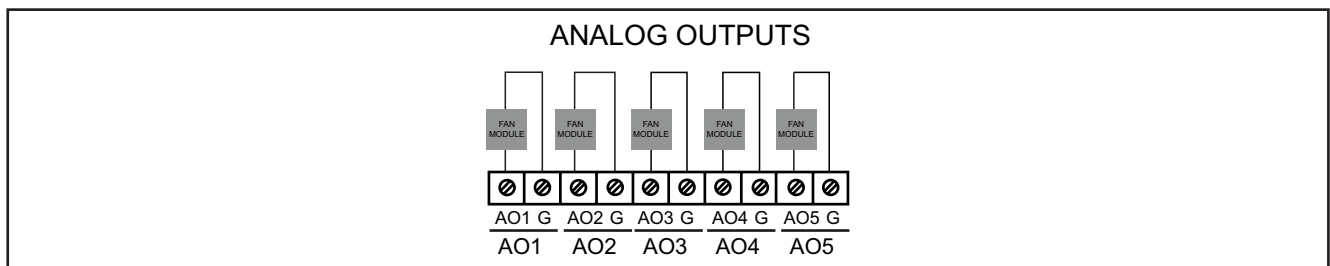


**Fig. 22.** Fan module connection

## Example: Open Collector connection

- 2 Open Collector outputs available as Open Collector connection: AO4/AO5
- Example with an external relay
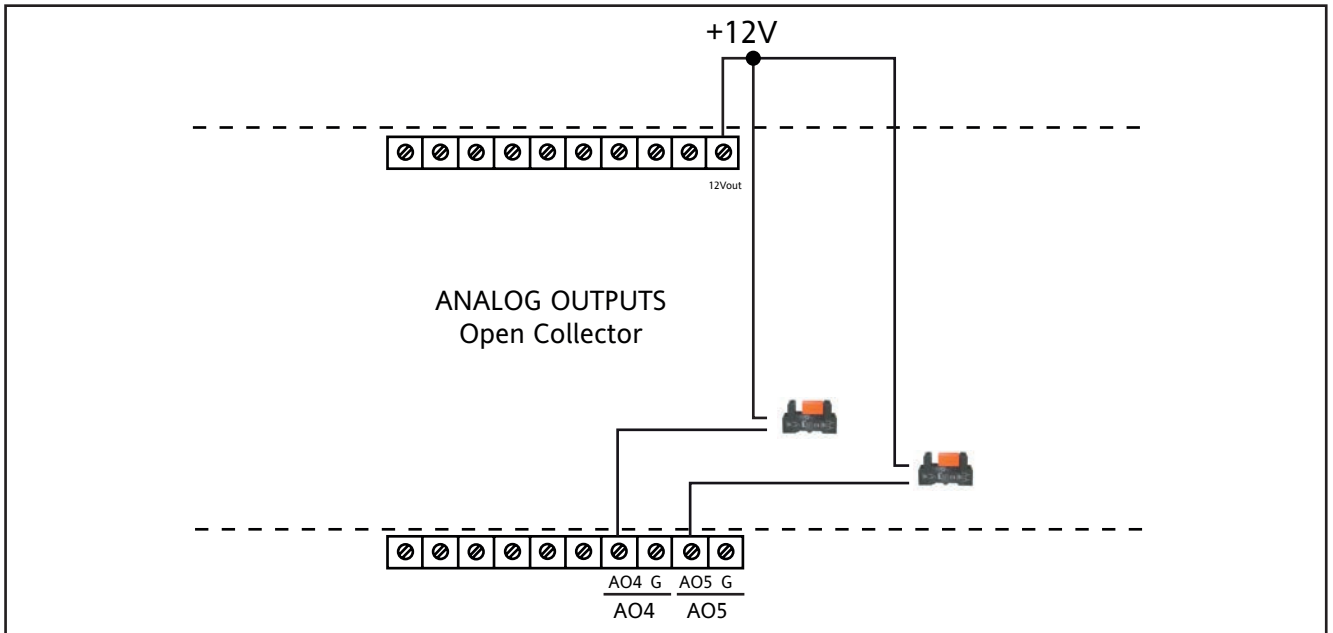


**Fig. 23.**    Open Collector connection

## 3.2.4. FREE Evolution / EVK1000 connection
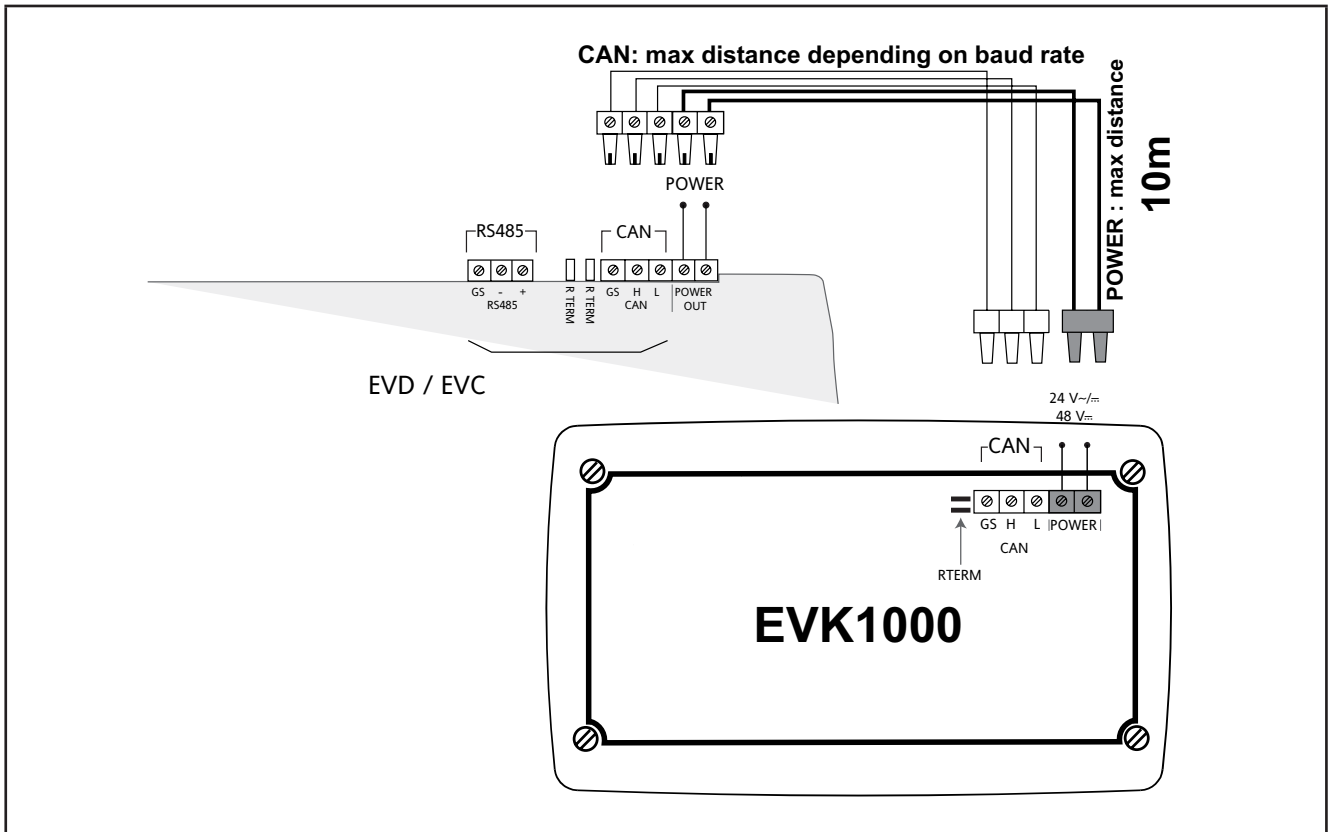


**Fig. 24.** FREE Evolution/ FREE EVK1000 terminal connection

**NOTE:** When supplying power from the **FREE Evolution logic controllers**, make the power connection cable as short as possible.

---

## NOTICE

**INOPERABLE EQUIPMENT**

Do not connect a power cable longer than 10m.

**Failure to follow these instructions can result in equipment damage.**

---

| | LABEL | DESCRIPTION | NOTES |
|---|---|---|---|
| **POWER** | **POWER IN** | +24 Vac/dc or +48 Vdc power supply | Maximum cable length 10m |
| | | | from **EVD** or separate power supply |
| **CAN** | **GS H L** | Isolated CAN serial **GS** ground serial insulated from **G** | R TERM termination resistors for CAN |
| | | | Maximum cable length See **3.1.6. Serial connections on page 28** |

## 3.2.5. EVP3300/C and EVP3500/C/RH connection
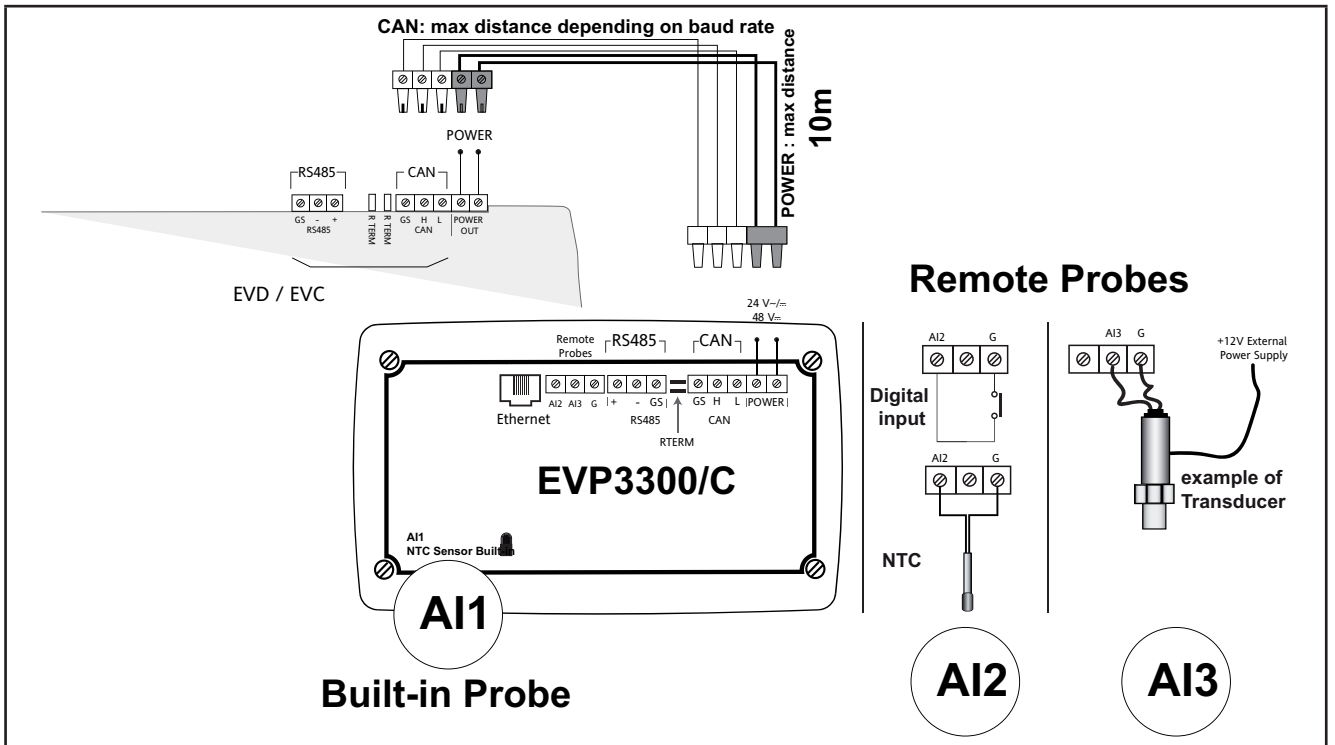


**Fig. 25.** EVP3300/C connection
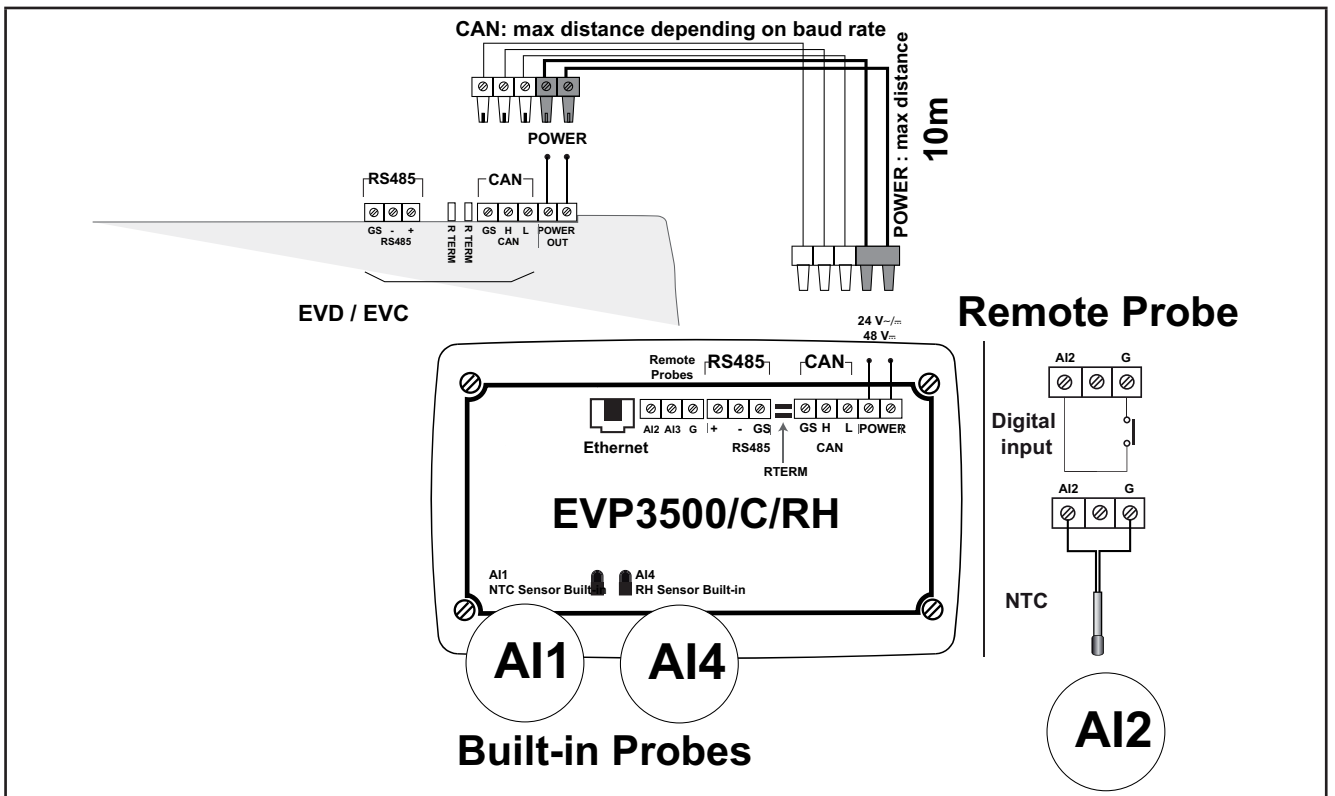


**Fig. 26.** EVP3500/C/RH connection

**NOTE:** When supplying power from the **FREE Evolution logic controllers**, make the power connection cable as short as possible.

| NOTICE | | |
|---|---|---|
| **INOPERABLE EQUIPMENT** | | |
| Do not connect a power cable longer than 10m. | | |
| **Failure to follow these instructions can result in equipment damage.** | | |

| Label | Description | Notes |
|---|---|---|
| **POWER** | +24 Vac/dc or +48 Vdc power supply | Pin POWER Vout on **EVD** / **EVC** Max. distance 10m **EVP** / **EVD** / **EVC** |
| **CAN GS H L** | Isolated CAN serial GS ground serial isolated from G | R TERM termination resistors for CAN |
| **RS485 GS - +** | Isolated RS485 serial GS ground serial isolated from G | Apply 120 Ω terminal resistors |
| **Ethernet** | ETHERNET serial | - |
| **Built-in AI1 NTC Sensor** | On-board NTC sensor | - |
| **AI2 Remote Probes G** | NTC, D.I.  remote Ground GND | Probe not included |
| **AI3 Remote Probes G** | 4...20 mA / 0-10 V -+/ 0-5 V Ground GND | **EVP3300/C** Probe not included 12 V External power supply |
| **Built-in AI4 RH Sensor** | On-board RH% sensor | **EVP3500/C/RH** |

## 3.3. FREE Evolution protocol connectivity

### 3.3.1. Example: CAN (Field) network connection

A CAN (Field) network connection can be constituted by:

• Max 1 **EVD** functioning as MASTER
• Max 12 **EVE** functioning as SLAVES

**NOTE**: No more than two **EVK1000** can be added to the network connected to **EVD**

The **EVK1000** is supplied by **EVD** via the POWER OUT output.
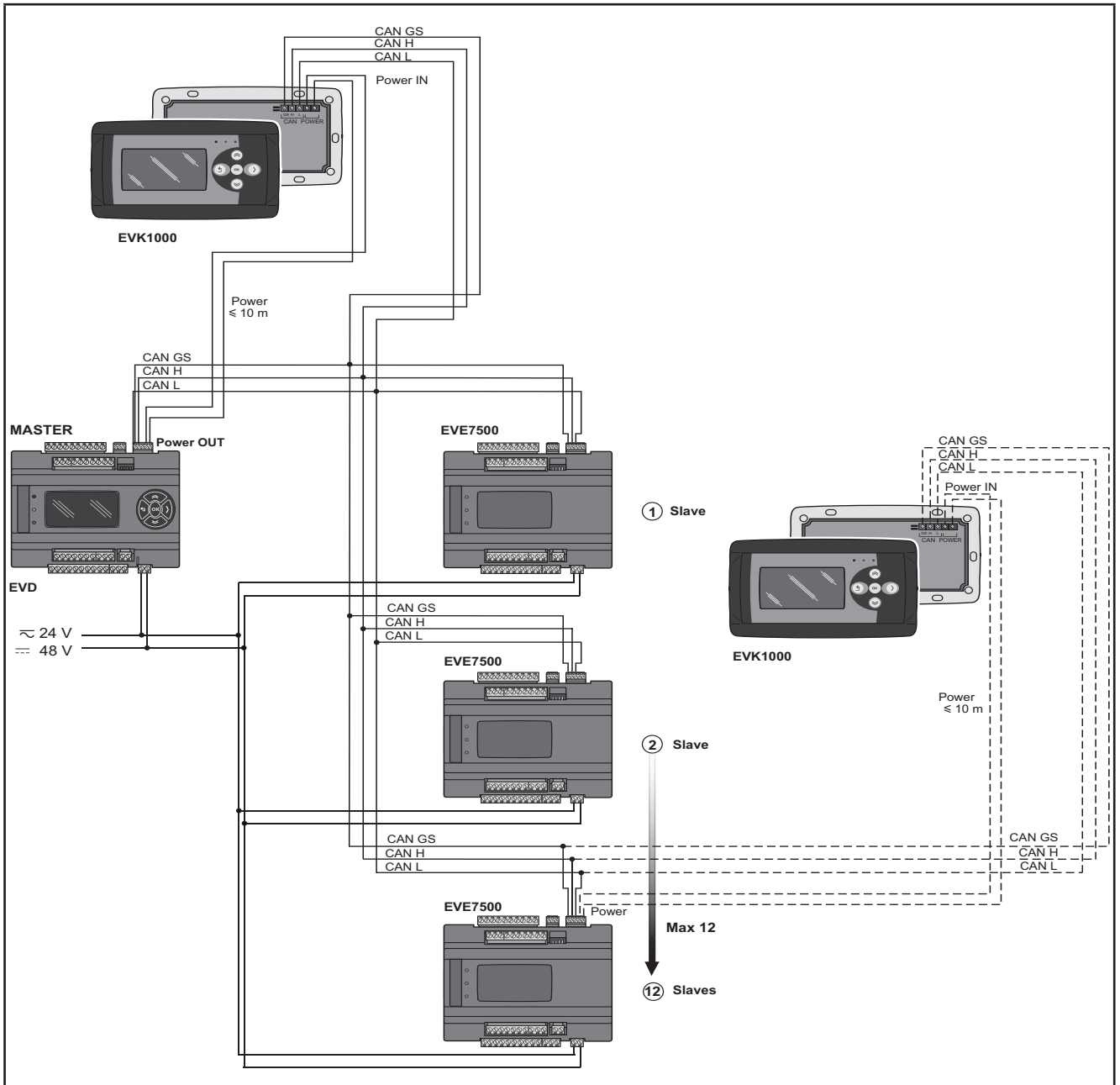


**Fig. 27.** CAN (Field) network connection using FREE Evolution

### 3.3.2. Example: CAN connection (Network)

A CAN connection (Network) can be constituted by:

* 1 **EVD**
* 1 **EVK1000** connected in CAN to **EVD** or alternatively, to **EVC.**

**NOTE**: Max 10 **EVC** connected in CAN (binding).

The **EVK1000** is supplied by **EVD** via the POWER OUT output.



**Fig. 28.**     CAN connection (Network) using FREE Evolution

### 3.3.3. Example: RS485 connection (Field)

A RS485 connection (Field) can be constituted by:

| Description | Notes |
|---|---|
| 1 **EVD** | **EVD** is in Modbus RTU Master mode |
| Max 127 **EVE7500** expansion modules connected in RS485 | **EVE7500** are in Modbus RTU Slave mode |
| 1 **EVK1000** connected in CAN to **EVD** | - |

The **EVK1000** is supplied by **EVD** via the POWER OUT output.
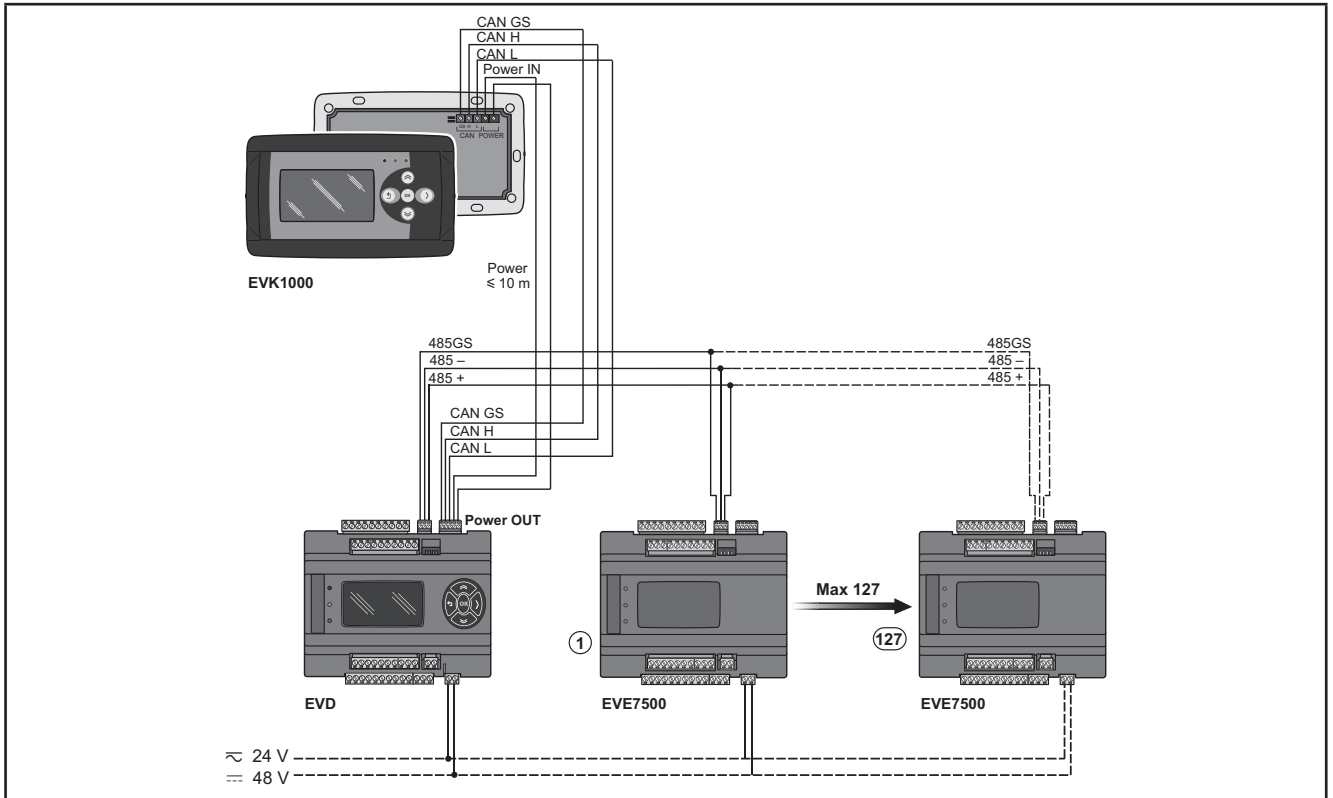


**Fig. 29.** RS485 connection (Field) using FREE Evolution

### 3.3.4. Example: RS485 connection with the FREE Smart network

A RS485 connection with the **FREE Smart** network can be constituted by:

| Description | Notes |
|---|---|
| **EVD** | **EVD** is in Modbus RTU Master mode |
| Max 127 **EVD / EVC** or **SMC-SMD-SMP4500-5500/C/S / SMD3600/C/S 2T** or **Eliwell** and/or third-party devices equipped with RS485 serial | All devices equipped with RS485 are in Modbus RTU Slave mode (including the **FREE Evolution** logic controllers) See also the **FREE Smart** manual for further details. |
| CAN network – see **3.3.1. Example: CAN (Field) network connection on page 41**. | The CAN connection can be <br> • Field, as illustrated <br> • Network, if one or more **EVD** / **EVC**s are connected |
| 1 **EVK1000** connected in CAN to **EVD** | - |

The **FREE EVK1000** is supplied by **EVD** via the POWER OUT output.
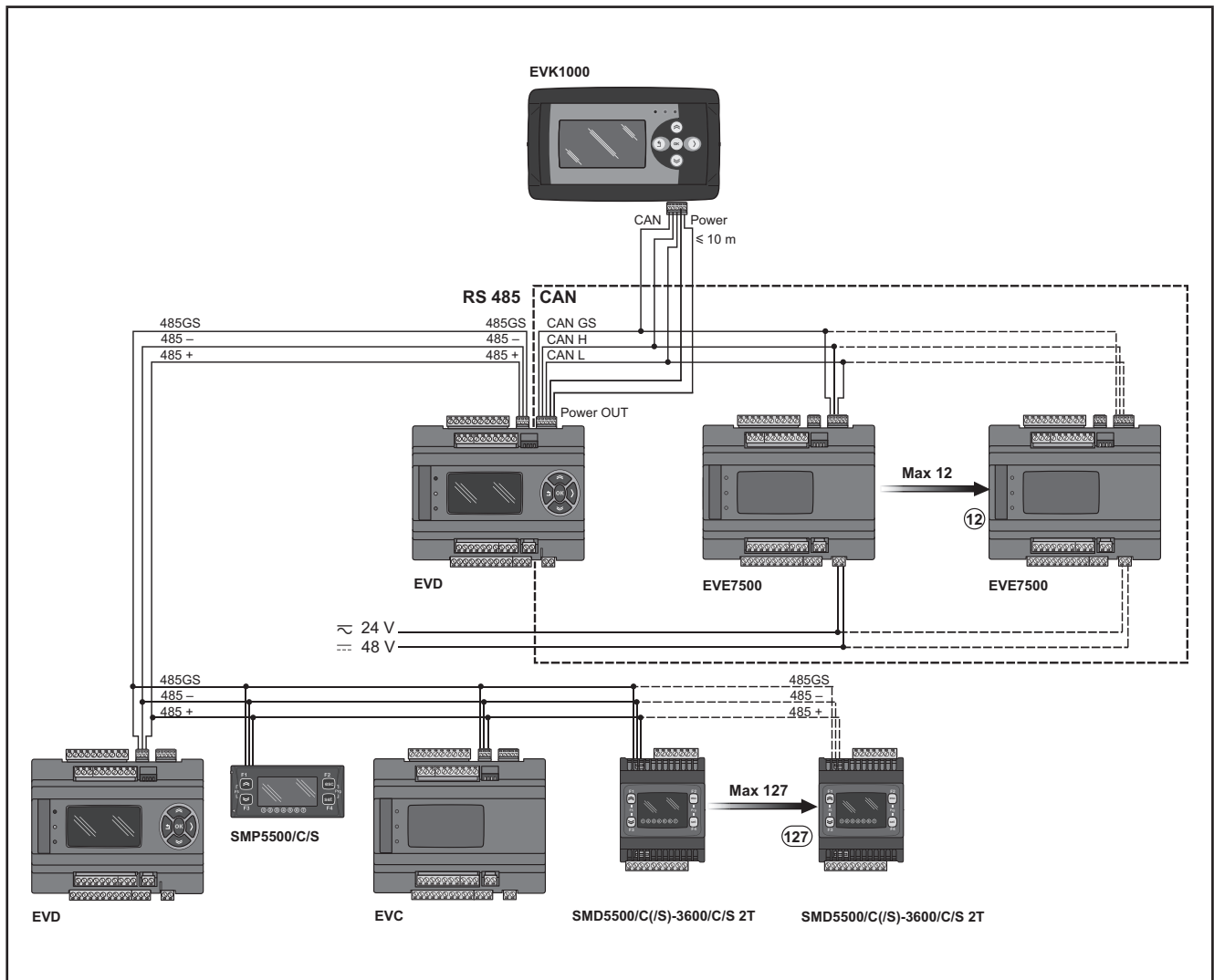


**Fig. 30.**    RS485 connection with the FREE Smart using FREE Evolution

## 3.4. FREE Panel protocol connectivity

### 3.4.1. Example: RS485 connection (Field)

A RS485 connection (Field) can be constituted by:

| Description | Notes |
|---|---|
| 1 **FREE Panel** | **FREE Panel** is in Modbus RTU Master mode |
| Max 127 **EVE7500** expansion modules connected in RS485 | **EVE7500** are in Modbus RTU Slave mode |
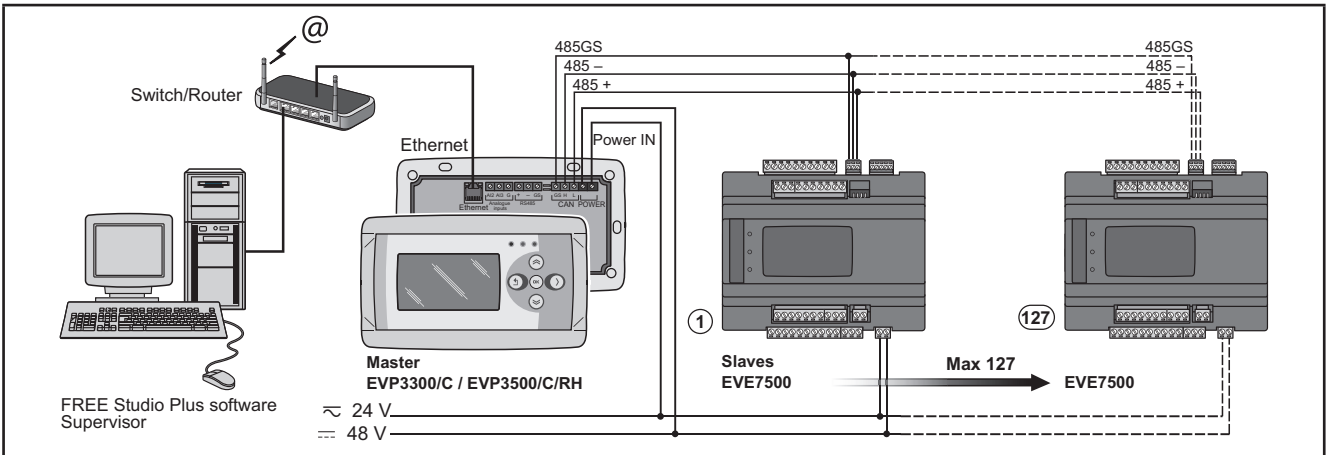


**Fig. 31.** RS485 connection (Field) using FREE Panel

### 3.4.2. Example: CAN connection

A CAN connection can be constituted by 1 **FREE Panel.**

**NOTE**: Max 12 **EVE** expansion modules connected in CAN.
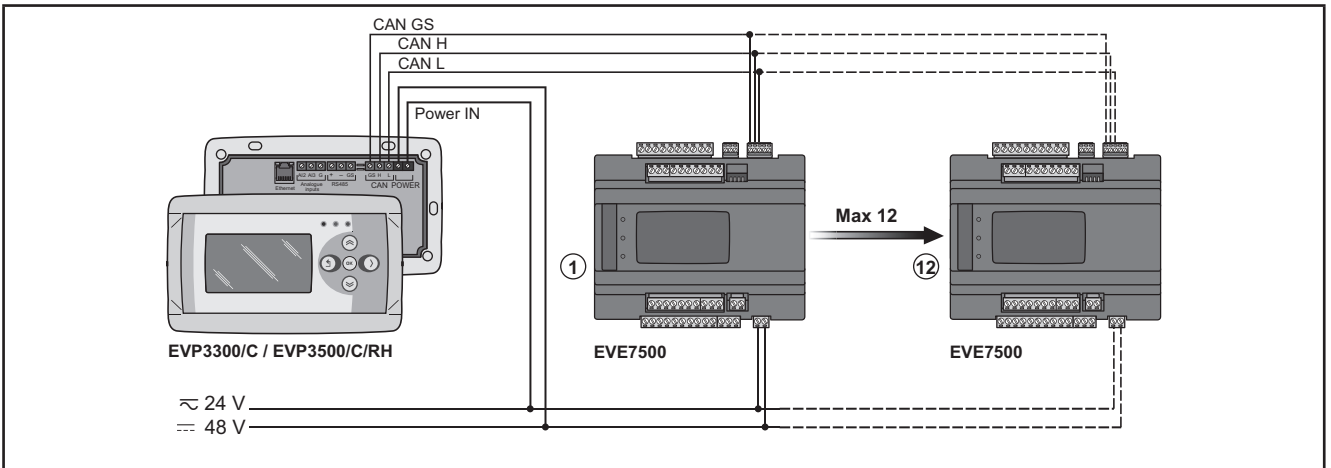


**Fig. 32.** CAN connection using FREE Panel

### 3.4.3. Example: RS485 connection with the FREE Smart network

A RS485 connection with the **FREE Smart** network can be constituted by:

| Description | Notes |
|---|---|
| 1 **FREE Panel** | **FREE Panel** is in Modbus RTU Master mode |
| Max 127 **EVD** / **EVC** or **FREE Smart** or **Eliwell** and/or third-party equipment equipped with RS485 serial | All devices equipped with RS485 are in Modbus RTU Slave mode (including the **FREE Evolution** logic controllers)<br>See also the **FREE Smart** manual for further details. |
| CAN network | see **3.4.2. Example: CAN connection on page 45** |
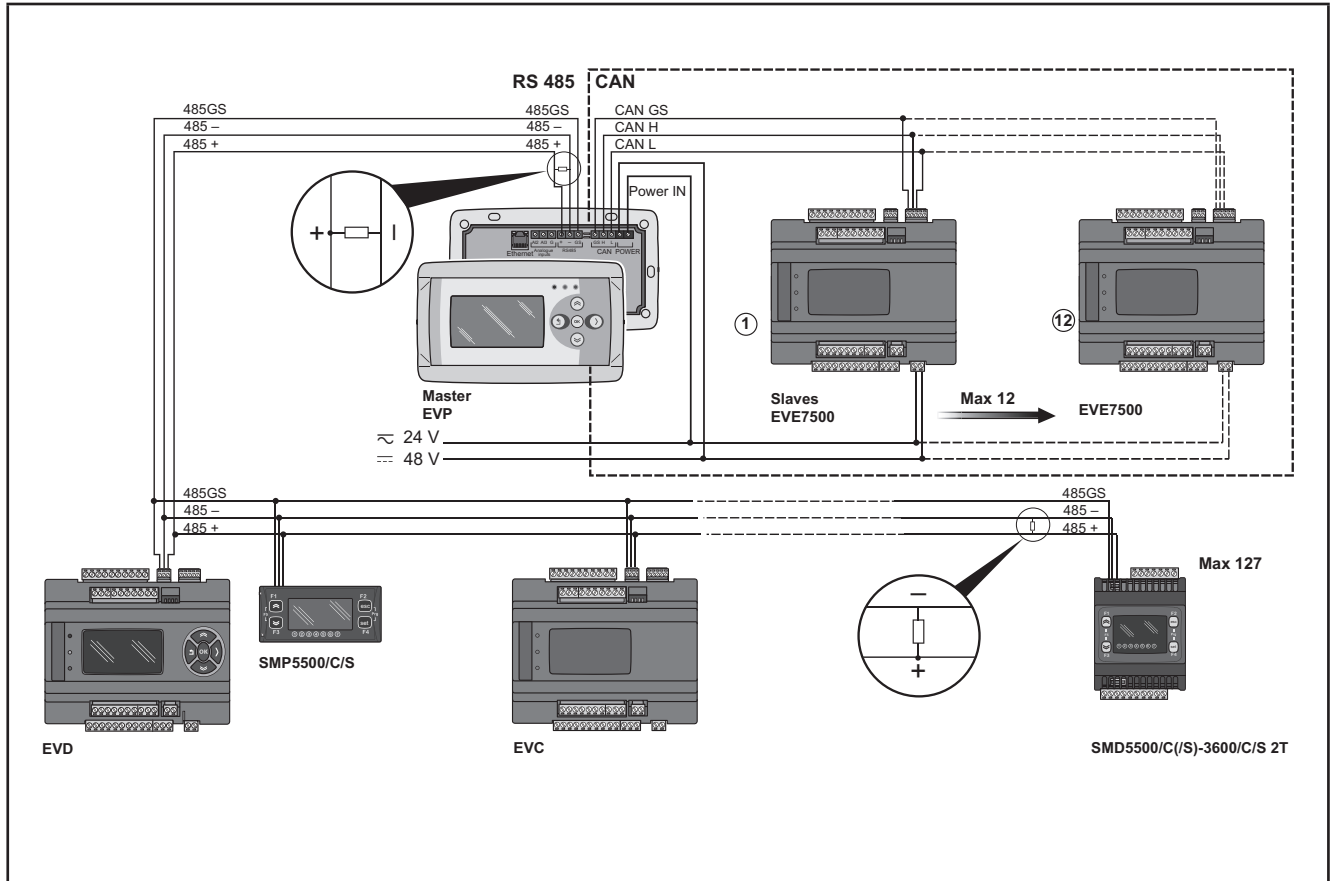


**Fig. 33.**   RS485 connection with the FREE Smart network using FREE Panel

### 3.4.4. Example: CAN network connection

A CAN network connection can be constituted by 1 **FREE Panel.**

**NOTE**: Max 10 **EVD** / **EVC.**

**NOTE**: CAN network: see **3.4.2. Example: CAN connection on page 45**

**HMI menu**
**FREE Panel** can be equipped with its own menu (named Network menu).
In this case **FREE Panel logic controller** is programmed with the network menu, which can read variables present in the **FREE Evolution logic controller** network.
**FREE Panel** logic controller can operate from the individual controllers and download up to 10 remote menus from the respective **FREE Evolution logic controllers**.
In this case the remote menu allows 'local' navigation of the individual **FREE Evolution logic controller**.

**Controller application**
The variables of the various controllers are shared (bound together).
An application present on **FREE Panel** logic controller can use variables present in the network and share its own variables with other applications present on the respective **FREE Evolution logic controllers**.
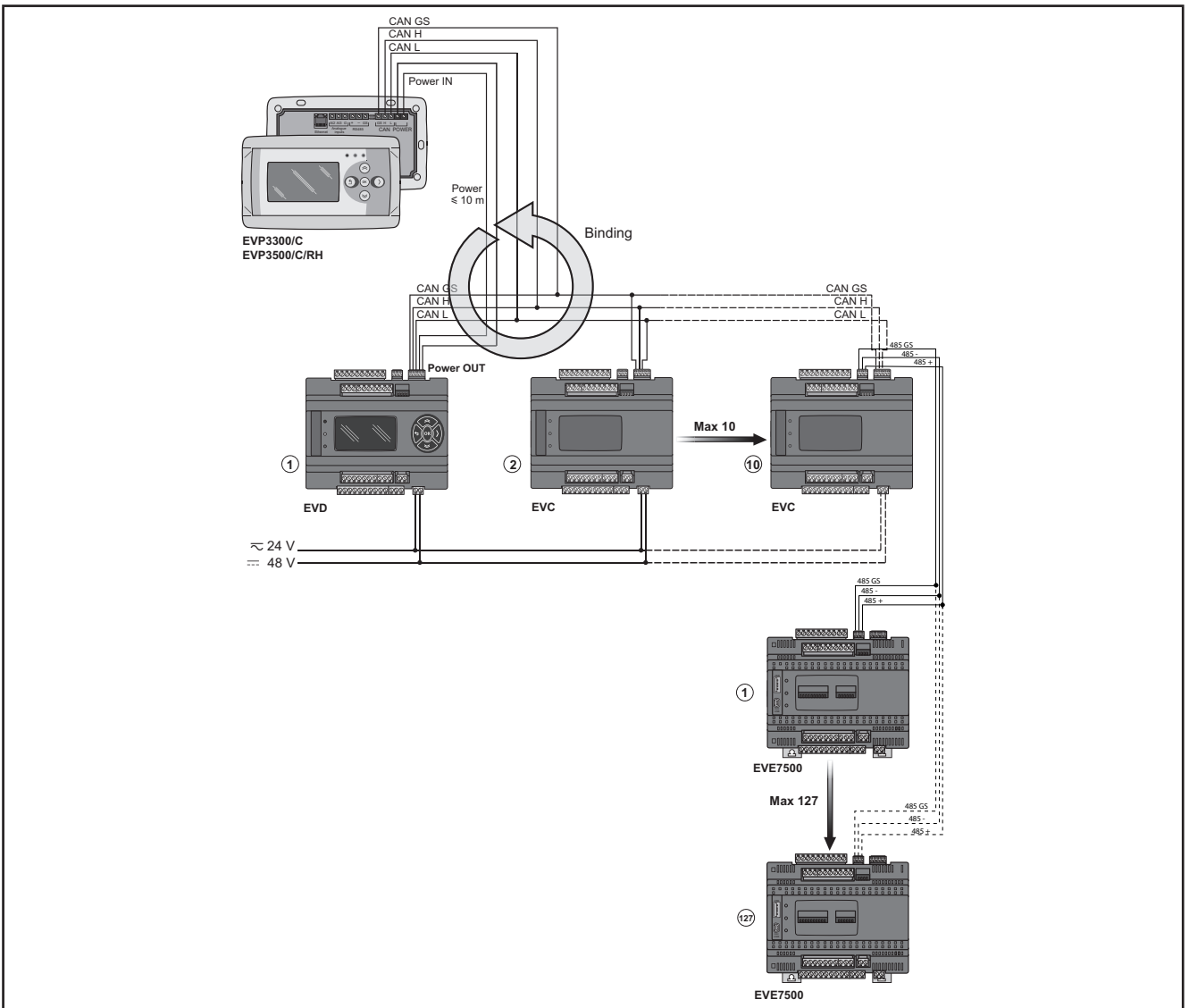


**Fig. 34.**　CAN network connection using FREE Panel

## 3.5. EVS Communication modules

Communication modules are 2DIN modules that can be connected to an **FREE Evolution** controller or an **FREE Advance** controller (with restrictions, refer to the **FREE Advance** controller Hardware Guide) via the Communication module connector on the left side, behind the removable door. The Communication module is anchored to the controller with the two fixing hooks.
It mounts to the DIN rail in the same way as the controller.

### 3.5.1. Communication modules compatible with FREE Evolution and FREE Advance

| Interface for | Communication module | |
|---|---|---|
| RS 232 | EVS RS232/R | 5A SPDT relay available |
| RS 485 | EVS RS485<br>EVS RS485 BACnet MS/TP | RS 485 in Daisy Chain(1) |
| CAN Expansion Bus | EVS CAN | CAN Expansion Bus in Daisy Chain(1) |
| LON | EVS LON | LonWorks Communication module |

(1) Use a shielded cable. See **3.1.6. Serial connections on page 28**.

**NOTE**: The LonWorks Communication module supports up to 63 nodes. Exceeding this specification may result in an electrical overload condition in the **EVS LON** Communication module and consequently in the controller.

---

## ⚠ WARNING

**UNINTENDED EQUIPMENT OPERATION**
Do not exceed the maximum of 63 nodes on the **EVS LON** Communication module.
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

---

For more information on the LonWorks network, visit www.echelon.com/technology/lonwork/

### 3.5.2. Communication modules exclusively compatible with FREE Evolution

| Interface for | Communication module | |
|---|---|---|
| **ETHERNET** | **EVS ETH**<br>**EVS ETH + RS485** | The MACADDRESS is supplied in the box,<br>Expressed as barcode and 12-digit alphanumeric code.<br>The Ethernet connector shield is connected internally to the equipment ground, and therefore to the reference of the input and output channels |
| | | **FREE WEB**: WEB functionalities of **EVD7500/C/U**(**/SSR**) or **EVC7500/C/U** + **EVS ETH/ EVS ETH + RS485** Communication module |
| **PROFIBUS** | **EVS PROFIBUS**<br>**Profibus DP Slave-V0** | Contact your local Eliwell representative for more information concerning the .GSD Profibus configuration file |
| | | See official Profibus documentation for more detailed information |

Communication module **EVS** are shown below:
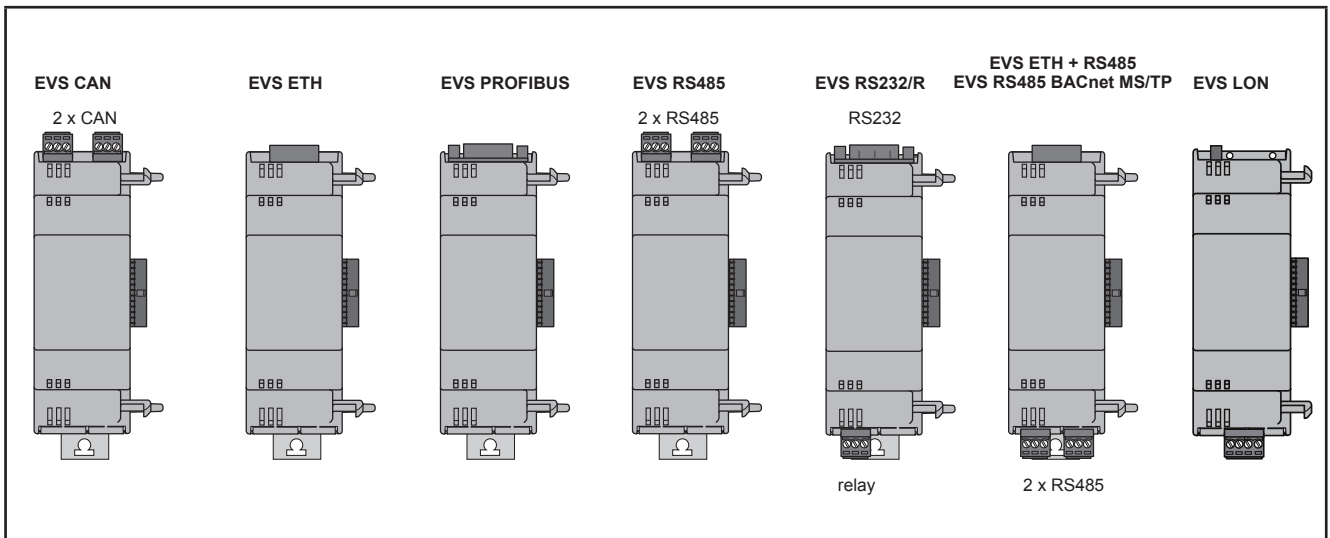


**Fig. 35.** EVS Communication modules

**EVS CAN**

| | CAN_GS | CAN_H | CAN_L | | | CAN_GS | CAN_H | CAN_L |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | | | 1 | 2 | 3 |

CAN    R Term.    CAN
(1)

A     B
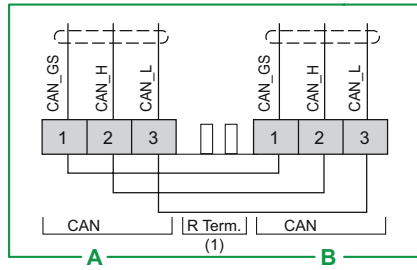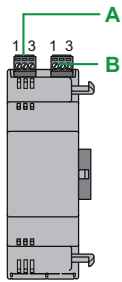
(1) CAN terminal resistance.

**EVS LON**

Service button
Service red LED
Lon status LED

| FT_B | FT_A | LON_GND | PE |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

(1)

(1) **PE**
To be connected
externally
to the protective earth

A

RT1
RT2
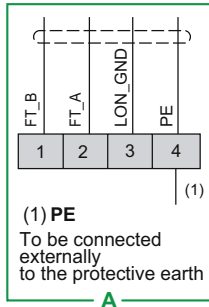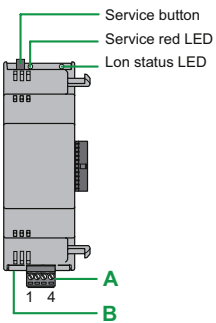
**RT1 AND RT2 terminators**

| RT1 mounted | RT2 mounted | Termination resistance value |
|---|---|---|
| YES | YES | 52.5 Ohm |
| YES | NO | 105 Ohm |
| NO | NO | No termination |

B

**EVS RS485 BACnet MS/TP**

| RS 485 | | | RS 485 | | |
|---|---|---|---|---|---|
| GS | − | + | GS | − | + |

A     B

**EVS RS485**

| | GS | RS 485 − | RS 485 + | | GS | RS 485 − | RS 485 + |
|---|---|---|---|---|---|---|---|
| | GS | − | + | | GS | − | + |

RS 485     RS 485

A     B

**EVS RS232/R**

5 A 250 Vac

| 1 | 2 | 3 |
|---|---|---|
| Common | NO | NC |

SPDT

A
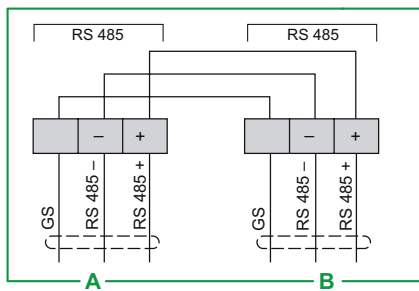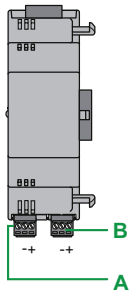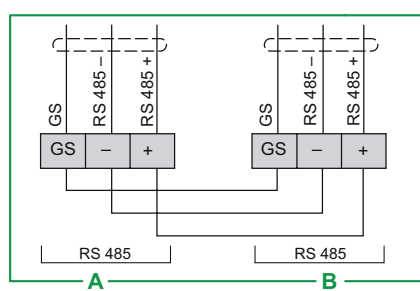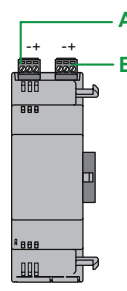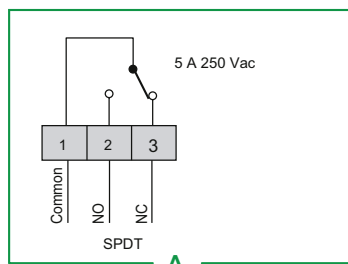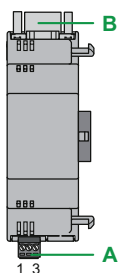
**RS 232**

| N° | RS232 |
|---|---|
| 1 | GND |
| 2 | DTR |
| 3 | TXD |
| 4 | RXD |
| 5 | DCD |
| 6 | RI |
| 7 | CTS |
| 8 | RTS |
| 9 | DSR |

5 4 3 2 1
9 8 7 6

Sub-DB9

B

**Fig. 36.**    Communication modules compatible with FREE Evolution / Advance
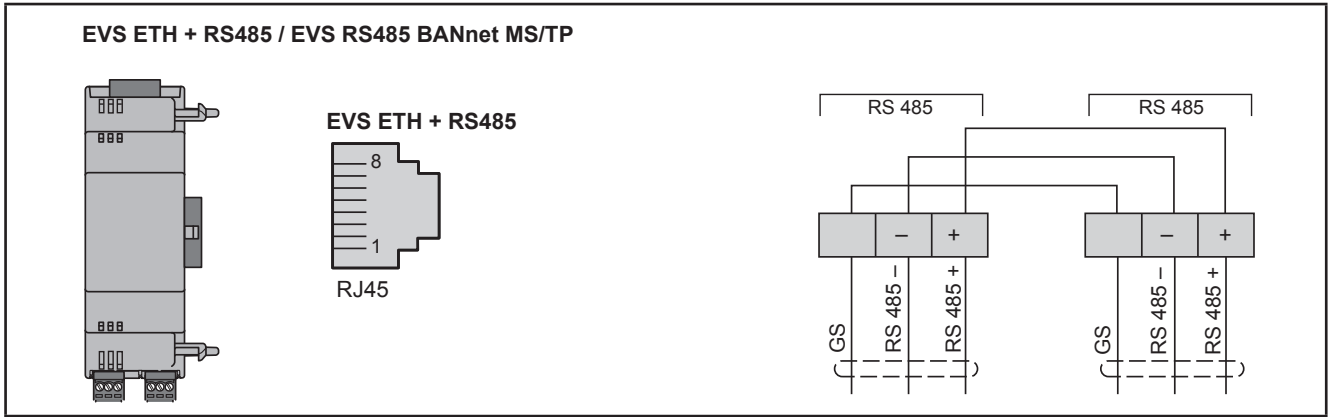
**Fig. 37.** ETHERNET, ETHERNET+RS485 Communication modules



**EVS PROFIBUS**

**Profibus**

| N° | Profibus |
|----|----------|
| 1 | Shield |
| 2 | Output ground 24 V |
| 3 | RXD-TXD + |
| 4 | Repeater Control Signal TRS |
| 5 | Ground 0 V |
| 6 | 5 V |
| 7 | 24 V |
| 8 | RXD-TXD- |
| 9 | Control Signal direction |

Sub-DB9

| Pin | Required signals - pins 3-5-6-8 |
|-----|----------------------------------|
| 1 | Shield<br>To be connected externally to the protective earth |
| 2 | 24V output ground |
| 3 | RXD-TXD + |
| 4 | RTS repeater control signal direction |
| 5 | Digital ground |
| 6 | 5V |
| 7 | 24V |
| 8 | RXD-TXD - |
| 9 | Direction control signal ground |

**Fig. 38.** PROFIBUS Communication module

**NOTE:** In a network with Profibus Communication modules, the first and last element in the network must terminate with Profibus resistors.

### 3.5.3. EVS RS232/R

The RS232 Communication module allows **FREE Evolution / Advance** DIN rail mounted controllers to communicate via an RS232 serial.

#### Modbus RTU communication protocol

The connection allows:

- connection to a supervision system using the Modbus RTU protocol

- connection of an IEC 61131-3 **FREE Stuдio Plus** development system
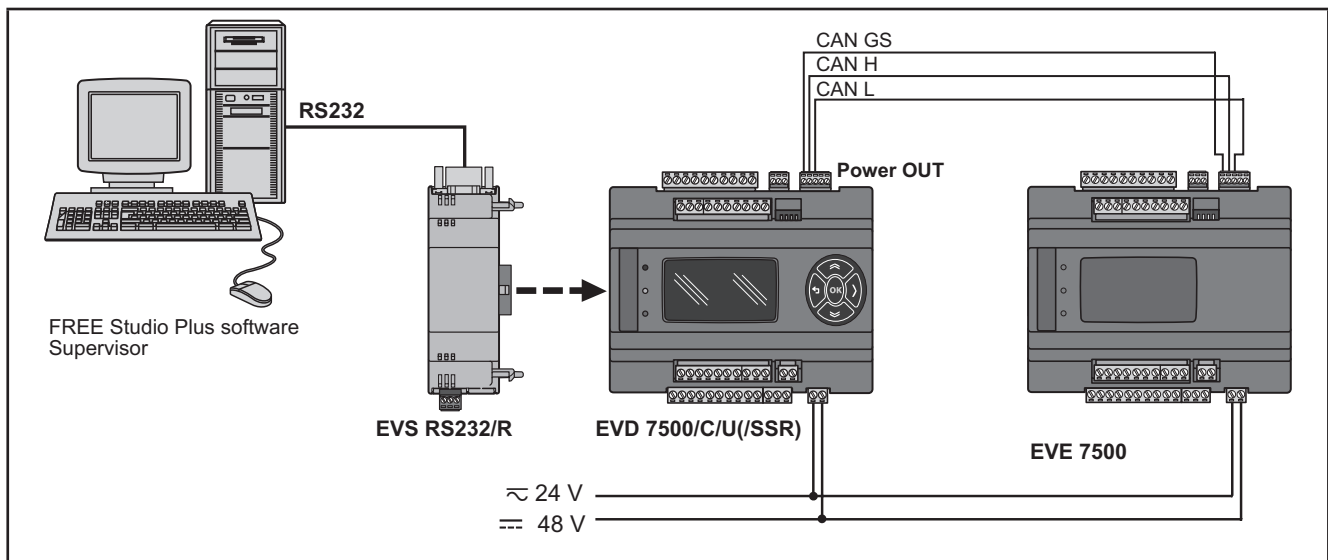


**Fig. 39.**    Modbus RTU communication protocol using EVS RS232/R

## Modbus ASCII communication protocol send/receive AT commands for modem[1]

This protocol activates when there is a modem connected to the Communication module.
The connection allows:

- connection to a monitoring system using the Modbus ASCII protocol;

- connection of an IEC 61131-3 **FREE Stu**d**io Plus** development system;

- send/receive TXT messages via a modem connected to the RS232[2] port.

**NOTE**: The Communication module has a relay that can be piloted from the controller application to allow the modem to be activated/reset or as an additional digital output.

[1] Refer to the **Modem_IEC.pll** software library in
C:\Program Files (x86)\Eliwell\free Studio Plus\Catalog\FreeEvolution\PLC
[2] Refer to the **SMS_IEC.pll** software library in
C:\Program Files (x86)\Eliwell\free Studio Plus\Catalog\FreeEvolution\PLC
See **FREE Stu**d**io Plus** Manual for details.

**NOTE**:
Refer to the section on Parameters / RS232 PASSIVE PLUG-IN folder (see **CHAPTER 9 Parameters on page 103**).
Refer to the section on Parameters / MODEM folder (see **CHAPTER 9 Parameters on page 103**).
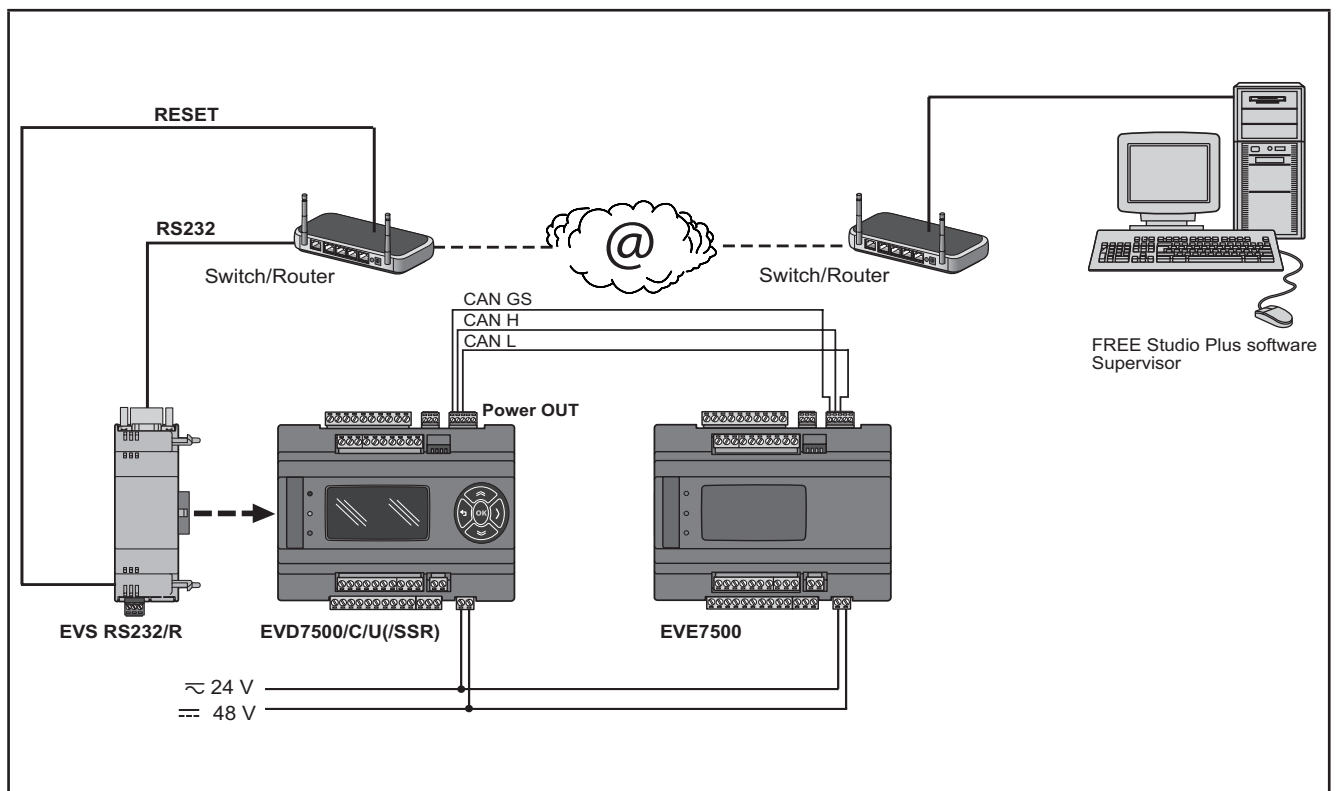


**Fig. 40.**   Modbus ASCII communication protocol using EVS RS232/R

### 3.5.4. EVS ETH / EVS ETH + RS485

The Ethernet Communication module enables communication of the **EVD** / **EVC** on an Ethernet network using the Modbus TCP protocol.
The connection allows:

- network connection of different controllers and/or applications exchanging variables and/or parameters (**network**)

- connection to a supervision system using the Modbus TCP protocol

- connection of an IEC 61131-3 **FREE Stu**d**io Plus** development system

**NOTE:**
The MAC ADDRESS (<u>barcode and 12-digit alphanumeric code</u>) is supplied in the box containing the Ethernet Communication module.
Refer to the section on Parameters / ETHERNET PASSIVE PLUG-IN folder (see **CHAPTER 9 Parameters on page 103**).

**NOTE:** The Ethernet connector shield is connected internally to the functional ground, and therefore to the reference of the input and output channels. Care must be taken to the fact there may be within the Ethernet communications system other grounding points. Interconnection of multiple protective earth grounding points in the same installation can cause current loops and voltage shifts across conductive parts of the equipment.

---

### ⚠ **WARNING**

**UNINTENDED EQUIPMENT OPERATION**

Do not connect the connector shield to protective earth (PE) or to functional earth (FE) of your installation.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

---
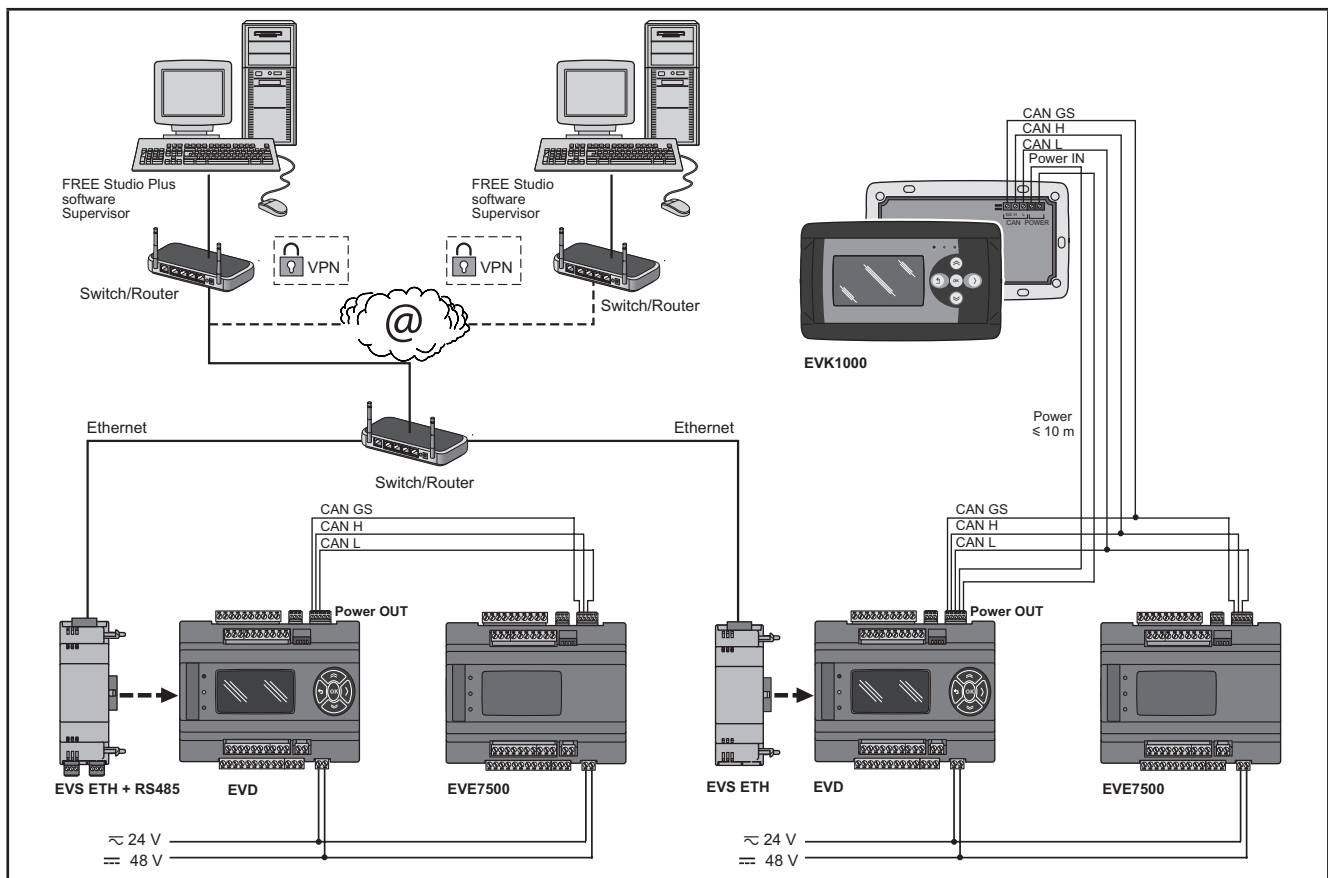


**Fig. 41.**     Modbus TCP protocol using EVS ETH

VPN is not necessary when using DynDNS connection.

| Protocol | Field | Network |
|---|---|---|
| Modbus TCP | - | Max 10 **FREE Evolution**+ 2 **EVK1000** <br> Max Modbus Messages = 128 / number of **FREE Evolution** connected |
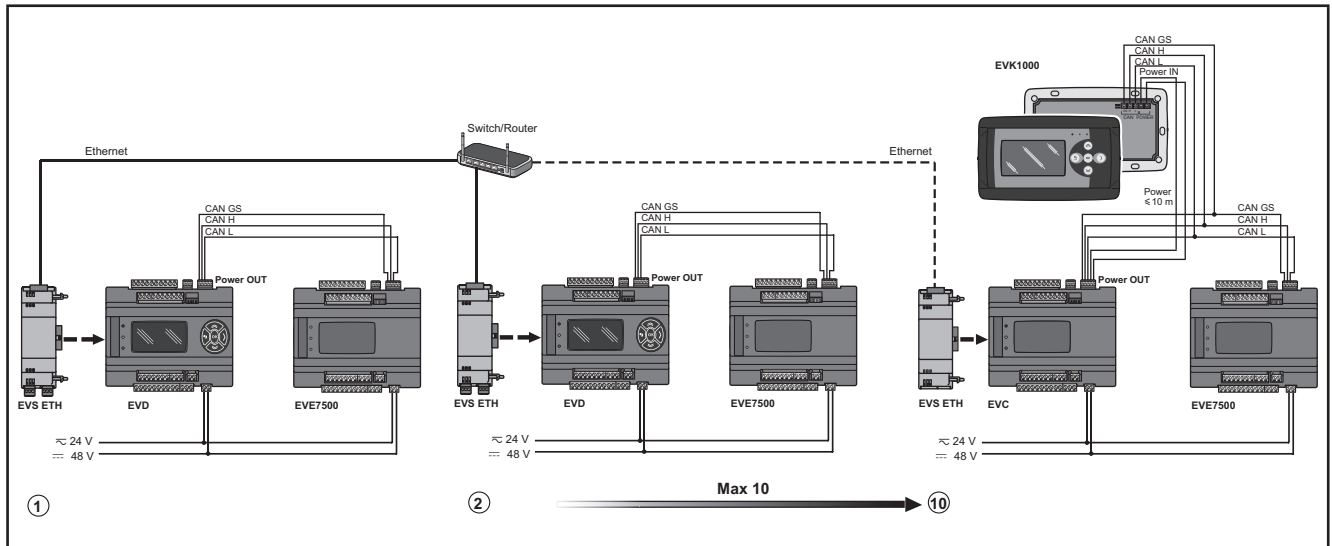


**Fig. 42.**    Modbus TCP protocol using EVS ETH - limits

## 3.5.5.  Example: BACnet / IP

| Protocol | Field | Network |
|---|---|---|
| BACnet IP | - | Max 4 **FREE Evolution** |
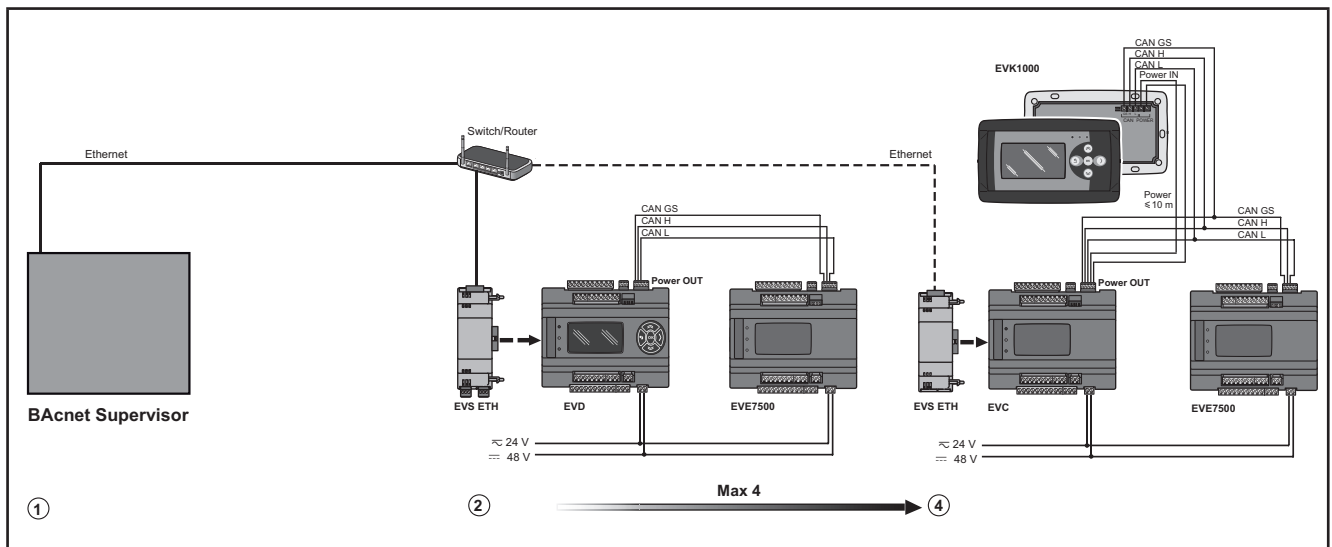


**Fig. 43.**    BACnet IP protocol using Ethernet port of the FREE Evolution

## FREE WEB (WEB SERVER HTTP)

**FREE WEB** is an **EVD/ EVC** with the **EVS ETH** Communication module.
The Ethernet Communication module also uses HTTP protocol, i.e. allowing access to a Web Server contained in **FREE Evolution**.

**FREE Studio Plus** allows the creation and management of web pages internally of **FREE WEB** (**WEB SERVER HTTP**), i.e. a website in miniature.

WEB functionalities allow local and remote access by way of an ordinary browser. Thanks to the web connection, the system provides reading, support and diagnostics services, as well as e-mail alarm alerts.

Main web functionalities:
- Web-based access.
- Remote reading and support.
- Local and remote system control, including alarms management.
- Preventive and predictive maintenance.
- Email alarm alerts.

Care must be taken and provisions made for use of this product as a control device to avoid inadvertent consequences of commanded machine operation, controller state changes, or alteration of data memory or machine operating parameters.

| ⚠ WARNING |
|---|
| **UNINTENDED EQUIPMENT OPERATION** |
| • Configure and install the mechanism that enables the remote HMI local to the machine, so that local control over the machine can be maintained regardless of the remote commands sent to the application. |
| • You must have a complete understanding of the application and the machine before attempting to control the application remotely. |
| • Take the precautions necessary to assure that you are operating remotely on the intended machine by having clear, identifying documentation within the application and its remote connection. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

Refer to the section on Parameters / ETHERNET PASSIVE PLUG-IN folder (see **CHAPTER 9 Parameters on page 103**).



**Fig. 44.**    FREE WEB (WEB SERVER HTTP) using FREE Evolution and EVS ETH

## BRIDGE

**FREE Stu**d**io Plus** allows monitoring of the **FREE Smart** or **FREE Evolution** controller or third party devices, typically Modbus/RTU slaves, where **FREE WEB** (or **FREE Evolution** with **EVS ETH** Communication module) is the Master Modbus/RTU.

In a **FREE Stu**d**io Plus** project, more exactly, **FREE WEB** is used as a Modbus/TCP to Modbus/RTU protocol conversion element for Modbus 0x03 and 0x10 commands.

For example from **FREE Stu**d**io Plus**, set the connection with the **FREE Smart** as Modbus/TCP, inserting the **FREE WEB** IP address and the Modbus/RTU address of the **FREE Smart** slave.
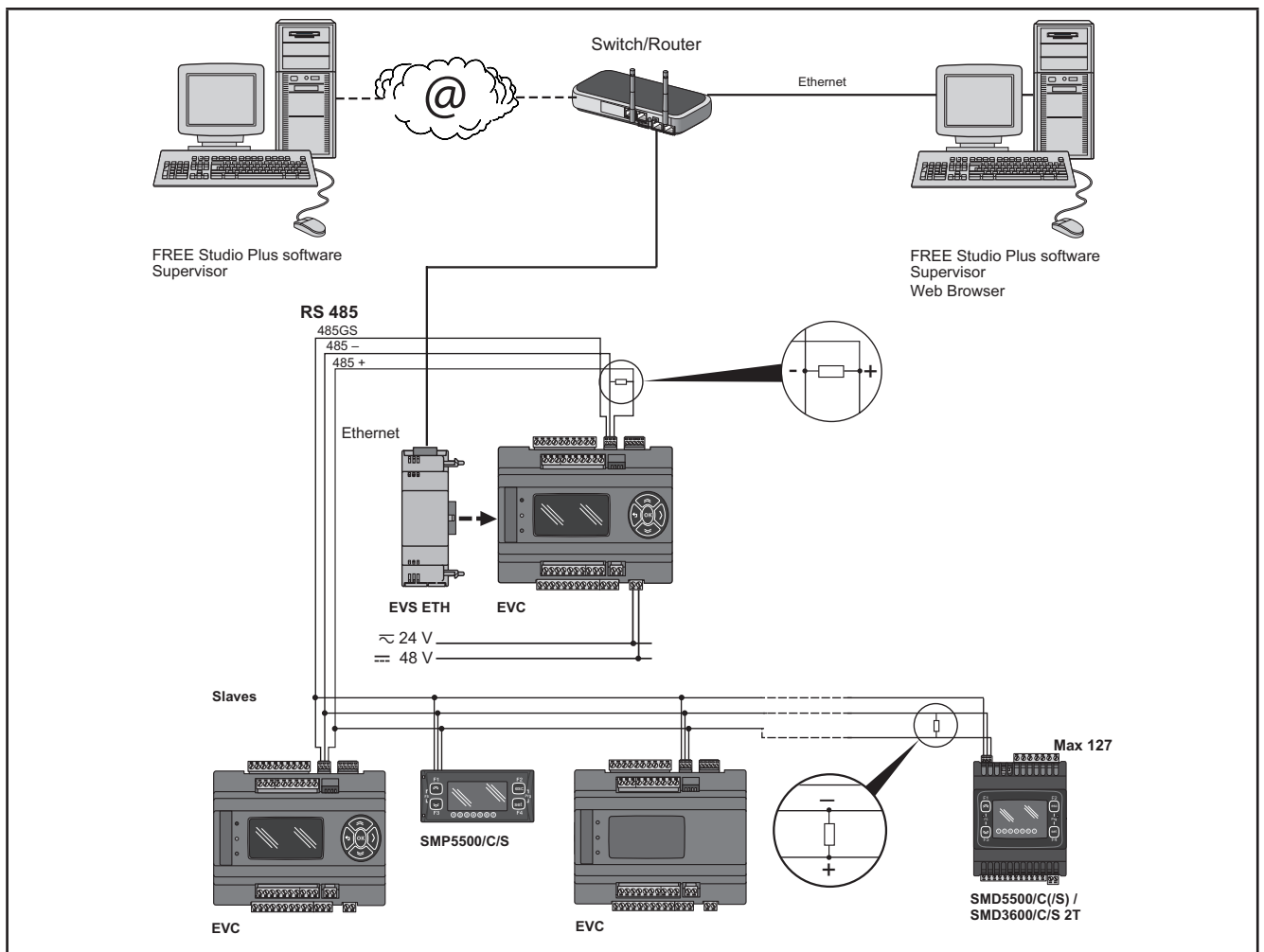


**Fig. 45.**    BRIDGE using EVS ETH

**TFTP** (**Trivial File Transfer Protocol**)

TFTP can also be enabled for file transfer between PC and controller on an Ethernet network.

### 3.5.6. EVS RS485

The RS485 Communication module allows **FREE Evolution / Advance** DIN rail mounted controllers to communicate via an RS485 serial using a Modbus RTU Master/Slave communication protocol, in addition to the RS485 serial.
The connection allows:

* connection to a supervision system using the Modbus RTU protocol

* connection of an IEC 61131-3 **FREE Studio Plus** development system

* connection to peripheral Modbus devices (for example **EVE**)

The two CAN serials ports (integrated and Communication module) offer the same level of services.
**FREE Evolution** manages only one of the two as Modbus Master. Both can operate as a Modbus Slave.



**Fig. 46.** Modbus RTU protocol using EVS RS485

### 3.5.7. EVS RS485 BACnet MS/TP / EVS ETH + RS485

The connection allows **FREE Evolution** controllers to connect to a BACnet supervision system using the BACnet MS/TP communication protocol.



**Fig. 47.**     BACnet MS/TP on RS 485 network using EVS RS485 BACnet MS/TP / EVS ETH + RS485

### 3.5.8. EVS CAN

The CAN Communication module allows **FREE Evolution / Advance** DIN rail mounted controllers to communicate via a CAN serial using a CAN protocol in addition to the existing CAN serial.
It allows:

• connection to a supervision system using the CAN protocol.

• connection of an IEC 61131-3 **FREE Stu**d**io Plus** development system.

• connection to **EVE** expansions.

• connection to **EVK1000** devices.

The two CAN serials ports (integrated and Communication module) offer the same level of services.
**FREE Evolution**manages only one of the two to pilot expansions.

Refer to the section on Parameters / CAN PASSIVE PLUG-IN folder (see **CHAPTER 9 Parameters on page 103**).



**Fig. 48.**     CAN protocol using EVS CAN

### 3.5.9. EVS PROFIBUS

The PROFIBUS Communication module allows **EVD** and **EVC** to communicate via a Profibus serial using the Profibus DP Slave V-0 communication profile.
The connection allows interface with a supervision system or master controller using the Profibus protocol.
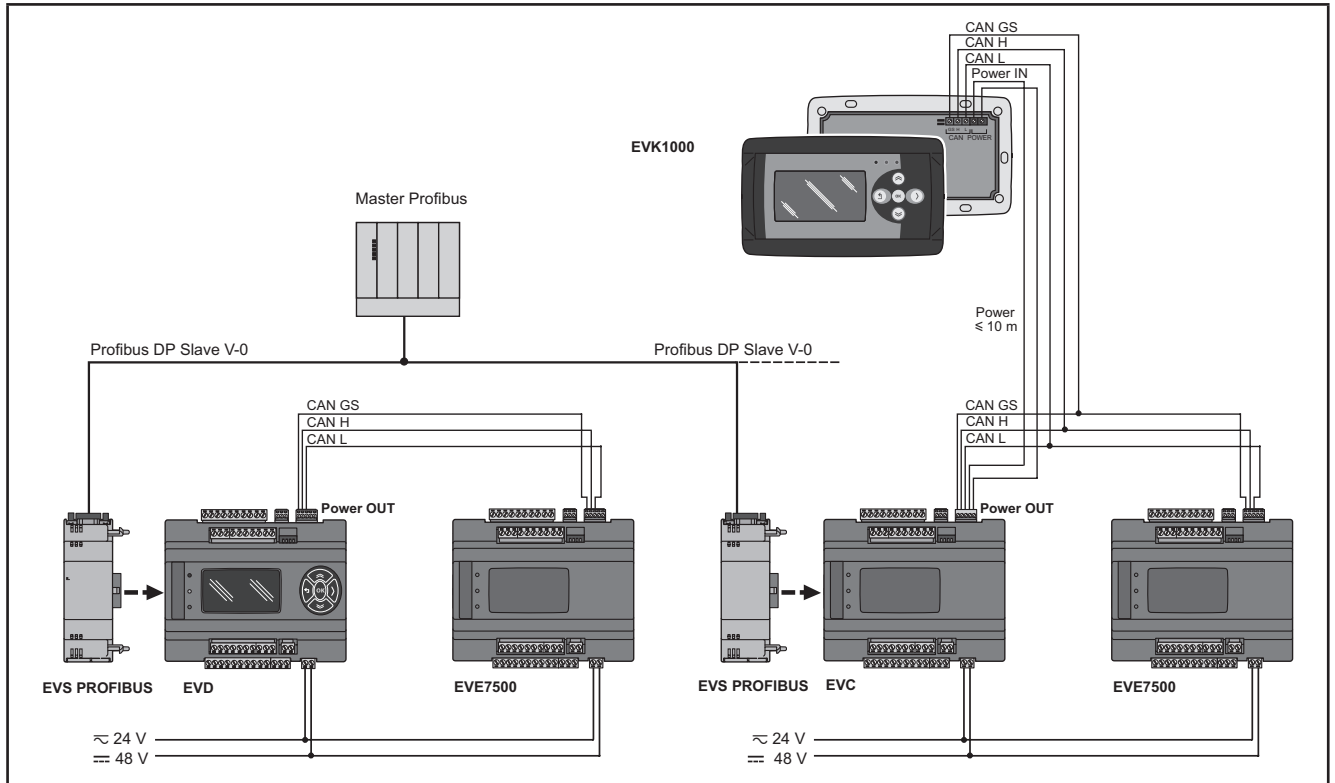


**Fig. 49.** Profibus protocol using EVS PROFIBUS

## 3.5.10. EVS LON

The LON Communication module allows **FREE Evolution / Advance** DIN rail mounted controllers to communicate via a LON serial using the LonWorkS (FFT-10) communication profile.
The connection allows interface with a supervision system or master controller using the LON protocol.
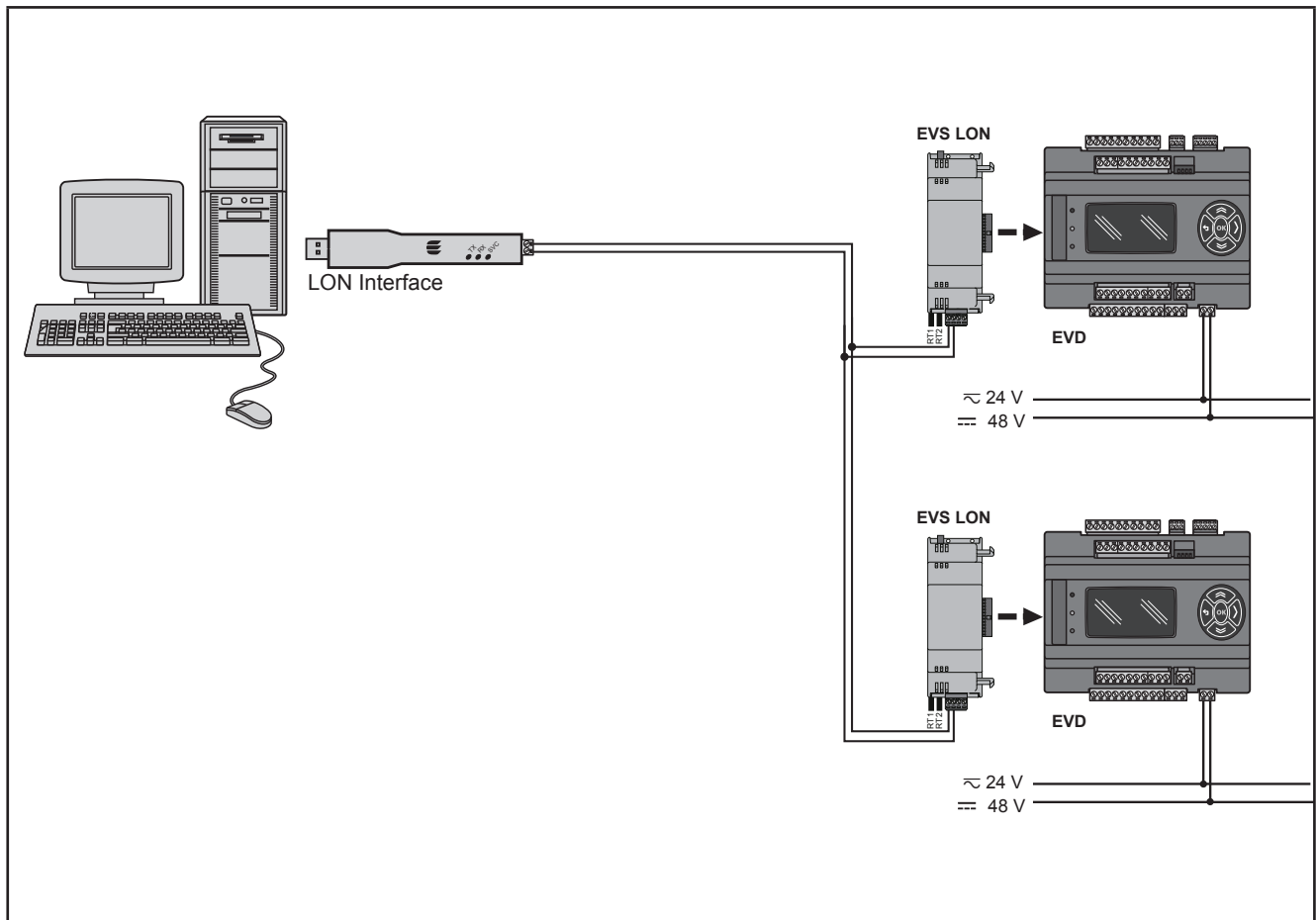


**Fig. 50.** LON protocol using EVS LON

**NOTE**: The LonWorks Communication module supports up to 63 nodes. Exceeding this specification may result in an electrical overload condition in the **EVS LON** Communication module and consequently in the controller.

| ⚠ WARNING |
|---|
| **UNINTENDED EQUIPMENT OPERATION** |
| Do not exceed the maximum of 63 nodes on the **EVS LON** Communication module. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

For more information on the LonWorks network, visit www.echelon.com/technology/lonwork/

## 3.6. Ethernet connection (for FREE Panel)

The **FREE Panel** product is also designated for **FREE WEB**
The Ethernet connection also allows communication using HTTP protocol, i.e. access to a Web Server contained in **FREE Evolution**.

**FREE Studio Plus** allows the creation and management of web pages internally of **FREE WEB** (**WEB SERVER HTTP**), i.e. a website in miniature.

WEB functionalities allow local and remote access by way of an ordinary browser. Thanks to the web connection, the system provides reading, support and diagnostics services, as well as e-mail alarm alerts.

Main web functionalities:
* Web-based access.
* Remote reading and support.
* Local and remote system control, including alarms management.
* Preventive and predictive maintenance.
* Email alarm alerts.

Care must be taken and provisions made for use of this product as a control device to avoid inadvertent consequences of commanded machine operation, controller state changes, or alteration of data memory or machine operating parameters.

| ⚠ WARNING |
|---|
| **UNINTENDED EQUIPMENT OPERATION** |
| • Configure and install the mechanism that enables the remote HMI local to the machine, so that local control over the machine can be maintained regardless of the remote commands sent to the application. |
| • You must have a complete understanding of the application and the machine before attempting to control the application remotely. |
| • Take the precautions necessary to assure that you are operating remotely on the intended machine by having clear, identifying documentation within the application and its remote connection. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

Refer to the section on Parameters / ETHERNET PASSIVE PLUG-IN folder (see **CHAPTER 9 Parameters on page 103**).



**Fig. 51.** FREE WEB using FREE Panel

## BRIDGE

**FREE Studio Plus** allows monitoring of the **FREE Smart** or **FREE Evolution** controller or third party devices, typically Modbus/RTU slaves, where **FREE WEB** (or **FREE Panel** logic controller with Communication module **EVS ETH**) is the Master Modbus/RTU.

In a **FREE Studio Plus** project, more exactly, **FREE WEB** is used as a Modbus/TCP to Modbus/RTU protocol conversion element for Modbus 0x03 and 0x10 commands.

For example from **FREE Studio Plus**, set the connection with the **FREE Smart** as Modbus/TCP, inserting the **FREE WEB** IP address and the Modbus/RTU address of the **FREE Smart** slave.
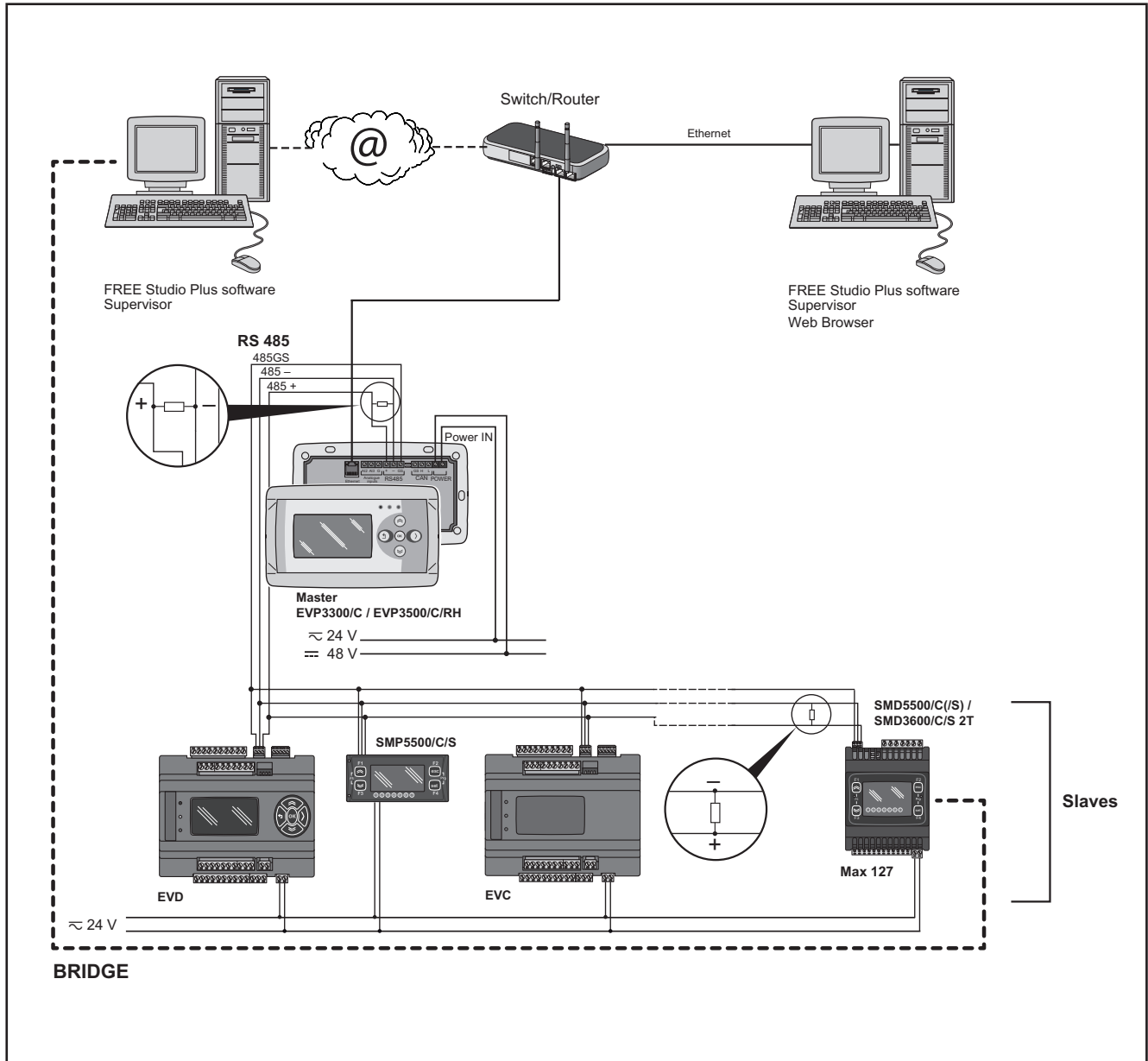


**Fig. 52.** FREE WEB using FREE Panel

## TFTP (**Trivial File Transfer Protocol**)

TFTP (Trivial File Transfer Protocol) can also be enabled for file transfer between PC and controller on an Ethernet network.

# CHAPTER 4

## Technical data

All **FREE Evolution logic controllers** system components meet European Community (CE) requirements for open equipment. You must install them in an enclosure or other location designed for the specific environmental conditions and to minimize the possibility of unintended contact with hazardous voltages. Use metal enclosures to improve the electromagnetic immunity of your **FREE Evolution logic controllers** system. This equipment meets CE requirements as indicated in the table below.

| ⚠ WARNING |
| --- |
| **UNINTENDED EQUIPMENT OPERATION** |
| Do not exceed any of the rated values specified within this chapter. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

Applying incorrect current or voltage levels on analog inputs and outputs could damage the electronic circuitry. Further, connecting a current input device to an analog input configure for voltage, and vice-versa, will likewise damage the electronic circuitry.

| *NOTICE* |
| --- |
| **INOPERABLE EQUIPMENT** |
| • Do not apply voltages above 11 Vdc to the analog inputs of the controller or Input/Output expansion module when analog input is configured as 0-10 V input. |
| • Do not apply current above 30 mA to the analog inputs of the controller or Input/Output expansion module when analog input is configured as 0-20 mA or 4-20 mA input. |
| • Do not mismatch applied signal with analog input configuration. |
| **Failure to follow these instructions can result in equipment damage.** |

# 4.1. General specifications

## 4.1.1. FREE Evolution / EVE4200

| | |
|---|---|
| The product complies with the following harmonized regulations: | EN 60730-2-9 / EN 60730-1 |
| Construction of control | Electronic automatic Incorporated Control |
| Type of action | 1.B relay output - 1.Y SSR output |
| Pollution degree | 2 |
| Over voltage category | II |
| Rated impulse voltage | 2500 V |
| Power Supply | 24 Vac, 50/60 Hz, or 24 Vdc, 48 Vdc Class 2 or SELV power source for all EVx7500 models<br>24 Vac, 50/60 Hz, or 24 Vdc  Class 2 or SELV power source for EVE4200 |
| Power Draw | 22 VA / 18 W All EVx7500 models<br>16 VA / 7 W EVE4200 |
| Digital outputs | **EVE4200**:<br>SPST: DO2, DO3, DO4: 3 A resistive 240 Vac<br>SPDT: DO1: 3 A resistive 240 Vac<br>**EVD7500/C/U / EVC7500/C/U / EVE7500:**<br>SPST: DO3, DO4, DO5, DO6 : 3 A resistive 240 Vac<br>SPDT: DO1, DO2 : 8 A resistive 240 Vac NO/NC - 1/2 HP 240 Vac NO<br>**EVD7500/C/U/SSR:**<br>SPST: DO5, DO6 : 3 A resistive 240 Vac<br>SPDT: DO1, DO2 : 8 A resistive 240 Vac NO/NC - 1/2 HP 240 Vac NO SSR: DO3, DO4 : 0,75 A resistive 240 Vac |
| Software class | A |
| Ambient operating conditions | -10 ... 55 °C (14 ... 131 °F) All EVx7500 models<br>-10 ... 60 °C (14 ... 140 °F) EVE4200<br>10…90% RH (non condensante) |
| Transportation and storage conditions | -20…85 °C (-4...185 °F)<br>10…90% RH (non-condensing) |
| Environmental front panel rating | Open Type |

## 4.1.2. FREE Panel

| | |
|---|---|
| The product complies with the following harmonized regulations: | EN 60730-2-9 / EN 60730-1 |
| Construction of control | Electronic automatic Incorporated Control |
| Type of action | 1 |
| Pollution degree | 2 |
| Over voltage category | I |
| Rated impulse voltage | 330 V |
| Power Supply[1] | 24 Vac, 50/60 Hz, or 24 Vdc, 48 Vdc Class 2 or SELV power source |
| Power Draw | 5 W |
| Software class | A |
| Ambient operating conditions | -10 ... 55 °C (14 ... 131 °F)<br>10…90% RH (non condensante) |
| Transportation and storage conditions | -20…85 °C (-4...185 °F)<br>10…90% RH (non-condensing) |
| Environmental front panel rating | Type 1 enclosure |

[1] For **FREE Panel / EVK1000**: powered by **EVD** / **EVC** or directly from an independent, properly rated power supply.
**NOTE:** When supplying power from the **FREE Evolution logic controllers**, make the power connection cable as short as possible.

| *NOTICE* |
|---|
| **INOPERABLE EQUIPMENT** |
| Do not connect a power cable longer than 10m. |
| **Failure to follow these instructions can result in equipment damage.** |

## 4.2. I/O Features

### 4.2.1. FREE Evolution I/O features

**FREE Evolution** features for inputs and outputs.

| Type and Label | No. | Description | EVD7500/C/U EVD7500/C/U EVE7500 | EVD7500/C/U/SSR |
|---|---|---|---|---|
| Digital input **DI1…DI8** | 8 | 8 opto-isolated digital inputs Working voltage +24 Vac/dc ±20% or +48 Vdc ±20% Power draw max. 5 mA Digital inputs can be used as pulse counters. The length of the pulse (positive or negative) must be greater than 12 ms. See **CHAPTER 8 Physical I/O and ports configuration on page 88**. | ✓ | ✓ |
| Digital input **FAST DI** | 1 | 1 no-voltage digital input (Pulse count + Read frequency) Note: measure a signal with a maximum frequency of 1 kHz See **CHAPTER 8 Physical I/O and ports configuration on page 88**. | ✓ | ✓ |
| Relay digital outputs High voltage **DO1, DO2** | 7 | 2  x  8 A resistive 240 Vac relays NO/NC - 1/2 HP 240 Vac NO | ✓ | - |
| Relay digital outputs High voltage **DO3…DO7** | | 5  x  5 A resistive 240 Vac relays | ✓ | - |
| Relay digital outputs High voltage **DO1, DO2** | 5 | 2  x  8 A resistive 240 Vac relays NO/NC - 1/2 HP 240 Vac NO | - | ✓ |
| Relay digital outputs High voltage **DO5, DO6, DO7** | | 3  x  5 A resistive 240 Vac relays | - | ✓ |
| SSR digital outputs High voltage **DO3, DO4** | 2 | 2  x 0.75 A resistive 240 Vac SSR | - | ✓ |
| Analog outputs **AO1…AO5** | 5 | 5 x 0-10 V / 4..20mA / ON-OFF configurable outputs: • **0..10V** 2% full scale Min.load 500 Ω; 1% full scale with load greater than 5 kΩ • **4…20mA** 2% full scale max. 400 Ω • **ON-OFF** Max.load 400 Ω  Note: AO4 and AO5 can be configured as Open Collector. See **CHAPTER 8 Physical I/O and ports configuration on page 88**. | ✓ | ✓ |
| Analog inputs **AI1 AI2 AI3 AI4 AI5 AI6** | 6 | See the following table | ✓ | ✓ |

| | NTC (NK103) 10 kΩ at 25 °C (77 °F) BETA value 3977 | DI (1) | NTC (103AT-2) 10 kΩ at 25 °C (77 °F) BETA value 3435 | 4-20 mA | 0-10 V |
|---|---|---|---|---|---|
| **AI1** | ✓ | ✓ | ✓ | - | - |
| **AI2** | ✓ | ✓ | ✓ | - | - |
| **AI3** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI4** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI5** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI6** | ✓ | ✓ | ✓ | ✓ | ✓ |
| Range | -40…+150 °C (-40...+302 °F) | - | -50...+110 °C (-58...+230 °F) | 0…1000 | 0…1000 |
| Accuracy | 0.5% full scale + 1 digit | - | 0.5% full scale + 1 digit | 1% full scale + 1 digit | 1% full scale + 1 digit |
| Resolution | 0.1°C | - | 0.1 °C | 1 digit | 1 digit |
| Input impedance | 10 kΩ | 20 kΩ | 10 kΩ | 100 Ω | 21 kΩ |

(1) DI Digital Input: voltage free digital input.

| | 0-5 V Ratiometric (1) | Pt1000 | hΩ (NTC) | daΩ (Pt1000) |
|---|---|---|---|---|
| **AI1** | - | - | - | - |
| **AI2** | - | - | - | - |
| **AI3** | ✓ | ✓ | ✓ | ✓ |
| **AI4** | ✓ | ✓ | ✓ | ✓ |
| **AI5** | ✓ | ✓ | ✓ | ✓ |
| **AI6** | ✓ | ✓ | ✓ | ✓ |
| Range | 0…1000 | -200...+800 °C (-328...+1472 °F) | 0...150 kΩ | 0…30 kΩ |
| Accuracy | 1% full scale + 1 digit | 0.5% full scale + 1 digit | 1% full scale + 1 digit | 1% full scale + 1 digit |
| Resolution | 1 digit | 0.1 °C | 1 hΩ | 1 daΩ |
| Input impedance | 21 kΩ | 2 kΩ | 10 kΩ | 2 kΩ |

(1) 0-5 V Ratiometric. 50 mA maximum current at 5 V

Also see for instructions on offsets and calibrations.

## 4.2.2. EVE4200 I/O features

**EVE4200** features for inputs and outputs.

| Type and Label | No. | Description | EVE4200 |
|---|---|---|---|
| Digital input **DI1…DI4** | 4 | 4 digital inputs NOT ISOLATED<br>Working voltage 24 Vac/dc ±10% (Vac: max 38Vac)<br>Power draw max. 5mA | ✓ |
| Relay digital outputs High voltage **DO1...DO4** | 4 | 1 x 5A 250 Vac SPDT relay<br>3 x 3A 250 Vac SPST relays<br>(common max 10A) | ✓ |
| Analog outputs **AO1…AO2** | 2 | 2 x 0-10 V outputs:<br>4% full scale Min.load 5KΩ; 2% full scale with load greater than 5KΩ | ✓ |
| Analog inputs **AI1 AI2 AI3 AI4** | 4 | See the following table | ✓ |

| | NTC (NK103) 10 kΩ at 25 °C (77 °F) BETA value 3977 | DI (1) | NTC (103AT-2) 10 kΩ at 25 °C (77 °F) BETA value 3435 | 4-20 mA | 0-10 V |
|---|---|---|---|---|---|
| **AI1** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI2** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI3** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI4** | ✓ | ✓ | ✓ | ✓ | ✓ |
| Range | -40…+137 °C (-40...+278.6 °F) | - | -50°...+110 °C (-58...230 °F) | 0…1000 | 0…1000 |
| Accuracy | 0.5% full scale + 1 digit | - | 0.5% full scale + 1 digit | 1% full scale + 1 digit | 1% full scale + 1 digit |
| Resolution | 0.1 °C | - | 0.1 °C | 1 digit | 1 digit |
| Input impedance | 10 kΩ | 10 kΩ | 10 kΩ | <200 Ω | >10 kΩ |

(1) DI Input: voltage free digital input.

| | 0-5 V (1) | Pt1000 | hΩ (NTC) | daΩ (Pt1000) | PTC (KTY81) |
|---|---|---|---|---|---|
| **AI1** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI2** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI3** | ✓ | ✓ | ✓ | ✓ | ✓ |
| **AI4** | ✓ | ✓ | ✓ | ✓ | ✓ |
| Range | 0…1000 | -200..+295 °C (-328...+563 °F) | 0..150 kΩ | 0…30 kΩ | -50°C ..+150 °C (-58...+302 °F) |
| Accuracy | 1% full scale + 1 digit | 0.5% full scale + 1 digit | 1% full scale + 1 digit | 1% full scale + 1 digit | 0.5% full scale + 1 digit |
| Resolution | 1 digit | 0.1 °C | 1 hΩ | 1 daΩ | 0.1 °C |
| Input impedance | >20 kΩ | 2 kΩ | 10 kΩ | 2 kΩ | 2 kΩ |

(1) Ratiometric. 50 mA maximum current at 5 V

Also see **8.1.1. Analog inputs configuration for FREE Evolution on page 89** for instructions on offsets and calibrations.

## 4.2.3. FREE Panel I/O features

**FREE Panel** features for inputs.

| Type and Label<br><br>Analog inputs | Probe | Description | Resolution | Accuracy | Measurement range | Impedance | EVP3300/C | EVP3500/C/RH |
|---|---|---|---|---|---|---|---|---|
| **AI1** | On-board | NTC | 0.1 °C / °F | 0.5% full scale + 1 digit | - | 10 kΩ | ✓ | ✓ |
| **AI2** configurable | Remote<br><br>NOT included | NTC 103AT | 0.1 °C / °F | 0.5% full scale + 1 digit | -50…+110 °C (-58...230 °F) | 10 kΩ | ✓ | ✓ |
| | | NTC NK103 | 0.1 °C / °F | 0.5% full scale + 1 digit | -40…+150 °C (-40...302 °F) | 10 kΩ | | |
| | | D.I.(1) | - | - | - | 20 kΩ | | |
| **AI3** configurable | Remote<br><br>NOT included | 4...20 mA | 1 digit | 1% full scale + 1 digit | 0…1000 | 100 Ω | ✓ | - |
| | | 0-5 V (2) | 1 digit | 1% full scale + 1 digit | 0…1000 | 21 kΩ | - | - |
| | | 0..10 V | 1 digit | 1% full scale + 1 digit | 0…1000 | 21 kΩ | - | - |
| **AI4** | On-board | On-board %RH input | 0.01 %RH (0%=0pt, 100% = 1000pt) | ±3% [20...80%] ±5% …elsewhere | 0-100 %RH | - | - | ✓ |

(1) D.I. Digital Input voltage-free.
(2) 50 mA maximum current at 5 V.

Also see **8.1.2. Analog inputs configuration for EVE4200 on page 90** for instructions on offsets and calibrations.

## 4.3.  Display

**EVD7500/C/U(/SSR**) references, remote display and **FREE Panel**:

• backlit with LEDs

• 3 LEDs

LEDs and backlighting can be controlled from application.

### 4.3.1.  EVK1000 / FREE Panel display

| Display | Monochromatic LCD graphic display 128x64px backlit with LEDs |
|---|---|
| Container | Backplate + frame in PC+ABS UL94 V-0 plastic resin, transparent polycarbonate front cover, polyester membrane keypad |

## 4.4.  Serials

| Serial | Description | Notes | References |
|---|---|---|---|
| **CAN** | CAN Expansion Bus | max 50 m at 500 kpbs; 200 m at 125 kpbs. | **EVD / EVC** **EVE** **EVK1000** |
| | | If necessary, apply a 120 Ω termination resistor to both the ends. | |
| **RS 485** | 2 x RS 485 serial | If the controller is connected at the end of the RS 485 communication line, apply a 120 Ω termination resistor between line + and line - of the RS 485 | **EVD / EVC** **EVE7500** |
| | | Only one RS 485 serial port can be configured as Modbus master at the same time. | |
| **USB** | 1 Type A USB female connector (Host) | 'Mass Storage' profile External memory, **FAT32** formatting. | **EVD / EVC** |
| | 1 Type mini-B USB female connector (Device) | Connection between PC and device through USB standard CDC profile. | |
| **ETHERNET** | Modbus TCP ETHERNET port | Equipment includes MACADDRESS, in barcode and 12-digit alphanumeric format. | **EVP** |

Pay special attention when connecting serial lines. Miswiring may lead to inoperable equipment.

| *NOTICE* |
|---|
| **INOPERABLE EQUIPMENT** <br> • Do not connect equipments that communicate using RS 485 serial to CAN Expansion Bus terminals. <br> • Do not connect equipments that communicate using CAN Expansion Bus to RS 485 terminals. <br> **Failure to follow these instructions can result in equipment damage.** |

## 4.4.1. EVS Communication module

| | Serial | Notes | Terminals |
|---|---|---|---|
| **EVS RS232/R** | RS232 Nullmodem | Digital outputs 1 x SPDT 5 A 250 Vac relay | terminals 1...3 screw type removable, spacing 5, 90° insertion for cables with 2.5 mm$^2$ cross-section. + DB9 connector |
| **EVS CAN** | Double serial port | Opto-isolated CAN serial | removable screw type , spacing 3.81, 90° insertion for cables with 2.5 mm$^2$ cross-section. |
| **EVS RS485**<br>**EVS RS485 BACnet MS/TP** | Double serial port | Opto-isolated RS485 serial | removable screw type , spacing 3.81, 90° insertion for cables with 2.5 mm$^2$ cross-section. |
| **EVS ETH** | Modbus TCP ETHERNET port | - | RJ45 connector |
| **EVS ETH + RS485** | Modbus TCP ETHERNET port Double serial port | Opto-isolated RS485 serial | RJ45 connector removable screw type , spacing 3.81, 90° insertion for cables with 2.5 mm$^2$ cross-section. |
| **EVS LON** | LON | - | - |
| **EVS PROFIBUS** | Profibus DP Slave-V0 | - | - |

## 4.5. Power supply

The **FREE Evolution logic controllers** and associated devices require power supplies with a nominal voltage of 24 Vac / 24 Vdc or 48 Vdc. The power supplies/transformers must be rated Safety Extra Low Voltage (SELV) according to IEC 61140. These sources of power are isolated between the electrical input and output circuits of the power supply as well as simple separation from ground (earth), PELV and other SELV systems.

---

### ⚡ ⚠ DANGER

**GROUND LOOP CAUSING ELECTRIC SHOCK AND/OR INOPERABLE EQUIPMENT**

- Do not connect the 0 V power supply/transformer connection supplying this equipment to any external ground (earth) connection.
- Do not connect any 0 V or ground (earth) of the sensors and actuators connected to this equipment to any external ground connection.
- If necessary, use separate power supplies/transformers to power sensors or actuators isolated from this equipment.

**Failure to follow these instructions will result in death or serious injury.**

---

If the specified voltage range is not maintained, or the effective separation of the SELV circuit connected to the concerned equipment is compromised, the products may not function as intended or may become damaged and inoperable.

---

### ⚠ WARNING

**POTENTIAL OF OVERHEATING AND FIRE**

- Do not connect the equipment directly to line voltage.
- Use only isolating SELV power supplies/transformers to supply power to this equipment.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

---

The equipment must be connected to a suitable power supply/transformers with the following features:

| | |
|---|---|
| Primary voltage | Depending on requirements of the individual device and/or country of installation. |
| Secondary voltage | +24 Vac/dc ±20% or +48 Vdc ±20% |
| Power supply frequency Vac | 50/60 Hz |
| Power | minimum 18 W (**FREE Evolution**)<br>minimum 5 W (**FREE Panel**) |

## 4.6. Mechanical dimensions

| | Length (L)<br>$\frac{mm}{in}$ | Depth (d)<br>$\frac{mm}{in}$ | Height (H)<br>$\frac{mm}{in}$ | Notes |
|---|---|---|---|---|
| **EVD / EVC / EVE7500** | $\frac{140}{5.51}$ | $\frac{61.6}{2.42}$ | $\frac{110}{4.33}$ | - |
| **EVE4200** | $\frac{70}{2.75}$ | $\frac{61.6}{2.42}$ | $\frac{87}{3.42}$ | - |
| **EVS** Communication module | $\frac{35}{1.38}$ | $\frac{61.6}{2.42}$ | $\frac{110}{4.33}$ | - |
| **EVK1000**<br>**EVP** | $\frac{160}{6.3}$ | $\frac{10}{0.39}$ | $\frac{96}{3.8}$ | - |
| **Opening for panel-mounting** of **EVK1000** or **EVP** | $\frac{138}{5.43}$ | - | $\frac{68}{2.68}$ | (+0.2mm / -0.1mm) |
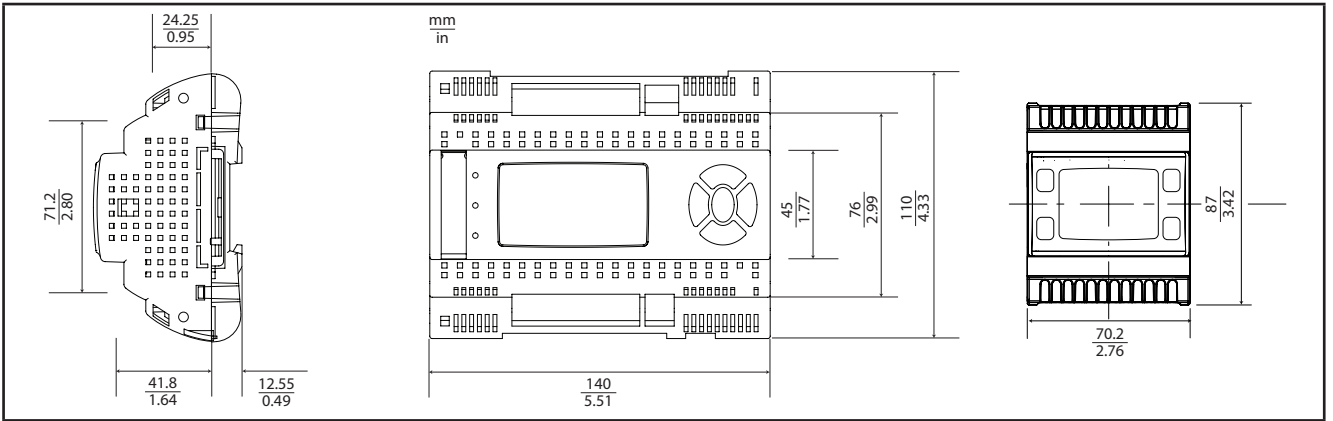
**Fig. 53.**    EVD / EVC / EVE7500 / EVE4200
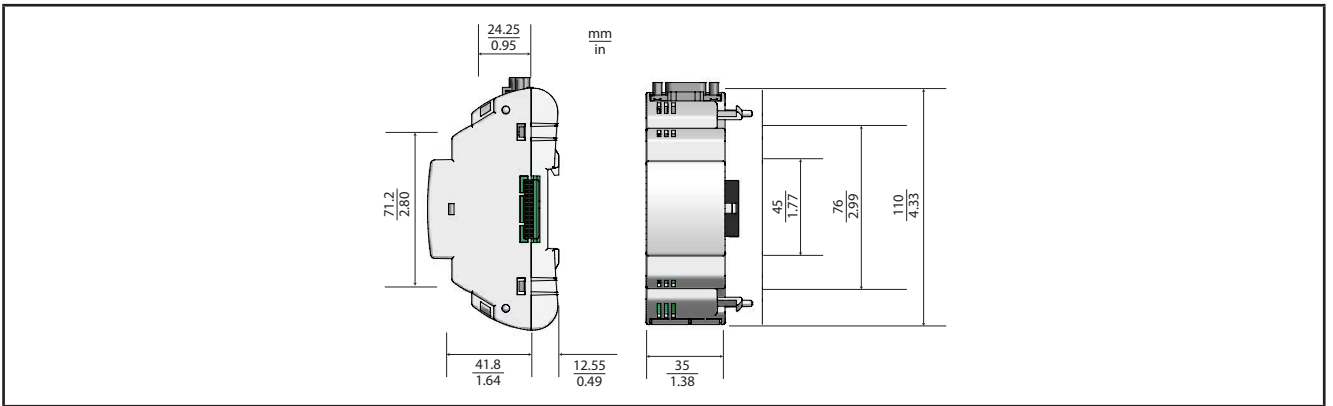


**Fig. 54.**    EVS
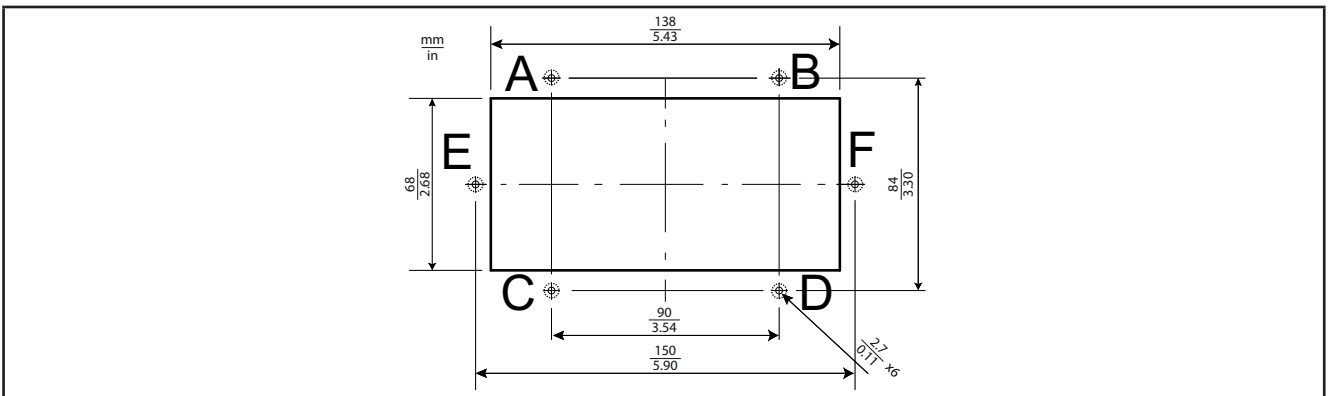


**Fig. 55.**    Panel opening dimensions for EVK1000 or EVP

# CHAPTER 5

# FREE Evolution User Interface

The interface, comprising the front cover of the controller, allows you to perform operations to use the device.

## 5.1. Keys and LEDs

The data provided for keys refers to **EVD** references.

The **EVC** module has no display. Use the **EVK1000** to work on this controller.
The **EVE** expansion module has no display.
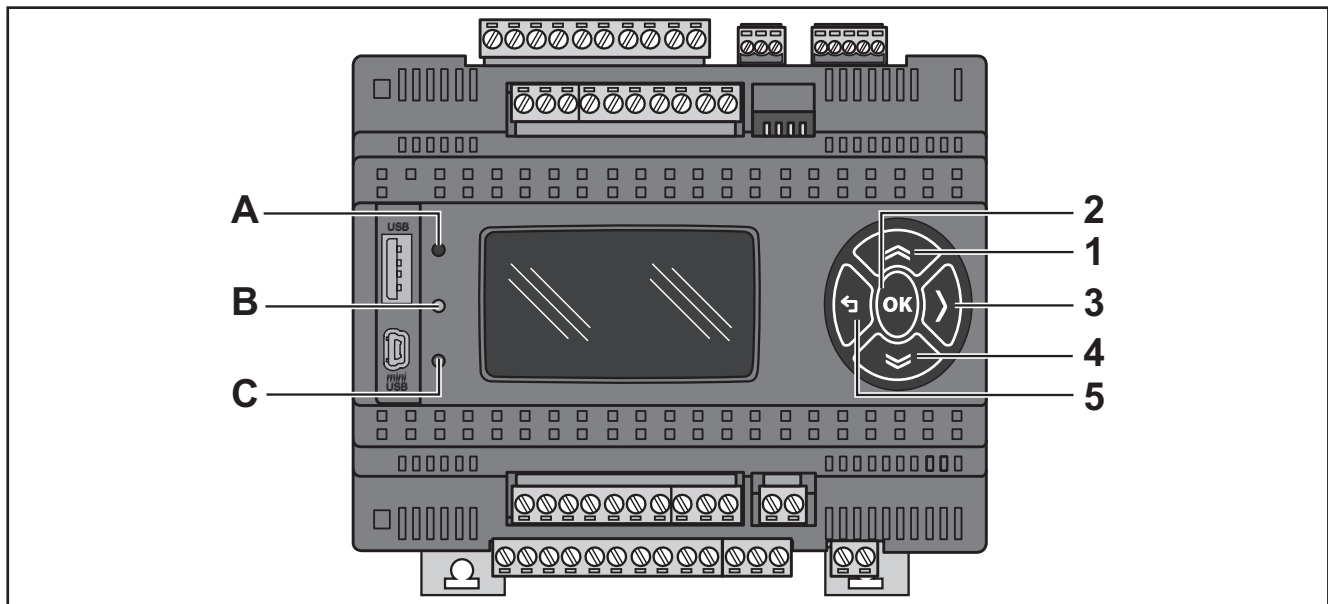


**Fig. 56.**   EVD

The keys can be programmed from the controller application. By default, the device displays a short menu containing the following default settings.

| No. | Key | Press once (**press and release**) |
|---|---|---|
| 1 | ⌃ <br> **UP** | • Scroll up <br> • Increase/modify a value <br> • Go to next label |
| 2 | **OK** | • Scroll down <br> • Move to next level/menu (open folder, subfolder, parameter, value) <br> • Enter/exit Edit mode <br> • Confirm operation |
| 3 | **RIGHT** 〉 | • Move cursor to right in Edit Mode |
| 4 | **DOWN** <br> ⌄ | • Scroll down <br> • Decrease/modify a value <br> • Go to previous label |
| 5 | ↵ <br> **Exit** | • Exit menu page / go back to previous menu <br> • Move cursor to left in Edit Mode <br> • (press and hold) Exit Edit Mode without saving |

The LEDs can be programmed from the application.

By default, they are used for USB management - see the relative section on USB-Handling (see **3.1.6. Serial connections on page 28**).

| LEDs | Description |
|:---:|:---:|
| **A B C** | A, B and C LEDs are programmable via controller application |

## 5.2. First power on

When the equipment is powered on for the first time, a few summary pages are displayed showing system status (**SYSTEM INFO**).

| SYSTEM INFO |
|:---:|
| HW |
| BIOS |
| DATE |
| BOOT |
| EEPROM |

| | |
|:---:|:---:|
| NOR FLASH | OK |
| NAND FLASH | OK |
| SDRAM | OK |
| BATRAM | OK |
| RTC | OK |
| Plug-in | None |
| USB-H | OK |
| USB-D | Service area |

# CHAPTER 6

## EVK1000 user interface

The interface, comprising the front cover of the controller, allows you to perform operations to use the device.
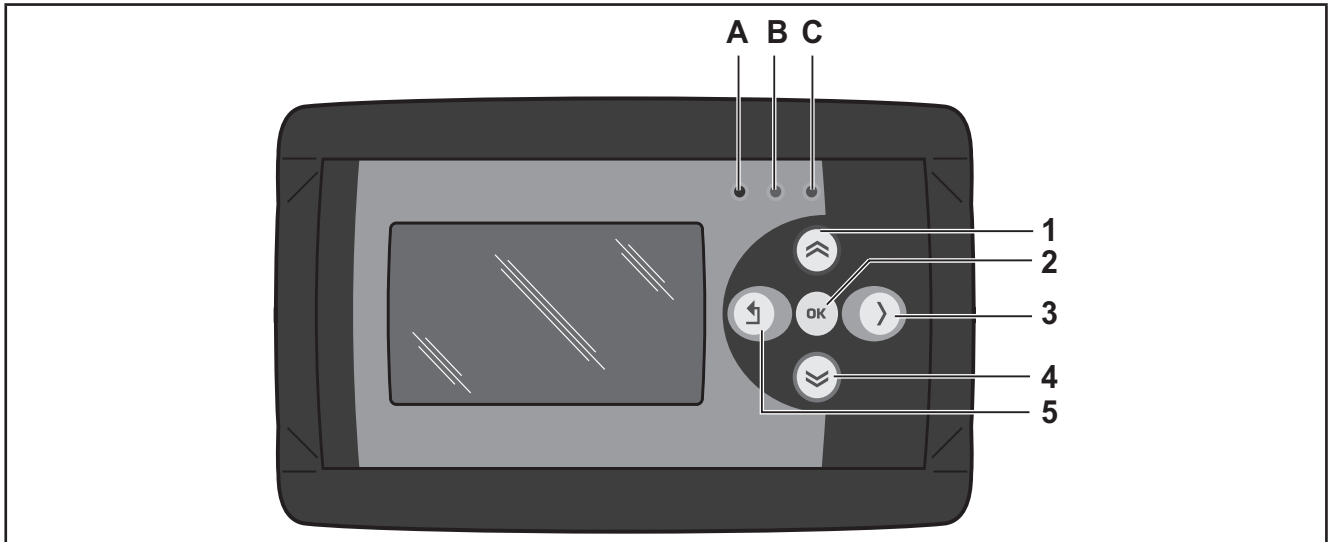


**Fig. 57.** EVK1000

## 6.1. Keys and LEDs

The keys can be programmed from the controller application. By default, the device displays a short menu containing the following default settings.

| No. | Key | Press once<br>(press and release) |
|-----|-----|-----|
| 1 | ⟪<br><br>UP | • Scroll up<br>• Return to previous page (for example 1/3 ←2/3)<br>• Increase / modify a value<br>• Go to next label |
| 2 | OK | • Scroll down<br>• Move to next level/menu (open folder, subfolder, parameter, value)<br>• Enter/exit Edit mode<br>• Confirm operation |
| 3 | RIGHT ❭ | • Move cursor to right in Edit Mode |
| 4 | DOWN<br><br>⟫ | • Scroll down<br>• Move to the next page (for example 1/3→2/3)<br>• Decrease / modify a value<br>• Go to previous label |
| 5 | ↰<br>Exit | • Exit menu page / go back to previous menu<br>• Move cursor to left in Edit Mode<br>• (press and hold) Exit Edit Mode without saving |

### DIAGNOSTICS Menu

**EVK1000** is factory-configured with a default DIAGNOSTICS (DIA) menu that appears when the equipment is powered on. After uploading a controller application and/or a HMI menu from **FREE Studio Plus**, the main display consists of the application menu created with **FREE Studio Plus** Interface.
In which case, to open the DIAGNOSTICS menu proceed as follows:

| No. | Key combination | Press and hold for about 3 seconds |
|---|---|---|
| **4+5** | **DOWN** | Open DIAGNOSTICS menu |
| | ↩ **Exit** | |

To return to the controller application menu, open the "HMI Management" page, select ↰ and press the **OK** key.
See **6.4. Remote interface on page 80**.

The LEDs can be programmed from the controller application.

| LEDs | Description |
|---|---|
| **A B C** | A, B and C LEDs are  programmable via controller application |

## 6.2.  First power on

When the equipment is powered on for the first time, a few summary pages are displayed showing system status (**SYSTEM INFO**).

| SYSTEM INFO |
|---|
| HW |
| BIOS |
| DATE |
| BOOT |
| EEPROM |

| NOR FLASH | OK |
|---|---|
| | |
| SDRAM | OK |
| | |
| | |

The system will also search for the controller application and the local menu…
If present, the menu will appear on the display.

| | |
|---|---|
| | |
| HMI searching | ... |
| | |
| DIA | |
| | |

## 6.3. DIAGNOSTICS menu

The default DIAGNOSTICS menu of the **EVK1000** allows you to manage system parameters (BIOS parameters) and the interface (HMI).
The DIAGNOSTICS menu can be displayed in 5 languages: English, Italian, German, Spanish and French.
To change the default language, open BIOS Parameters > Display.

| EVK |
|---|
| BIOS parameters |
| HMI Management |
|  |
|  |

### 6.3.1. BIOS parameters

Parameter configuration menu. See **CHAPTER 9 Parameters on page 103**.

This menu is depopulated with respect to the parameters table contained in the corresponding chapter and in the **FREE Stuɑio Plus** device.

A language change example:
BIOS parameters → < **OK** key > Display 1/3 → < **OK** key > Edit Mode < **UP/DOWN** key > select language < **OK** key > < ↰ key >

| BIOS parameters |
|---|
| Display |
| Buzzer |
| CAN |
|  |

| Display          1/3 |
|---|
| Language |
| Italiano |
|  |
|  |

| Display          1/3 |
|---|
| Language |
| English |
|  |
|  |

See parameter Display/**Hmi_Language**.

### 6.3.2. HMI Management

See **6.4. Remote interface on page 80**.

## 6.4. Remote interface

| EVK |
|---|
| Language: 0       ⎿⏋ |
|  |
|  |
| HMI Management |

### 6.4.1. Language

This section is for setting the language of the remote menu, defined from the **FREE Stuɑio Plus** User Interface.
The number of languages and the order are established by the corresponding application/menu.
See parameter HMI Management/**Hmi_Language** (see **CHAPTER 9 Parameters on page 103**).

### 6.4.2. ⎿⏋

To return to the menu of the controller application, move the cursor onto the ⎿⏋ symbol and press the **OK** key.

## 6.4.3. HMI Management

This page shows the configuration of the remote page.

| EVK |  |
|---|---|
| File: HMIREM.KBD | ⌐⌐ |
| Id: 0 | ⊡⌐ |
| Com: CAN |  |
| Addr: 124 |  |

From these pages it is possible to "launch" (run) the corresponding menu – if present.
Move the cursor to ⌐⌐ and press the **OK** key.
To "upload" a remote page use ⊡⌐
After selecting the desired menu move the cursor to ⌐⌐  to view the menu.

| Upload remote page |
|---|
| Upload page? |
| The process cannot be interrupted |
|  |
| Cancel            OK |

Press **OK** to upload or any other key to cancel:

| Upload remote page |
|---|
| Uploading... |
| ■■■■■■■□□ |
| 80% |
|  |

The upload may take up to a minute.

If there are no data to upload, the following screen displays:

| Upload remote page |
|---|
| There are no remote |
| pages on the card. |
|  |
| Press OK |

# CHAPTER 7
# FREE Panel user interface

The interface, comprising the front cover of the controller, allows you to perform operations to use the device.
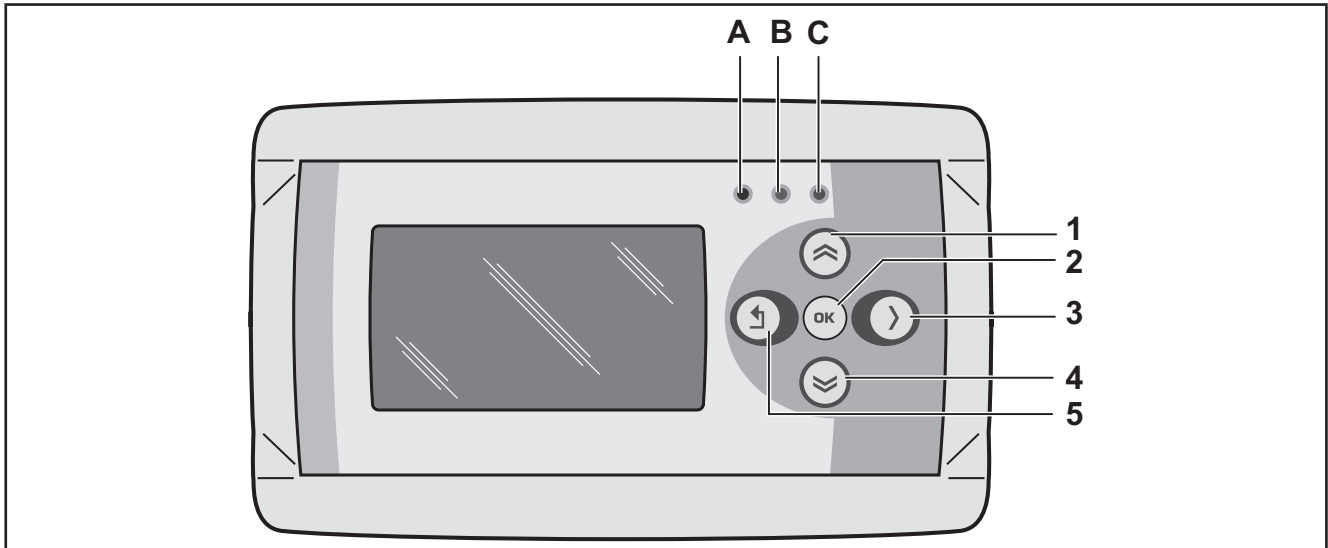


**Fig. 58.**    FREE Panel

The keys can be programmed from the controller application. By default, the device displays a short menu containing the following default settings.

## 7.1. Keys and LEDs

| No. | Key | Press once (press and release) |
|-----|-----|-------------------------------|
| 1 | ⤊ **UP** | • Scroll up<br>• Return to previous page (for example 2/10 ← 3/10)<br>• Increase / modify a value<br>• Go to the next label |
| 2 | **OK** | • Scroll down<br>• Move to next level/menu (open folder, subfolder, parameter value)<br>• Enter/exit Edit mode<br>• Confirm operation |
| 3 | **RIGHT** ❯ | • Moves cursor to right in Edit Mode |
| 4 | **DOWN** ⤋ | • Scroll down<br>• Move to the next page (for example 1/10 → 2/10)<br>• Decrease / modify a value<br>• Go to previous label |
| 5 | ↰ **Exit** | • Exit menu page / go back to previous menu<br>• Move cursor to left  in Edit Mode<br>• (press and hold) Exit Edit Mode without saving any changes |

The **FREE Panel** is factory-configured with a default DIAGNOSTICS (DIA) menu that appears when the equipment is powered on.

After uploading of a controller application and/or a HMI menu from **FREE Stuᴅio Plus**, the main display consists of the application menu created with **FREE Stuᴅio Plus** Interface.

In which case, to open the DIAGNOSTICS menu proceed as follows:

| Key combination | | Press and hold for about 3 seconds |
|---|---|---|
| **4+5** | **DOWN** | Open DIAGNOSTICS menu |
| | ↤ **Exit** | |

The LEDs can be programmed from the controller application.

| LEDs | Description |
|---|---|
| **A B C** | A, B and C LEDs are programmable via controller application |

To return to the controller application menu open the 'HMI Management' page (**7.3.2. HMI management on page 84**), select ↳ and press the **OK** key.

See **7.4. Remote interface on page 86**.

## 7.2. First power on

When the equipment is powered up for the first time, a few summary pages are displayed showing system status (**SYSTEM INFO**).

| SYSTEM INFO |
|---|
| HW |
| BIOS |
| DATE |
| BOOT |
| EEPROM |

| NOR FLASH | OK |
|---|---|
| NAND FLASH | OK |
| SDRAM | OK |
| BATRAM | OK |
| RTC | OK |

The system will also search for the controller application and the local menu…

If present, the menu will appear on the display

| PLC searching | … |
|---|---|
| HMI searching | … |
| CON | loaded |
| | |
| | |

## 7.3. DIAGNOSTIC menu

The DIAGNOSTICS menu of the **FREE Panel** is used to manage system parameters (BIOS parameters), remote interfaces (HMI) and to display I/O values and clock.
The DIAGNOSTICS menu can be displayed in 5 languages: English, Italian, German, Spanish and French.
To change the language, open BIOS Parameters > Display

| EVP |
| --- |
| BIOS parameters |
| HMI Management |
| Probe values |
| Date and time |

### 7.3.1. BIOS parameters

For Parameter configuration menu, see **CHAPTER 9 Parameters on page 103**.

This menu is depopulated with respect to the parameters table contained in the corresponding chapter and in the **FREE Stu**d**io Plus** device.

A language change example:
BIOS parameters → < **OK** key > Display 1/3 → < **OK** key > Edit Mode < **UP/DOWN** key > select language < **OK** key > < ↰ key >

| BIOS parameters |
| --- |
| Display |
| Buzzer |
| CAN |
| |

| Display         1/3 |
| --- |
| Language |
| Italiano |
| |

| Display         1/3 |
| --- |
| Language |
| English |
| |

See parameter Display/**Hmi_Language**.

### 7.3.2. HMI management

See **7.4. Remote interface on page 86**.

### 7.3.3. Probe values

Shows input values (read only).
**EVP** has 3 inputs.
A **EVP3500/C/RH** example:

| Probes values    1/3 |
| --- |
| Internal NTC |
| 27.3 |
| °C, °F |
| |

| Probes values    2/3 |
| --- |
| External NTC |
| - - - - - - - - - - - - - - |
| °C, °F |
| |

| Probes values    3/3 |
| --- |
| Humidity sensor |
| 43.38 |
| RH% |
| |

For offset programming see **8.1.2. Analog inputs configuration for EVE4200 on page 90**.

### 7.3.4. Date and time

Shows time (HH : MM : SS) and date (DD / MM / YY) of the internal clock.

```
┌─────────────────────────────┐
│        Date and time        │
├─────────────────────────────┤
│                             │
│          14 : 45 : 45       │
│         20 / 07  / 11       │
├─────────────────────────────┤
│           Update            │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

To edit the value press **OK**. Select the value that you want to modify.
Press the **OK** key to enter Edit Mode. Use the **UP** and **DOWN** keys to modify value. Confirm with the **OK** key.
Select 'Update' and press **OK** to update the clock.

```
┌─────────────────────────────┐
│        Date and time        │
├─────────────────────────────┤
│                             │
│          16 : 50 : 56       │
│         20 / 07  / 11       │
├─────────────────────────────┤
│           Update            │
├─────────────────────────────┤
│                             │
└─────────────────────────────┘
```

## 7.4. Remote interface

| EVP |
| --- |
| Language: 0 ↳↴ |
| HMI sel: Network |
| COM setting |
| HMI Management |

### 7.4.1. Language

This section is for setting the language of the remote menu, defined from the **FREE Stu**d**io Plus** User Interface.
The number of languages and the order are established by the corresponding application/menu.
See parameter HMI Management/**Hmi_Language**.

### 7.4.2. ↳↴

To return to the menu of the controller application, move the cursor onto the ↳↴ symbol and press the **OK** key.
See .

### 7.4.3. HMI sel

This section is for setting the menu to be shown on the display.
By default HMI menus are NOT present (only the DIAGNOSTICS menu is available).
**Network**: this is the **FREE Panel** 'local' menu (local HMI).
**rem1…rem10**: menus located on max 10 **FREE Evolution** devices connected to the network that can be 'uploaded' to **FREE Panel**.

| EVP | | EVP | | EVP |
| --- | --- | --- | --- | --- |
| | | | | |
| HMI sel: Network | → | HMI sel: rem1 | ... | HMI sel: rem10 |
| | | | ← | |
| | | | | |
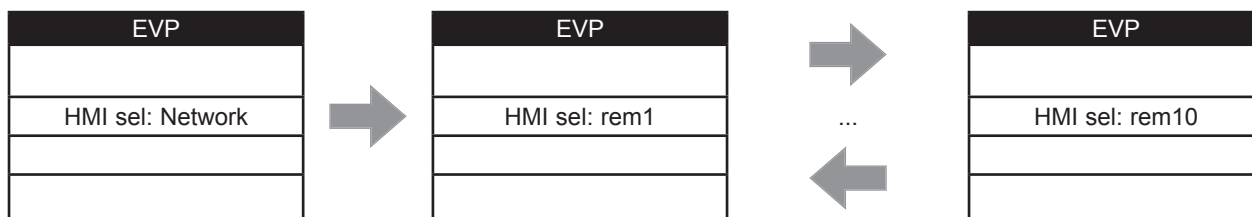
To move from one page to the next press the **UP** and **DOWN** keys.
After selecting the desired menu move the cursor onto ↳↴ to view the menu

| Launch remote page |
| --- |
| |
| Please Wait |
| |
| |

If OK the display will show the selected menu (controller application).
If the menu is not present, the following screen appears

| Warning |
| --- |
| Upload failed |
| |
| Press OK |
| |

### 7.4.4. COM Setting

This **read-only** page shows the configuration of the **FREE Panel** serial ports.

| FREE Panel |
|---|
| CAN : 1 . 500000 |
| 485s : 1 . 38400.P81 |
| ETH : 010.000.000.100 |
| |

### 7.4.5. HMI Management

This page shows the configuration of the 10 remote pages.

| EVP 1/10 | | EVP 1/10 | | EVP 10/10 |
|---|---|---|---|---|
| File: HMIREM.KBD | ⌐⌐ | | ⌐⌐ | | ⌐⌐ |
| Id: 0 | ⊟⌐ | Id: 0 | ⊟⌐ ... | Id: 0 | ⊟⌐ |
| Com: CAN | | Com: CAN | | Com: CAN |
| Addr: 125 | | Addr: 000 | | Addr: 000 |

From these pages it is possible to 'launch' (run) the corresponding menu – if present
Move the cursor onto ⌐⌐ and press the **OK** key.

It will not be possible to launch the local (network) menu from this section.
In the example only one remote page is present.

To 'upload' a remote page use ⊟⌐.

After selecting the desired menu move the cursor onto ⌐⌐ to view the menu.

| Upload remote page |
|---|
| Upload page? |
| The process cannot be interrupted |
| |
| Cancel          OK |

Press **OK** to upload or any other key to cancel

| Upload remote page |
|---|
| Uploading... |
| ■■■■■■■■□□ |
| 80% |
| |

The upload may take up to a minute.

If there are no data to upload, the following screen displays

| Warning |
|---|
| There are no remote |
| pages on the card |
| |
| Press OK |

# CHAPTER 8

# Physical I/O and ports configuration

From time to time, new input modules, output modules or other devices are made available that are not documented in the following information. For information on new devices, contact your local Eliwell representative.

---

## NOTICE

**INOPERABLE EQUIPMENT**

Update the controller firmware to the latest version every time you install a newly released Input/Output expansion module or other device to this equipment.

**Failure to follow these instructions can result in equipment damage.**

---

**NOTE**: For more information on how to update the controller firmware, contact your local Eliwell representative.

|  | FREE Evolution | FREE Panel |
|---|---|---|
| **Analog inputs** | Configurable by parameter (see **8.1.1. Analog inputs configuration for FREE Evolution on page 89**) | Configurable by parameter (see **8.1.2. Analog inputs configuration for EVE4200 on page 90**) |
| **Analog outputs** | Configurable by parameter (see **"8.2. Analog outputs configuration for FREE Evolution"**) | - |
| **Digital inputs** | Configurable by parameter (see **8.3. Digital inputs configuration for FREE Evolution on page 93**) | - |
| **Digital outputs** | Configurable by parameter (see **8.4. Digital outputs configuration for FREE Evolution on page 94**) | - |
| **Serials** | Configurable by parameter (see **9.1.1. EVD / EVC / EVE7500 parameters on page 105**) or dip-switch (see **8.5. Ports configuration for FREE Evolution using DipSwitch on page 94**) | Configurable by parameter (see **9.1.2. EVE4200 parameters on page 116**) |

Applying incorrect current or voltage levels on analog inputs and outputs could damage the electronic circuitry. Further, connecting a current input device to an analog input configure for voltage, and vice-versa, will likewise damage the electronic circuitry.

---

## NOTICE

**INOPERABLE EQUIPMENT**

- Do not apply voltages above 11 Vdc to the analog inputs of the controller or Input/Output expansion module when analog input is configured as 0-10V input.
- Do not apply current above 30 mA to the analog inputs of the controller or Input/Output expansion module when analog input is configured as 0-20 mA or 4-20 mA input.
- Do not mismatch applied signal with analog input configuration.

**Failure to follow these instructions can result in equipment damage.**

---

## 8.1. Analog inputs

**FREE Evolution** and **FREE Panel** have analog inputs.

### 8.1.1. Analog inputs configuration for FREE Evolution

There are a total of 6 analog inputs, referred to below as AI1…AI6.
Using the parameters, a physical resource (probe, digital input, voltage/current signal) can be configured for each type of input:

- 2 inputs can be configured as temperature probes (NTC type probe) or as digital inputs.

- 4 inputs (AI3…AI6) can be configured as temperature probes (NTC or Pt1000), as digital inputs or as a current/voltage input (4-20mA signal/ 0-10V, 0-5V ratiometric).

Inputs can be configured as specified in the table below.

| Parameter | Description | Value | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **Cfg_AI1** | Type of analog input AI1 | NTC probe (NK103) | Probe configured as voltage-free digital input | NTC probe (103AT) | - | - | - | - | - | - |
| **Cfg_AI2** | Type of analog input AI2 | NTC probe (NK103) | Probe configured as voltage-free digital input | NTC probe (103AT) | - | - | - | - | - | - |
| **Cfg_AI3** | Type of analog input AI3 | NTC probe (NK103) | Probe configured as voltage-free digital input | NTC probe (103AT) | 4-20 mA (1) | 0-10 V (1) | 0-5 V Ratiometric (1) | Pt1000 | hΩ (NTC) (2) | daΩ (Pt1000) (3) |
| **Cfg_AI4** | Type of analog input AI4 | NTC probe (NK103) | Probe configured as voltage-free digital input | NTC probe (103AT) | 4-20 mA | 0-10 V | 0-5 V Ratiometric | Pt1000 | hΩ (NTC) | daΩ (Pt1000) |
| **Cfg_AI5** | Type of analog input AI5 | NTC probe (NK103) | Probe configured as voltage-free digital input | NTC probe (103AT) | 4-20 mA | 0-10 V | 0-5 V Ratiometric | Pt1000 | hΩ (NTC) | daΩ (Pt1000) |
| **Cfg_AI6** | Type of analog input AI6 | NTC probe (NK103) | Probe configured as voltage-free digital input | NTC probe (103AT) | 4-20 mA | 0-10 V | 0-5 V Ratiometric | Pt1000 | hΩ (NTC) | daΩ (Pt1000) |

(1) **4-20 mA / 0-10V / 0-5 V ratiometric**

**Minimum full scale** AIx
- for current probe, value = 4 mA,
- for 0-10 V voltage probe, value = 0 V,
- for ratiometric probe (0÷5V), value = 10% (corresponding to 0.5 V)

**Maximum full scale** AIx
- for current probe, value = 20 mA,
- for 0-10V voltage probe, value = 10 V,
- for ratiometric probe (0÷5 V), value = 90% (corresponding to 4.5 V)

(2) Cfg_AIx = 7 Resistance value read, expressed in hΩ, for a resistance applied to the input using the controller in NTC configuration, i.e. **creating a divider with pull-up resistance of 10 kΩ**.

(3) Cfg_AIx = 8 Resistance value read, expressed in daΩ, for a resistance applied to the input using the controller in Pt1000 configuration, i.e. **creating a divider with pull-up resistance of 2 kΩ**.
Note: Typically used with potentiometer at input.
The resistance range for the hΩ (NTC) configuration is up to 150 K, and up to 30 K for the daΩ (Pt1000) configuration.

| Parameter | Range | Description |
|---|---|---|
| FullScaleMin_AI3 | -9999…+9999 | Analog input AI3 start of scale value |
| FullScaleMax_AI3 | -9999…+9999 | Analog input AI3 full scale value |
| FullScaleMin_AI4 | -9999…+9999 | Analog input AI4 start of scale value |
| FullScaleMax_AI4 | -9999…+9999 | Analog input AI4 full scale value |
| FullScaleMin_AI5 | -9999…+9999 | Analog input AI5 start of scale value |
| FullScaleMax_AI5 | -9999…+9999 | Analog input AI5 full scale value |
| FullScaleMin_AI6 | -9999…+9999 | Analog input AI6 start of scale value |
| FullScaleMaxAI6 | -9999…+9999 | Analog input AI6 full scale value |

The values read by analog inputs can be configured via the following parameters:

| Parameter | Description | Measurement Unit | Range |
|---|---|---|---|
| Calibration_AI1 | Analog input AI1 differential | °C/10 or °F/10 | -180 ... 180 |
| Calibration_AI2 | Analog input AI2 differential | °C/10 or °F/10 | -180 ... 180 |
| Calibration_AI3 | Analog input AI3 differential | - | -1000 ... 1000 |
| Calibration_AI4 | Analog input AI4 differential | - | -1000 ... 1000 |
| Calibration_AI5 | Analog input AI5 differential | - | -1000 ... 1000 |
| Calibration_AI6 | Analog input AI6 differential | - | -1000 ... 1000 |

## 8.1.2. Analog inputs configuration for EVE4200

There are a total of 4 analog inputs, referred to below as AI1…AI4.
Using the parameters, a physical resource (probe, digital input, voltage/current signal) can be "physically" configured for each type of input
The inputs are configurable in pairs AI1, AI2 and AI3, AI4
Inputs can be "physically" configured as specified in the table below.

| Par | Description | Value | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Cfg_AIx<br><br>x=1...4 | Type of analog input AIx | NTC probe (NK103) | DI (1) | NTC probe (103AT) | 4-20 mA (2) | 0-10 V (2) | 0-5 V Ratiometric (2) | Pt1000 | hΩ (NTC) (3) | daΩ (Pt1000) (4) | PTC (KTY81) | 0-5 V |

(1) DI Input configured as voltage-free digital input

(2) **4-20 mA / 0-10 V / 0-5 V ratiometric**

**Minimum full scale** AIx
- for current probe, value = 4 mA,
- for 0-10V voltage probe, value = 0 V,
- for ratiometric probe (0÷5 V), value = 10% (corresponding to 0.5 V)

**Maximum full scale** AIx
- for current probe, value = 20 mA,
- for 0-10 V voltage probe, value = 10 V,
  for ratiometric probe (0÷5V), value = 90% (corresponding to 4.5 V)

(3) Cfg_AIx = 7 Resistance value read, expressed in hΩ, for a resistance applied to the input using the controller in NTC configuration, i.e. **creating a divider with pull-up resistance of 10 kΩ**.

(4) Cfg_AIx = 8 Resistance value read, expressed in daΩ, for a resistance applied to the input using the controller in Pt1000 configuration, i.e. **creating a divider with pull-up resistance of 2 kΩ**.
Note: Typically used with potentiometer at input.
The resistance range for the hΩ (NTC) configuration is up to 150 K, and up to 30 K for the daΩ( Pt1000) configuration.

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## Allowed configurations for analog inputs

The pairs (AI1, AI2) and (AI3, AI4) shall be configured as specified in the table below.

Cells compiled show correct combinations. Empty cells indicate incorrect combinations.
Applying incorrect configuration will produce 0x8003 error on probes range configuration

| | | Cfg_AI1 / Cfg_AI3 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Cfg_AI2 / Cfg_AI4 | 0 | NTC probe (NK103) | DI | NTC probe (103AT) | - | - | - | - | hΩ (NTC) | - | - | - |
| | 1 | NTC probe (NK103) | DI | NTC probe (103AT) | - | - | - | - | hΩ (NTC) | - | - | - |
| | 2 | NTC probe (NK103) | DI | NTC probe (103AT) | - | - | - | - | hΩ (NTC) | - | - | - |
| | 3 | - | - | - | 4-20 mA | - | - | - | - | - | - | - |
| | 4 | - | - | - | - | 0-10 V | - | - | - | - | - | - |
| | 5 | - | - | - | - | - | 0-5 V Ratiometric | - | - | (Pt1000) | - | 0-5 V |
| | 6 | - | - | - | - | - | - | Pt1000 | - | daΩ (Pt1000) | - | - |
| | 7 | NTC probe (NK103) | DI | NTC probe (103AT) | - | - | - | - | hΩ (NTC) | - | PTC (KTY81) | - |
| | 8 | - | - | - | - | - | - | Pt1000 | - | daΩ (Pt1000) | PTC (KTY81) | - |
| | 9 | - | - | - | - | - | - | Pt1000 | - | daΩ (Pt1000) | PTC (KTY81) | - |
| | 10 | - | - | - | - | - | 0-5 V Ratiometric | - | - | - | - | 0-5 V |

## 8.1.3. Analog inputs configuration for FREE Panel

Inputs can be configured as specified in the table below.

| Parameter | Description | Values | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 |
| **Cfg_AI1** | Type of input analog AI1 | NTC probe (NK103) | Probe configured as voltage-free digital input | NTC probe (103AT-2) | - | - | - |
| **Cfg_AI2** | Type of input analog AI2 | NTC probe (NK103) | Probe configured as voltage-free digital input | NTC probe (103AT-2) | - | - | - |
| **Cfg_AI3** | Type of input analog AI3 | - | - | - | 4-20 mA | 0-10 V | 0-5 V |

| Parameter | Range | Description |
|---|---|---|
| **FullScaleMin_AI3** | -9999...+9999 | Analog input AI3 start of scale value |
| **FullScaleMax_AI3** | -9999...+9999 | Analog input AI3 full scale value |

The temperature and humidity measurement, as well as the corresponding precisions and tolerances, refer to the application point of the probes inside the equipment.

If these same measurements are to be referred to air conditions outside of the equipment, for example ambient measurements, account must be taken of offset (differential) parameters that depend on the installation and usage conditions of the equipment itself. The differentials for example **Calibration** parameters that can be set are:

| Parameter | Description | Unit of measure | Range |
|---|---|---|---|
| **Calibration_AI1** | Analog input AI1 differential | °C/10 or °F/10 | -180 ... 180 |
| **Calibration_AI2** | Analog input AI2 differential | °C/10 or °F/10 | -180 ... 180 |
| **Calibration_AI3** | Analog input AI3 differential | - | -1000 ... 1000 |
| **Calibration_AI4** | Analog input AI4 differential | - | -1000 ... 1000 |

For on-board (built-in) sensors, **Compensation** parameters are also available

| Parameter | Description | Unit of measure | Range |
|---|---|---|---|
| **Compensation_AI1** | **Internal compensation AI1** difference between external air temperature and measurement read by NTC sensor AI1 | °C/10 or °F/10 | -1000 ... 1000 |
| **Compensation_AI4** | **Internal compensation AI4** difference between external temperature and T measurement read by RH sensor AI4 (this temperature is used to calculate the relative humidity based on psychrometric charts) | °C/10 or °F/10 | -1000 ... 1000 |

Default values for these offsets assume a typical installation with wall mounted backplate in a non-ventilated environment and with the display backlighting mainly OFF. In these conditions the following calibration values are obtained:

**Compensation_AI1** = -12.0 °C (10.4 °F)
**Compensation_AI4** = -10.5 °C (13.1 °F)

If the usage conditions require the backlight to be mainly ON, the values must be modified as follows:

**Compensation_AI1** = -15.0 °C (5.0 °F)
**Compensation_AI4** = -13.0 °C (8.6 °F)

**NOTE**: For other mounting conditions carry out **calibration** during installation, checking the temperature and relative humidity differences between the external air and the internal probes and if necessary correcting the parameters **Compensation_AI1 / Compensation_AI4**.
In any case it is possible to achieve a precision of ± 1°C on the temperature measurement and ± 3%RH on the relative humidity measurement.

## 8.2. Analog outputs configuration for FREE Evolution

See **CHAPTER 3 Electrical connections on page 24** for the number and type of analog outputs used and for information on the symbols used on labels supplied with the controller.
There are 5 analog outputs with the following characteristics:

### Configuration of analog output

| AO1/AO5 | | AO2 | AO3 | AO4 |
|---|---|---|---|---|
| Current/voltage output<br>AO1 and AO5 are configured in pairs. | | Current/voltage output | Current/voltage output | Current/voltage output |
| **Sub-mode configuration AO5<br>Only if AO1/AO5 have not<br>been configured as voltage outputs (value<br>≠2)** | | - | - | - |

Outputs AO1, AO2, AO3, AO4, AO5 are configurable as:

• 0 = 4-20mA current analog output

• 1 = output configured as 0…20mA switch (ON= max 20mA, OFF=0mA) for piloting switch loads such as ON/OFF.

• 2 = 0-10V voltage analog output.

**Outputs AO4, AO5 can be configured as Open Collector output**. Set:

• **Cfg_AO4** = 1 (ON/OFF type switching)

• **Cfg_AO1_AO5** = 0 or 1 (pair of outputs configured as current outputs)

• **SubCfg_AO5** = 1 (ON/OFF type switching)

• Analog value piloted for both outputs = 0.

**For developers using FREE Studio Plus**: see the sysAOasOC function (target block) in the **FREE Studio Plus** Application Library

## 8.3. Digital inputs configuration for FREE Evolution

There are 8 digital inputs, identified below as DI1…DI8. They are grouped as:

• DI1…DI4

• DI5…DI8

Each one has its own common contact.
Digital inputs can be used as pulse counters.
The length of the pulse (positive or negative) must be greater than 12ms.

There is also a fast, voltage-free digital input  (FDI) that also works as a pulse counter:

• It reads the number of times the contact applied to the input closes.

• It reads frequencies from 0.1 Hz to 1 kHz.

| Characteristic | Value | | |
|---|---|---|---|
| | **FDI: fast digital input** | | **DI1…DI8: regular inputs** |
| Type | Digital input | | |
| Working voltage | 0…3.3 Vdc<br>(internal supply) | 0…5 Vdc<br>connecting FDI to 5 Vout<br>using a 4700 Ohm resistor | 0…24 Vdc / 0…48 Vdc<br>0…24 Vac 50/60 Hz |
| Maximum frequency measurement | 200 Hz | 1000 Hz | - |
| Level 1 | +0…0.8 Vdc | | 20…24 Vdc / 20…48 Vdc<br>24 Vac 50/60 Hz |
| Level 0 | 2…3.3 Vdc | 2…5 Vdc | 0…4 Vdc<br>0…4 Vac 50/60 Hz |

## 8.4. Digital outputs configuration for FREE Evolution

See **CHAPTER 3 Electrical connections on page 24** for the number and capacity of relays and/or SSR depending on the reference, and for information on the symbols used on labels supplied with the controller.

- There are 7 high voltage outputs (relays) identified as DO1…DO7.

- In references **EVD7500/C/U/SSR** there are 5 high voltage outputs (relays) identified as DO1…DO3, DO6, DO7 whereas there are 2 SSR outputs identified as DO3…DO4.

## 8.5. Ports configuration for FREE Evolution using DipSwitch

Dipswitches are used for the configuration of serial ports, which can be On-Board (**OB**) or available via Communication module **EVS** modules (**PI**).

### 4-position lateral DipSwitch

There is a 4-position lateral DipSwitch (microswitch) in all **EVD**, **EVC** and **EVE expansion** references.
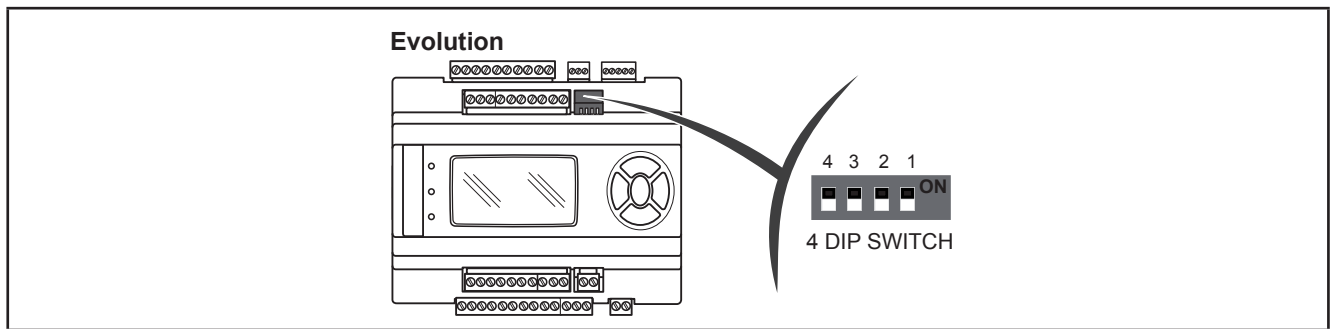


### 6 and 10-position DipSwitch

Under the front panel, **EVC** and **EVE expansion** references have:

- A 6-position DipSwitch (microswitch) (**SW2**)
- A 10-position DipSwitch (microswitch) (**SW1**)
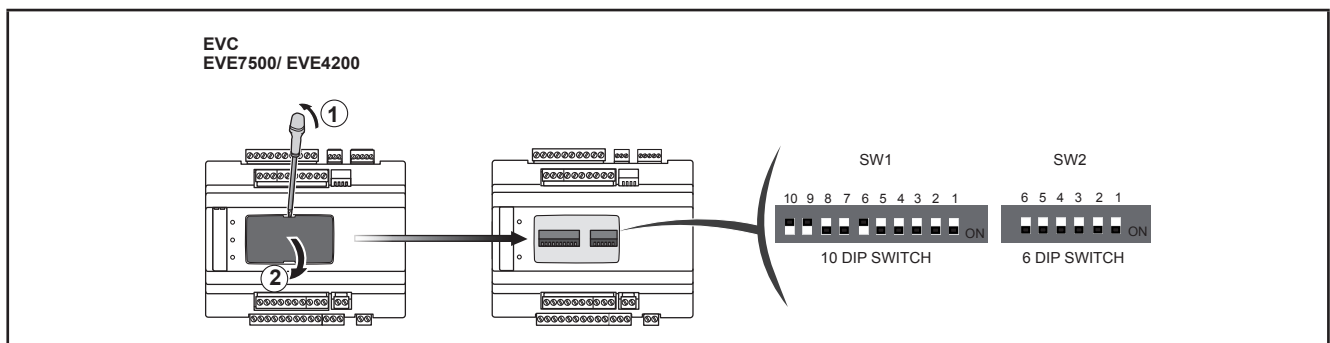


Remove the front panel with a fingernail, or the tip of a slot head screwdriver.
Configure as necessary then replace the front panel by pressing lightly back into place.

## 4-position DipSwitch compared to 6 and 10-position DipSwitch
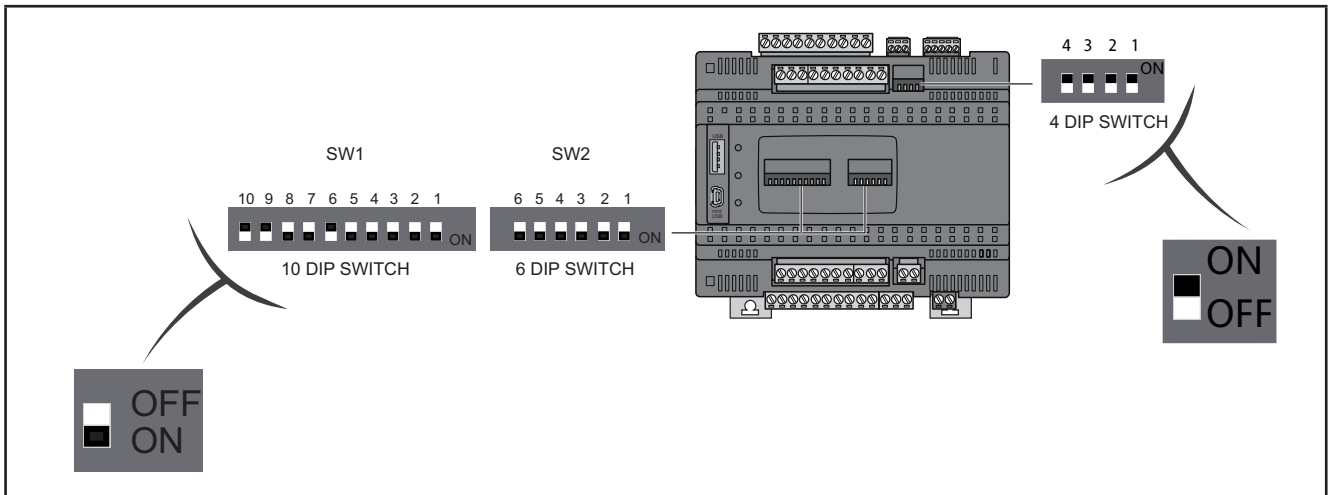


**NOTE.** OFF=0 / ON=1

## 8.5.1. EVD DipSwitch

### 4-position lateral DipSwitch

Used for serial addressing only.
The address is given by the sum of the value of a parameter (1) plus the value defined by the dipswitch (16 addresses).

| | | 4-position dip | | | |
|---|---|---|---|---|---|
| **Serial Addressing Default=0** | **Dip value** | **Dip4** | **3** | **2** | **1** |
|  | 0 | **0** | **0** | **0** | **0** |
| | 1 | **0** | **0** | **0** | **1** |
| | 2 | **0** | **0** | **1** | **0** |
| | 3 | **0** | **0** | **1** | **1** |
| | ... | **...** | **...** | **...** | **...** |
| | 15 | **1** | **1** | **1** | **1** |

| Address | | | |
|---|---|---|---|
| **Parameter** (1) | **Default Parameter** | | **LOW address**<br>**Default=0** |
| **Addr_RS485_OB** | 1 | | |
| **Addr_CAN_OB** | 1 | | |
| **Addr_RS485_PI** | 1 | + |  |
| **Addr_CAN_PI** | 1 | | |
| **Addr_RS232_PI** | 1 | | |
| **Ip_4_ETH_PI** | 100 | | |

## 8.5.2. EVC DipSwitch
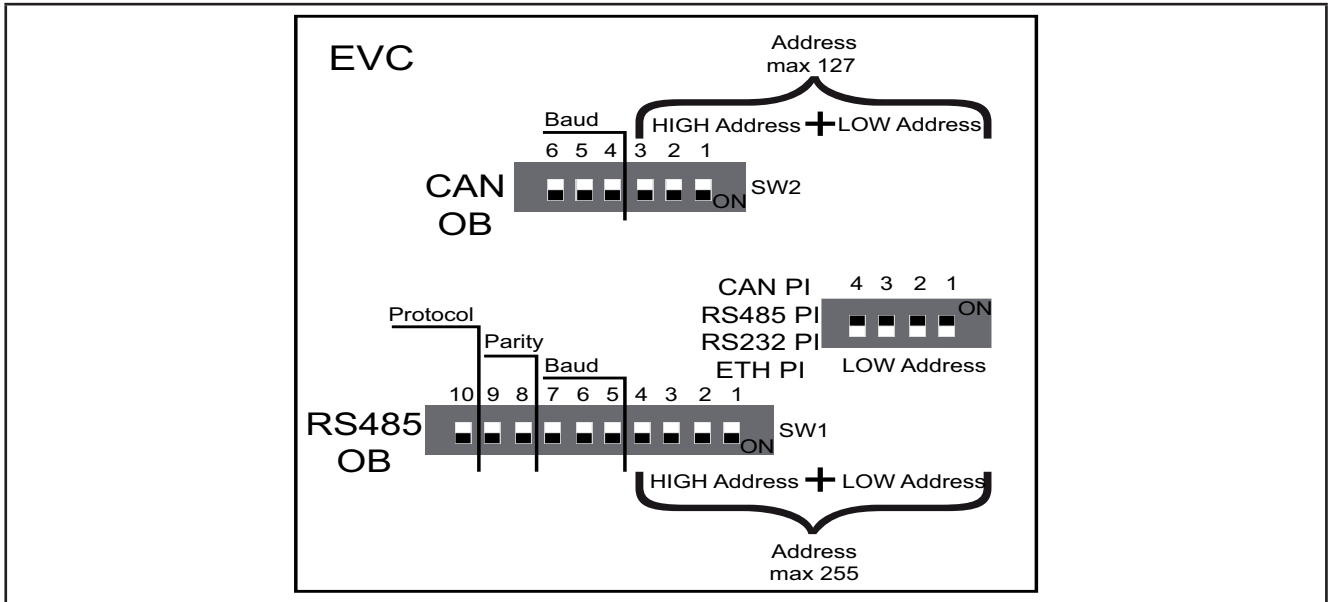


**Fig. 59.**   EVC Dipswitch

### Serial addressing

**4-position DipSwitch**
Used for the serial addressing of the Communication module port (PI) only.

**In the serial addressing of On-Board (OB) serial ports, the 4-position dip is not used for EVC.**

The address is given by the sum of the value of a parameter (1) plus the value defined by the dipswitch (16 addresses).

| Serial Addressing Default=0 | Dip value | 4-position dip | | | |
|---|---|---|---|---|---|
| | | Dip4 | 3 | 2 | 1 |
|  | 0 | 0 | 0 | 0 | 0 |
| | 1 | 0 | 0 | 0 | 1 |
| | 2 | 0 | 0 | 1 | 0 |
| | 3 | 0 | 0 | 1 | 1 |
| | ... | ... | ... | ... | ... |
| | 15 | 1 | 1 | 1 | 1 |

| Address | | | |
|---|---|---|---|
| Parameter (1) | Default Parameter | | LOW address Default=0 |
| Addr_RS485_PI | 1 | |  |
| Addr_CAN_PI | 1 | | |
| Addr_RS232_PI | 1 | + | |
| Ip_4_ETH_PI | 100 | | |

## Baud

**6-position EVC DipSwitch**

The actual CAN Baud rate comprises the sum of parameter **Baud_CAN_OB** plus the composite value of the 3-position dip-switches (8 values).

| CAN baud selection OB Default = 500 kbaud | Dip value | Dip6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| CAN  Baud 6 5 4 3 2 1 ■ ■ ■  ON SW2 | 0 | 0 | 0 | 0 | - | - | - |

| Actual CAN Baud Value Default = 500 kbaud | | Parameter Baud_CAN_OB | | CAN baud selection Default = 0 |
|---|---|---|---|---|
| 2=500k | | | | |
| 3=250k | | | | |
| 4=125k | = | Parameter Baud_CAN_OB | + | CAN  Baud 6 5 4 3 2 1 ■ ■ ■ ON SW2 |
| 5=125k | | | | |
| 6=50k | | | | |
| default example | | 2 | + | 0 |

## CAN OB serial addressing

**6-position dipswitch + 4-position dipswitch**

The addressing comprises the sum of parameter **Addr_CAN_OB** plus the composite value of the 6 and 4-position dipswitches (127 addresses).

| CAN OB serial addressing Default = 1 | Dip value | 6-position dip HIGH address | | | | | | 4-position dip LOW address | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Dip6 | 5 | 4 | 3 | 2 | 1 | Dip4 | 3 | 2 | 1 |
| CAN  Address max 127  HIGH Address + LOW Address  6 5 4 3 2 1  ■ ■ ■ ON SW2  4 3 2 1  ■ ■ ■ ■ ON  LOW Address | 0 | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 1 | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 2 | - | - | - | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | 3 | - | - | - | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 126 | - | - | - | 1 | 1 | 1 | 1 | 1 | 1 | 0 |

| Address | | |
|---|---|---|
| **Parameter** | | **HIGH+LOW address - Default = 0** |
| **Addr_CAN_OB** | + | CAN  Address max 127  HIGH Address + LOW Address  6 5 4 3 2 1  ■ ■ ■ ON SW2  4 3 2 1  ■ ■ ■ ■ ON  LOW Address |
| 1 | + | 0 |

## RS485 OB serial configuration

**10-position dipswitch**

| | | Dip value | Dip10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Protocol selection RS485 OB Default = 1** | RS485 OB — Protocol SW1 | 0 | **0** | - | - | - | - | - | - | - | - | - |
| | | 1 | **1** | - | - | - | - | - | - | - | - | - |
| **Parity selection RS485 OB Default = EVEN** | RS485 OB — Parity SW1 | 0 | - | **0** | **0** | - | - | - | - | - | - | - |
| | | 1 | - | **0** | **1** | - | - | - | - | - | - | - |
| | | 2 | - | **1** | **0** | - | - | - | - | - | - | - |
| **Baud selection RS485 OB Default = 38400 baud** | RS485 OB — Baud SW1 | 0 | - | - | - | **0** | **0** | **0** | - | - | - | - |
| | | 1 | - | - | - | **0** | **0** | **1** | - | - | - | - |
| | | 2 | - | - | - | **0** | **1** | **0** | - | - | - | - |
| | | 3 | - | - | - | **0** | **1** | **1** | - | - | - | - |
| | | 4 | - | - | - | **1** | **0** | **0** | - | - | - | - |
| | | 5 | - | - | - | **1** | **0** | **1** | - | - | - | - |

| Parameter | Default Parameter | | LOW address Default = 0 |
|---|---|---|---|
| **Proto_RS485_OB** | 2=Reserved<br>3= Modbus RTU | + | RS485 RS232 PI — Protocol SW1 |
| **Parity_RS485_OB** | 0= NULL<br>1= ODD<br>2= EVEN | + | RS485 OB — Parity SW1 |
| **Baud_RS485_OB** | 0=9600<br>1=19200<br>2=38400<br>3=57600<br>4=76800<br>5=115200 | + | RS485 OB — Baud SW1 |

## RS485 OB serial addressing

**10-position dipswitch + 4-position dipswitch**
The address is given by the sum of the value of the two 6 and 4-position dipswitches (255 addresses).

| Serial addressing RS485 OB Default = 1 | Dip value | 10-position dip HIGH address | | | | | 4-position dip LOW address | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Dip10...5 | 4 | 3 | 2 | 1 | Dip4 | 3 | 2 | 1 |
|  | 0 | - | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| | 1 | - | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| | 2 | - | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** |
| | 3 | - | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** |
| | ... | ... | **...** | **...** | **...** | **...** | **...** | **...** | **...** | **...** |
| | 254 | - | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **0** |

| Address | | |
|---|---|---|
| **Parameter** | | **LOW address Default = 0** |
| **Addr_RS485_OB** | + |  |
| **1** | + | **0** |

**NOTE:** Any other combination of the dipswitches not listed here is not permitted.

To summarize, in the case of **EVC**, the default configuration for all dipswitches is as follows:

## EVC DipSwitch default configuration
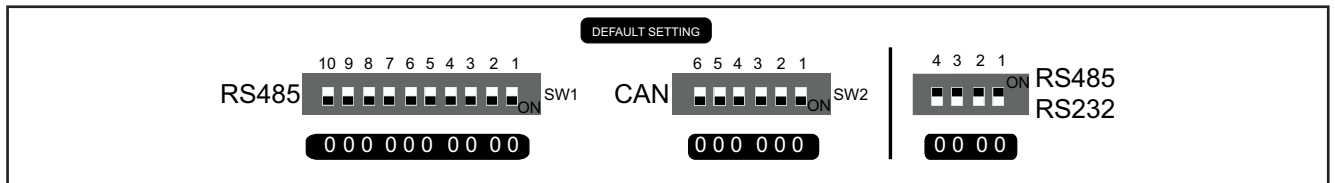


**Fig. 60.** Default setting

## RS232 OB configuration and serial addressing

**6 and 10-position dipswitches are not used.**
See **CHAPTER 9 Parameters on page 103**.

## 8.5.3. EVE7500 expansion DipSwitch

**EVE7500** expansion serials are configured by configuring dipswitches, without using the "internal" parameters visible in the **CHAPTER 9 Parameters on page 103**.
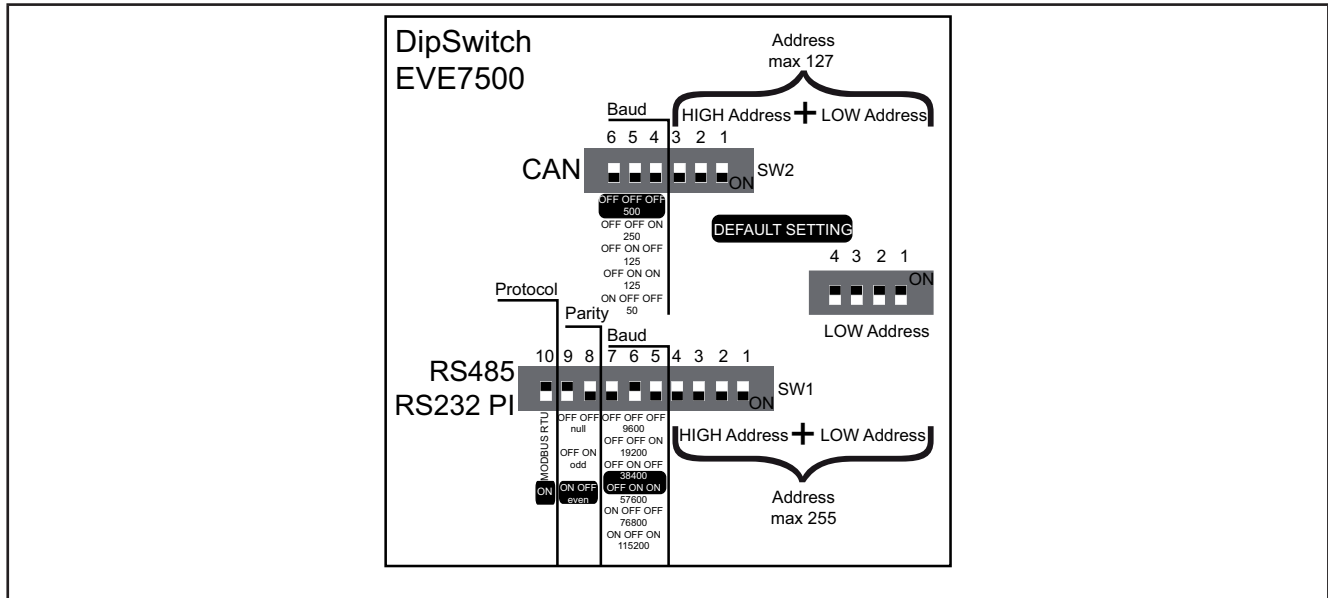


**Fig. 61.**  Dipswitch EVE7500

### Baud

**6-position EVE7500 dipswitch**

| CAN baud selection OB and PI Default = 500 kbaud | kBaud | Dip value | Dip6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
|  | 500 | 0 | **0** | **0** | **0** | - | - | - |
| | 250 | 1 | **0** | **0** | **1** | - | - | - |
| | 125 | 2 | **0** | **1** | **0** | - | - | - |
| | 125 | 3 | **0** | **1** | **1** | - | - | - |
| | 50 | 4 | **1** | **0** | **0** | - | - | - |

### CAN OB and PI serial addressing

**6-position dipswitch + 4-position EVE7500 dipswitch**
The address is given by the value of the 6 and 4-position dipswitches (127 addresses).

| CAN serial addressing OB and PI Default = 1 | Address | Dip value | 6-position dip HIGH address | | | | | | 4-position dip LOW address | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dip6 | 5 | 4 | 3 | 2 | 1 | Dip4 | 3 | 2 | 1 |
|  | 1 | 0 | - | - | - | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| | 2 | 1 | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 3 | 2 | - | - | - | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | 4 | 3 | - | - | - | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| | 127 | 126 | - | - | - | 1 | 1 | 1 | 1 | 1 | 1 | 0 |

## RS232 PI and RS485 OB serial configuration

**10-position dipswitch**

| | | Protocol | Dip value | Dip10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Protocol selection RS232 PI / RS485 OB Default = 1** | RS485 / RS232 PI — Protocol — SW1 | Reserved for **Eliwell** use | 0 | **0** | - | - | - | - | - | - | - | - | - |
| | | ModBus RTU | 1 | **1** | - | - | - | - | - | - | - | - | - |
| **Parity selection RS232 PI / RS485 OB Default = EVEN** | RS485 / RS232 PI — Parity — SW1 | Null | 0 | - | **0** | **0** | - | - | - | - | - | - | - |
| | | Odd | 1 | - | **0** | **1** | - | - | - | - | - | - | - |
| | | Even Even | 2 | - | **1** | **0** | - | - | - | - | - | - | - |
| **Baud selection RS232 PI / RS485 OB Default = 38400 baud** | RS485 / RS232 PI — Baud — SW1 | 9600 | 0 | - | - | - | **0** | **0** | **0** | - | - | - | - |
| | | 19200 | 1 | - | - | - | **0** | **0** | **1** | - | - | - | - |
| | | 38400 | 2 | - | - | - | **0** | **1** | **0** | - | - | - | - |
| | | 57600 | 3 | - | - | - | **0** | **1** | **1** | - | - | - | - |
| | | 76800 | 4 | - | - | - | **1** | **0** | **0** | - | - | - | - |
| | | 115200 | 5 | - | - | - | **1** | **0** | **1** | - | - | - | - |

## RS485 OB and PI serial addressing

**10-position dipswitch + 4-position dipswitch**
The address is given by the sum of the value of the two 6 and 4-position dipswitches (255 addresses).

| | | | 10-position dip HIGH address | | | | | 4-position dip LOW address | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CAN serial addressing OB and PI Default = 1** | **Address** | **Dip value** | **Dip10...5** | **4** | **3** | **2** | **1** | **Dip4** | **3** | **2** | **1** |
| RS485 / RS232 PI — HIGH Address + LOW Address — Address max 255 | 1 | 0 | - | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| | 2 | 1 | - | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |
| | 3 | 2 | - | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** |
| | 4 | 3 | - | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** |
| | … | … | … | … | … | … | … | … | … | … | … |
| | 255 | 254 | - | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **0** |

**NOTE:** Any other combination of the dipswitches not listed here is not permitted.

To summarize, in the case of **EVE7500**, the default configuration for the dipswitches is as follows:

## EVE7500 DipSwitch default configuration



**DEFAULT SETTING**

RS485 — SW1 — 0 1 0 0 1 0 0 0 0 0
CAN — SW2 — 0 0 0 0 0 0
RS485 / RS232 — 0 0 0 0
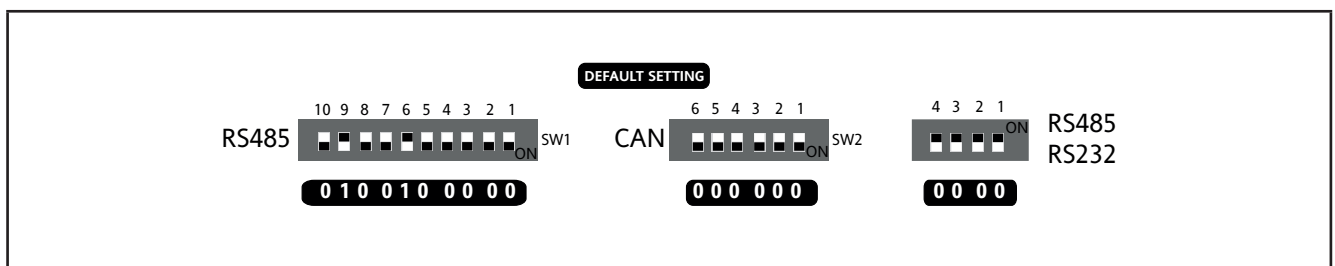
**Fig. 62.** Default setting

## 8.5.4. EVE4200 expansion DipSwitch
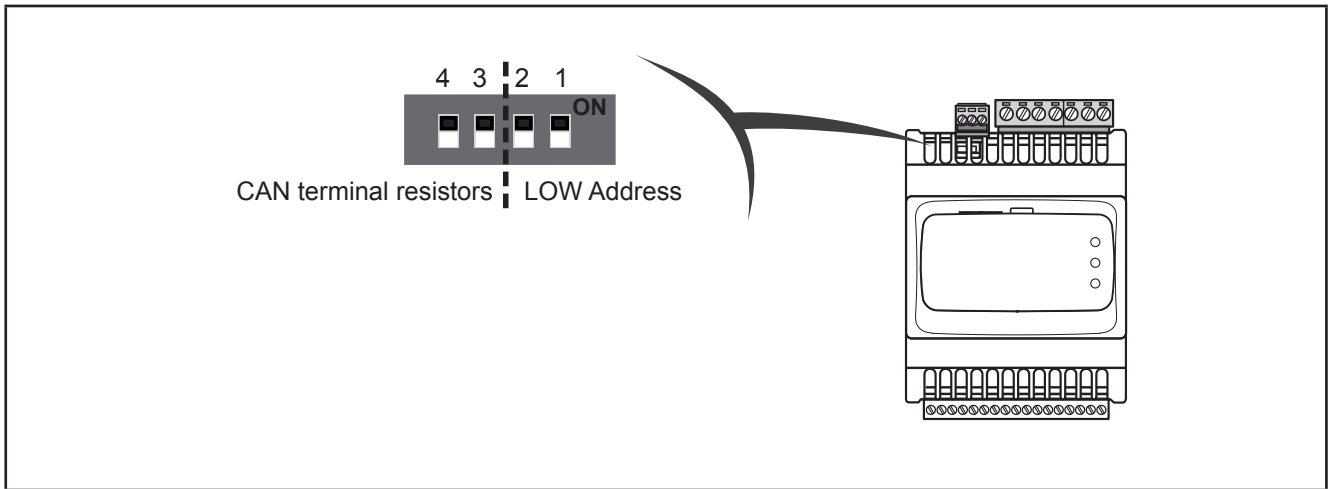


**Fig. 63.**   4-position lateral DipSwitch

Used for:
- serial addressing (dip 1 and 2)
- line termination (dip 3 and 4)

| Serial Addressing | Address = DipValue+1 | Dip value | 4-position dip | | | |
|---|---|---|---|---|---|---|
| | | | Dip4 | 3 | 2 | 1 |
|  CAN terminal resistors / LOW Address | 1 | 0 | - | - | 0 | 0 |
| | 2 | 1 | - | - | 0 | 1 |
| | 3 | 2 | - | - | 1 | 0 |
| | 4 | 3 | - | - | 1 | 1 |
| | Dip value (**Address**) | Dip value (**Address**) | Dip4 | 3 | 2 | 1 |
| | 120 Ω termination | 120 Ω termination | 1 | 1 | - | - |

### CAN OB serial addressing

The addressing comprises the sum of parameter **Addr_CAN_OB** plus the composite value of the 4-position dipswitches (only dip 1 and 2).

| Actual CAN Adresss Default = 1 | | Parameter Addr_CAN_OB Default = 1 | | CAN address selection Default = 0 |
|---|---|---|---|---|
| 1 | = | **Parameter Baud_CAN_OB** | + |  CAN terminal resistors / LOW Address |
| 2 | | | | |
| ... | | | | |
| ... | | | | |
| 127 max | | | | |
| default example | | **1** | + | **0** |

### Baud

Baud rate is set by **Baud_CAN_OB** parameter

### Line Termination resistors

Dip4 and Dip3 both = 1 connects L/H CAN lines to 120 Ω termination

# CHAPTER 9

## Parameters

User-parameterization renders the **FREE Evolution** configurable.
Parameters can be changed using:

- Keys on the **EVD** / **EVP** front panel or remote **EVK1000** panel.

- PC and **FREE Stu**d**io Plus** software.

The following sections provide a detailed analysis of each parameter, divided into categories (folders).

For **FREE Evolution**, the parameter table shows the configuration parameters for the controller saved in the non-volatile memory.
For **FREE Panel**, the parameter table contains the device configuration parameters available in **FREE Stu**d**io Plus** Device and in the DIAGNOSTICS (DIA) / BIOS Parameters menu.

### Modbus commands available and data areas

The following commands are implemented:

| Modbus command | Description of command |
|:---:|:---:|
| 3 (**0x03**) | Read multiple registers on Client side |
| 6 (**0x06**) | Write single register on Client side |
| 16 (**0x10**) | Write multiple registers on Client side |
| 43 (**0x2B**) | Read device ID:<br>• Manufacturer ID<br>• Model ID<br>• Version ID |

**NOTE**
- Command **6 (0x06)** not supported by **EVE7500 expansion**
- Command **15 (0x0F)** 'Write multiple coils on Client side', supported only by **EVE7500 expansion**
- **FREE Evolution / Panel logic controllers** configured as Modbus Master support also commands 1, 2, 4 and 15 up to 16 registers.

## 9.1.  FREE Evolution parameter table

This table presents the column headers of the parameter table that follows.

| Column | Description |
|---|---|
| **LABEL** | Indicates the label used to display the parameters in the menu of the controller. |
| **PAR. VALUE ADDRESS** | Indicates the address of the modbus register containing the resource to be accessed. |
| **DATA TYPE** | Indicates the type of the data as indicated in EcoStuxure Machine Expert HVAC Installer. |
| **CPL** | Indicates the register value conversion.<br>To carry out the conversion, proceed as follows:<br>• If the value in the register is between 0 and 32767, the result is the value itself (zero and positive values)<br>• If the value in the register is between 32768 and 65535, the result is the value of the register minus 65536 (negative values)<br>• When the field indicates "-1", the value read by the register requires conversion, because the value represents a number with a sign. |
| **RESET** | Indicates whether the controller MUST be rebooted after the parameter has been modified.<br>• Y = YES the controller MUST be rebooted to modify the parameter.<br>• Empty " " = NO the controller does not need to be rebooted to modify the parameter |
| **RANGE** | Describes the interval of values that can be assigned to the parameter. It can be correlated with other equipment parameters (indicated in the parameter label). |
| **DEFAULT** | Indicates the factory setting for the reference. |
| **U.M.** | Indicates the unit of measurement for values converted according to the rules indicated in the CPL column<br>The unit of measurement shown is for example purposes only, as it may change depending on the application (for example parameters with a U.M. in °C/bar could also have %RH) |

## 9.1.1. EVD / EVC / EVE7500 parameters

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **ACKNOWLEDGEMENT folder** | | | | | | | | |
| **Par_TAB** | **15716** | UINT | - | Y | **Map code**<br>Note: read/write parameter | 0 … 65535 | 0 | num |
| **Par_POLI** | **15717** | UINT | - | Y | **Model Code**<br>Note: read/write parameter | 0 … 65535 | 2049 | num |
| **Par_PARMOD** | **15719** | BOOL | - | - | **Parameter modified**<br>Flag indicating change to default settings.<br>• 0= map not modified.<br>• 1= at least one parameter has been modified with respect to the original configuration. | 0 … 1 | 0 | num |
| **AI CALIBRATION folder** | | | | | | | | |
| **Gain_Ntc_AI1** | **15616** | UINT | - | - | **Ai1 NTC calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Ntc_AI2** | **15617** | UINT | - | - | **Ai2 NTC calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Ntc_AI3** | **15618** | UINT | - | - | **Ai3 NTC calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Pt1000_AI3** | **15619** | UINT | - | - | **Ai3 Pt1000 calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_5V_AI3** | **15620** | UINT | - | - | **Ai3 0-5V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_10V_AI3** | **15621** | UINT | - | - | **Ai3 0-10V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_mA_AI3** | **15622** | UINT | - | - | **Ai3 4-20mA calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Ntc_AI4** | **15623** | UINT | - | - | **Ai4 NTC calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Pt1000_AI4** | **15624** | UINT | - | - | **Ai4 Pt1000 calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_5V_AI4** | **15625** | UINT | - | - | **Ai4 0-5V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_10V_AI4** | **15626** | UINT | - | - | **Ai4 0-10V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_mA_AI4** | **15627** | UINT | - | - | **Ai4 4-20mA calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Ntc_AI5** | **15628** | UINT | - | - | **Ai5 NTC calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Pt1000_AI5** | **15629** | UINT | - | - | **Ai5 Pt1000 calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_5V_AI5** | **15630** | UINT | - | - | **Ai5 0-5V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_10V_AI5** | **15631** | UINT | - | - | **Ai5 0-10V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_mA_AI5** | **15632** | UINT | - | - | **Ai5 4-20mA calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Ntc_AI6** | **15633** | UINT | - | - | **Ai6 NTC calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Pt1000_AI6** | **15634** | UINT | - | - | **Ai6 Pt1000 calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_5V_AI6** | **15635** | UINT | - | - | **Ai6 0-5V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_10V_AI6** | **15636** | UINT | - | - | **Ai6 0-10V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_mA_AI6** | **15637** | UINT | - | - | **Ai6 0-10mA calibration gain** | 0 … 65535 | 32768 | num |
| **Offs_Ntc_AI1** | **15650** | INT | -1 | - | **Ai1 NTC calibration offset** | -32768 … 32767 | 0 | num |
| **Offs_Ntc_AI2** | **15651** | INT | -1 | - | **Ai2 NTC calibration offset** | -32768 … 32767 | 0 | num |
| **Offs_Ntc_AI3** | **15652** | INT | -1 | - | **Ai3 NTC calibration offset** | -32768 … 32767 | 0 | num |
| **Offs_Pt1000_AI3** | **15653** | INT | -1 | - | **Ai3 Pt1000 calibration offset** | -32768 … 32767 | 0 | num |

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Offs_5V_AI3 | 15654 | INT | -1 | - | Ai3 0-5V calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AI3 | 15655 | INT | -1 | - | Ai3 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AI3 | 15656 | INT | -1 | - | Ai3 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_Ntc_AI4 | 15657 | INT | -1 | - | Ai4 NTC calibration offset | -32768 … 32767 | 0 | num |
| Offs_Pt1000_AI4 | 15658 | INT | -1 | - | Ai4 Pt1000 calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_AI4 | 15659 | INT | -1 | - | Ai4 0-5V calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AI4 | 15660 | INT | -1 | - | Ai4 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AI4 | 15661 | INT | -1 | - | Ai4 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_Ntc_AI5 | 15662 | INT | -1 | - | Ai5 NTC calibration offset | -32768 … 32767 | 0 | num |
| Offs_Pt1000_AI5 | 15663 | INT | -1 | - | Ai5 Pt1000 calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_AI5 | 15664 | INT | -1 | - | Ai5 0-5V calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AI5 | 15665 | INT | -1 | - | Ai5 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AI5 | 15666 | INT | -1 | - | Ai5 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_Ntc_AI6 | 15667 | INT | -1 | - | Ai6 NTC calibration offset | -32768 … 32767 | 0 | num |
| Offs_Pt1000_AI6 | 15668 | INT | -1 | - | Ai6 Pt1000 calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_AI6 | 15669 | INT | -1 | - | Ai6 0-5V calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AI6 | 15670 | INT | -1 | - | Ai6 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AI6 | 15671 | INT | -1 | - | Ai6 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| **AO CALIBRATION folder** | | | | | | | | |
| Gain_10V_AO1 | 15684 | UINT | - | - | AO1 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Gain_mA_AO1 | 15685 | UINT | - | - | AO1 4-20mA calibration gain | 0 … 65535 | 32768 | num |
| Gain_10V_AO2 | 15686 | UINT | - | - | AO2 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Gain_mA_AO2 | 15687 | UINT | - | - | AO2 4-20mA calibration gain | 0 … 65535 | 32768 | num |
| Gain_10V_AO3 | 15688 | UINT | - | - | AO3 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Gain_mA_AO3 | 15689 | UINT | - | - | AO3 4-20mA calibration gain | 0 … 65535 | 32768 | num |
| Gain_10V_AO4 | 15690 | UINT | - | - | AO4 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Gain_mA_AO4 | 15691 | UINT | - | - | AO4 4-20mA calibration gain | 0 … 65535 | 32768 | num |
| Gain_10V_AO5 | 15692 | UINT | - | - | AO5 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Gain_mA_AO5 | 15693 | UINT | - | - | AO5 4-20mA calibration gain | 0 … 65535 | 32768 | num |
| Offs_10V_AO1 | 15700 | UINT | -1 | - | AO1 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AO1 | 15701 | UINT | -1 | - | AO1 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AO2 | 15702 | UINT | -1 | - | AO2 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AO2 | 15703 | UINT | -1 | - | AO2 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AO3 | 15704 | UINT | -1 | - | AO3 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AO3 | 15705 | UINT | -1 | - | AO3 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AO4 | 15706 | UINT | -1 | - | AO4 0-10V calibration offset | -32768 … 32767 | 0 | num |

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Offs_mA_AO4 | 15707 | UINT | -1 | - | **AO4 4-20mA calibration offset** | -32768 … 32767 | 0 | num |
| Offs_10V_AO5 | 15708 | UINT | -1 | - | **AO5 0-10V calibration offset** | -32768 … 32767 | 0 | num |
| Offs_mA_AO5 | 15709 | UINT | -1 | - | **AO5 4-20mA calibration offset** | -32768 … 32767 | 0 | num |
| **ANALOG INPUTS folder** | | | | | | | | |
| Temp_UM | 15725 | UINT | - | Y | **Temperature unit of measurement**<br>• 0 = °C;<br>• 1 = °F | 0, 1 | 0 | num |
| Cfg_Ai1 | 15726 | UINT | - | - | **Type of analog input  Ai1**<br>• 0= NTC (NK103)<br>• 1= DI<br>• 2= NTC (103AT) | 0 ... 2 | 2 | num |
| Cfg_Ai2 | 15727 | UINT | - | - | **Type of analog input Ai2**<br>See Cfg_Ai1 | 0 ... 2 | 2 | num |
| Cfg_Ai3 | 15728 | UINT | - | - | **Type of analog input Ai3**<br>• 0= NTC (NK103)<br>• 1= DI<br>• 2= NTC (103AT)<br>• 3 = 4…20mA<br>• 4=0-10V<br>• 5=0-5V<br>• 6=Pt1000<br>• 7=hΩ(NTC)<br>• 8=daΩ(Pt1000) | 0 ... 8 | 3 | num |
| Cfg_Ai4 | 15729 | UINT | - | - | **Type of analog input Ai4**<br>See Cfg_Ai3 | 0 ... 8 | 3 | num |
| Cfg_Ai5 | 15730 | UINT | - | - | **Type of analog input Ai5**<br>See Cfg_Ai3 | 0 ... 8 | 3 | num |

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Cfg_Ai6 | 15731 | UINT | - | - | **Type of analog input Ai6**<br>See Cfg_Ai3 | 0 ... 8 | 3 | num |
| FullScaleMin_Ai3 | 15736 | UINT | -1 | - | **Analog input Ai3 start of scale value**<br>Note: Minimum full scale: for current probes, value at 4mA, for 0-10V voltage probes, value at 0V, for ratiometric probes (0-5V), value at 10% (corresponding to 0.5V). | -9999…+9999 | 0 | |
| FullScaleMax_Ai3 | 15737 | UINT | - | - | **Analog input Ai3 full scale value**<br>Note: Maximum full scale for current probes, value at 20mA, for 0-10V voltage probes, value at 10V, for ratiometric probes (0-5V), value at 90% (corresponding to 4.5V). | -9999…+9999 | 1000 | |
| FullScaleMin_Ai4 | 15738 | UINT | -1 | - | **Analog input Ai4 start of scale value**<br>See FullScaleMin_Ai3 | -9999…+9999 | 0 | |
| FullScaleMax_Ai4 | 15739 | UINT | - | - | **Analog input Ai4 full scale value**<br>See FullScaleMAx_Ai3 | -9999…+9999 | 1000 | |
| FullScaleMin_Ai5 | 15740 | UINT | -1 | - | **Analog input Ai5 start of scale value**<br>See FullScaleMin_Ai3 | -9999…+9999 | 0 | |
| FullScaleMax_Ai5 | 15741 | UINT | - | - | **Analog input Ai5 full scale value**<br>See FullScaleMax_Ai3 | -9999…+9999 | 1000 | |
| FullScaleMin_Ai6 | 15742 | UINT | -1 | - | **Analog input Ai6 start of scale value**<br>See FullScaleMin_Ai3 | -9999…+9999 | 0 | |
| FullScaleMaxAi6 | 15743 | UINT | - | - | **Analog input Ai6 full scale value**<br>See FullScaleMax_Ai3 | -9999…+9999 | 1000 | |
| Calibration_Ai1 | 15748 | UINT | -1 | - | **Analog input Ai1 differential** | -180 ... 180 | 0 | °C/10 or °F/10 |
| Calibration_Ai2 | 15749 | UINT | -1 | - | **Analog input Ai2 differential** | -180 ... 180 | 0 | °C/10 or °F/10 |
| Calibration_Ai3 | 15750 | UINT | -1 | - | **Analog input Ai3 differential** | -1000 ... 1000 | 0 | |
| Calibration_Ai4 | 15751 | UINT | -1 | - | **Analog input Ai4 differential** | -1000 ... 1000 | 0 | |
| Calibration_Ai5 | 15752 | UINT | -1 | - | **Analog input Ai5 differential** | -1000 ... 1000 | 0 | |
| Calibration_Ai6 | 15753 | UINT | -1 | - | **Analog input Ai6 differential** | -1000 ... 1000 | 0 | |

**ANALOG OUTPUTS V/I folder**

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **Cfg_AO1_AO5** | **15758** | enum | - | Y | **Type of analog output AO1/AO5** AO1 and AO5 are configured in pairs. See SubCfg_AO5<br>• 0 = 4-20mA current analog output<br>• 1 = ON/OFF output configured as 0/4…20mA switch (ON= max 20mA, OFF=0mA) for piloting switch loads such as ON/OFF.<br>• 2=0-10V analog output - voltage<br>**Note. AO4 and AO5 can be configured as Open Collector → A04=1, A01/A05=0 or 1, SubCfg_AO5=1** | 0 ... 2 | 0 | num |
| **Cfg_AO2** | **15759** | enum | - | Y | **Type of analog output AO2** See Cfg_ AO1_AO5 | 0 ... 2 | 0 | num |
| **Cfg_AO3** | **15760** | enum | - | Y | **Type of analog output AO3** See Cfg_ AO1_AO5 | 0 ... 2 | 0 | num |
| **Cfg_AO4** | **15761** | enum | - | Y | **Type of analog output AO4** | 0 ... 2 | 0 | num |
| **SubCfg_AO5** | **15762** | enum | - | Y | **Analog output AO5 sub-mode function** Only applies if **Cfg_AO1_AO5≠2**<br>• 0 = 4-20mA current analog output<br>• 1 = ON/OFF output configured as 0/4…20mA switch (ON= max 20mA, OFF=0mA) for piloting switch loads such as ON/OFF.<br>**Note. AO4 and AO5 can be configured as Open Collector → A04=1, A01/A05=0 or 1, SubCfg_AO5=1** | 0, 1 | 0 | num |

## EVD / EVC parameters

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **ON BOARD RS485 folder** | | | | | | | | |
| Addr_RS485_OB | 15774 | UINT | - | Y | **On-board RS485 serial address**<br>The actual address is determined by the sum of this value + the value of the dip switch. | 0 ... 255 | 1 | num |
| Proto_RS485_OB | 15775 | enum | - | Y | **On-board RS485 protocol selection**<br>• 2 = uNET<br>• 3 = Modbus/RTU | 2 ... 3 | 3 | num |
| Databit_RS485_OB | 15776 | UINT | - | Y | **On-board RS485 data bit number**<br>Fixed setting 8 | 8 ... 8 | 8 | num |
| Stopbit_RS485_OB | 15777 | UINT | - | Y | **On-board RS485 stop bit number**<br>1= 1 stop bit<br>2= 2 stop bit | 1... 2 | 1 | num |
| Parity_RS485_OB | 15778 | enum | - | Y | **On-board RS485 protocol parity** 0= NULL<br>• 1= ODD<br>• 2= EVEN | 0 ... 2 | 2 | num |
| Baud_RS485_OB | 15779 | enum | - | Y | **On-board RS485 protocol baudrate**<br>• 0=9600 baud<br>• 1=19200 baud<br>• 2=38400 baud<br>• 3=57600 baud<br>• 4=76800 baud<br>• 5=115200 baud | 0 ... 5 | 2 | num |
| **ON BOARD CAN folder** | | | | | | | | |
| Addr_CAN_OB | 15780 | UINT | - | Y | **On-board CAN serial address**<br>The actual address is determined by the sum of this value + the value of the dip switch. | 1 ... 127 | 1 | num |
| Baud_CAN_OB | 15781 | enum | - | Y | **On-board CAN protocol baudrate**<br>• 2=500 kbaud<br>• 3=250 kbaud<br>• 4=125 kbaud<br>• 5=125 kbaud<br>• 6=50 kbaud | 2 ... 6 | 2 | num |
| **CAN PLUGIN PASSIVE folder** | | | | | | | | |
| Addr_RS485_PI | 15782 | UINT | - | Y | **RS485 passive Communication module serial address**<br>The actual address is determined by the sum of this value + the value of the dip switch. | 0 … 255 | 1 | num |

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Proto_RS485_PI | 15783 | enum | - | Y | **RS485 passive Communication module protocol selection**<br>2 = uNET<br>3 = Modbus/RTU | 2 … 3 | 3 | num |
| Databit_RS485_PI | 15784 | UINT | - | Y | **RS485 passive Communication module data bit number**<br>Fixed setting 8 | 8 … 8 | 8 | num |
| Stopbit_RS485_PI | 15785 | UINT | - | Y | **RS485 passive Communication module stop bit number**<br>• 1= 1 stop bit<br>• 2= 2 stop bit | 1… 2 | 1 | num |
| Parity_RS485_PI | 15786 | enum | - | Y | **RS485 passive Communication module protocol parity**<br>0= NULL<br>1= ODD<br>2= EVEN | 0 … 2 | 2 | num |
| Baud_RS485_PI | 15787 | enum | - | Y | **RS485 passive Communication module protocol baudrate**<br>• 0=9600 baud<br>• 1=19200 baud<br>• 2=38400 baud<br>• 3=57600 baud<br>• 4=76800 baud<br>• 5=115200 baud | 0 … 5 | 2 | num |
| Addr_CAN_PI | 15788 | UINT | - | Y | **CAN passive Communication module serial address**<br>The actual address is determined by the sum of this value + the value of the dip switch. | 1 … 127 | 1 | num |
| Baud_CAN_PI | 15789 | enum | - | Y | **CAN passive Communication module protocol baudrate**<br>• 2=500 kbaud<br>• 3=250 kbaud<br>• 4=125 kbaud<br>• 5=125 kbaud<br>• 6=50 kbaud | 2 … 6 | 2 | num |
| **RS232 PASSIVE PLUG-IN folder** | | | | | | | | |
| Addr_ RS232_PI | 15790 | UINT | - | Y | **RS232 passive Communication module serial address**<br>The actual address is determined by the sum of this value + the value of the dip switch. | 0 ... 255 | 1 | num |

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Proto_ RS232_PI | 15791 | enum | - | Y | **RS232 passive Communication module protocol selection**<br>• 2 = uNET<br>• 3 = Modbus/RTU | 2 ... 3 | 3 | num |
| Databit_ RS232_PI | 15792 | UINT | - | Y | **RS232 passive Communication module data bit number**<br>• 7= 7 bit<br>• 8= 8 bit | 7 ... 8 | 8 | num |
| Stopbit_ RS232_PI | 15793 | UINT | - | Y | **RS232 passive Communication module stop bit number**<br>• 1= 1 stop bit<br>• 2= 2 stop bit | 1... 2 | 1 | num |
| Parity_ RS232_PI | 15784 | enum | - | Y | **RS232 passive Communication module protocol parity**<br>• 0= NULL<br>• 1= ODD<br>• 2= EVEN | 0 ... 2 | 2 | num |
| Baud_RS232_PI | 15795 | enum | - | Y | **RS232 passive Communication module protocol baudrate**<br>• 0=9600 baud<br>• 1=19200 baud<br>• 2=38400 baud<br>• 3=57600 baud<br>• 4=76800 baud<br>• 5=115200 baud | 0 ... 5 | 2 | num |

# PASSIVE ETHERNET COMMUNICATION MODULE

ETHERNET configuration parameters for passive Communication module require configuration of the TCP/IP communication port (for example 502), the IP address, the gateway and the subnet mask
The 'Default Gateway' and 'Net mask' parameters are of no significance in the local point-to-point network.
For connections via a router the 'Default Gateway' parameters must match the IP address, as in the following example:

| | | Value | | | Value |
|---|---|---|---|---|---|
| Ip_1_ETH_PI | Ethernet Passive Communication module IP address (part 1) | 192 | DefGtwy_1_ETH_PI | Default Gateway (part 1) | 192 |
| Ip_2_ETH_PI | Ethernet Passive Communication module IP address (part 2) | 168 | DefGtwy_2_ETH_PI | Default Gateway (part 2) | 168 |
| Ip_3_ETH_PI | Ethernet Passive Communication module IP address (part 3) | 0 | DefGtwy_3_ETH_PI | Default Gateway (part 3) | 0 |
| Ip_4_ETH_PI | Ethernet Passive Communication module IP address (part 4) | 100 | DefGtwy_4_ETH_PI | Default Gateway (part 4) | 1 |

The parameters necessary for the configuration of ports and protocols are these:

**FREE WEB** allows the use of HTTP and TFTP servers.

| Parameter | Description | Label |
|---|---|---|
| HTTP ports | **HTTP HyperText Transfer Protocol.** <br> An HTTP server generally monitors port 80 using TCP protocol. | **Port_HTTP_PI** |
| TFTP ports | **TFTP Trivial File Transfer Protocol.** <br> Protocol using basic FTP functionalities. Typical use: transfer of small files between hosts on a network. TFTP USES PORT 69 | **Port_TFTP_PI** |
| DHCP protocol | **DHCP Dynamic Host Configuration Protocol** | **EnableDHCP_ETH_PI** |
| DNS system | **DNS Domain Name System** <br> System for the conversion of host names, or network nodes, to IP addresses <br> Used by **FREE Studio Plus** to send text e-mails (strings) | **PriDNS_1_ETH_PI** |
| | | **PriDNS_2_ETH_PI** |
| | | **PriDNS_3_ETH_PI** |
| | | **PriDNS_4_ETH_PI** |
| | | **SecDNS_1_ETH_PI** |
| | | **SecDNS_2_ETH_PI** |
| | | **SecDNS_3_ETH_PI** |
| | | **SecDNS_4_ETH_PI** |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **ETHERNET PASSIVE PLUG-IN folder** | | | | | | | | |
| Port_TFTP_PI | 15772 | UINT | - | Y | **TFTP port**<br>TFTP communication Port number Default 0 corresponds to **port 69** | 0 … 65535 | 0 | num |
| Port_HTTP_PI | 15796 | UINT | - | Y | **HTTP port**<br>HTTP communication Port number Default 0 corresponds to **port 80** | 0 … 65535 | 0 | num |
| Port_ETH_PI | 15797 | UINT | - | Y | **Port**<br>TCP/IP Modbus communication port. Port 502 for example | 0 … 65535 | 502 | num |
| Ip_1_ETH_PI | 15798 | UINT | - | Y | **Ethernet passive Communication module IP address** (part 1) | 0 … 255 | 10 | num |
| Ip_2_ETH_PI | 15799 | UINT | - | Y | **Ethernet passive Communication module IP address** (part 2) | 0 … 255 | 0 | num |
| Ip_3_ETH_PI | 15800 | UINT | - | Y | **Ethernet passive Communication module IP address** (part 3) | 0 … 255 | 0 | num |
| Ip_4_ETH_PI | 15801 | UINT | - | Y | **Ethernet passive Communication module IP address** (part 4) | 0 … 255 | 100 | num |
| DefGtwy_1_ETH_PI | 15802 | UINT | - | Y | **Default Gateway (part 1)** | 0 … 255 | 192 | num |
| DefGtwy_2_ETH_PI | 15803 | UINT | - | Y | **Default Gateway (part 2)** | 0 … 255 | 168 | num |
| DefGtwy_3_ETH_PI | 15804 | UINT | - | Y | **Default Gateway (part 3)** | 0 … 255 | 0 | num |
| DefGtwy_4_ETH_PI | 15805 | UINT | - | Y | **Default Gateway (part 4)** | 0 … 255 | 1 | num |
| NetMsk_1_ETH_PI | 15806 | UINT | - | Y | **Net mask (part 1)** | 0 … 255 | 255 | num |
| NetMsk_2_ETH_PI | 15807 | UINT | - | Y | **Net mask (part 2)** | 0 … 255 | 255 | num |
| NetMsk_3_ETH_PI | 15808 | UINT | - | Y | **Net mask (part 3)** | 0 … 255 | 255 | num |
| NetMsk_4_ETH_PI | 15809 | UINT | - | Y | **Net mask (part 4)** | 0 … 255 | 0 | num |
| PriDNS_1_ETH_PI | 15810 | UINT | - | Y | **Primary DNS server (part 1)** | 0 … 255 | 194 | num |
| PriDNS_2_ETH_PI | 15811 | UINT | - | Y | **Primary DNS server (part 2)** | 0 … 255 | 25 | num |
| PriDNS_3_ETH_PI | 15812 | UINT | - | Y | **Primary DNS server (part 3)** | 0 … 255 | 2 | num |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| PriDNS_4_ ETH_PI | 15813 | UINT | - | Y | **Primary DNS server (part 4)** | 0 … 255 | 129 | num |
| SecDNS_1_ ETH_PI | 15814 | UINT | - | Y | **Secondary DNS server (part 1)** | 0 … 255 | 194 | num |
| SecDNS_2_ ETH_PI | 15815 | UINT | - | Y | **Secondary DNS server (part 2)** | 0 … 255 | 25 | num |
| SecDNS_3_ ETH_PI | 15816 | UINT | - | Y | **Secondary DNS server (part 3)** | 0 … 255 | 2 | num |
| SecDNS_4_ ETH_PI | 15817 | UINT | - | Y | **Secondary DNS server (part 4)** | 0 … 255 | 130 | num |
| EnableDHCP_ ETH_PI | 15819 | BOOL | - | Y | **Enable DHCP** | 0 … 1 (False, True) | False | flag |
| **Modems folder** | | | | | | | | |
| Modem_ RS232_PI | 15820 | BOOL | - | Y | **Presence of Modem** | 0 … 1 | 0 | num |
| Modem_InitStr1 | 15821 | STRING 19 BYTES | - | Y | **Modem initialization string (part I)** | ********** | (1) | string |
| Modem_InitStr2 | 15831 | STRING 19 BYTES | - | Y | **Modem initialization string (part II)** | ********** | | string |
| Modem_ Hangup | 15851 | STRING 19 BYTES | - | Y | **Hangup String** | ********** | ATH0 | string |
| **Display folder** | | | | | | | | |
| Hmi_Language | 15819 | UINT | - | Y | **Display language** | 0 … 65535 | 0 | num |
| Par_ContrLCD | 15723 | UINT | - | Y | **LCD Contrast** Allows adjustment of the LCD display contrast. | 0 ... 64 | 30 | num |
| Par_ BackLightTime | 15724 | UINT | - | Y | **Backlight switch-on time** Allows adjustment of LCD display switch-on time. | 0 ... 3600 | 10 | num |
| (1) AT&F&C&D2E0X1S0=0 | | | | | | | | |

## 9.1.2. EVE4200 parameters

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **ACKNOWLEDGEMENT folder** | | | | | | | | |
| Par_TAB | 15716 | UINT | - | Y | **Map code**<br>Note: read/write parameter | 0 … 65535 | 0 | num |
| Par_POLI | 15717 | UINT | - | Y | **Model Code**<br>Note: read/write parameter | 0 … 65535 | 2049 | num |
| Par_PCH | 15718 | UINT | - | - | **Model ID Code** | 0 … 65535 | 262 | num |
| **AI CALIBRATION folder** | | | | | | | | |
| Gain_Ntc_AI1 | 15616 | UINT | - | - | **Ai1 NTC calibration gain** | 0 … 65535 | 32768 | num |
| Gain_Ntc_AI2 | 15617 | UINT | - | - | **Ai2 NTC calibration gain** | 0 … 65535 | 32768 | num |
| Gain_Ntc_AI3 | 15618 | UINT | - | - | **Ai3 NTC calibration gain** | 0 … 65535 | 32768 | num |
| Gain_Ntc_AI4 | 15619 | UINT | - | - | **Ai4 NTC calibration gain** | 0 … 65535 | 32768 | num |
| Offs_Ntc_AI1 | 15621 | INT | -1 | - | **Ai1 NTC calibration offset** | -32768 … 32767 | 0 | num |
| Offs_Ntc_AI2 | 15622 | INT | -1 | - | **Ai2 NTC calibration offset** | -32768 … 32767 | 0 | num |
| Offs_Ntc_AI3 | 15623 | INT | -1 | - | **Ai3 NTC calibration offset** | -32768 … 32767 | 0 | num |
| Offs_Ntc_AI4 | 15624 | INT | -1 | - | **Ai4 NTC calibration offset** | -32768 … 32767 | 0 | num |
| Gain_PTC_AI1 | 15626 | UINT | - | - | **Ai1 PTC calibration gain** | 0 … 65535 | 32768 | num |
| Gain_PTC_AI2 | 15627 | UINT | - | - | **Ai2 PTC calibration gain** | 0 … 65535 | 32768 | num |
| Gain_PTC_AI3 | 15628 | UINT | - | - | **Ai3 PTC calibration gain** | 0 … 65535 | 32768 | num |
| Gain_PTC_AI4 | 15629 | UINT | | - | **Ai4 PTC calibration gain** | 0 … 65535 | 32768 | num |
| Offs_PTC_AI1 | 15631 | INT | -1 | - | **Ai1 PTC calibration offset** | -32768 … 32767 | 0 | num |
| Offs_PTC_AI2 | 15632 | INT | -1 | - | **Ai2 PTC calibration offset** | -32768 … 32767 | 0 | num |
| Offs_PTC_AI3 | 15633 | INT | -1 | - | **Ai3 PTC calibration offset** | -32768 … 32767 | 0 | num |
| Offs_PTC_AI4 | 15634 | INT | -1 | - | **Ai4 PTC calibration offset** | -32768 … 32767 | 0 | num |
| Gain_daOhm_AI1 | 15636 | UINT | - | - | **Ai1 daOhm calibration gain** | 0 … 65535 | 32768 | num |
| Gain_daOhm_AI2 | 15637 | UINT | - | - | **Ai2 daOhm calibration gain** | 0 … 65535 | 32768 | num |
| Gain_daOhm_AI3 | 15638 | UINT | - | - | **Ai3 daOhm calibration gain** | 0 … 65535 | 32768 | num |
| Gain_daOhm_AI4 | 15639 | UINT | - | - | **Ai4 daOhm calibration gain** | 0 … 65535 | 32768 | num |
| Offs_daOhm_AI1 | 15641 | INT | -1 | - | **Ai1 daOhm calibration offset** | -32768 … 32767 | 0 | num |
| Offs_daOhm_AI2 | 15642 | INT | -1 | - | **Ai2 daOhm calibration offset** | -32768 … 32767 | 0 | num |
| Offs_daOhm_AI3 | 15643 | INT | -1 | - | **Ai3 daOhm calibration offset** | -32768 … 32767 | 0 | num |
| Offs_daOhm_AI4 | 15644 | INT | -1 | - | **Ai4 daOhm calibration offset** | -32768 … 32767 | 0 | num |
| Gain_mA_AI1 | 15646 | UINT | - | - | **Ai1 4-20mA calibration gain** | 0 … 65535 | 32768 | num |
| Gain_mA_AI2 | 15647 | UINT | - | - | **Ai2 4-20mA calibration gain** | 0 … 65535 | 32768 | num |
| Gain_mA_AI3 | 15648 | UINT | - | - | **Ai3 4-20mA calibration gain** | 0 … 65535 | 32768 | num |

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| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Gain_mA_AI4 | 15649 | UINT | - | - | Ai4 4-20mA calibration gain | 0 … 65535 | 32768 | num |
| Offs_mA_AI1 | 15651 | INT | -1 | - | Ai1 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AI2 | 15652 | INT | -1 | - | Ai2 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AI3 | 15653 | INT | -1 | - | Ai3 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Offs_mA_AI4 | 15654 | INT | -1 | - | Ai4 4-20mA calibration offset | -32768 … 32767 | 0 | num |
| Gain_5V_Ratio_AI1 | 15656 | UINT | - | - | Ai1 5V Ratiometric calibration gain | 0 … 65535 | 32768 | num |
| Gain_5V_Ratio_AI2 | 15657 | UINT | - | - | Ai2 5V Ratiometric calibration gain | 0 … 65535 | 32768 | num |
| Gain_5V_Ratio_AI3 | 15658 | UINT | - | - | Ai3 5V Ratiometric calibration gain | 0 … 65535 | 32768 | num |
| Gain_5V_Ratio_AI4 | 15659 | UINT | - | - | Ai4 5V Ratiometric calibration gain | 0 … 65535 | 32768 | num |
| Offs_5V_Ratio_AI1 | 15661 | INT | -1 | - | Ai1 5V Ratiometric calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_Ratio_AI2 | 15662 | INT | -1 | - | Ai2 5V Ratiometric calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_Ratio_AI3 | 15663 | INT | -1 | - | Ai3 5V Ratiometric calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_Ratio_AI4 | 15664 | INT | -1 | - | Ai4 5V Ratiometric calibration offset | -32768 … 32767 | 0 | num |
| Gain_10V_AI1 | 15666 | UINT | - | - | Ai1 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Gain_10V_AI2 | 15667 | UINT | - | - | Ai2 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Gain_10V_AI3 | 15668 | UINT | - | - | Ai3 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Gain_10V_AI4 | 15669 | UINT | - | - | Ai4 0-10V calibration gain | 0 … 65535 | 32768 | num |
| Offs_10V_AI1 | 15671 | INT | -1 | - | Ai1 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AI2 | 15672 | INT | -1 | - | Ai2 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AI3 | 15673 | INT | -1 | - | Ai3 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Offs_10V_AI4 | 15674 | INT | -1 | - | Ai4 0-10V calibration offset | -32768 … 32767 | 0 | num |
| Gain_5V_AI1 | 15676 | UINT | - | - | Ai1 0-5V calibration gain | 0 … 65535 | 32768 | num |
| Gain_5V_AI2 | 15677 | UINT | - | - | Ai2 0-5V calibration gain | 0 … 65535 | 32768 | num |
| Gain_5V_AI3 | 15678 | UINT | - | - | Ai3 0-5V calibration gain | 0 … 65535 | 32768 | num |
| Gain_5V_AI4 | 15679 | UINT | - | - | Ai4 0-5V calibration gain | 0 … 65535 | 32768 | num |
| Offs_5V_AI1 | 15681 | INT | -1 | - | Ai1 0-5V calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_AI2 | 15682 | INT | -1 | - | Ai2 0-5V calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_AI3 | 15683 | INT | -1 | - | Ai3 0-5V calibration offset | -32768 … 32767 | 0 | num |
| Offs_5V_AI4 | 15684 | INT | -1 | - | Ai4 0-5V calibration offset | -32768 … 32767 | 0 | num |
| Gain_Pt1000_AI1 | 15686 | UINT | - | - | Ai1 Pt1000 calibration gain | 0 … 65535 | 32768 | num |
| Gain_Pt1000_AI2 | 15687 | UINT | - | - | Ai2 Pt1000 calibration gain | 0 … 65535 | 32768 | num |
| Gain_Pt1000_AI3 | 15688 | UINT | - | - | Ai3 Pt1000 calibration gain | 0 … 65535 | 32768 | num |
| Gain_Pt1000_AI4 | 15689 | UINT | - | - | Ai4 Pt1000 calibration gain | 0 … 65535 | 32768 | num |
| Offs_Pt1000_AI1 | 15691 | INT | -1 | - | Ai1 Pt1000 calibration offset | -32768 … 32767 | 0 | num |

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Offs_Pt1000_AI2 | 15692 | INT | -1 | - | **Ai2 Pt1000 calibration offset** | -32768 … 32767 | 0 | num |
| Offs_Pt1000_AI3 | 15693 | INT | -1 | - | **Ai3 Pt1000 calibration offset** | -32768 … 32767 | 0 | num |
| Offs_Pt1000_AI4 | 15694 | INT | -1 | -- | **Ai4 Pt1000 calibration offset** | -32768 … 32767 | 0 | num |
| **AO CALIBRATION folder** | | | | | | | | |
| Gain_10V_AO1 | 15696 | UINT | - | - | **AO1 0-10V calibration gain** | 0 … 65535 | 32768 | num |
| Gain_10V_AO2 | 15697 | UINT | - | - | **AO2 0-10V calibration gain** | 0 … 65535 | 32768 | num |
| Offs_10V_AO1 | 15698 | INT | -1 | - | **AO1 0-10V calibration offset** | -32768 … 32767 | 0 | num |
| Offs_10V_AO2 | 15699 | INT | -1 | - | **AO2 0-10V calibration offset** | -32768 … 32767 | 0 | num |
| **ANALOG INPUTS folder** | | | | | | | | |
| Temp_UM | 15725 | enum | - | Y | **Temperature unit of measurement**<br>• 0 = °C;<br>• 1 = °F | 0, 1 | 0 | num |
| Cfg_Ai1 | 15726 | enum | - | - | **Type of analog input Ai1**<br>• 0= NTC (NK103)<br>• 1= DI<br>• 2= NTC (103AT)<br>• 3 = 4…20mA<br>• 4=0-10V<br>• 5=0-5V Ratiometric<br>• 6=Pt1000<br>• 7=hΩ(NTC)<br>• 8=daΩ(Pt1000)<br>• PTC<br>• 10=0-5V | 0 ... 10 | 3 | num |
| Cfg_Ai2 | 15727 | enum | | - | **Type of analog input Ai2**<br>See Cfg_Ai1 | 0 ... 10 | 3 | num |
| Cfg_Ai3 | 15728 | enum | | - | **Type of analog input Ai3**<br>See Cfg_Ai1 | 0 ... 10 | 2 | num |
| Cfg_Ai4 | 15729 | enum | | - | **Type of analog input Ai4**<br>See Cfg_Ai1 | 0 ... 10 | 2 | num |
| FullScaleMin_Ai1 | 15736 | INT | -1 | - | **Analog input Ai1 start of scale value** | -9999…+9999 | 0 | |
| FullScaleMax_Ai1 | 15737 | INT | - | - | **Analog input Ai1 full scale value** | -9999…+9999 | 1000 | |
| FullScaleMin_Ai2 | 15738 | INT | -1 | - | **Analog input Ai2 start of scale value**<br>See FullScaleMin_Ai1 | -9999…+9999 | 0 | |

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **FullScaleMax_A2** | **15739** | INT | - | - | **Analog input Ai2 full scale value**<br>See FullScaleMAx_Ai1 | -999…+999 | 1000 | |
| **FullScaleMin_Ai3** | **15740** | INT | -1 | - | **Analog input Ai3 start of scale value**<br>See FullScaleMin_Ai1 | -9999…+9999 | 0 | |
| **FullScaleMax_Ai3** | **15741** | INT | - | - | **Analog input Ai3 full scale value**<br>See FullScaleMax_Ai1 | -999…+999 | 1000 | |
| **FullScaleMin_Ai4** | **15742** | INT | -1 | - | **Analog input Ai4 start of scale value**<br>See FullScaleMin_Ai1 | -9999…+9999 | 0 | |
| **FullScaleMaxAi4** | **15743** | INT | - | - | **Analog input Ai4 full scale value**<br>See FullScaleMax_Ai1 | -999…+999 | 100 | |
| **Calibration_Ai1** | **15748** | INT | -1 | - | **Analog input Ai1 differential** | -180 ... 180 | 0 | °C/10 or °F/10 |
| **Calibration_Ai2** | **15749** | INT | -1 | - | **Analog input Ai2 differential** | -180 ... 180 | 0 | °C/10 or °F/10 |
| **Calibration_Ai3** | **15750** | INT | -1 | - | **Analog input Ai3 differential** | -1000 ... 1000 | 0 | |
| **Calibration_Ai4** | **15751** | INT | -1 | - | **Analog input Ai4 differential** | -1000 ... 1000 | 0 | |
| **SubCfg_AI1** | **16010** | enum | - | Y | **Analog input AI5 sub-mode function**<br><br>• 0 = Low Pass Filter disabled, analog value in raw points<br>• 1 = Low Pass Filter disabled, analog value converted<br>• 2 = Low Pass Filter enabled, analog value in raw points<br>• 1 = Low Pass Filter enabled, analog value converted | 0 ... 3 | 3 | num |
| **SubCfg_AI2** | **16011** | enum | - | Y | **See SubCfg_AI1** | 0 ... 3 | 3 | num |
| **SubCfg_AI3** | **16012** | enum | - | Y | **See SubCfg_AI1** | 0 ... 3 | 3 | num |
| **SubCfg_AI4** | **16013** | enum | - | Y | **See SubCfg_AI1** | 0 ... 3 | 3 | num |
| **ON BOARD CAN folder** | | | | | | | | |
| **Addr_CAN_OB** | **15780** | UINT | - | Y | **On-board CAN serial address**<br>The actual address is determined by the sum of this value + the value of the dip switch. | 1 ... 127 | 1 | num |

| LABEL | PAR. VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Baud_CAN_OB | 15781 | enum | - | Y | **On-board CAN protocol baudrate**<br>• 2=500 kbaud<br>• 3=250 kbaud<br>• 4=125 kbaud<br>• 5=125 kbaud<br>• 6=50 kbaud | 2 ... 6 | 2 | num |

## 9.1.3. EVP parameters

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **ACKNOWLEDGEMENT folder** | | | | | | | | |
| **Par_TAB** | 15716 | UINT | - | Y | **Map code**<br>Note: read/write parameter | 0 … 65535 | 0 | num |
| **Par_POLI** | 15717 | UINT | - | Y | **Model Code**<br>Note: read/write parameter | 0 … 65535 | 2049 | num |
| **Par_PARMOD** | 15719 | BOOL | - | - | **Parameter changed**<br>Flag indicating change to default settings.<br>• 0= map not modified.<br>• 1= at least one parameter has been changed from the original configuration. | 0 … 1 | 0 | num |
| **AI CALIBRATION folder** | | | | | | | | |
| **Gain_Ntc_AI1** | 15616 | UINT | - | - | **Ai1 NTC calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_Ntc_AI2** | 15617 | UINT | - | - | **Ai2 NTC calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_5V_AI3** | 15620 | UINT | - | - | **Ai3 0-5V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_10V_AI3** | 15621 | UINT | - | - | **Ai3 0-10V calibration gain** | 0 … 65535 | 32768 | num |
| **Gain_mA_AI3** | 15622 | UINT | - | - | **Ai3 4-20mA calibration gain** | 0 … 65535 | 32768 | num |
| **Offs_Ntc_AI1** | 15650 | INT | -1 | - | **Ai1 NTC calibration offset** | -32768 … 32767 | 0 | num |
| **Offs_Ntc_AI2** | 15651 | INT | -1 | - | **Ai2 NTC calibration offset** | -32768 … 32767 | 0 | num |
| **Offs_5V_AI3** | 15654 | INT | -1 | - | **Ai3 0-5V calibration offset** | -32768 … 32767 | 0 | num |
| **Offs_10V_AI3** | 15655 | INT | -1 | - | **Ai3 0-10V calibration offset** | -32768 … 32767 | 0 | num |
| **Offs_mA_AI3** | 15656 | INT | -1 | - | **Ai3 4-20mA calibration offset** | -32768 … 32767 | 0 | num |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **ANALOG INPUTS folder** | | | | | | | | |
| Temp_UM | 15725 | enum | - | Y | **Temperature unit of measure**<br>• 0 = °C;<br>• 1 = °F | 0, 1 | 0 | num |
| Cfg_AI1 | 15726 | enum | - | - | **Type of analog input Ai1**<br>• 0= NTC (NK103)<br>• 1= DI<br>• 2= NTC (103AT) | 0 ... 2 | 2 | num |
| Cfg_Ai2 | 15727 | enum | - | - | **Type of analog input Ai2**<br>See Cfg_Ai1 | 0 ... 2 | 2 | num |
| Cfg_Ai3 | 15728 | enum | - | - | **Type of analog input Ai3**<br>• 3 = 4…20mA<br>• 4=0-10V<br>• 5=0-5V | 3 ... 5 | 3 | num |
| Cfg_Ai4 | 15729 | enum | - | - | **Type of analog input Ai4**<br>See Cfg_Ai3 | 3 ... 5 | 3 | num |
| FullScaleMin_Ai3 | 15736 | INT | -1 | - | **Analog input Ai3 start of scale value**<br>N.B.: Minimum full scale: for current probes, value at 4mA, for 0-10V voltage probes, value at 0V, 10% for ( 0-5V) probes, value at 10% (corresponding to 0.5V). | -9999…+9999 | 0 | |
| FullScaleMAx_Ai3 | 15737 | INT | -1 | - | **Analog input Ai3 full scale value**<br>N.B.: Maximum full scale for current probes, value at 20mA, for 0-10V voltage probes, value at 10V, for (0-5V) probes, value at 90% (corresponding to 4.5V). | -9999…+9999 | 1000 | |
| Calibration_Ai1 | 15748 | INT | -1 | - | **Analog input Ai1 differential** | -180 ... 180 | 0 | °C/10 or °F/10 |
| Calibration_Ai2 | 15749 | INT | -1 | - | **Analog input Ai2 differential** | -180 ... 180 | 0 | °C/10 or °F/10 |
| Calibration_Ai3 | 15750 | INT | -1 | - | **Analog input Ai3 differential** | -1000 ... 1000 | 0 | |
| Calibration_Ai4 | 15751 | INT | -1 | - | **Analog input Ai4 differential** | -1000 ... 1000 | 0 | |
| Compensation_AI1 | 15752 | INT | -1 | - | **Internal compensation AI1** | -1000 ... 1000 °C/10 | 0 | °C/10 |
| Compensation_AI4 | 15753 | INT | -1 | - | **Internal compensation AI4** | -1000 ... 1000 °C/10 | 0 | °C/10 |
| **RS485 ON BOARD folder** | | | | | | | | |
| Addr_RS485_OB | 15774 | UINT | - | Y | **On-board RS485 serial address**<br>The actual address is determined by the sum of this value + the value of the dip switch. | 0 ... 255 | 1 | num |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| Proto_RS485_OB | 15775 | enum | - | Y | **On-board RS485 protocol selection**<br>• 2 = uNET<br>• 3 = Modbus/RTU | 2 ... 3 | 2 | num |
| Databit_RS485_OB | 15776 | UINT | - | Y | **On-board RS485 data bit number**<br>Fixed setting 8 | 8 ... 8 | 8 | num |
| Stopbit_RS485_OB | 15777 | UINT | - | Y | **On-board RS485 stop bit number**<br>• 1= 1 stop bit<br>• 2= 2 stop bits | 1... 2 | 1 | num |
| Parity_RS485_OB | 15778 | enum | - | Y | **On-board RS485 protocol parity**<br>• 0= NULL<br>• 1= ODD<br>• 2= EVEN | 0 ... 2 | 2 | num |
| Baud_RS485_OB | 15779 | enum | - | Y | **On-board RS485 protocol baudrate**<br>• 0=9600 baud<br>• 1=19200 baud<br>• 2=38400 baud<br>• 3=57600 baud<br>• 4=76800 baud<br>• 5=115200 baud | 0 ... 5 | 2 | num |
| **ON BOARD CAN folder** | | | | | | | | |
| Addr_CAN_OB | 15780 | UINT | - | Y | **On-board CAN serial address**<br>The actual address is determined by the sum of this value + the value of the dip switch. | 1 ... 127 | 1 | num |
| Baud_CAN_OB | 15781 | UINT | - | Y | **On-board CAN protocol baudrate**<br>2=500 kbaud<br>3=250 kbaud<br>4=125 kbaud<br>5=125 kbaud<br>6=50 kbaud | 2 ... 6 | 2 | num |

## ON BOARD ETHERNET

The parameters necessary for the configuration of ports and protocols are these:

**FREE WEB** allows the use of HTTP and TFTP servers.

| Parameter | Description | Label |
|---|---|---|
| HTTP ports | **HTTP HyperText Transfer Protocol.**<br>An HTTP server generally monitors port 80 using TCP protocol. | **Port_HTTP** |

| Parameter | Description | Label |
|---|---|---|
| TFTP ports | **TFTP Trivial File Transfer Protocol.** <br> Protocol using basic FTP functionalities. Typical use: transfer of small files between hosts on a network. TFTP USES PORT 69 | **Port_TFTP** |
| DHCP protocol | **DHCP Dynamic Host Configuration Protocol** | **EnableDHCP_ ETH** |
| DNS system | **DNS Domain Name System** <br> System for the conversion of host names, or network nodes, to IP addresses <br> Used by **FREE Studio Plus** to send text e-mails (strings) | **PriDNS_1_ETH** |
| | | **PriDNS_2_ETH** |
| | | **PriDNS_3_ETH** |
| | | **PriDNS_4_ETH** |
| | | **SecDNS_1_ETH** |
| | | **SecDNS_2_ETH** |
| | | **SecDNS_3_ETH** |
| | | **SecDNS_4_ETH** |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| **ETHERNET ON BOARD folder** | | | | | | | | |
| **Port_TFTP** | **15772** | UINT | - | Y | **TFTP port** <br> TFTP communication Port number Default 0 corresponds to **port 69** | 0 … 65535 | 0 | num |
| **Port_HTTP** | **15796** | UINT | - | Y | **HTTP port** <br> HTTP communication Port number Default 0 corresponds to **port 80** | 0 … 65535 | 0 | num |
| **Port_ETH** | **15797** | UINT | - | Y | **Port** <br> TCP/IP Modbus communication port. Port 502 for example | 0 … 65535 | 502 | num |
| **Ip_1_ETH** | **15798** | UINT | - | Y | **On-board Ethernet passive IP address (part 1)** | 0 … 255 | 10 | num |
| **Ip_2_ETH** | **15799** | UINT | - | Y | **On-board Ethernet passive IP address (part 2)** | 0 … 255 | 0 | num |
| **Ip_3_ETH** | **15800** | UINT | - | Y | **On-board Ethernet passive IP address (part 3)** | 0 … 255 | 0 | num |
| **Ip_4_ETH** | **15801** | UINT | - | Y | **On-board Ethernet passive IP address (part 4)** | 0 … 255 | 100 | num |
| **DefGtwy_1_ETH** | **15802** | UINT | - | Y | **Default Gateway (part 1)** | 0 … 255 | 192 | num |
| **DefGtwy_2_ETH** | **15803** | UINT | - | Y | **Default Gateway (part 2)** | 0 … 255 | 168 | num |
| **DefGtwy_3_ETH** | **15804** | UINT | - | Y | **Default Gateway (part 3)** | 0 … 255 | 0 | num |
| **DefGtwy_4_ETH** | **15805** | UINT | - | Y | **Default Gateway (part 4)** | 0 … 255 | 1 | num |
| **NetMsk_1_ETH** | **15806** | UINT | - | Y | **Net mask (part 1)** | 0 … 255 | 255 | num |
| **NetMsk_2_ETH** | **15807** | UINT | - | Y | **Net mask (part 2)** | 0 … 255 | 255 | num |
| **NetMsk_3_ETH** | **15808** | UINT | - | Y | **Net mask (part 3)** | 0 … 255 | 255 | num |
| **NetMsk_4_ETH** | **15809** | UINT | - | Y | **Net mask (part 4)** | 0 … 255 | 0 | num |
| **PriDNS_1_ETH** | **15810** | UINT | - | Y | **Primary DNS server (part 1)** | 0 … 255 | 194 | num |
| **PriDNS_2_ETH** | **15811** | UINT | - | Y | **Primary DNS server (part 2)** | 0 … 255 | 25 | num |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| PriDNS_3_ETH | 15812 | UINT | - | Y | **Primary DNS server (part 3)** | 0 … 255 | 2 | num |
| PriDNS_4_ETH | 15813 | UINT | - | Y | **Primary DNS server (part 4)** | 0 … 255 | 129 | num |
| SecDNS_1_ETH | 15814 | UINT | - | Y | **Secondary DNS server (part 1)** | 0 … 255 | 194 | num |
| SecDNS_2_ETH | 15815 | UINT | - | Y | **Secondary DNS server (part 2)** | 0 … 255 | 25 | num |
| SecDNS_3_ETH | 15816 | UINT | | Y | **Secondary DNS server (part 3)** | 0 … 255 | 2 | num |
| SecDNS_4_ETH | 15817 | UINT | - | Y | **Secondary DNS server (part 4)** | 0 … 255 | 130 | num |
| EnableDHCP_ETH | 15819 | BOOL | - | Y | **Enable DHCP** | 0 … 1 (False, True) | False | flag |
| **Display folder** | | | | | | | | |
| Hmi_Language | 15819 | enum | - | - | **Display language** 0 = Italian 1 = English 2 = French 3 = German 4 = Spanish | 0 … 65535 | 0 | num |
| Par_ContrLCD | 15723 | UINT | - | Y | **LCD Contrast** Allows adjustment of the LCD display contrast. | 0 … 64 | 30 | num |
| Par_BackLightTime | 15724 | UINT | - | - | **Backlight switch-on time** Allows adjustment of LCD display switch-on time. | 0 … 3600 | 10 | sec |
| **Buzzer folder** | | | | | | | | |
| Buzzer_Mode | 15990 | enum | - | - | **Buzzer mode** 0= always off 1= beep per key | 0 … 1 | 0 | num |
| **HMI Management folder** | | | | | | | | |
| Hmi_Language | 15989 | UINT | | | | 0 … 65535 | 0 | num |
| HmiList_Current | 15820 | enum | - | - | Current HMI 0= HMI remote 1 1= HMI remote 2 2= HMI remote 3 3= HMI remote 4 4= HMI remote 5 5= HMI remote 6 6= HMI remote 7 7= HMI remote 8 8= HMI remote 9 9= HMI remote 10 10 = not used 11= Local HMI | 0 … 11 | 11 | num |
| **If HmiList_Current=11 the following folders/parameters are NOT USED.** | | | | | | | | |
| **HMI remote 1 folder** | | | | | | | | |
| HmiList_ID_1 | 15821 | UINT | - | - | HMI remote 1 navigation ID list | 0 ... 254 | 0 | num |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| HmiList_Res_1 | 15833 | enum | - | - | HMI remote 1 navigation resource type<br>HMI remote 1 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15845 | UINT | - | - | HMI remote 1 navigation resource address for CAN, RTU and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15846 | UINT | - | - | HMI remote 1 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15847 | UINT | - | - | HMI remote 1 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15848 | UINT | - | - | HMI remote 1 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_1 | 15893 | STRING 15 byte | - | - | HMI remote 1 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 2 folder** | | | | | | | | |
| HmiList_ID_2 | 15822 | UINT | - | - | HMI remote 2 navigation ID list | 0 ... 254 | 0 | num |
| HmiList_Res_2 | 15834 | enum | - | - | HMI remote 2 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15849 | UINT | - | - | HMI remote 2 navigation resource address for CAN, RTU and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15850 | UINT | - | - | HMI remote 2 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15851 | UINT | - | - | HMI remote 2 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15852 | UINT | - | - | HMI remote 2 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_2 | 15901 | STRING 15 byte | - | - | HMI remote 2 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 3 folder** | | | | | | | | |
| HmiList_ID_3 | 15823 | UINT | - | - | HMI remote 3 navigation ID list | 0 ... 254 | 0 | num |
| HmiList_Res_3 | 15835 | enum | - | - | HMI remote 3 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15853 | UINT | - | - | HMI remote 3 navigation resource address for CAN, RTU and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15854 | UINT | - | - | HMI remote 3 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| HmiList_Addr_3 | 15855 | UINT | - | - | HMI remote 3 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15856 | UINT | - | - | HMI remote 3 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_3 | 15909 | STRING 15 byte | - | - | HMI remote 3 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 4 folder** | | | | | | | | |
| HmiList_ID_4 | 15824 | UINT | - | - | HMI remote 4 navigation ID list | 0 ... 254 | 0 | num |
| HmiList_Res_4 | 15836 | enum | - | - | HMI remote 4 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15857 | UINT | - | - | HMI remote 4 navigation resource address for CAN, RTU and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15859 | UINT | - | - | HMI remote 4 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15859 | UINT | - | - | HMI remote 4 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15860 | UINT | - | - | HMI remote 4 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_4 | 15917 | STRING 15 byte | - | - | HMI remote 4 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 5 folder** | | | | | | | | |
| HmiList_ID_5 | 15825 | UINT | - | - | HMI remote 5 navigation ID list | 0 ... 254 | 0 | num |
| HmiList_Res_5 | 15837 | enum | - | - | HMI remote 5 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15861 | UINT | - | - | HMI remote 5 navigation resource address for CAN, RTH and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15862 | UINT | - | - | HMI remote 5 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15863 | UINT | - | - | HMI remote 5 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15864 | UINT | - | - | HMI remote 5 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_5 | 15925 | STRING 15 byte | - | - | HMI remote 5 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 6 folder** | | | | | | | | |
| HmiList_ID_6 | 15826 | UINT | - | - | HMI remote 6 navigation ID list | 0 ... 254 | 0 | num |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| HmiList_Res_6 | 15838 | enum | - | - | HMI remote 6 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15865 | UINT | - | - | HMI remote 6 navigation resource address for CAN, RTH and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15866 | UINT | - | - | HMI remote 6 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15867 | UINT | - | - | HMI remote 6 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15868 | UINT | - | - | HMI remote 6 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_6 | 15933 | STRING 15 byte | - | - | HMI remote 6 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 7 folder** | | | | | | | | |
| HmiList_ID_7 | 15827 | UINT | - | - | HMI remote 7 navigation ID list | 0 ... 254 | 0 | num |
| HmiList_Res_7 | 15839 | enum | - | - | HMI remote 7 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15869 | UINT | - | - | HMI remote 7 navigation resource address for CAN, RTU and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15870 | UINT | - | - | HMI remote 7 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15871 | UINT | - | - | HMI remote 7 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15872 | UINT | - | - | HMI remote 7 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_7 | 15941 | STRING 15 byte | | | HMI remote 7 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 8 folder** | | | | | | | | |
| HmiList_ID_8 | 15828 | UINT | - | - | HMI remote 8 navigation ID list | 0 ... 254 | 0 | num |
| HmiList_Res_8 | 15840 | enum | - | - | HMI remote 8 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15873 | UINT | - | - | HMI remote 8 navigation resource address for CAN, RTU and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15874 | UINT | - | - | HMI remote 8 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15875 | UINT | - | - | HMI remote 8 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |

| LABEL | PAR VALUE ADDRESS | DATA TYPE | CPL | RESET (Y/N) | DESCRIPTION | RANGE | DEFAULT | U.M. |
|---|---|---|---|---|---|---|---|---|
| HmiList_Addr_4 | 15876 | UINT | - | - | HMI remote 8 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_8 | 15949 | STRING 15 byte | - | - | HMI remote 8 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 9 folder** | | | | | | | | |
| HmiList_ID_9 | 15829 | UINT | - | - | HMI remote 9 navigation ID list | 0 ... 254 | 0 | num |
| HmiList_Res_9 | 15841 | enum | - | - | HMI remote 9 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15877 | UINT | - | - | HMI remote 9 navigation resource address for CAN, RTU and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15878 | UINT | - | - | HMI remote 9 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15879 | UINT | - | - | HMI remote 9 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15880 | UINT | - | - | HMI remote 9 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_9 | 15957 | STRING 15 byte | - | - | HMI remote 9 navigation file (DOS 8.3 uppercase format) | ******** | | string |
| **HMI remote 10 folder** | | | | | | | | |
| HmiList_ID_10 | 15830 | UINT | - | - | HMI remote 10 navigation ID list | 0 ... 254 | 0 | num |
| HmiList_Res_10 | 15842 | enum | - | - | HMI remote 10 navigation resource type<br>1=RTU (RS485 Modbus RTU)<br>2=TCP (Modbus TCP)<br>3=CAN (CAN) | 1 … 3 | 3 | num |
| HmiList_Addr_1 | 15881 | UINT | - | - | HMI remote 10 navigation resource address for CAN, RTU and TCP (IP part 1) | 0 ... 255 | 0 | num |
| HmiList_Addr_2 | 15882 | UINT | - | - | HMI remote 10 navigation resource address for TCP (IP part 2) | 0 ... 255 | 0 | num |
| HmiList_Addr_3 | 15883 | UINT | - | - | HMI remote 10 navigation resource address for TCP (IP part 3) | 0 ... 255 | 0 | num |
| HmiList_Addr_4 | 15884 | UINT | - | - | HMI remote 10 navigation resource address for TCP (IP part 4) | 0 ... 255 | 0 | num |
| HmiList_File_10 | 15965 | STRING 15 byte | - | - | HMI remote 10 navigation file (DOS 8.3 uppercase format) | ******** | | string |

# CHAPTER 10

# Programming of the EVE4200

The **DMI 100-3** and **MFK 100** are accessories that can be connected to the **EVE4200 expansion** (target) serial port to make a quick programming of :

• Targets parameters (upload and download of a parameter map to/from one or more targets of the same type)

• Targets BIOS

## Connection of Programming Cable (**DMI 100-3**)



| DMI 100-3 → EVE4200 | DMI 100-3 ← EVE4200 |
|---|---|
| Parameters | Parameters |
| BIOS | - |
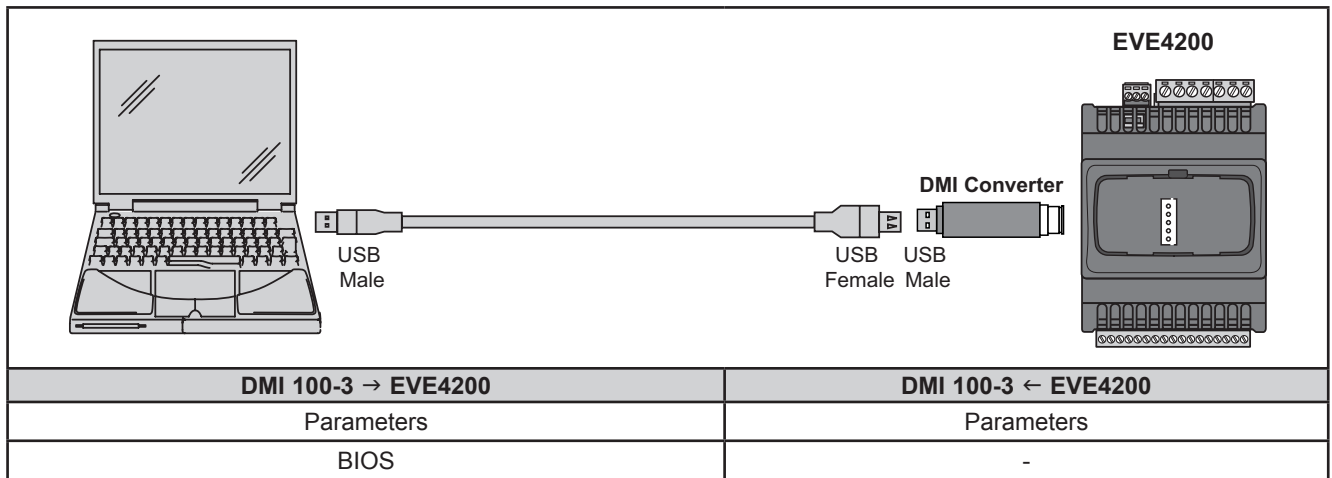
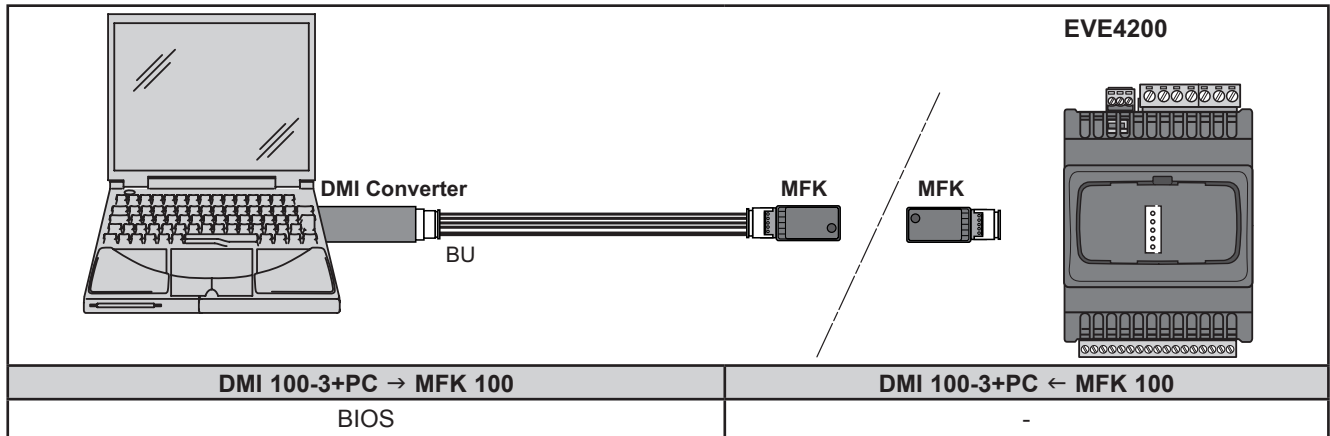**Fig. 64.**    Connections between DMI 100-3 Converter and the EVE4200

**NOTE**: When supplying power to the expansion module from the PC, **EVE4200** must not be connected to earth.
If a ground (earth) connection exists for the PC as well as the **EVE4200** a ground loop condition could develop and render either PC or the **EVE4200** inoperable.

| *NOTICE* |
|---|
| **INOPERABLE EQUIPMENT** |
| If you are unsure whether the **EVE4200** is connected to an SELV power supply, disconnect the power supply connection to the **EVE4200** before connecting a PC. |
| **Failure to follow these instructions can result in equipment damage.** |

## Connection of Multi Function Key (MFK 100)

To connect **MFK 100** to **DMI 100-3** the **BLUE** cable is used.



| DMI 100-3+PC → MFK 100 | DMI 100-3+PC ← MFK 100 |
|---|---|
| BIOS | - |

**Fig. 65.** Connections between MFK 100 and DMI 100-3 Converter + PC

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## ⚠ WARNING

**UNINTENDED EQUIPMENT OPERATION**

- Connect the programming cable to the PC first, then to the programming port of the controller.
- Disconnect the programming cable from the controller before disconnecting it from the PC.

**Failure to follow these instructions can result in death, serious injury, or equipment damage**

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