

free Evolution

Programmable controller  
Installation manual



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# 1 INTRODUCTION

To allow quick, easy reference, the manual has been designed with the following features:

## References

### **References column:**

A column to the left of the text contains *references* to subjects discussed in the text to help you locate the information you need quickly and easily.

## Cross references

### **Cross references:**

All words in italics are listed in the analytical index with the number of the page where they are dealt with in more detail. In the "online" (computer) manual, the words in italics are "hyperlinks" (i.e. mouse-clickable links), connecting up the different parts of the manual and making it "navigable".

## Highlighting icons

Some text passages are marked by icons in the *references* column, which have the following meanings:



### **Important! :**

**Information that the user must be aware of to prevent any damage to the system or hazards for people, devices, data, etc. Users MUST read and take note of these sections.**



### **Note / highlight:**

Further information on the topic in question that the user should be aware of.



### **Tip:**

A suggestion that could help the user to understand and make better use of the information provided.

## 1.1 General description

**FREE Evolution** is the top-end of the Eliwell *range* of programmable controllers suitable for a variety of requirements in the HVAC/R and other fields, to manage from the simplest to the most complex of applications.

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

The *models* are available as a 8 DIN rail-mounted versions which saves time in terms of wiring.

In association with **FREE Evolution** hardware, there is also the **FREE Studio** development tool to quickly and reliably program and customize new programmes for any application.

The use of several different programming languages in accordance with IEC61131-3 regulations (programming standard for industrial control), makes it possible to develop new algorithms or entire programmes totally unassisted, which *can* then be uploaded to **FREE Evolution** modules via PC or standard *USB*, guaranteeing the utmost confidentiality with appropriate security.

A wide *range* of plug-in, DIN rail-mounted modules allow integration with industrial systems, BMS and *Ethernet* networks.

Ratiometric pressure sensors and remote *terminals can* also be connected with no need for any further serial interfaces.

### 1.1.1 Specifications:

**FREE Evolution EVD / EVC** has 27 inputs/outputs, 5 of which are *analogue outputs*, 6 *analogue inputs*, 7 relay *digital outputs* (or 5 relays + 2 SSRs) and 9 *digital inputs*.

**FREE Evolution EVD / EVC** comes in two different *models*, allowing you to choose an integrated serial as standard with or without integrated *USB* as standard (/U model).

**FREE Evolution EVD** comes with a built-in graphics user terminal whilst **FREE Evolution EVC** has no *display*, to be connected to a remote EVK graphics terminal for the configuration of BIOS *parameters*.

**FREE Evolution** is expandable, up to 12 extra modules.

The 8DIN format guarantees maximum flexibility and easy installation.

The **FREE Evolution EVE** expansion has 27 inputs/outputs, 5 of which are *analogue outputs*, and 6 *analogue inputs*.

The 8DIN format guarantees maximum flexibility and easy installation.

---

24V~/= or 48V= power supply.

### 1.1.2 Main functions of hardware:

- Parameter settings via built-in/remote terminal or via PC.
- *USB* to upload and download parameter maps.
- *Analogue Inputs* configurable as NTC 103AT/NTCNK103, PT1000, DI, 4...20mA, 0...5V ratiometric, 0...10V, or hΩ(NTC)/ daΩ(PT1000) from *parameters*.



## 1.2 Models and Features

-->See Appendix A - *Models and Accessories*, and *Technical Data* section.

## 2 MECHANICAL INSTALLATION

**IMPORTANT! Always make sure the device is switched OFF before touching connections.**

All operations must be carried out by qualified personnel.

Do not mount devices in extremely damp and/or dirt-laden areas; they are designed for use in places with ordinary or normal levels of contamination.

Make sure the area near the cooling slots is ventilated.

### Free Evolution EVD • EVC • EVE Installation

The instrument is intended for 8DIN rail mounting.

For GUIDA DIN installation, follow the steps described below:

Move the two spring docking devices to their standby position (use a screwdriver to press against the relative compartments, see figure 1b). Then install the device on the DIN RAIL, pressing on the "spring docking devices" to put them into the locked position.

N.B.: Once assembled on the DIN RAIL, the "spring docking devices" must be turned downwards.

### Assembling the EVK terminal • (Free Evolution EVP)

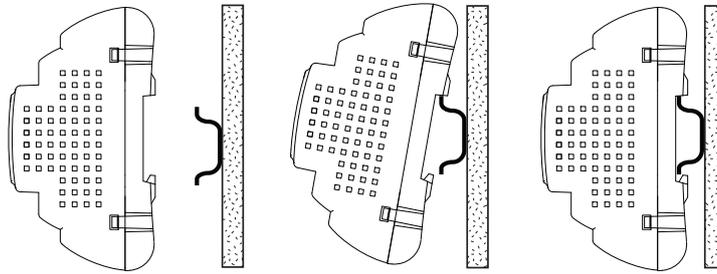
Designed for panel mounting.

Make a 138x68mm hole.

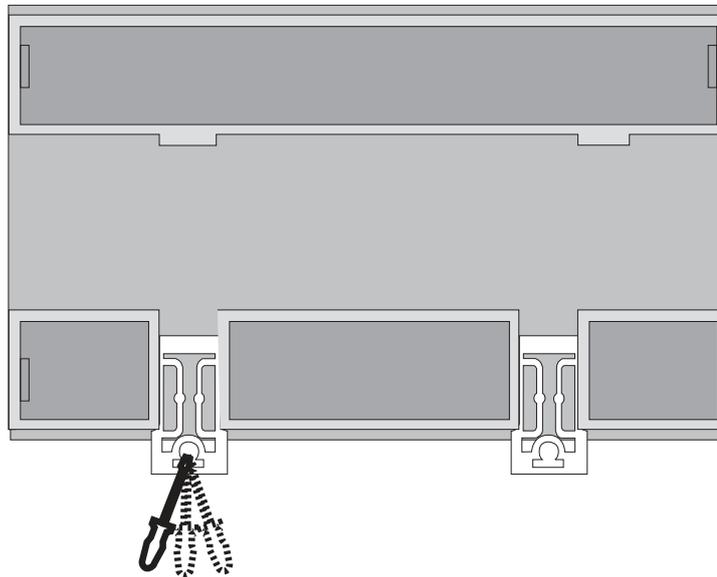
Remove the front panel and make 4 holes in the panel that the controller is to be mounted on (Figure 6 points A/B/C/D) or two holes (Figure 6 points E/F) of dia. 2.7 mm at the specified spacing (Figure 6).

Insert the device, fixing it with the screws. Press the front of the terminal / EVP to close.

**Figure 1**  
**Installation on DIN rail**



**Figure 1b**  
**Details of spring docking devices**



### Assembling the *EVS Plug-ins*

*Plug-ins* are 2DIN modules that connect to a FREE Evolution EVD/EVC controller.

To assemble EVS to EVD/EVC follow the instructions:

- remove the door (if present) on the left side of the EVD/EVC controller by using fingers or a screw-driver
- anchor EVS to the EVD/EVC controller

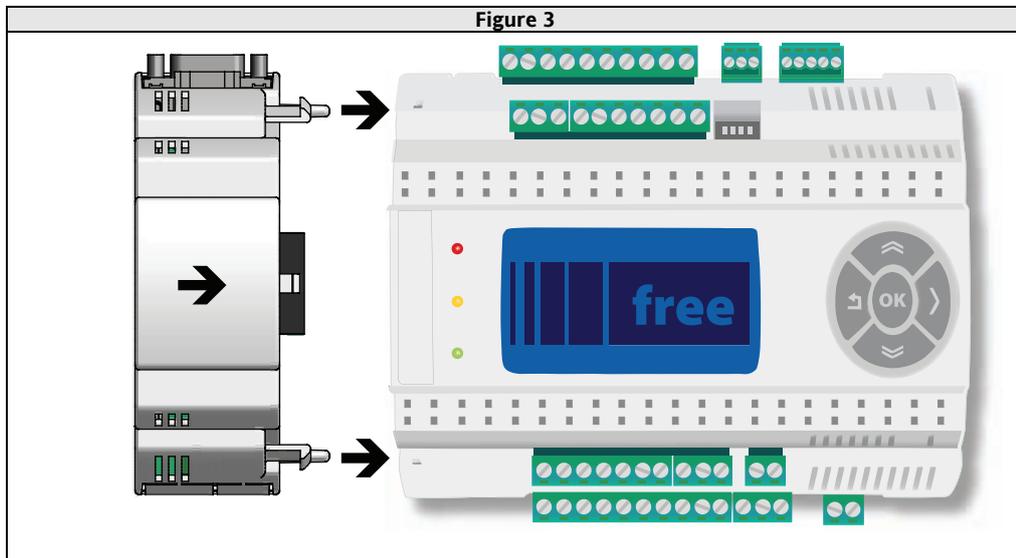
a) via the plug-in connector, behind the removable door.

b) with the fixing screws to which the plug-in is anchored to

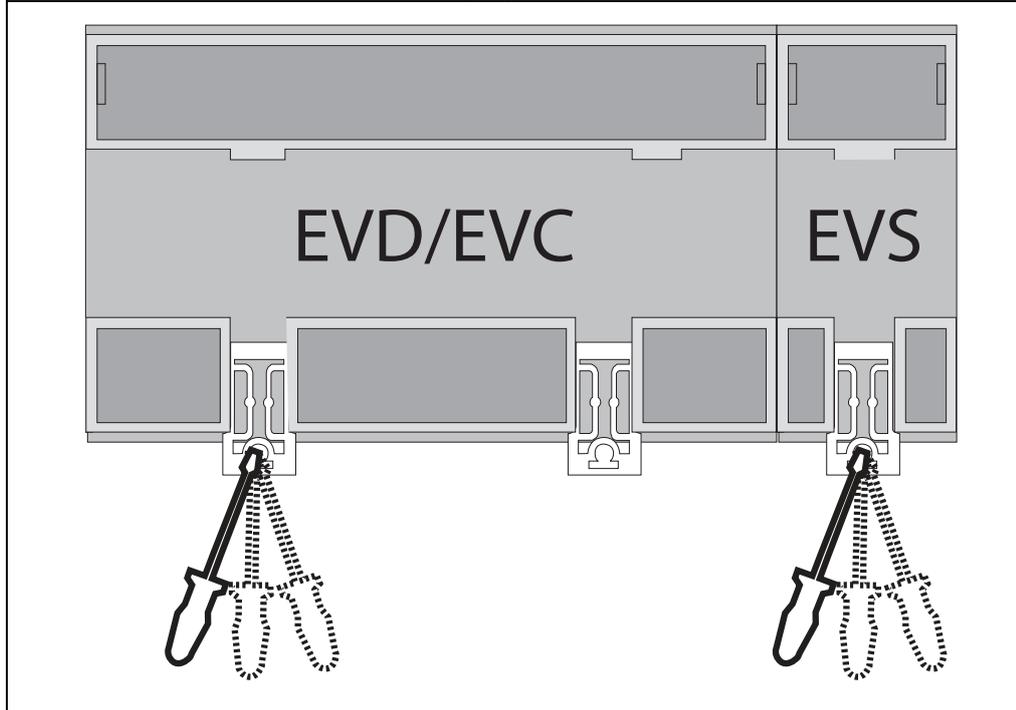
Follow the instructions below to install it on DIN RAIL:

- Move the spring docking devices (two for EVD/EVC, one for EVS) to his standby position (use a screwdriver).
- Install EVD/EVC+EVS on the DIN RAIL, then press the "spring docking device" which will go to the closing position.

N.B.: Once the "BASE" is mounted on the DIN RAIL, the "Spring docking device" must be turned downwards.

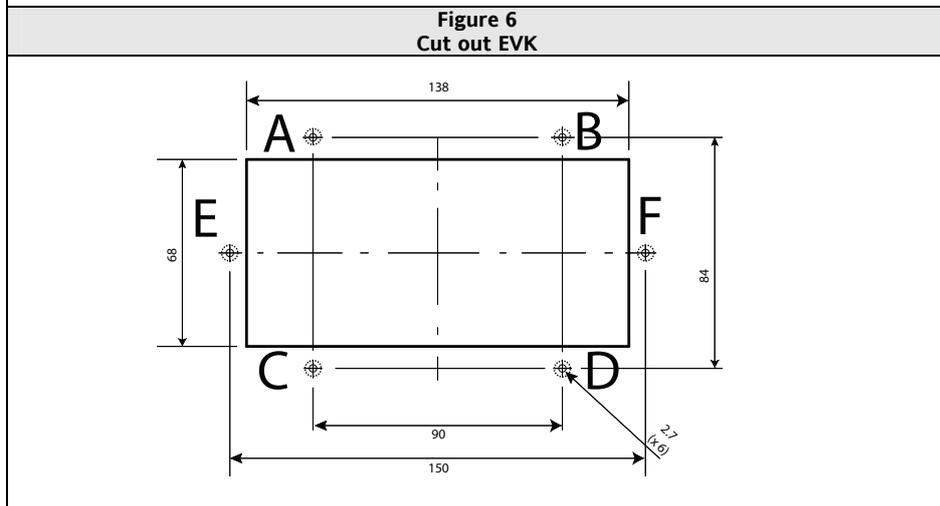
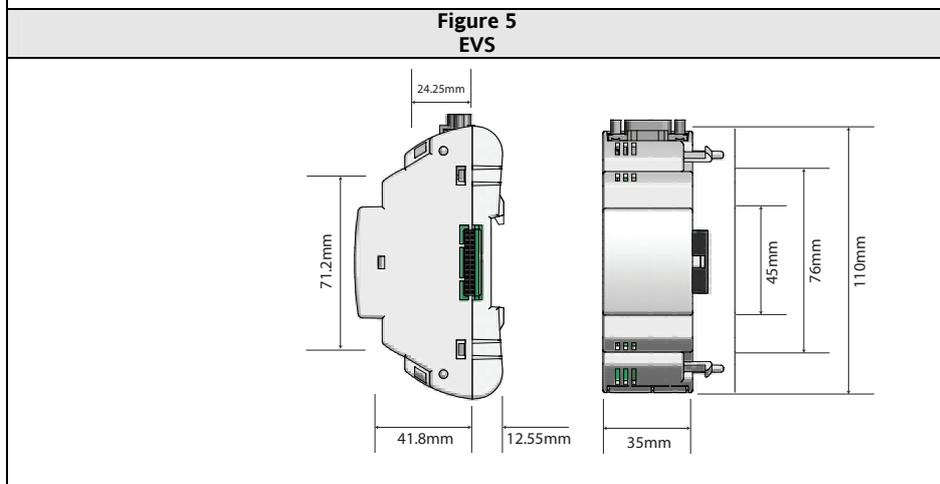
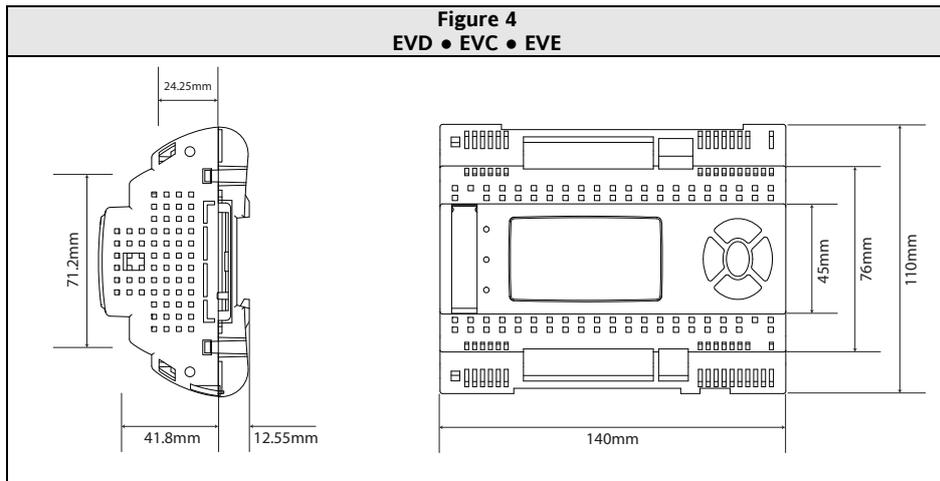


**Figure 3b**  
Details of spring docking devices



Note. EVS - EVE expansion connection is allowed for dedicated *models* only – see [Electrical connections](#) chapter for details

## 2.1 Mechanical dimensions





## 3 ELECTRICAL CONNECTIONS



### 3.1 General warnings

Before doing anything, make sure the device is connected to a suitable external *transformer*. The following rules must be followed when connecting cards to each other and to the application:

- Loads that exceed the maximum limits set forth herein must not be applied to outputs.
- When connecting loads, follow connection diagrams carefully.
- To avoid electric pairings, wire all low SELV (\*) utilities separately from high voltage ones.

#### IMPORTANT!

Make sure the machine is switched off before working on the *electrical connections*. All operations must be carried out by qualified personnel. To ensure proper connections, comply with the following:

- Power supplies other than those specified *can* seriously damage the system.
- Use cables of suitable section for the *terminals* used.
- Separate the cables of probes and *digital inputs* from inductive loads and high voltage connections to prevent any electromagnetic interference. Do not place the probe cables near other electrical equipment (switches, meters, etc.)
- Make connections as short as possible and do not wind them around electrically connected parts.
- To avoid causing static discharges, do not touch the electronic components on the boards.
- The device must be connected to a suitable *transformer* that complies with the specifications provided in the Specifications chapter.

#### ETHERNET

#### PLUG-IN ETH

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

#### 3.1.1 Power supply - High voltage inputs (relay)

Do not exceed the maximum permitted current; for higher loads, use a contactor with sufficient power capacity.

#### Important!

Make sure that power supply is of the correct voltage for the instrument.

#### 3.1.2 Analogue Inputs-Probes

Probes have no connection polarity and *can* be extended using a normal bipolar cable (note that the extension of the probes influences the instrument's EMC electromagnetic compatibility: take great care with the wiring).

#### Important!

*Pressure probes* have a specific insertion polarity which must be observed.

Signal cables (temperature/*pressure probes*, *digital inputs*, RS-485/*CAN-BUS serials* and the electronic supply) must be cabled separately from power cables.

Eliwell-supplied probes are recommended. Contact Eliwell sales department for item availability.

Temperature  
probes



Pressure probes

### 3.1.3 Serial connections

- All *models* have an integrated *CAN* serial as standard.
- **7500 models** have an integrated *RS485* serial as standard.
- **75MP models** have an integrated MPBUS serial as standard.
- */U models* have an integrated *USB* serial as standard.



PAY ATTENTION WHILE CONNECTING SERIAL LINES: DO NOT CABLE *RS485* IN *CAN* PORT OR VICEVERSA

By means of the *EVS plug-in* modules, further serial ports are available for integration with industrial, BMS and *Ethernet* systems.

The controller serial ports are defined as 'OnBoard' (OB), whereas the serial ports available on the EVS modules are identified with the letters PI (Plug-In).

CAN

#### *CAN*

##### NOTE 1

- Use a shielded and "**twisted**" cable with two 0.5mm<sup>2</sup> conductors, plus braiding (i.e. suggested Belden shielded cable model 3105A rated as having 120 Ohm impedance, with PVC sleeve, 2 conductors plus braiding, 22 AWG, nominal capacity between conductors 36pF/m, nominal capacity of 68pF/m between conductor and shielding).
- Follow applicable regulations relevant to the laying of cables. Make sure data transmission circuits are well 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 board beside the *CAN* serial as the *default* factory configuration).

##### NOTE 2

The maximum distance depends on rated baud:

Kb/s (Kbaud)	<i>CAN</i> OnBoard	<i>CAN</i> Plug-In
50 Kbaud	1000m	1000m
125 Kbaud	500m	500m
250 Kbaud	200m	250m
500 Kbaud	30m	60m

##### NOTE 3

It is a 5-way terminal board:

- 3-way ("GS", "H" and "L") serial *CAN*
- 2-way POWER OUT supply for *EVK1000 terminal*.

RS485

#### *RS485*

##### INSTALLING THE RS-485 NETWORK

##### NOTE 1

Use a shielded and "**twisted**" cable with two 0.5mm<sup>2</sup> conductors, plus braiding (i.e. Belden cable model 8762 with PVC sleeve, 2 conductors plus braiding, 20 AWG, nominal capacity between conductors 89pF/m, nominal capacity of 161pF/m between conductor and shielding).

See standards relating to EN 50174 data transmission systems for indications on how to lay cables..

Make sure data transmission circuits are well separated from power lines.

An RS-485 network up to 1200m in length featuring a maximum of 256\* devices *can* be connected straight to the controller.

Note: Evolution shall be in Master/Slave configuration with a unique Master supervisor

This length *can* be extended and the number of devices for each channel increased using appropriate repeater modules.

##### NOTE 2

It is a single terminal board with 3 conductors: use all 3 conductors ("+", "-", "GS" for the braiding).

##### NOTE 3

Attach the 120 (Ohm) 1/4W resistors between the "+" and "-" *terminals* on the interface and the last controller in each branch of the network.

##### NOTE 4

Maximum speed that *can* be set 57600 baud. Higher speeds are required for local connection to FREE Studio Device and tests.

## USB On /U *models* only

On /U *models* only there are 22 *USB* connectors inside the door on the right of the LEDs, on the top part of the cap.

N.B.: the two USBs should not be used at the same time.

### Type A *USB* (HOST)

Used to connect a standard *USB* directly to download the application. This should be done from the controller keypad (EVD model) or from an *EVK1000 terminal* (EVC model).

See the section on *User Interface / USB-Host Handling* for handling files stored on the *USB* memory stick

### Type B mini *USB* (DEVICE)

Used to connect FREE Evolution to a PC or third party device via mini *USB* cable to up/download the application or documentation. This *can* be done from a PC or other device.

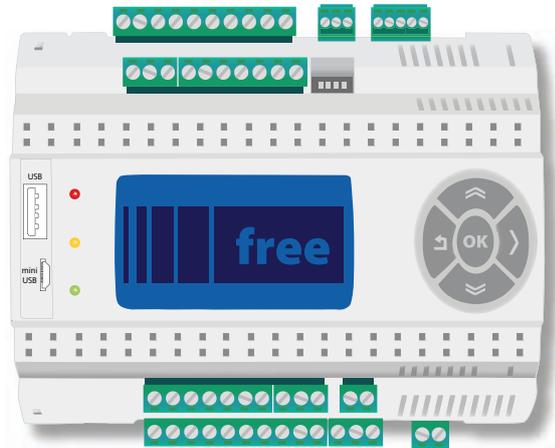
**N.B.:** compatible with Windows XP Home and Professional, Windows 2000 and Windows Vista operating systems.

**Note for developers who use FREE Studio:** FREE Studio does not communicate with Evolution via *USB*

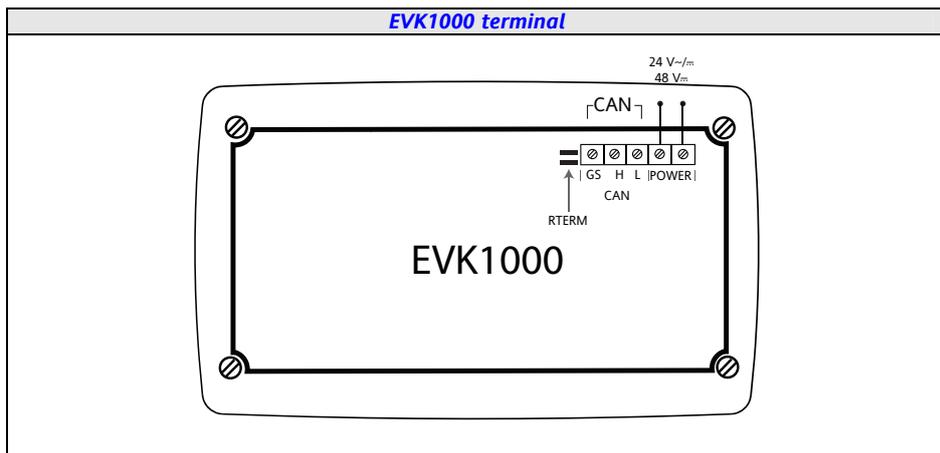
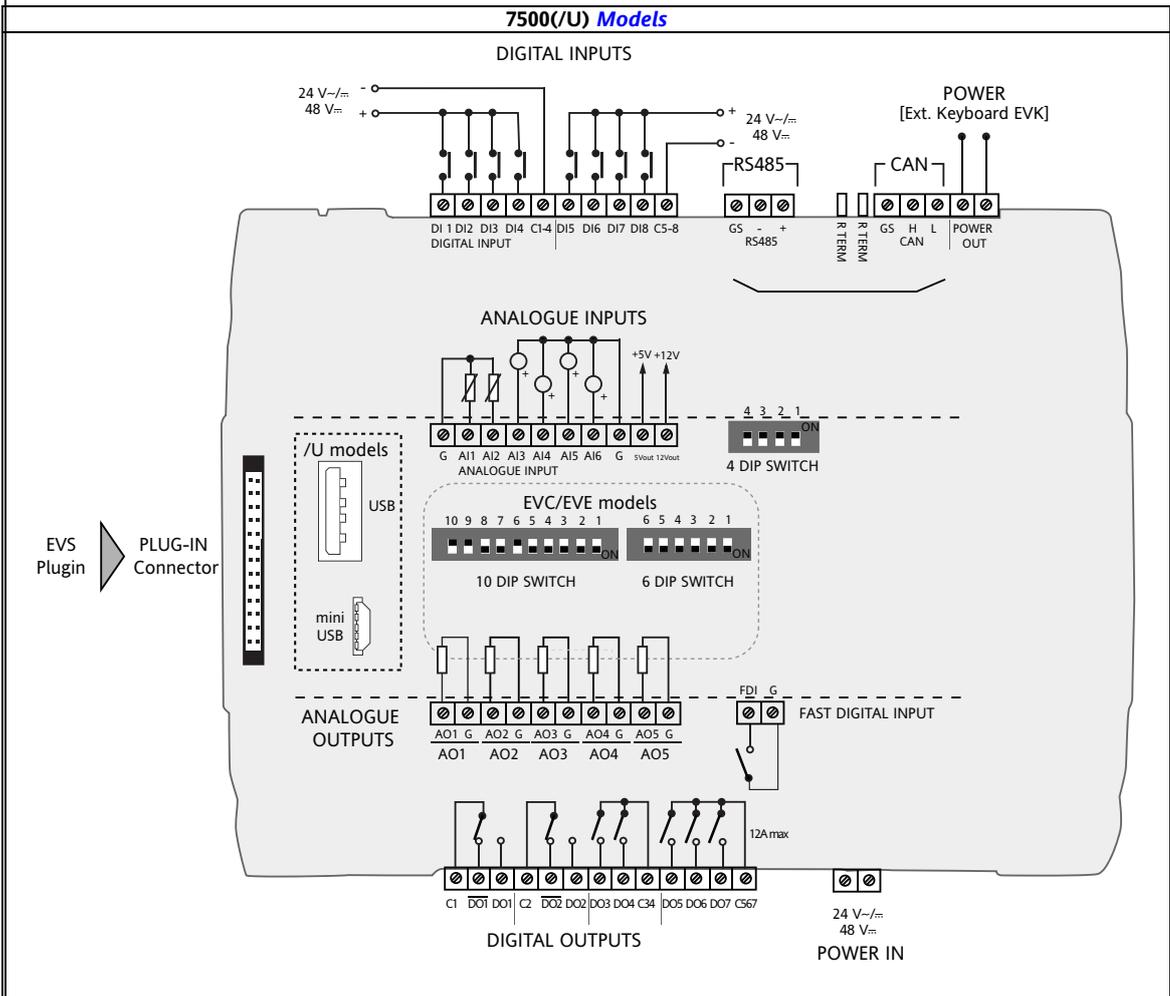
**Note for developers who use FREE Studio:** FREE Studio does however control the use of the *USB* serial port through the software library *fs\_iec* located at

C:\<Programs>\Eliwell\free Studio\Catalog\FreeEvolution\PLC

The library also contains “target block” functions to be used for handling files in the internal memory of Evolution (see FREE Studio manual for details)



### 3.2 Wiring diagrams



### 3.2.1 Terminals

Label		Description	Notes
<b>4 DIP SWITCH</b>		Dip Switch 4 positions	<i>default</i> OFF
<b>6 DIP SWITCH</b>		Dip Switch 6 positions	EVC <i>Models</i> & EVE Expansions
<b>10 DIP SWITCH</b>		Dip Switch 10 positions	Available under the cover
<b>POWER IN</b>		24V~/= - 48V=	<b>POWER [Ext. Keyboard EVK]</b> Output for remote keyboard
<b>POWER OUT</b>			
<b>ANALOGUE OUTPUTS</b>	<b>A01...A05</b>	<i>Analogue outputs</i> 1...5	
	<b>G</b>	Ground	
	<b>12Vout</b>	12V output for <i>analogue inputs</i> .	
	<b>5Vout</b>	5V output for ratiometric <i>analogue inputs</i> .	
<b>DIGITAL OUTPUTS</b>	<b>C1 DO1 DO1</b>	Output on relay 1	DO1: Normally Open DO1: Normally Closed
	<b>C2 DO2 DO2</b>	Output on relay 2	DO2: Normally Open DO2: Normally Closed
	<b>DO3 DO4</b>	Output on relay 3-4 also available as SSR* output	*Contact Eliwell sales department for item availability.
	<b>C34</b>	common <i>digital outputs</i> 3-4	
	<b>DO5 DO6 DO7</b>	Output on relay 5-6-7	
	<b>C567</b>	common <i>digital outputs</i> 5-6-7	12Amp max.
<b>CAN</b>	<b>GS H L</b>	Isolated <i>CAN</i> serial <b>GS</b> ground insulated serial from <b>G</b>	<b>R TERM</b> termination resistors for <i>CAN</i>
<b>RS485</b>	<b>GS - +</b>	Isolated <i>RS485</i> serial <b>GS</b> ground insulated serial from <b>G</b>	
<b>DIGITAL INPUTS</b>	<b>DI1...DI4</b>	<i>Digital inputs</i> 1...4	
	<b>C1-4</b>	Common <i>digital inputs</i> 1...4	
	<b>DI5...DI8</b>	<i>Digital inputs</i> 5...8	
	<b>C5-8</b>	Common <i>digital inputs</i> 5...8	
<b>FAST D.I.</b>	<b>FDI</b>	FAST digital input	Pulse/frequency counter up to 1KHz
	<b>G</b>	Ground GND	
<b>ANALOGUE INPUTS</b>	<b>A11...A16</b>	<i>Analogue Inputs</i>	
	<b>G</b>	Ground GND	

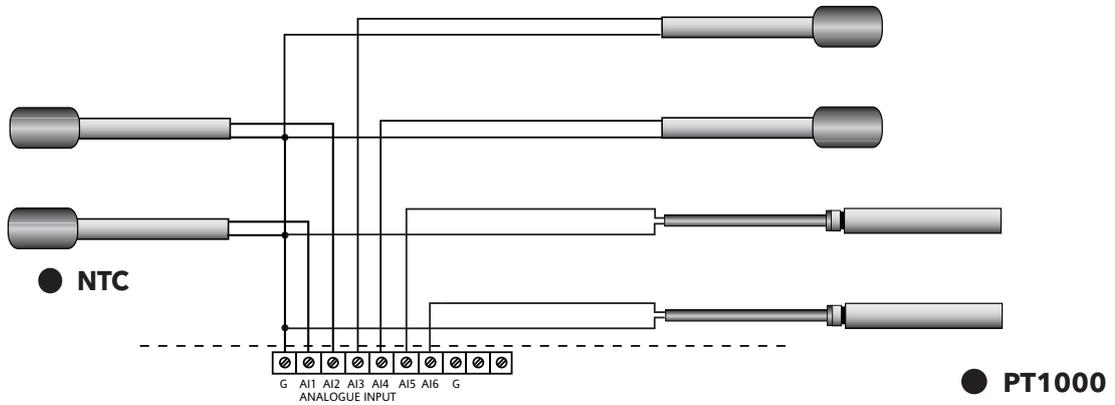
### 3.2.2 EVK1000 terminal

Label		Description	Notes
<b>POWER IN</b>		Power Supply 24V~/= - 48V=	supply from FREE Evolution EVD/EVC or independent from mains
<b>CAN</b>	<b>GS H L</b>	Isolated <i>CAN</i> serial <b>GS</b> ground insulated serial from <b>G</b>	<b>R TERM</b> termination resistors for <i>CAN</i>

### 3.3 Example of analogue input connections

#### 3.3.1 NTC/PT1000 probe connection example

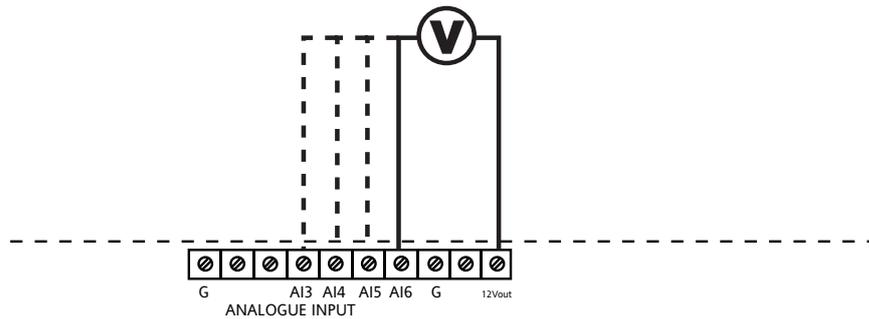
- *Analogue inputs* AI1...AI6 are available for NTC.
- *Analogue inputs* AI3...AI6 are available for NTC/PT1000.



#### 3.3.2 0-10V transducer connection example

- *Analogue Inputs* AI3...AI6 are available.

#### ● Transducer 0-10V

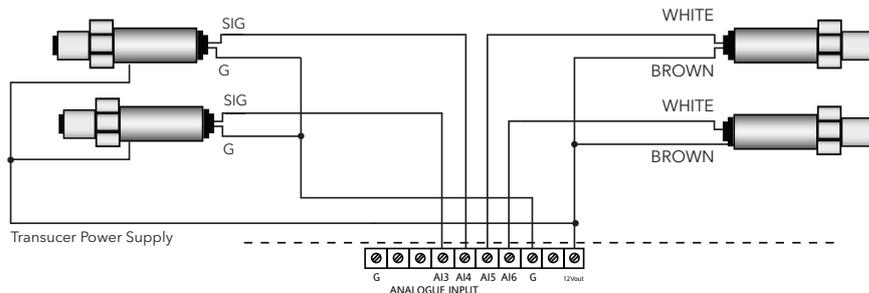


#### 3.3.3 4...20mA pressure transducer connection example

- *Analogue Inputs* AI3...AI6 are available.
- You are recommended to use a 4...20mA Eliwell EWPA transducer.
- If you are using a general 3-wire transducer, connect the earth wire to terminal G (GND) and the transducer power supply to the 12Vout.

#### ● Transducer 4...20mA

#### ● EWPA 4...20mA

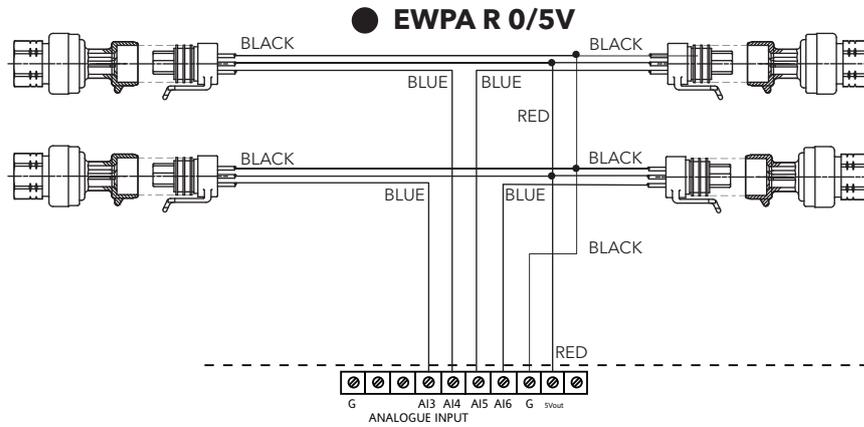


FREE Evolution	EWPA	4...20mA transducer
GND	/	GND
AI3 AI4 AI5 AI6	WHITE	SIG
12Vout	BROWN	Transducer Power Supply

### 3.3.4 Ratiometric transducer connection example

*Analogue Inputs* AI3...AI6 are available.

You are recommended to use a 0-5V Eliwell EWPA ratiometric transducer.

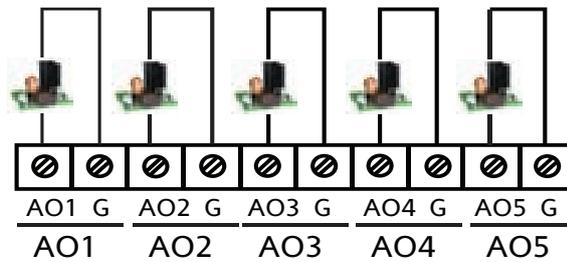


FREE Evolution	EWPA R 0/5V
GND	Black
AI3 AI4 AI5 AI6	Blue
5Vout	Red

### 3.3.5 Fan module connection example

- There are 5 available *analogue outputs*: AO1...AO5
- Example diagram with CFS 4 ...20mA or 0-10V fan module.

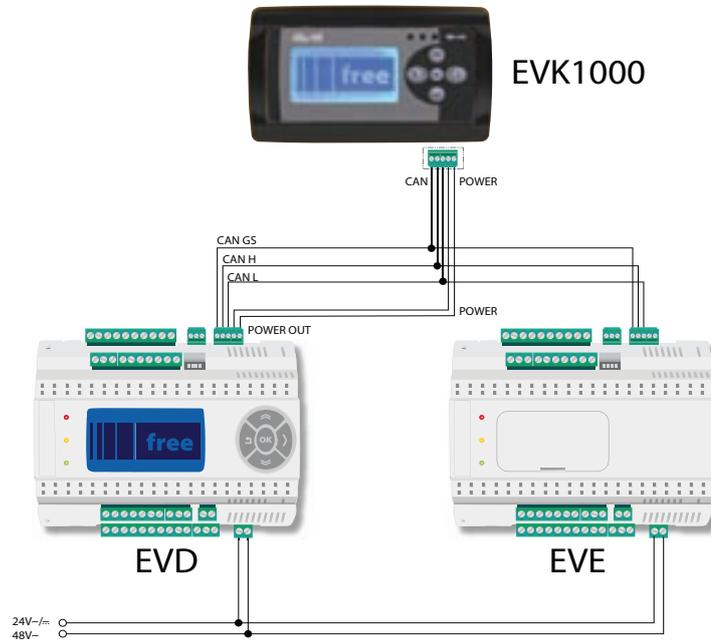
## ANALOGUE OUTPUTS



### 3.4 Serial connection examples

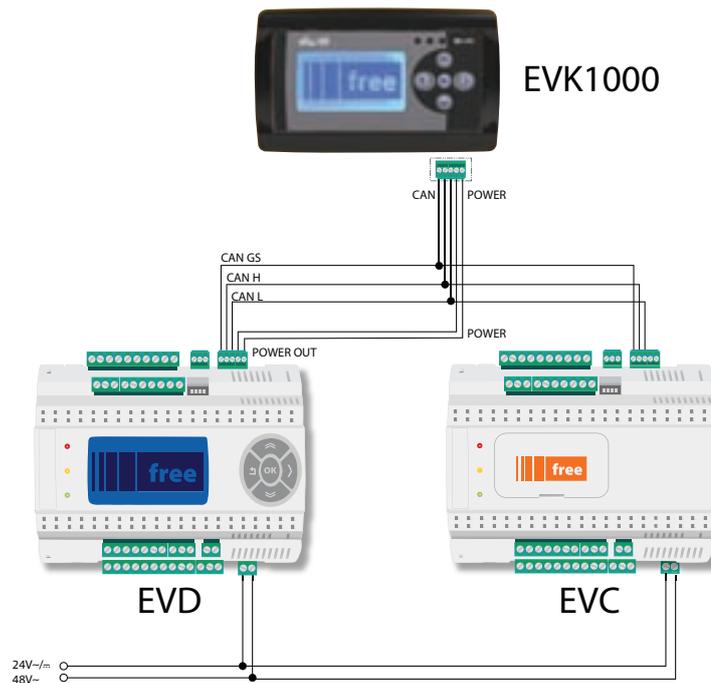
#### 3.4.1 CAN connection example 1 (Field)

- 1 FREE Evolution EVD
- 1 FREE Evolution EVE expansion connected in *CAN*
- 1 *EVK1000 terminal* connected in *CAN* to FREE Evolution EVD
  - The *EVK1000 terminal* is supplied by EVD via the POWER OUT output.



#### 3.4.2 CAN connection example 2 (Network)

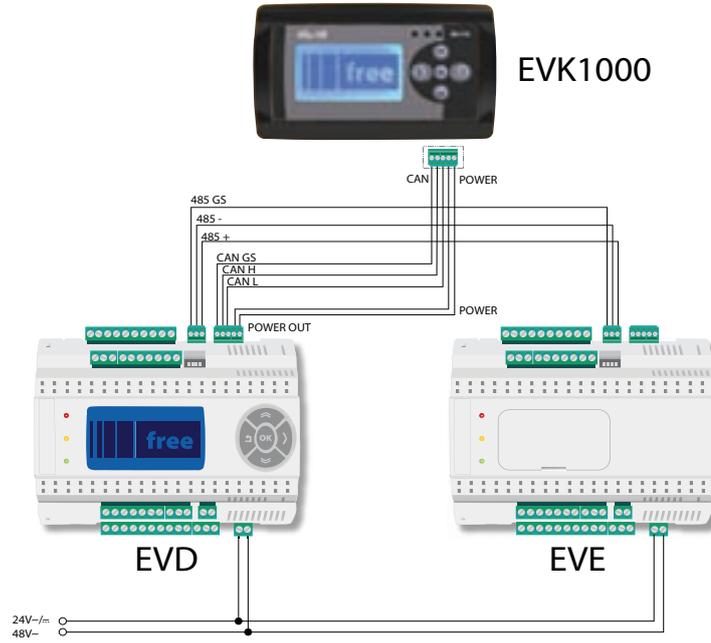
- 1 FREE Evolution EVD
- 1 FREE Evolution EVC connected in *CAN* (binding)
- 1 *EVK1000 terminal* connected in *CAN* to FREE Evolution EVD or, alternatively, to EVC
  - The *EVK1000 terminal* is supplied by EVD via the POWER OUT output.





### 3.4.3 RS485 connection example

- 1 FREE Evolution EVD
- 1 FREE Evolution EVE expansion connected in *RS485*
- 1 *EVK1000 terminal* connected in *CAN* to FREE Evolution EVD
  - The *EVK1000 terminal* is supplied by EVD via the POWER OUT output.



### 3.4.4 Example of RS485 connection with FREE smart network

#### FREE Evolution

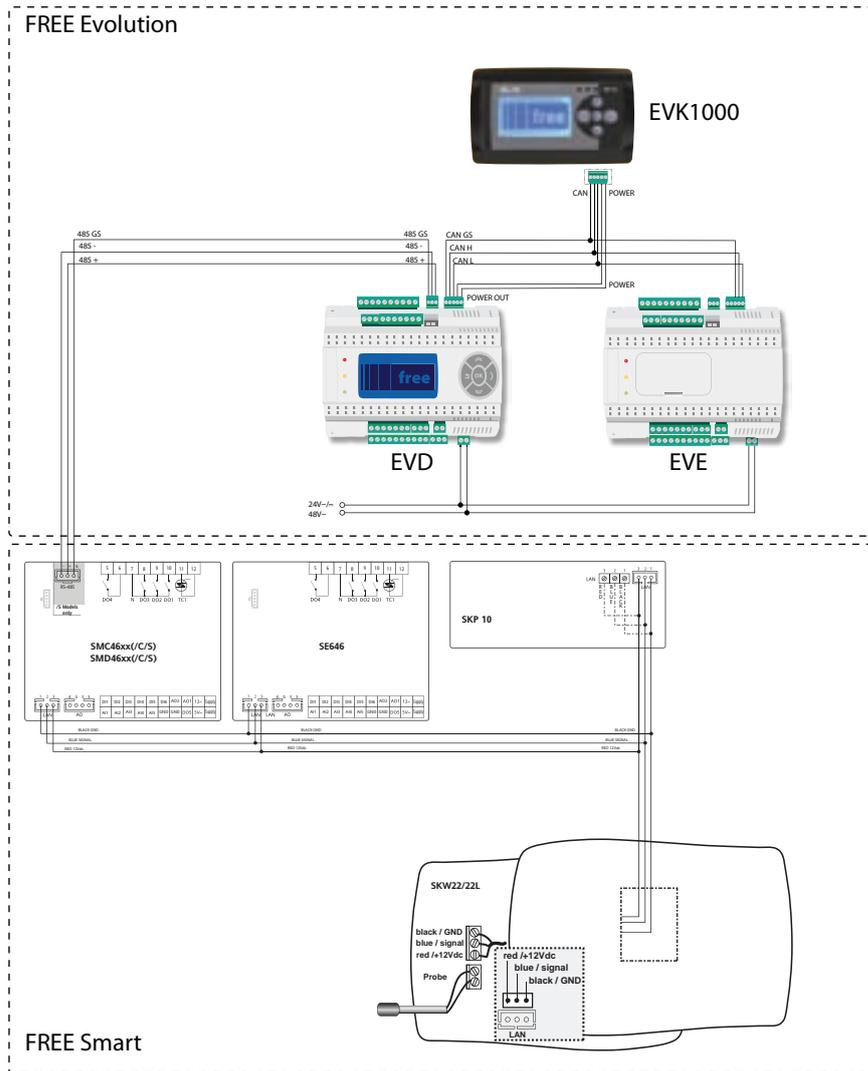
- 1 FREE Evolution EVD
- 1 FREE Evolution EVE expansion connected in CAN<sup>(°)</sup>
- 1 remote **EVK1000 terminal** connected in CAN to FREE Evolution EVD.
  - The remote **EVK1000 terminal** is supplied by EVD via the POWER OUT output.

(°) CAN connection may be

- Field, as of previous example
- Network while connecting one or more FREE Evolution EVD/EVC

#### FREE Smart

- 1 FREE Smart system (Modbus Slave) connected in RS485 with FREE Evolution (Modbus Master)
- FREE Smart system comprising SMC/SMD (model /S), SE expansion, remote terminals SKP10/SKW22\* connected in LAN\*\* network.
  - \*alternatively SKP22



- \*\*See FREE Smart for further details



### 3.5 EVS plug-in

*Plug-ins* are 2DIN modules that connect to a **FREE evolution EVD/EVC** or to an expansion **EVE\*** controller via the plug-in connector on the left side of the controller, behind the removable door. The plug-in is anchored to the controller with the fixing screws.

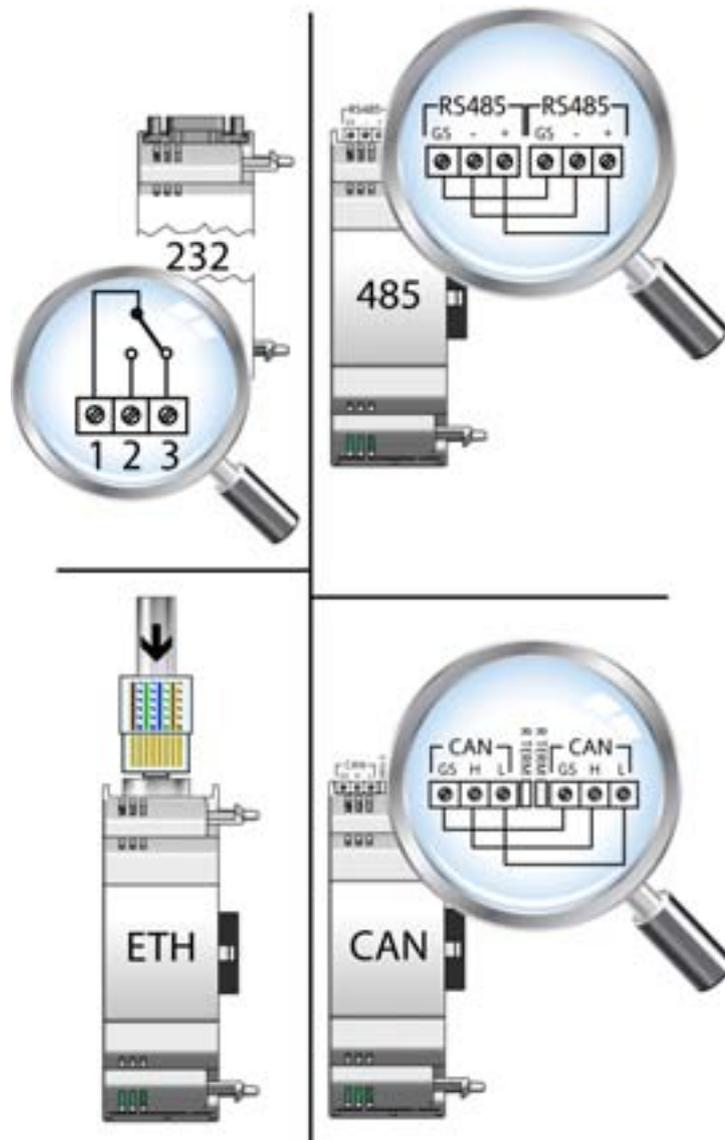
It assembles onto the DIN rail in the same way as the controller.

\*see [EVS vs EVE](#)

Plug-in	
<b>EVS RS232</b>	5A SPDT relay available
<b>EVS RS485</b>	<a href="#">RS485</a> dual network In parallel*
<b>EVS CAN</b>	<a href="#">CAN</a> dual network In parallel*
<b>EVS ETH (ETHERNET)</b>	The MACADDRESS is supplied inside the pack In barcode and 12 digit alphanumeric format The <a href="#">Ethernet</a> connector shield is internally connected to the earth of the instrument and therefore to the reference of the input and output channels
*We recommend the use of shielded cable. See <a href="#">Serial Connections</a>	

#### 3.5.1 EVS plug-in wiring diagrams

Power is supplied from FREE Evolution



**EVS RS232/R**

The RS232 plug-in enables **FREE Evolution EVD/EVC** to communicate over an RS232 serial

**Using the Modbus RTU communication protocol**

The connection allows:

- Connection to a monitoring system using the Modbus RTU protocol.
- Connection of an IEC 61131-3 **FREE Studio** development system.



**Using the Modbus ASCII communication protocol and or send/receive AT commands for modem<sup>(1)</sup>.**

This protocol is enabled only when a modem is connected to the plug-in

The connection allows:

- Connection to a monitoring system using the Modbus ASCII protocol.
- Connection of an IEC 61131-3 **FREE Studio\*** development system.
- Send/receive TXT messages via a modem connected to the RS232 port<sup>(2)</sup>.

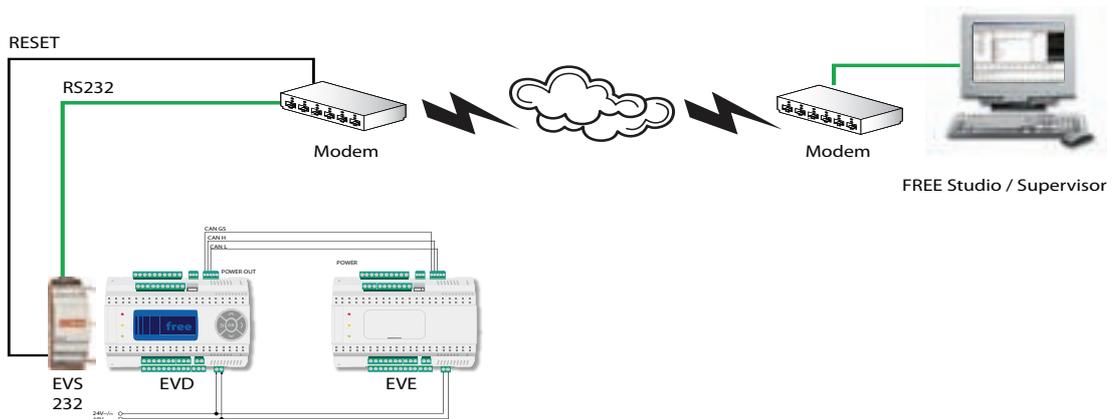
\*Note: The plug-in has a relay that *can* be piloted from the IEC application to allow the modem to be activated/reset or as an additional digital output.

<sup>(1)</sup> **for developers who use FREE Studio:** refer to the software library **Modem\_IEC.pll** located at <C:\<Programs>\Eliwell\free Studio\Catalog\FreeEvolution\PLC>

<sup>(2)</sup> **for developers who use FREE Studio:** refer to the software library **SMS\_IEC.pll** located at <C:\<Programs>\Eliwell\free Studio\Catalog\FreeEvolution\PLC>

NOTE: ref. [Parameters](#) chapter / RS232 PLUGIN PASSIVE *folder*

NOTE: ref. [Parameters](#) chapter / MODEM *folder*



**EVS ETH**

The *Ethernet* plug-in enables **FREE evolution EVD/EVC** to communicate on an *Ethernet* network using the Modbus TCP protocol.

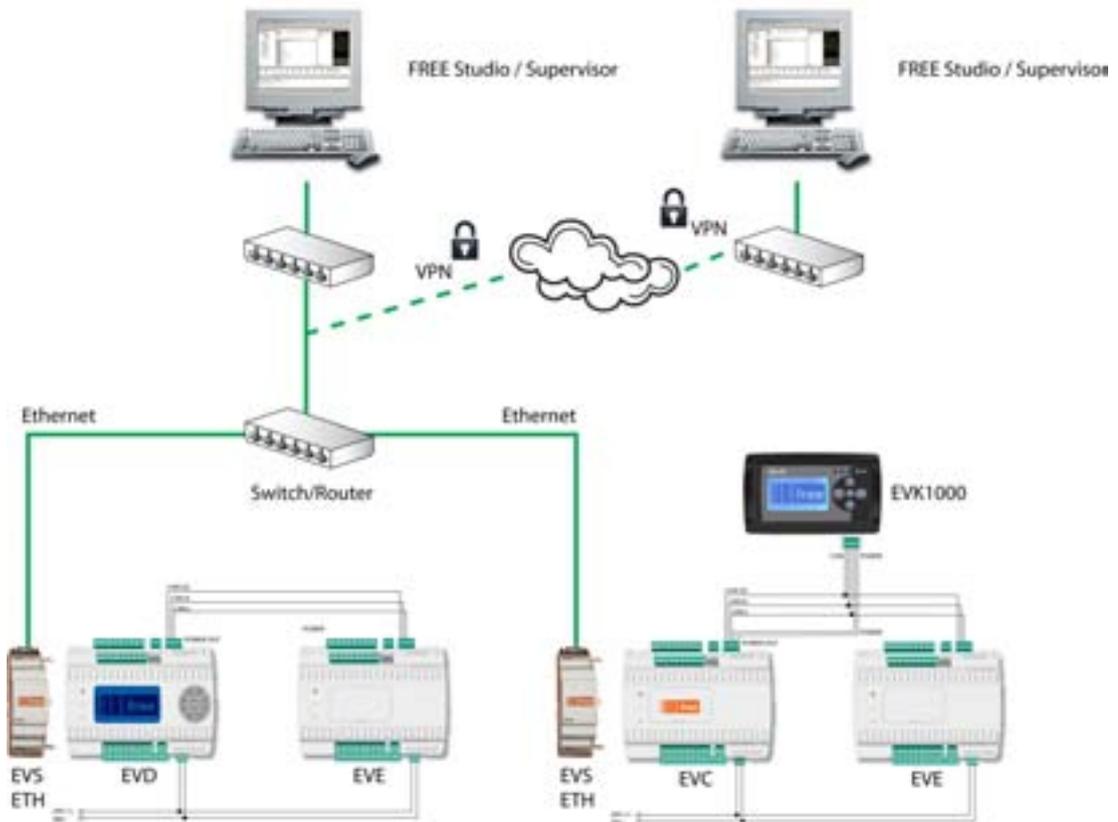
The connection allows:

- To connect different controllers and/or applications exchanging variables and/or *parameters* to be connected in a **network**.
- Connection to a monitoring system using the Modbus TCP protocol.
- Connection of an IEC 61131-3 **FREE Studio** development system.

NOTE: The MACADDRESS is supplied inside the pack In barcode and 12 digit alphanumeric format

NOTE: ref. *Parameters* chapter / *ETHERNET* PLUGIN PASSIVE *folder*

NOTE: The *Ethernet* connector shield is internally connected to the earth of the instrument and therefore to the reference of the input and output channels



**EVS RS485**

**EVS RS485**

The **RS485** plug-in enables **FREE Evolution EVD/EVC** to communicate over an **RS485** serial using the Modbus RTU Master/Slave communication protocol in addition to the **RS485** serial present on the base board.

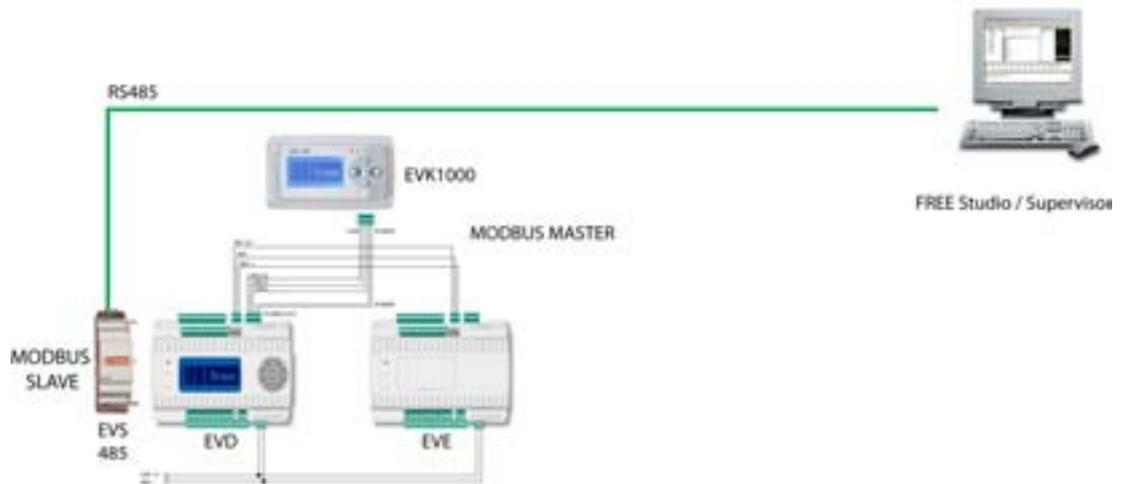
The connection allows:

- Connection to a monitoring system using the Modbus RTU protocol.
- Connection of an IEC 61131-3 **FREE Studio** development system.
- Connection to Modbus peripherals (i.e. expansion EVE)

Note: The **RS485 serials** are interchangeable. FREE Evolution manages only one of the two **serials** as Modbus Master.

Both **can** be Modbus Slave

NOTE: ref. [Parameters](#) chapter / **RS485 PLUGIN PASSIVE** folder



**EVS CANOpen**

***EVS CANOpen***

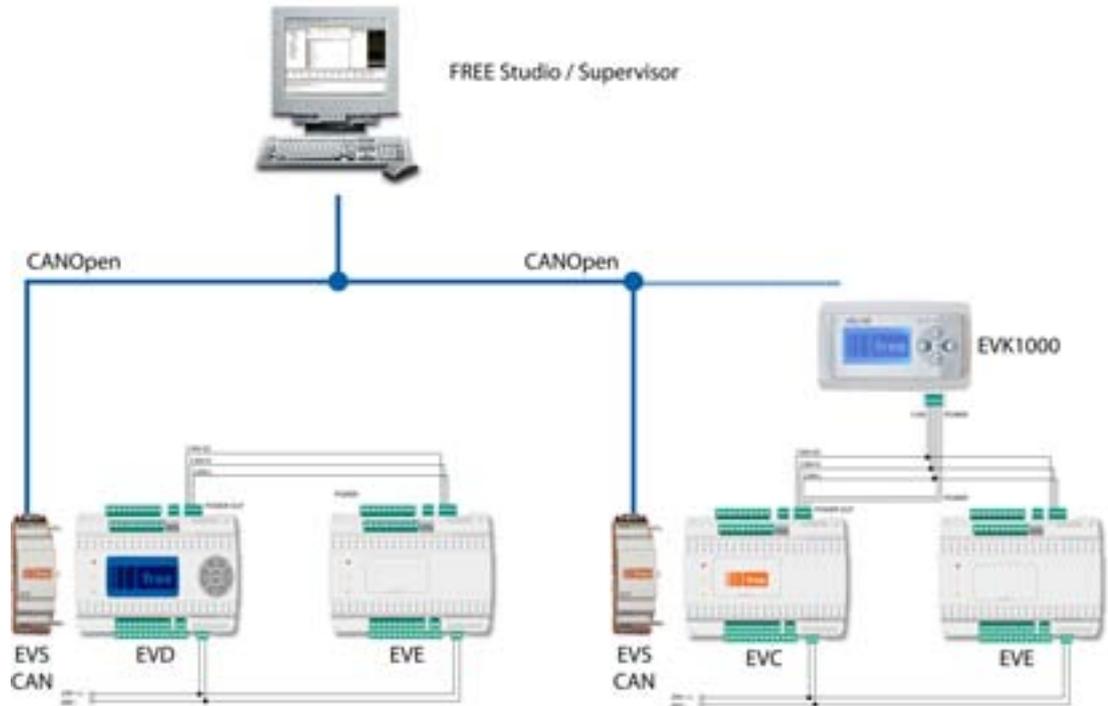
The CANOpen plug-in enables **FREE evolution EVD/EVC** to communicate over an **CAN** serial using the CANOpen communication protocol in addition to the **CAN** serial present on the base board.

The connection allows:

- Connection to a monitoring system using the CANOpen protocol.
- Connection of an IEC 61131-3 **FREE Studio** development system.
- Connection to expansions EVE
- Connection to **EVK1000 terminals**

Note: The CANOpen *serials* are interchangeable. FREE Evolution manages only one of the two *serials* to pilot expansions or third party devices.

NOTE: ref. *Parameters* chapter / **CAN PLUGIN PASSIVE** folder



**EVS vs EVE**

***EVS vs EVE***

The *plug-ins can* connect to an **EVE expansion module** with certain restrictions. See the following table:

Plug-in	Connection with EVE
<b>EVS RS232</b>	Modbus RTU only Cannot connect to a modem (Modbus ASCII)
<b><i>EVS RS485</i></b>	SLAVE only
<b><i>EVS ETH (ETHERNET)</i></b>	NO
<b>EVS CAN</b>	SLAVE only OnBoard <b>CAN</b> serial NOT usable



## 4 TECHNICAL DATA

### 4.1 General specifications

	Standard	Min.	Max.
Supply voltage*	24V~/... ±20% or 48V~/... ±20%	21V	60V
Power supply frequency	50Hz/60Hz	---	---
Power draw	18W	---	---
Power draw <i>EVK1000 terminal</i>	5W	---	---
Insulation class	2	---	---
Ambient operating temperature	25°C	-10°C	55°C
Ambient operating temperature <i>EVK1000 terminal</i>	25°C	-5°C	55°C
Ambient operating humidity (non-condensing)	30%	10%	90%
Storage temperature	25°C	-20°C	85°C
Ambient storage humidity (non-condensing)	30%	10%	90%

\*Note EVK1000: supply from FREE Evolution EVD/EVC or independent from mains  
Note: cable must be no longer than 10m.

Classification	
The product meets the requirements of the following: European Community Directives	Directive 2006/95/EC Directive 89/108/EC
and complies with the following harmonised regulations	EN 60730-2-6 / EN 60730-2-9 / EN 60730-1
Use	in terms of construction, as a independently mounted temperature-sensitive automatic electronic controller
Mounting	Panel or on DIN Omega bar support
Type of action	1.B
Pollution class	2 (normal)
Overvoltage category	II
Nominal pulse voltage	2500V
<i>Digital outputs</i>	Refer to the <i>label</i> on the device
Fire resistance category	D
Software class and structure	A
Type of disconnection or suspension for each circuit	Microswitch disconnection
PTI of materials used for insulation:	PTI 250V
Period of electrical stress on the insulating parts	Long period

### 4.2 I/O features

Type and <i>Label</i>	Nr.	Description	7500 75MP	75SS
<i>Digital inputs</i> low voltage (SELV) <b>DI1...DI8</b>	8	8 optoisolated voltage inputs 50/60KZ mains frequency or DC signal	x	x
Digital input <b>FAST DI</b>	1	1 no-voltage digital input (Pulse counter)	x	x
Relay <i>digital outputs</i> High voltage <b>DO1 DO2</b>	7	2 x 8A 250V~ relays	x	-
Relay <i>digital outputs</i> High voltage <b>DO3...DO7</b>		5 x 5A 250V~ relays	x	-
Relay <i>digital outputs</i> High voltage <b>DO1 DO2</b>	5	2 x 8A 250V~ relays	-	x
Relay <i>digital outputs</i> High voltage <b>DO5 DO6 DO7</b>		3 x 5A 250V~ relays	-	x
SSR <i>digital outputs</i> High voltage <b>DO3 DO4</b>	2	2 x 1A 250V~ SSR	-	x

Type and <i>Label</i>	Nr.	Description	7500 75MP	75SS
<i>Analogue outputs</i> low voltage (SELV) <b>AO1...AO5</b>	5	5 x 0-10V / 4..20mA / ON-OFF configurable outputs  <b>0-10V</b> 2% f.s. Load min 500Ω; 1% f.s with load over 5KΩ  <b>4..20mA</b> 2% f.s. Load up to 400Ω  <b>ON-OFF</b> Load up to 400Ω	x	x
5 <i>Analogue inputs</i> <b>AI1 AI2</b>	2	2 configurable inputs: a) NTC temperature 103AT 10kΩ, measurement <i>range</i> - 50°C ÷ 110°C (-58...230°F); b) NTC temperature NK103 10kΩ, measurement <i>range</i> - 40...+150°C (-40...302°F) c) no voltage digital input	x	x
<i>Analogue inputs</i> <b>AI3 AI4</b>  <b>AI5 AI6</b>	4	4 configurable inputs: a) NTC temperature 103AT 10kΩ, measurement <i>range</i> - 50°C ÷ 110°C (-58...230°F); b) NTC temperature NK103 10kΩ, measurement <i>range</i> - 40...+150°C (-40...302°F) c) no voltage digital input d) Pt1000 temperature measurement <i>range</i> -200...+800°C (-328...1472°F) e) Current input 4...20 mA /voltage input 0-10V/0-5V ratiometric (*) <i>Range</i> 0... 1000 (*) 50mA maximum current @5V f) hΩ(NTC) g) daΩ(PT1000)  Accuracy: (a) (b) (d) 0.5% full scale + 1 digit (e) 1% full scale + 1 digit  Resolution: (a) (b) (d) 0.1°C (e) 1 digit  Input impedance (e): • 0-10V and 0-5V: 21KOhm • 4...20mA: 100Ohm	x	x

### 4.3 Display

EVD *models* and remote terminal:

- backlit with LEDs +
- 3 LEDs

Note: LED and backlighting *can* be controlled from IEC application

#### 4.3.1 Display EVK1000

Front Protection: IP65 on the front

*Display*: LCD monochromatic graphic *display* 128x64px backlit with LEDs

Container: bottom + frame PC+ABS UL94 V-0 plastic resing casing, front transparent polycarbonate, keypad polyester membrane

### 4.4 Serials

Serial	Description	Notes	Models
<i>CAN</i>	Open opto-isolated serial <i>CAN</i>	max50m@500kpbs 200m@125kpbs	All <i>models</i> + <i>EVK1000 terminal</i>
RS-485	RS-485 opto-isolated serial		EVD EVC EVE <i>models</i> 7500 75SS
MPBUS	MPBUS serial to pilot up to 8 Belimo actuators		EVD EVC <i>models</i> 75MP
<i>USB</i>	<ul style="list-style-type: none"> <li>• 1 type A (HOST) female <i>USB</i> connector</li> <li>• 1 type B (DEVICE) female mini <i>USB</i> connector</li> </ul>	'Mass Stotage' Profile External memory Formatted <b>FAT32</b> Up to <b>2TB</b>	<i>/U models</i>

### 4.5 Transformer

The instrument must be connected to a suitable current *transformer* with the following features:

- Primary voltage: Depending on requirements of individual device and/or country of installation.
- Secondary voltage: 24V~/= - 48V= ±20%
- Power supply frequency V~: 50/60Hz
- Power: 18W min.

### 4.6 EVS plug-in

	Serial	Notes	<i>terminals</i>
EVS RS232	RS232 null modem	<i>Digital outputs</i> 1 relay SPDT 5A 250V~	<i>terminals</i> 1...3 removable, screw type*, pitch 5, 90° insertion for cables with 2.5 mm <sup>2</sup> cross-section + DB9 connector
EVSCAN	dual serial port in parallel	Open opto-isolated <i>CAN</i> serial	removable screw-type*, pitch 3.81, 90° insertion for cables with 2.5 mm <sup>2</sup> cross- section
EVS RS-485	dual serial port in parallel	RS-485 opto-isolated serial	
<i>EVS ETH</i>	Modbus TCP <i>ETHERNET</i> port	MPBUS serial to pilot up to 8 Belimo actuators	RJ45 connector

\*available spring-loaded from semi-finished product  
Power supply: from EVD/EVC power board

### 4.7 Mechanical dimensions

FREE EVOLUTION EVD/EVC/EVE	Length (L) mm	Depth (d) mm	Height (H) mm	Notes
Space required	140	61.6	110	
Plug-in	Length (L) mm	Depth (d) mm	Height (H) mm	Notes
Plug-in EVS	35	61.6	110	
Terminal EVK1000	Length (L) mm	Depth (d) mm	Height (H) mm	Notes
Space required	160	10	96	
Hole for panel wall-mounting Remote terminal	68	/	138	(+0.2mm / -0.1mm)

#### 4.8 Permitted use

For safety reasons, the instrument must be installed and used according to the instructions provided. In particular, parts carrying dangerous voltages must not be accessible under normal operating 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 suitable for use in household refrigeration appliances and/or similar equipment and has been tested for safety aspects in accordance with the harmonized European reference standards

#### 4.9 Improper Use

**Any use other than that expressly permitted is prohibited.**

The relay contacts supplied are of the functional type and subject to fault (since they are electronically controlled they are prone to short-circuiting or remaining open). Any protection devices specified in product standards or suggested by common sense for obvious safety requirements must be installed externally to the device.

Eliwell is not liable for damage caused by:

- 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 in which dangerous components *can* be accessed without the use of specific tools.
- Installation/use on equipment which does not comply with established legislation and standards.

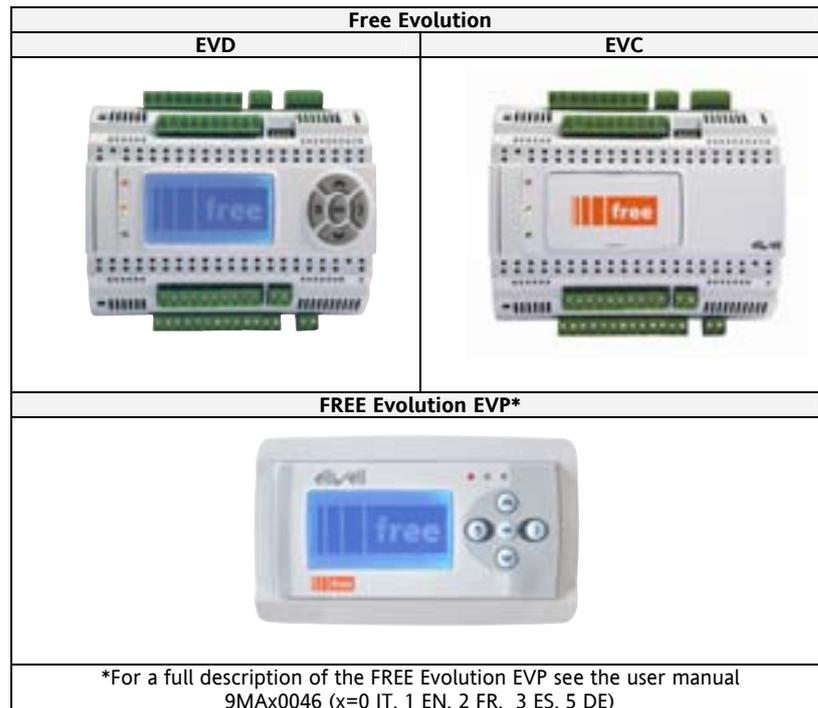
#### 4.10 Disclaimer

This document is the exclusive property of **Eliwell Controls srl** and may not be reproduced or circulated unless expressly authorized by **Eliwell Controls srl** itself.

Every care has been taken in preparing this document; however, **Eliwell Controls srl** cannot accept liability for any damage resulting from its use.

## 5 USER INTERFACE

The front panel of the device serves as the *user interface* and is used to perform all operations relating to the device.

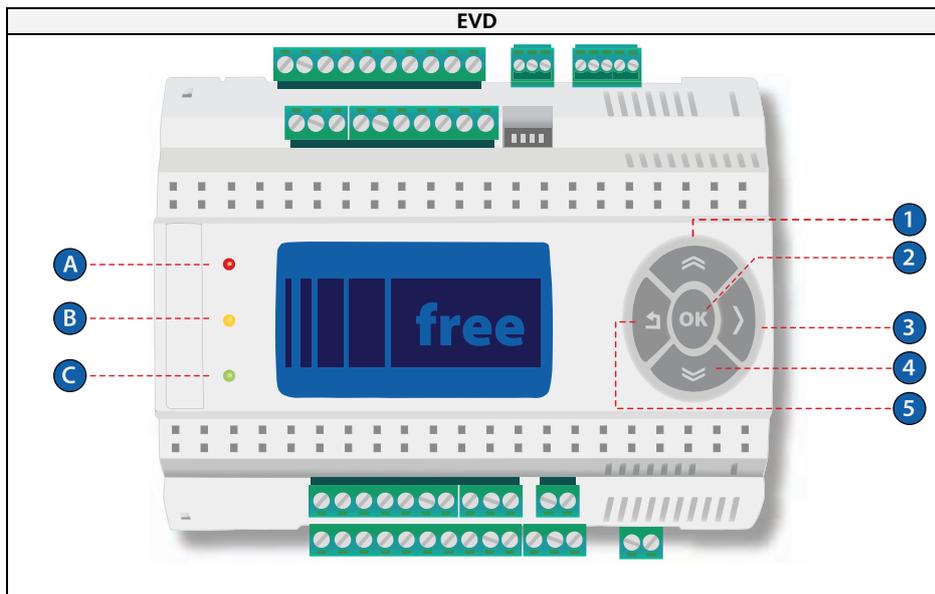


N.B.:

- The EVC module has no *display*. To work on the device, use the remote EVK terminal.
- The EVE expansion module has no *display*.

## 5.1 Keys

The data provided refers to EVD *models*.



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

Key	Key	Press once (press and release)
1	UP	<ul style="list-style-type: none"> <li>• Scroll up.</li> <li>• Increase/modify a value.</li> <li>• Go to the next <i>label</i>.</li> </ul>
2	OK	<ul style="list-style-type: none"> <li>• Scroll down.</li> <li>• Move to next level/<i>menu</i> (open <i>folder</i>, subfolder, parameter, value).</li> <li>• Enter/exit edit mode.</li> <li>• Confirm operation.</li> </ul>
3		<ul style="list-style-type: none"> <li>• Moves cursor to right in Edit Mode.</li> </ul>
4	DOWN	<ul style="list-style-type: none"> <li>• Scroll down.</li> <li>• Decrease/modify a value.</li> <li>• Goes to the previous <i>label</i></li> </ul>
5	Exit	<ul style="list-style-type: none"> <li>• Exit <i>menu</i> page / go back to previous <i>menu</i>.</li> <li>• Moves cursor to left in Edit Mode.</li> <li>• (press and hold) Exit Edit Mode without saving any changes.</li> </ul>

All LEDs are fully programmable via IEC application.

As *default* they are used only for *USB* management – see related paragraph *USB-Handling*

## 5.2 First power on

On powering up the controller for the first time, a few summary pages are displayed showing system status (**SYSTEM INFO**)

SYSTEM INFO	
HW	
BIOS	
DATE	
BOOT	

NOR FLASH	OK
NOR FLASH	OK
SDRAM	OK
BATRAM	OK
RTC	OK
PlugIn	None
USB-H	OK
USB-D	Load service

## 5.3 Menu

By factory *default*, Free Evolution has a minimal *system menu* to configure inputs/outputs, *display* I/O values and *USB* operations where present (/U *models*).  
The *menu* is only available in English.

### 5.3.1 System Menu

System Menu
<a href="#">BIOS Configuration</a>
<a href="#">BIOS I/O Values</a>
<a href="#">BIOS RTC Values</a>
<a href="#">USB-Host Handling</a>

### 5.3.2 BIOS Configuration

Parameter configuration *menu*. See *Parameters* chapter.

BIOS Configuration
Analog Input
Analog Output
<a href="#">RS485</a> On Board
<a href="#">CAN</a> On Board

The table below lists the *parameters* that *can* be configured from the LCD *display* (EVD model) and/or remote EVK terminal.

The *menu* for parameter configuration is **System Menu > BIOS Configuration**

<a href="#">BIOS Configuration</a>	Parameter Folder
Analog Input	ANALOGUE INPUTS
Analog Output	ANALOGUE OUTPUTS V/I
<a href="#">RS485</a> On Board	<a href="#">RS485</a> ON BOARD
<a href="#">CAN</a> On Board	<a href="#">CAN</a> ON BOARD

### 5.3.3 BIOS I/O Values

Shows input (read only) and output values (modifiable).

BIOS I/O Values	
Analog Input	
Analog Output	
Digital Output	
Digital Input	

Inputs are read only. Digital input example:

Digital Input	
D11 Off	D15 Off
D12 Off	D16 Off
D13 Off	D17 Off
D14 Off	D18 Off

The analogue and *digital outputs* are modifiable.

Scroll to the resource required.

Press the OK key to enter Edit Mode. Use the UP and DOWN *keys* to modify value. Confirm with the OK key.

*Analogue outputs* example

Analogue Output 1/2	
AO1	0.2 %
AO2	0.0 %
AO3	0.0 %
V Prev	Next ^

Digital outputs example

Digital Output	
DO1 On	DO5 Off
DO2 Off	DO6 Off
DO3 Off	DO7 Off
DO4 Off	

#### 5.3.3.1 BIOS RTC Values

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

BIOS RTC Values	
16 : 50 : 56	
30 / 10 / 10	
RTC set	

Press the OK key.

Scroll to the value required.

Press the OK key to enter Edit Mode. Use the UP and DOWN *keys* to modify value. Confirm with the OK key.

Scroll to RTC update and press the OK key to update clock

BIOS RTC Values	
17 : 50 : 56	
31 / 10 / 10	
RTC update	



### 5.3.3.2 USB-Host Handling

Only *models* with *USB* (/U *models*)

N.B.: the two USBs should not be used at the same time.



USB -> FREE EVOLUTION

#### *USB -> FREE EVOLUTION* Note. *USB* type A (Host)

*Menu* that allows you to upload *parameters*, applications and menus from PC to Free Evolution.

The operation should be done individually for each Free Studio development environment and for BIOS *parameters*:

- **Application:**
- *User Interface*
- **Connection**
- *Parameters*

FREE EVOLUTION -> USB

#### *FREE EVOLUTION --> USB* Note. *USB* type mini B (Device)

*Menu* that allows you to download *parameters* to PC.

This should only be done for BIOS *parameters*:

- *Parameters*

#### **USB tipo A (Host)**

Connect *USB* to the PC

Check *USB* formatting: it should be FAT32:

Select Computer resources

Click the right mouse button on Removable Disc

Select Properties and check File Sytem type: FAT32

Add to *USB* key the following files:

file	Development environment	description	notes
HMIIEC.COD	<i>User Interface</i>	<i>Menu</i>	Available after Evolution reboot
PLCIEC.COD	Application	IEC Application	
CONNEX.PAR	Connection	Network configurationFile	
PARAM.BIN	<i>Parameters</i>	<i>parameters</i>	<b>USB type A (Host)</b> 'immediate' update without need to reboot
PARAM.DAT	<i>Parameters</i>	<i>parameters</i>	<b>USB type mini B (Device)</b> 'immediate' update without need to reboot

Note. Using two or more Evolution update will be managed through dipswitch settings

File naming will have prefix 00, 01, 02, 03 etc and Evolution will load related file only if the number matches with dipswitch settings

Example1. 4 files on *USB* key. Please note files PARAM.BIN & 00PARAM.BIN are the same file

Files available on <i>USB</i> key	Dipswitch Evolution	description	notes
PARAM.BIN	00	<i>Parameters</i> ' file downloaded on Evolution	See previous table
00PARAM.BIN	01	File ignored (not downloaded)	
01PARAM.BIN	01	<i>Parameters</i> ' file downloaded on Evolution	
02PARAM.BIN	01	File ignored (not downloaded)	
02PARAM.BIN	02	<i>Parameters</i> ' file downloaded on Evolution	

Example2.1 file on *USB* key

Files available on <i>USB</i> key	dipswitch	description	notes
02PARAM.BIN	01	File ignored (not downloaded)	'File not present' Message will appear

**USB -> FREE EVOLUTION**

Connect *USB* key  
Select *USB -> FREE EVOLUTION*  
Select the item required



If download has been successful following messages will appear



N.B. If there is no file the following message will be displayed:



N.B. If there is no *USB* key, the following message will be displayed:



## 6 PHYSICAL I/O CONFIGURATION

### 6.1 Analogue inputs

#### Free Evolution Analogue Inputs

The *analogue inputs* referred to below as AI1...AI6 are 6 in total.

Using the *parameters*, a physical resource (probe, digital input, voltage/current signal) *can* be "physically" 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 "physically" configured as specified in the table below.

#### Analogue inputs: table

Parameter	Description	Value								
		0	1	2	3	4	5	6	7	8
Cfg_AI1	Analogue input type AI1	NTC sensor (NK103)	Probe configured as no voltage digital input	NTC probe (103AT)	//	//	//	//	//	//
Cfg_AI2	Analogue input type AI2	NTC sensor (NK103)	Probe configured as no voltage digital input	NTC sensor (103AT)	//	//	//	//	//	//
Cfg_AI3	Analogue input type AI3	NTC sensor (NK103)	Probe configured as no voltage digital input	NTC sensor (103AT)	4-20 mA	0-10 V	0-5 V ratiometric	PT1000	hΩ(NTC) (*)	daΩ (PT1000) (**)
Cfg_AI4	Analogue input type AI4	NTC sensor (NK103)	Probe configured as no voltage digital input	NTC sensor (103AT)	4-20 mA	0-10 V	0-5 V ratiometric	PT1000	hΩ(NTC)	daΩ (PT1000)
Cfg_AI5	Analogue input type AI5	NTC sensor (NK103)	Probe configured as no voltage digital input	NTC sensor (103AT)	4-20 mA	0-10 V	0-5 V ratiometric	PT1000	hΩ(NTC)	daΩ (PT1000)
Cfg_AI6	Analogue input type AI6	NTC sensor (NK103)	Probe configured as no voltage digital input	NTC sensor (103AT)	4-20 mA	0-10 V	0-5 V ratiometric	PT1000	hΩ(NTC)	daΩ (PT1000)

NOTE: // indicates that value is not present.

(\*) Cfg\_AIx = 7: resistive value read, expressed in hΩ, for a resistance applied to the input using the controller in NTC configuration, i.e. **creating a divider with a pull-up resistance of 10k**.

(\*) Cfg\_AIx = 8: resistive value read, expressed in daΩ, for a resistance applied to the input using the controller in PT1000 configuration, i.e. **creating a divider with a pull-up resistance of 1.66k**.

Please Note. Typical use with a trimmer applied to the input

Resistance *range* for hΩ(NTC) configuration is up to 150K, while for daΩ(PT1000) configuration is up to 30K.

Parameter	range	Description
FullScaleMin AI3	-9999...+9999	Analogue input AI3 start of scale value
FullScaleMax AI3	-9999...+9999	Analogue input AI3 full scale value
FullScaleMin AI4	-9999...+9999	Analogue input AI4 start of scale value
FullScaleMax AI4	-9999...+9999	Analogue input AI4 full scale value
FullScaleMin AI5	-9999...+9999	Analogue input AI5 start of scale value
FullScaleMax AI5	-9999...+9999	Analogue input AI5 full scale value
FullScaleMin AI6	-9999...+9999	Analogue input AI6 start of scale value
FullScaleMax AI6	-9999...+9999	Analogue input AI6 full scale value

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

Parameter	Description	Measurement Unit	Range
<b>Calibration AI1</b>	Analogue input AI1 differential	°C/10 or °F/10	-180 ... 180
<b>Calibration AI2</b>	Analogue input AI2 differential	°C/10 or °F/10	-180 ... 180
<b>Calibration AI3</b>	Analogue input AI3 differential		-1000 ... 1000
<b>Calibration AI4</b>	Analogue input AI4 differential		-1000 ... 1000
<b>Calibration AI5</b>	Analogue input AI5 differential		-1000 ... 1000
<b>Calibration AI6</b>	AI6 analogue input differential		-1000 ... 1000

## 6.2 Digital Inputs

### Digital Inputs

There are 8 low-voltage *digital inputs*, identified below as DI1...DI8:

They are grouped as:

- DI1...DI4
- DI5...DI8

Each with their own

There is also a fast, no-voltage digital input that acts as a pulse counter, i.e

- it detects when the contact applied to the input closes
- reads the relative frequency from 0.1Hz up to a maximum of 1KHz

## 6.3 Digital Outputs

### Digital Outputs

See the *Electrical Connections* chapter for the number and capacity of relays and/or SSR depending on the model, 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 *models* EVD/EVC75SS there are 5 high voltage outputs (relays) identified as DO1...DO3, DO6, DO7 whereas there are 2 SSR outputs identified as DO3...DO4.

## 6.4 Analogue Outputs

### Analogue Outputs

See the chapter on Electric Connections for the number and type of *analogue outputs* used and for information on the symbols used on labels supplied with the controller.

There are 5 extra-low voltage (SELV) *analogue outputs* with the following characteristics:

### Configuration of low voltage (SELV) analogue output

AO1/AO5	AO2	AO3	AO4
Always available Current/voltage output Low voltage (SELV) AO1 and AO5 are configured in pairs	Always available Current/voltage output Low voltage (SELV)	Always available Current/voltage output Low voltage (SELV)	Always available Current/voltage output Low voltage (SELV)
Configurable as: <ul style="list-style-type: none"> <li>• 0 = 4-20mA current analogue output</li> <li>• Output configured as 0...20mA switch (ON= max 20mA, OFF=0mA) for piloting switch loads such as ON/OFF.</li> <li>• 0-10V voltage analogue output</li> </ul>			

## 6.5 DIP Switches

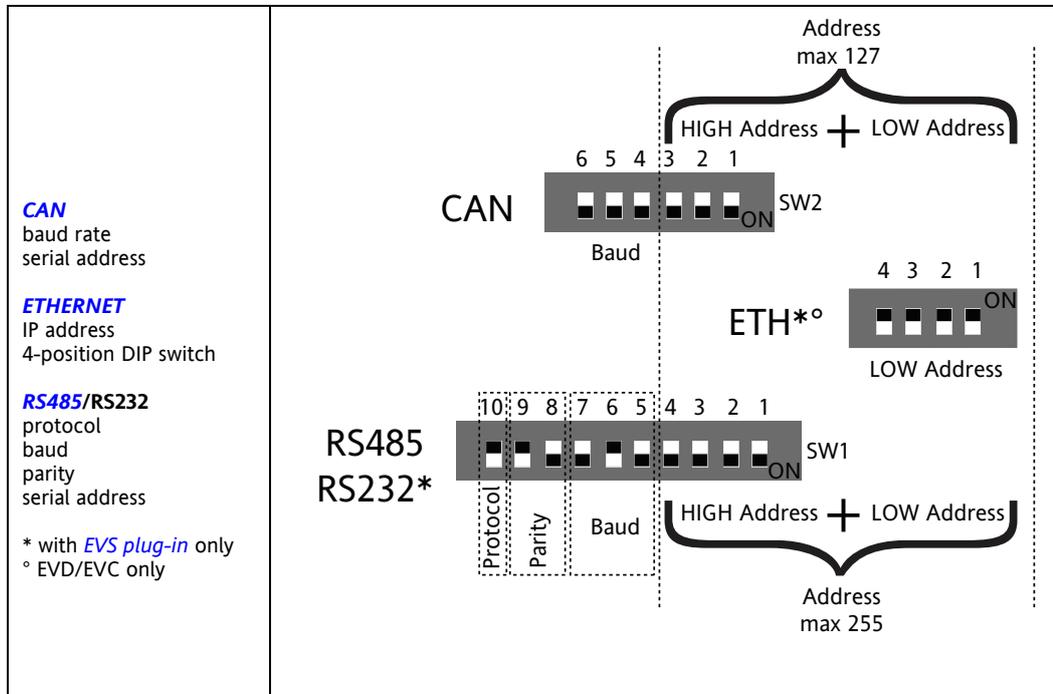
All *models* have a 4-position DIP switch

The EVC *models* and EVE expansion modules have, behind the door on the front panel:

- a 6-position DIP switch
- a 10-position DIP switch

Open the door with a slotted screwdriver or the nail of your index finger.

After making the configuration setting, close the front panel simply by pressing with your finger.



### Default values for expansion EVE

<b>CAN</b> baud rate serial address	500Kb/s 1
<b>RS485/RS232</b> protocol baud parity serial address	Modbus/RTU 28400 Kb/s EVEN 1

#### 4-position DIP switch

Used for serial addressing

The address will be defined by the sum of the value of a parameter(\*) plus the value defined by the DIP switch (16 addresses)

	address	DIP value	4-position DIP			
			DIP4	3	2	1
Serial Addressing	1	0	0	0	0	0
	2	1	0	0	0	1
	3	2	0	0	1	0
	...					
	16	15	1	1	1	1
OFF=0 / ON=1						

parameter	address		
	Parameter default(*)	LOW address	
<b>OnBoard serials</b>			
Addr <i>RS485</i> OB	1	+ 4-position DIP switch	
Addr <i>CAN</i> OB	1		
<b>Plug-In serials</b>			
Addr <i>RS485</i> PI	1		
Addr <i>CAN</i> PI	1		
Addr <i>RS232</i> PI	1		
Ip <b>1</b> <i>ETH</i> PI	1		

(\*) for the EVE expansion module the *default* cannot be modified

#### 6.5.1 DIP Switch Table for EVC models and EVE expansion modules

##### 6-position DIP switch

	baud	DIP value	DIP6	5	4	3	2	1
250	1	0	0	1	//	//	//	
125	2	0	1	0	//	//	//	
125	3	0	1	1	//	//	//	
50	4	1	0	0	//	//	//	

##### 6-position DIP switch + 4-position DIP switch

The address will be defined by the sum of the value of the two 6- and 4-position *DIP switches* (127 addresses)

	address	DIP value	6-position DIP HIGH address						4-position DIP LOW address			
			DIP6	5	4	3	2	1	DIP4	3	2	1
Serial Addressing <i>CAN</i>	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
	...											
	127	126	//	//	//	1	1	1	1	1	1	0

10-position DIP switch

	protocol	DIP value	DIP10	9	8	7	6	5	4	3	2	1
Protocol selection	Reserved for Eliwell	0	0	//	//	//	//	//	//	//	//	//
	Modbus RTU	1	1	//	//	//	//	//	//	//	//	//
RS232/RS485 parity selection	Null	0	//	0	0	//	//	//	//	//	//	//
	Odd	1	//	0	1	//	//	//	//	//	//	//
	Even	2	//	1	0	//	//	//	//	//	//	//
RS232/RS485 baud rate selection	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	//	//	//	//

10-position DIP switch + 4-position DIP switch

The address will be defined by the sum of the value of the two 6- and 4-position *DIP switches* (255 addresses)

	address	DIP value	10-position DIP HIGH address							4-position DIP LOW address							
			DIP10	9	8	7	6	5	DIP4	3	2	1	DIP4	3	2	1	
RS232/RS485 Serial Addressing	1	0	//	//	//	//	//	//	0	0	0	0	0	0	0	0	0
	2	1	//	//	//	//	//	//	0	0	0	0	0	0	0	0	1
	3	2	//	//	//	//	//	//	0	0	0	0	0	0	0	1	0
	...																
	255	254	//	//	//	//	//	//	//	1	1	1	1	1	1	1	0

NOTE: Different DIP switch combinations from those listed are not permitted

## 7 PARAMETERS

The *parameters can* be set to fully configure FREE Evolution.

They *can* be modified with:

- *Keys* on the EVD front panel or remote EVK panel.
- PC and Free Studio software

The following sections analyze each parameter, divided into categories (folders), in detail.

### 7.1 Parameter table

The following table shows all configuration *parameters* for the controller saved in the non-volatile memory.

#### Description of columns:

**FOLDER** This indicates the *label* of the *folder* containing the parameter in question. Certain folders are not available for the EVE expansion module. See the following table

<i>FOLDER</i>	EVD	EVE
ACKNOWLEDGEMENT	x	x
CALIBRATION AI	x	x
CALIBRATION AO	x	x
<i>ANALOGUE INPUTS</i>	x	x
<i>ANALOGUE OUTPUTS V/I</i>	x	x
<i>RS485 ON BOARD</i>	x	NO
<i>CAN ON BOARD</i>	x	NO
<i>RS485 PLUGIN PASSIVE</i>	x	NO
<i>CAN PLUGIN PASSIVE</i>	x	NO
RS232 PLUGIN PASSIVE	x	NO
<i>ETHERNET PLUGIN PASSIVE</i>	x	NO
<i>Display</i>	x	NO
Modem	x	NO

**LABEL** This indicates the *label* used to *display* the *parameters* in the *menu* of the controller.

**VALUE PAR ADDRESS** Indicates the address of the modbus register containing the resource that you want to access.

**RESET (Y/N)** Indicates whether the device **MUST** be rebooted after the parameter has been modified.

- Y=YES the device **MUST** be switched off then back on again to modify the parameter.
- N=NO the device DOESN'T need to be switched off then back on again to modify the parameter

**R/W** Indicates if resources are read/write, read-only or write-only:

R The resource is read-only.  
W The resource is write-only.  
RW The resource *can* be both read and written.

**DATA SIZE** Indicates the size of the data in bits.

**CPL** When the field indicates "-1", the value read by the register requires conversion, because the value represents a number with a sign. In the other cases the value is always positive or null.  
To carry out conversion, proceed as follows:

- If the value in the register is between 0 and 32.767, the result is the value itself (zero and positive values).
- If the value in the register is between 32.768 and 65.535, the result is the value of the register – 65.536 (negative values).

**RANGE** Describes the interval of values that *can* be assigned to the parameter. It *can* be correlated with other instrument *parameters* (indicated with the parameter *label*).

**DEFAULT** Indicates the factory setting for the standard model of the instrument.

**U.M.** Unit of measure for values converted according to the rules indicated in the *CPL* column. The unit of measure shown is for example purposes only, as it may change depending on the application (e.g. *parameters* with an UoM in °C/bar could also have %RH).

#### 7.1.1 Parameter table

(See next page)



EVD / EVE Parameters

FOLDER	LABEL	VAL PAR ADDRESS	DATA SIZE	CPL	RESET (Y/N)	R/W	DESCRIPTION	RANGE	DEFAULT	U.M.
ACKNOWLEDGEMENT	Par_TAB	15716	WORD		Y	RW	<b>Map code</b> Note: read/write parameter	0 ... 65535	0	num
ACKNOWLEDGEMENT	Par_POLI	15717	WORD		Y	RW	<b>Model Code</b> Note: read/write parameter	0 ... 65535	1025	num
ACKNOWLEDGEMENT	Par_PARMOD	15719	BOOL			RW	<b>Parameter modified</b> Flag indicating change to <i>default</i> settings. <ul style="list-style-type: none"> <li>0= map not modified.</li> <li>1= at least one parameter has been modified with respect to the original configuration.</li> </ul>	0 ... 1	0	num
CALIBRATION AI	Gain_Ntc_AI1	15616	WORD			RW	<b>Ai1 NTC calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_Ntc_AI2	15617	WORD			RW	<b>Ai2 NTC calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_Ntc_AI3	15618	WORD			RW	<b>Ai3 NTC calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_PT1000_AI3	15619	WORD			RW	<b>Ai3 PT1000 calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_5V_AI3	15620	WORD			RW	<b>Ai3 0-5V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_10V_AI3	15621	WORD			RW	<b>Ai3 0-10V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_mA_AI3	15622	WORD			RW	<b>Ai3 4-20mA calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_Ntc_AI4	15623	WORD			RW	<b>Ai4 NTC calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_PT1000_AI4	15624	WORD			RW	<b>Ai4 PT1000 calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_5V_AI4	15625	WORD			RW	<b>Ai4 0-5V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_10V_AI4	15626	WORD			RW	<b>Ai4 0-10V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_mA_AI4	15627	WORD			RW	<b>Ai4 4-20mA calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_Ntc_AI5	15628	WORD			RW	<b>Ai5 NTC calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_PT1000_AI5	15629	WORD			RW	<b>Ai5 PT1000 calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_5V_AI5	15630	WORD			RW	<b>Ai5 0-5V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_10V_AI5	15631	WORD			RW	<b>Ai5 0-10V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_mA_AI5	15632	WORD			RW	<b>Ai5 4-20mA calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_Ntc_AI6	15633	WORD			RW	<b>Ai6 NTC calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_PT1000_AI6	15634	WORD			RW	<b>Ai6 PT1000 calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_5V_AI6	15635	WORD			RW	<b>Ai6 0-5V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_10V_AI6	15636	WORD			RW	<b>Ai6 0-10V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Gain_mA_AI6	15637	WORD			RW	<b>Ai6 4-20V calibration gain</b>	0 ... 65535	32768	num
CALIBRATION AI	Offs_Ntc_AI1	15650	WORD	-1		RW	<b>Ai1 NTC calibration offset</b>	-32768 ... 32767	0	num
CALIBRATION AI	Offs_Ntc_AI2	15651	WORD	-1		RW	<b>Ai2 NTC calibration offset</b>	-32768 ... 32767	0	num
CALIBRATION AI	Offs_Ntc_AI3	15652	WORD	-1		RW	<b>Ai3 NTC calibration offset</b>	-32768 ... 32767	0	num
CALIBRATION AI	Offs_PT1000_AI3	15653	WORD	-1		RW	<b>Ai3 PT1000 calibration offset</b>	-32768 ... 32767	0	num
CALIBRATION AI	Offs_5V_AI3	15654	WORD	-1		RW	<b>Ai3 0-5V calibration offset</b>	-32768 ... 32767	0	num
CALIBRATION AI	Offs_10V_AI3	15655	WORD	-1		RW	<b>Ai3 0-10V calibration offset</b>	-32768 ... 32767	0	num
CALIBRATION AI	Offs_mA_AI3	15656	WORD	-1		RW	<b>Ai3 4-20mA calibration offset</b>	-32768 ... 32767	0	num
CALIBRATION AI	Offs_Ntc_AI4	15657	WORD	-1		RW	<b>Ai4 NTC calibration offset</b>	-32768 ... 32767	0	num

FOLDER	LABEL	VAL PAR ADDRESS	DATA SIZE	CPL	RESET (Y/N)	R/W	DESCRIPTION	RANGE	DEFAULT	U.M.
CALIBRATION AI	Offs_PT1000_AI4	15658	WORD	-1		RW	Ai4 PT1000 calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_5V_AI4	15659	WORD	-1		RW	Ai4 0-5V calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_10V_AI4	15660	WORD	-1		RW	Ai4 0-10V calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_mA_AI4	15661	WORD	-1		RW	Ai4 4-20mA calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_Ntc_AI5	15662	WORD	-1		RW	Ai5 NTC calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_PT1000_AI5	15663	WORD	-1		RW	Ai5 PT1000 calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_5V_AI5	15664	WORD	-1		RW	Ai5 0-5V calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_10V_AI5	15665	WORD	-1		RW	Ai5 0-10V calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_mA_AI5	15666	WORD	-1		RW	Ai5 4-20mA calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_Ntc_AI6	15667	WORD	-1		RW	Ai6 NTC calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_PT1000_AI6	15668	WORD	-1		RW	Ai6 PT1000 calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_5V_AI6	15669	WORD	-1		RW	Ai6 0-5V calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_10V_AI6	15670	WORD	-1		RW	Ai6 0-10V calibration offset	-32768 ... 32767	0	num
CALIBRATION AI	Offs_mA_AI6	15671	WORD	-1		RW	Ai6 4-20mA calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Gain_10V_AO1	15684	WORD			RW	AO1 0-10V calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_mA_AO1	15685	WORD			RW	AO1 4-20mA calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_10V_AO2	15686	WORD			RW	AO2 0-10V calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_mA_AO2	15687	WORD			RW	AO2 4-20mA calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_10V_AO3	15688	WORD			RW	AO3 0-10V calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_mA_AO3	15689	WORD			RW	AO3 4-20mA calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_10V_AO4	15690	WORD			RW	AO4 0-10V calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_mA_AO4	15691	WORD			RW	AO4 4-20mA calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_10V_AO5	15692	WORD			RW	AO5 0-10V calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Gain_mA_AO5	15693	WORD			RW	AO5 4-20mA calibration gain	0 ... 65535	32768	num
CALIBRATION AO	Offs_10V_AO1	15700	WORD	-1		RW	AO1 0-10V calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_mA_AO1	15701	WORD	-1		RW	AO1 4-20mA calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_10V_AO2	15702	WORD	-1		RW	AO2 0-10V calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_mA_AO2	15703	WORD	-1		RW	AO2 4-20mA calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_10V_AO3	15704	WORD	-1		RW	AO3 0-10V calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_mA_AO3	15705	WORD	-1		RW	AO3 4-20mA calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_10V_AO4	15706	WORD	-1		RW	AO4 0-10V calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_mA_AO4	15707	WORD	-1		RW	AO4 4-20mA calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_10V_AO5	15708	WORD	-1		RW	AO5 0-10V calibration offset	-32768 ... 32767	0	num
CALIBRATION AO	Offs_mA_AO5	15709	WORD	-1		RW	AO5 4-20mA calibration offset	-32768 ... 32767	0	num

FOLDER	LABEL	VAL PAR ADDRESS	DATA SIZE	CPL	RESET (Y/N)	R/W	DESCRIPTION	RANGE	DEFAULT	U.M.
ANALOGUE INPUTS	Temp_UM	15725	WORD		Y	RW	<b>Temperature unit of measurement</b> <ul style="list-style-type: none"> <li>0 = °C</li> <li>1 = °F.</li> </ul>	0 ... 1	0	num
ANALOGUE INPUTS	Cfg_Ai1	15726	WORD			RW	<b>Type of analogue input Ai1</b> <ul style="list-style-type: none"> <li>0= NTC (NK103)</li> <li>1= DI</li> <li>2= NTC (103AT)</li> </ul>	0 ... 2	2	num
ANALOGUE INPUTS	Cfg_Ai2	15727	WORD			RW	<b>Type of input analogue Ai2</b> See Cfg_Ai1	0 ... 2	2	num
ANALOGUE INPUTS	Cfg_Ai3	15728	WORD			RW	<b>Type of input analogue Ai3</b> <ul style="list-style-type: none"> <li>0= NTC (NK103)</li> <li>1= DI</li> <li>2= NTC (103AT)</li> <li>3 = 4...20mA</li> <li>4 = 0-10V</li> <li>5=0-5V</li> <li>6=Pt1000</li> <li>7=hΩ(NTC)</li> <li>8=daΩ(PT1000)</li> </ul>	0 ... 8	3	num
ANALOGUE INPUTS	Cfg_Ai4	15729	WORD			RW	<b>Type of input analogue Ai4</b> See Cfg_Ai3	0 ... 8	3	num
ANALOGUE INPUTS	Cfg_Ai5	15730	WORD			RW	<b>Type of input analogue Ai5</b> See Cfg_Ai3	0 ... 8	3	num
ANALOGUE INPUTS	Cfg_Ai6	15731	WORD			RW	<b>Type of analogue input Ai6</b> See Cfg_Ai3	0 ... 8	3	num
ANALOGUE INPUTS	FullScaleMin_Ai3	15736	WORD	-1		RW	<b>Analogue input Ai3 start of scale value</b> <b>Note:</b> <b>Minimum full scale:</b> for 4mA current probes, 0-10V voltage probes at 0V, 10% ratiometric probes (0-5V) (equal to 0.5V).	-9999...+9999	0	
ANALOGUE INPUTS	FullScaleMAx_Ai3	15737	WORD			RW	<b>Analogue input Ai3 full scale value</b> <b>Maximum full scale:</b> for 20mA current probes, 0-10V voltage probes at 10V, 90% ratiometric probes (0-5V) (equal to 4.5V).	-9999...+9999	1000	
ANALOGUE INPUTS	FullScaleMin_Ai4	15738	WORD	-1		RW	<b>Analogue input Ai4 start of scale value</b> See FullScaleMin_Ai3	-9999...+9999	0	
ANALOGUE INPUTS	FullScaleMax_A4	15739	WORD			RW	<b>Analogue input Ai4 full scale value</b> See FullScaleMax_Ai3	-999...+999	1000	
ANALOGUE INPUTS	FullScaleMin_Ai5	15740	WORD	-1		RW	<b>Ai5 analogue input start of scale value</b> See FullScaleMin_Ai3	-9999...+9999	0	
ANALOGUE INPUTS	FullScaleMax_Ai5	15741	WORD			RW	<b>Ai5 analogue input full scale value</b> See FullScaleMax_Ai3	-999...+999	1000	

FOLDER	LABEL	VAL PAR ADDRESS	DATA SIZE	CPL	RESET (Y/N)	R/W	DESCRIPTION	RANGE	DEFAULT	U.M.
ANALOGUE INPUTS	FullScaleMin_Ai6	15742	WORD	-1		RW	<b>Ai6 analogue input start of scale value</b> See FullScaleMin_Ai3	-9999...+9999	0	
ANALOGUE INPUTS	FullScaleMaxAi6	15743	WORD			RW	<b>Ai6 analogue input full scale value</b> See FullScaleMax_Ai3	-999...+999	1000	
ANALOGUE INPUTS	Calibration_Ai1	15748	WORD	-1		RW	<b>Analogue input Ai1 differential</b>	-180 ... 180	0	°C/10 or °F/10
ANALOGUE INPUTS	Calibration_Ai2	15749	WORD	-1		RW	<b>Analogue input Ai2 differential</b>	-180 ... 180	0	°C/10 or °F/10
ANALOGUE INPUTS	Calibration_Ai3	15750	WORD	-1		RW	<b>Analogue input Ai3 differential</b>	-1000 ... 1000	0	
ANALOGUE INPUTS	Calibration_Ai4	15751	WORD	-1		RW	<b>Analogue input Ai4 differential</b>	-1000 ... 1000	0	
ANALOGUE INPUTS	Calibration_Ai5	15752	WORD	-1		RW	<b>Analogue input Ai5 differential</b>	-1000 ... 1000	0	
ANALOGUE INPUTS	Calibration_Ai6	15753	WORD	-1		RW	<b>Ai6 analogue input differential</b>	-1000 ... 1000	0	
ANALOGUE OUTPUTS V/I	Cfg_AO1_AO5	15758	WORD		Y	RW	<b>Analogue output type AO1/AO5</b> AO1 and AO5 are configured in pairs. See SubCfg_AO5 <ul style="list-style-type: none"> <li>0 = 4-20mA current analogue output</li> <li>1 = ON/OFF output configured as 0/4...20mA switch (ON= max 20mA, OFF=0mA) for piloting switch loads such as ON/OFF.</li> <li>2=0-10V analogue output - voltage</li> </ul>	0 ... 2	0	num
ANALOGUE OUTPUTS V/I	Cfg_AO2	15759	WORD		Y	RW	<b>Analogue output type AO2</b> <ul style="list-style-type: none"> <li>0 = 4-20mA</li> <li>1 = ON/OFF</li> <li>2 = 0-10V</li> </ul>	0 ... 2	0	num
ANALOGUE OUTPUTS V/I	Cfg_AO3	15760	WORD		Y	RW	<b>Type of output analogue AO3</b> See Cfg_AO2	0 ... 2	0	num
ANALOGUE OUTPUTS V/I	Cfg_AO4	15761	WORD		Y	RW	<b>Analogue output type AO4</b> See Cfg_AO2	0 ... 2	0	num
ANALOGUE OUTPUTS V/I	SubCfg_AO5	15762	WORD		Y	RW	<b>Analogue output AO5 sub-mode function</b> AO1 and A5 are configured in pairs. See Cfg_AO1_AO5 <ul style="list-style-type: none"> <li>0 = 4-20mA current analogue output</li> <li>1 = ON/OFF output configured as 0/4...20mA switch (ON= max 20mA, OFF=0mA) for piloting switch loads such as ON/OFF.</li> </ul>	0 ... 1	0	num

EVD *Parameters*

FOLDER	LABEL	VAL PAR ADDRESS	DATA SIZE	CPL	RESET (Y/N)	R/W	DESCRIPTION	RANGE	DEFAULT	U.M.
RS485 ON BOARD	Addr_RS485_OB	15774	WORD		Y	RW	<b>Integrated RS485 serial address</b> The actual address is determined by the sum of this value + the value of the dip switch.	0 ... 255	1	num
RS485 ON BOARD	Proto_RS485_OB	15775	WORD		Y	RW	<b>Integrated RS485 protocol selection</b> 2 = uNET 3 = Modbus/RTU	2 ... 3	2	num
RS485 ON BOARD	Databit_RS485_OB	15776	WORD		Y	RW	<b>Integrated RS485 data bit number</b> Fixed at 8	8 ... 8	8	num
RS485 ON BOARD	Stopbit_RS485_OB	15777	WORD		Y	RW	<b>Integrated RS485 stop bit number</b> • 1= 1 stop bit • 2= 2 stop bit	1... 2	1	num
RS485 ON BOARD	Parity_RS485_OB	15778	WORD		Y	RW	<b>Integrated RS485 protocol parity</b> • 0= NULL • 1= ODD • 2= EVEN	0 ... 2	2	num
RS485 ON BOARD	Baud_RS485_OB	15779	WORD		Y	RW	<b>Integrated RS485 protocol baudrate</b> • 0=9600 baud • 1=19200 baud • 2=38400 baud • 3=57600 baud(°) • 4=76800 baud • 5=115200 baud ° maximum speed allowed. Higher speeds are required for local connection to FREE Studio Device and tests	0 ... 5	2	num
CAN ON BOARD	Addr_CAN_OB	15780	WORD		Y	RW	<b>Integrated CAN serial address</b> The actual address is determined by the sum of this value + the value of the dip switch.	1 ... 127	1	num
CAN ON BOARD	Baud_CAN_OB	15781	WORD		Y	RW	<b>Integrated CAN protocol baudrate</b> • 2=500 Kbaud • 3=250 Kbaud • 4=125 Kbaud • 5=125 Kbaud • 6=50 Kbaud	2 ... 6	2	num

FOOLDER	LABEL	VAL PAR ADDRESS	DATA SIZE	CPL	RESET (Y/N)	R/W	DESCRIPTION	RANGE	DEFAULT	U.M.
RS485 PLUGIN PASSIVE	Addr_RS485_PI	15782	WORD		Y	RW	<b>RS485 passive plug-in serial address</b> The actual address is determined by the sum of this value + the value of the dip switch.	0 ... 255	1	num
RS485 PLUGIN PASSIVE	Proto_RS485_PI	15783	WORD		Y	RW	<b>RS485 passive plug-in protocol selection</b> 2 = uNET 3 = Modbus/RTU	2 ... 3	2	num
RS485 PLUGIN PASSIVE	Databit_RS485_PI	15784	WORD		Y	RW	<b>RS485 passive plug-in data bit number</b> Fixed at 8	8 ... 8	8	num
RS485 PLUGIN PASSIVE RS485 PLUGIN PASSIVE	Stopbit_RS485_PI	15785	WORD		Y	RW	<b>RS485 passive plug-in stop bit number</b> <ul style="list-style-type: none"> <li>1= 1 stop bit</li> <li>2= 2 stop bit</li> </ul>	1... 2	1	num
RS485 PLUGIN PASSIVE	Parity_RS485_PI	15786	WORD		Y	RW	<b>RS485 passive plug-in protocol parity</b> <ul style="list-style-type: none"> <li>0= NULL</li> <li>1= ODD</li> <li>2= EVEN</li> </ul>	0 ... 2	2	num
RS485 PLUGIN PASSIVE	Baud_RS485_PI	15787	WORD		Y	RW	<b>RS485 passive plug-in protocol baudrate</b> <ul style="list-style-type: none"> <li>0=9600 baud</li> <li>1=19200 baud</li> <li>2=38400 baud</li> <li>3=57600 baud(°)</li> <li>4=76800 baud</li> <li>5=115200 baud</li> </ul> ° maximum speed allowed. Higher speeds are required for local connection to FREE Studio Device and tests	0 ... 5	2	num
CAN PLUGIN PASSIVE	Addr_CAN_PI	15788	WORD		Y	RW	<b>CAN passive plug-in serial address</b> The actual address is determined by the sum of this value + the value of the dip switch.	1 ... 127	1	num
CAN PLUGIN PASSIVE	Baud_CAN_PI	15789	WORD		Y	RW	<b>CAN passive plug-in protocol baudrate</b> <ul style="list-style-type: none"> <li>2=500 Kbaud</li> <li>3=250 Kbaud</li> <li>4=125 Kbaud</li> <li>5=125 Kbaud</li> <li>6=50 Kbaud</li> </ul>	2 ... 6	2	num

FOLDER	LABEL	VAL PAR ADDRESS	DATA SIZE	CPL	RESET (Y/N)	R/W	DESCRIPTION	RANGE	DEFAULT	U.M.
RS232 PLUGIN PASSIVE	Addr_RS232_PI	15790	WORD		Y	RW	<b>RS232 passive plug-in serial address</b> The actual address is determined by the sum of this value + the value of the dip switch.	0 ... 255	1	num
RS232 PLUGIN PASSIVE	Proto_RS232_PI	15791	WORD		Y	RW	<b>RS232 passive plug-in protocol selection</b> 2 = uNET 3 = Modbus/RTU	2 ... 3	2	num
RS232 PLUGIN PASSIVE	Databit_RS232_PI	15792	WORD		Y	RW	<b>RS232 passive plug-in data bit number</b> 7= 7 bit 8= 8 bit	7 ... 8	8	num
RS232 PLUGIN PASSIVE	Stopbit_RS232_PI	15793	WORD		Y	RW	<b>RS232 passive plug-in stop bit number</b> • 1= 1 stop bit • 2= 2 stop bit	1... 2	1	num
RS232 PLUGIN PASSIVE	Parity_RS232_PI	15784	WORD		Y	RW	<b>RS232 passive plug-in protocol parity</b> • 0= NULL • 1= ODD • 2= EVEN	0 ... 2	2	num
RS232 PLUGIN PASSIVE	Baud_RS232_PI	15795	WORD		Y	RW	<b>RS232 passive plug-in protocol baudrate</b> • 0=9600 baud • 1=19200 baud • 2=38400 baud • 3=57600 baud(°) • 4=76800 baud • 5=115200 baud ° maximum speed allowed. Higher speeds are required for local connection to FREE Studio Device and tests	0 ... 5	2	num
<i>ETHERNET</i> PLUGIN PASSIVE	Ip_1_ETH_PI	15798	WORD		Y	RW	<i>Ethernet</i> Passive Plug-In IP address (part 1)	0 ... 255	10	num
<i>ETHERNET</i> PLUGIN PASSIVE	Ip_1_ETH_P	15798	WORD		Y	RW	<i>Ethernet</i> Passive Plug-In IP address (part 2)	0 ... 255	0	num
<i>ETHERNET</i> PLUGIN PASSIVE	Ip_1_ETH_PI	15798	WORD		Y	RW	<i>Ethernet</i> Passive Plug-In IP address (part 3)	0 ... 255	0	num
<i>ETHERNET</i> PLUGIN PASSIVE	Ip_1_ETH_PI	15798	WORD		Y	RW	<i>Ethernet</i> Passive Plug-In IP address (part 4)	0 ... 255	100	num

FOLDER	LABEL	VAL PAR ADDRESS	DATA SIZE	CPL	RESET (Y/N)	R/W	DESCRIPTION	RANGE	DEFAULT	U.M.
Modem	Modem_RS232_PI	15820	BOOL		Y	RW	Presence of Modem	0 ... 1	0	num
Modem	Modem_InitStr1	15821	19 BYTES		Y	RW	Modem initialization string (part I)	*****	(*)	string
Modem	Modem_InitStr2	15831	19 BYTES		Y	RW	Modem initialization string (part II)	*****		string
Modem	Modem_Hangup	15851	19 BYTES		Y	RW	Hangup String	*****	ATH0	string
<b>(*) AT&amp;F&amp;C&amp;D2E0X1S0=0</b>										
<i>Display</i>	Hmi_Language	15819	WORD			RW	<i>Display</i> language	0 ... 65535	0	num
<i>Display</i>	Par_ContrLCD	15723	WORD		Y	RW	<b>LCD Contrast</b> Allows you to vary the LCD <i>display</i> contrast.	0 ... 64	30	Num.
<i>Display</i>	Par_BackLightTime	15724	WORD			RW	<b>Backlight switch-on time:</b> Allows you to vary the LCD <i>display</i> switch-on time.	0 ... 3600	10	sec





## 8 MODELS AND ACCESSORIES

### 8.1 Models

#### 8.1.1 FREE Evolution models EVD 75xx with display

Model	Relay <i>digital</i> outputs (high voltage)	SSR <i>digital</i> outputs (high voltage)	Analogue outputs Safe voltage (SELV)	Digital Inputs Safe voltage (SELV)	Digital Inputs No voltage	Analogue Inputs Safe voltage (SELV)	Integrated USB	Integrated RS485 / MPBUS
FREE EVO Display	(DO1...DO7)	SSR	(AO1-AO5)	(DI1...DI8)	(DI)	(AI)	/U	
EVD7500/C/U	7	-	5	8	1	6	YES	485
EVD7500/C	7	-	5	8	1	6	NO	485
EVD7555/C/U (SSR)	5	2	5	8	1	6	YES	485
EVD7555/C (SSR)	5	2	5	8	1	6	NO	485
EVD75MP/C/U (MP-BUS)	7	-	5	8	1	6	YES	MP BUS
EVD75MP/C (MP-BUS)	7	-	5	8	1	6	NO	MP BUS

Integrated **CAN** as standard  
 /C indicates the presence of the RTC - Real Time Clock  
 SELV: SAFETY EXTRA LOW VOLTAGE  
 All **models** are 8Din-mountable.

#### 8.1.2 FREE Evolution models EVD 75xx without display

Model	Relay <i>digital</i> outputs (high voltage)	SSR <i>digital</i> outputs (high voltage)	Analogue outputs Safe voltage (SELV)	Digital Inputs Safe voltage (SELV)	Digital Inputs No voltage	Analogue Inputs Safe voltage (SELV)	Integrated USB	Integrated RS485 / MPBUS
FREE EVO Closed	(DO1...DO7)	SSR	(AO1-AO5)	(DI1...DI8)	(DI)	(AI)	/U	
EVC7500/C/U	7	-	5	8	1	6	YES	485
EVC7500/C	7	-	5	8	1	6	NO	485
EVC7555/C/U (SSR)	5	2	5	8	1	6	YES	485
EVC7555/C (SSR)	5	2	5	8	1	6	NO	485
EVC75MP/C/U (MP-BUS)	7	-	5	8	1	6	YES	MP BUS
EVC75MP/C (MP-BUS)	7	-	5	8	1	6	NO	MP BUS

Integrated **CAN** as standard  
 /C indicates the presence of the RTC - Real Time Clock  
 SELV: SAFETY EXTRA LOW VOLTAGE  
 All **models** are 8Din-mountable.

### 8.1.3 FREE Evolution EVE 75xx expansion

Model	Relay digital outputs (high voltage)	SSR digital outputs (high voltage)	Analogue Outputs Safe voltage (SELV)	Digital Inputs Safe voltage (SELV)	Digital Inputs No voltage	Analogue Inputs Safe voltage (SELV)
FREE EVO Expansion	(DO1...DO7)	SSR	(AO1-AO5)	(DI1...DI8)	(DI)	(AI)
EVE7500	7	-	5	8	1	6
EVE75SS (SSR)	5	2	5	8	1	6

Integrated **RS485/CAN** as standard  
 SELV: SAFETY EXTRA LOW VOLTAGE  
 All **models** are 8Din-mountable.

### 8.1.4 Plug-ins

Model	Relay digital outputs (high voltage)	Serial	Dimensions	Power supply	Notes
<i>EVS RS232/R</i>	1	RS232	2Din	From base EVD/EVC	Integrated relay
<i>EVS RS485</i>	/	<i>RS485</i>	2Din	From base EVD/EVC	
<i>EVS CANOpen</i>	/	CANOpen	2Din	From base EVD/EVC	
<i>EVS CANOpen + RS485*</i>	/	<i>RS485</i> +CANOpen	2Din	From base EVD/EVC	
<i>EVS ETH</i>	/	<i>ETHERNET</i>	2Din	From base EVD/EVC	MODBUS TCP

\*Contact the Eliwell Sales Office

### 8.1.5 Terminals

Model	Mounting	Dimensions	Display	Analogue Inputs Safe voltage (SELV)	Power supply	Serial
EVK1000	Panel*	160x96x10mm	LCD backlit	/	From base	CANOpen

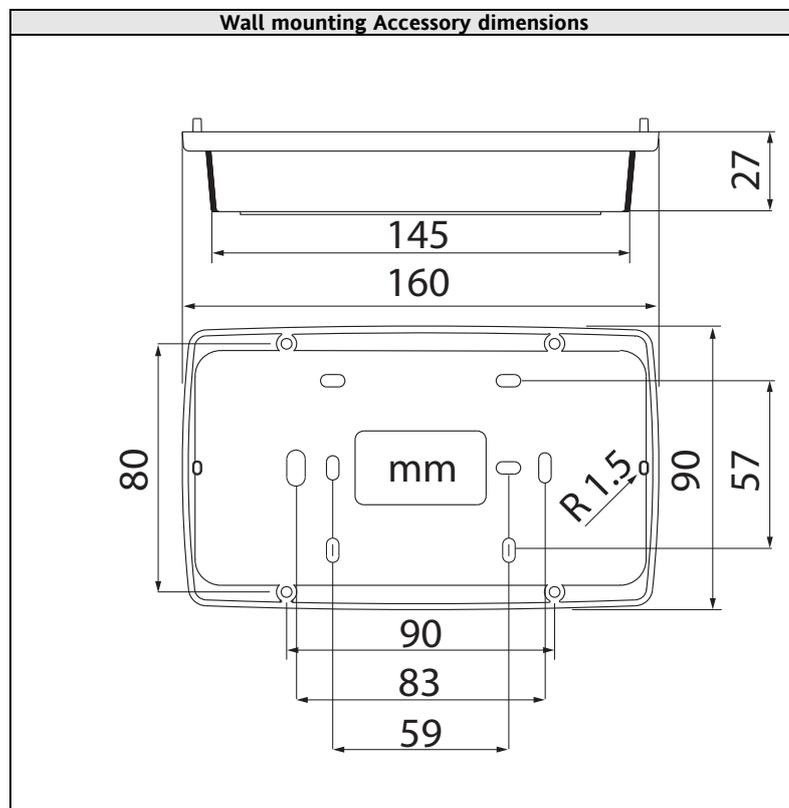
\*Contact the Eliwell Sales Office for wall-mounting [accessories](#).

### Wall mounting [Accessories](#)

\*Contact the Eliwell Sales Office for wall-mounting [accessories](#).

Make 4 holes in the wall of dia. 4.2 mm at the specified spacing: to fix the back-plate M3 screw are suggested. Use the two side slits, one on the upper- one on the lower side under its removable doors to break, preventing the opening of holes in the wall with the recessed-wall wiring. [Ethernet](#) connector wiring needs a hole in the wall as well

Make all necessary connections , then insert EVP Operator terminal (without front) in the back-plate, which serves as a panel, which should be set as an 'panel mounted' device (see Mounting chapter)



## 8.2 Accessories

Note: The photos are intended to show the *accessories* and are by way of example only. The dimensions shown in the figures are not to scale.

	Name	P/N	Description	Documentation / Notes
Adapters and cables		SAR0RA00X701	USB/485 MINI KIT adapter + USB cable	
				
Cable		Contact Eliwell Sales Department	Ethernet cable	
Transformer		TF111205	230V~/24V 35VA transformer N.B.: cable must be no no longer than 10m.	Mounting on DIN rail
Temperature probes		SN8D6L4002	NTC Probe NK103C1R1, 4m Extended range (polyester, 2-wire cable) IP65.	Instruction Sheet SN8D6L4002 GB-I
		SN691150	Probe NTC 103AT, 1.5m (plastic cap, 2-wire cable).	Instruction Sheet SN8D6L4002 GB-I
		SN8T6H1502	NTC temperature probe 5X20 1.5m TPE IP68	Instruction Sheet SN8T6H1502 GB-I
		SN8T6A1502	NTC temperature probe 6X40 1.5m TPE STEEL IP68	Instruction Sheet SN8T6H1502 GB-I
		SN8T6N1502	NTC temperature probe 6X50 1.5m TPE STEEL IP68	Instruction Sheet SN8T6H1502 GB-I

	Name	P/N	Description	Documentation / Notes
Ratiometric transducers		TD400010	Ratiometric transducer EWPA 010 R 0/5V 0/10BAR Female connector	
		TD400030	Ratiometric transducer EWPA 030 R 0/5V 0/30BAR Female connector	
		TD400050	Ratiometric transducer EWPA 050 R 0/5V 0/50BAR Female connector	
Pressure transducers		(!)	EWPA 4...20mA pressure transducer with male or female connector. <i>Range</i> -0.5/7bar to 0/50bar Depending on model	<b>Instruction sheet</b> <b>9IS64173</b> EWPA EN-IT-ES-DE-FR-RU
Pressure switches		(!)	<i>HR range</i> (automatic reset) - minimum 100,000 ON/OFF cycles.	
		(!)	<i>HL range</i> (manual reset) - minimum 6,000 ON/OFF cycles	
		(!)	<i>HC range</i> (automatic reset) - minimum 250,000 ON/OFF cycles	
Fan modules		For codes <b>See instruction sheet</b> (1)	<b>CFS FAN MODULES</b> Single-phase speed regulators for currents from 2A to 9A.	<b>Instruction Sheet</b> <b>8FI40014</b> CFS –Fan Speed Modules GB-I-E-D-F
		MW991300	<b>CF-REL FAN MODULE</b> 6A 230V relay	<b>Instruction Sheet</b> <b>8FI40014</b> CFS –Fan Speed Modules GB-I-E-D-F
		Contact Eliwell Sales Department	THREE-PHASE FAN REGULATOR (DRV 300) (!)  3 phases 12...20A/420V~ (IP22 or IP55)	Contact Eliwell Sales Department

		P/N	Description	Documentation / Notes
		BARFOTS00NH00 (1)	RadioAdapter TTL/WIRELESS 802.15.4	<b>Instruction Sheet</b> <b>8FI40023</b> RadioAdapter GB-I-E-D-F  <b>Manual</b> <b>9MAX0010</b> RadioAdapter GB-I-E-D-F
		Contact Eliwell Sales Department	WebAdapter	<b>Instruction Sheet</b> <b>9IS44065</b> WebAdapter GB-I-E-D-F- RUS  <b>Manual</b> <b>8MA00202</b> WebAdapter <b>X = 0 IT; 1 EN; 2 FR; 3</b> <b>ES; 5 DE; A RU</b>
			WebAdapter Wi-Fi	
<b>Software Tools</b>		Contact Eliwell Sales Department	FREE Studio	Contact Eliwell Sales Department
<b>Demo Case</b>		VAL00033K	FREE Evolution Simulator Case	
<b>Back-plate</b>		EVA00WMRC0000	Back-plate for Wall mounting Accessory	

(1) various items available. Contact the Sales Department.

(2) Various lengths *can* be requested.

**GENERAL NOTES:**

- Eliwell *can* also supply a variety of different NTC probes depending on the cable type (PVC or silicon) and length.





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