

Boosters Installation and Configuration Manual



EC declaration of conformity



BioLogic
Science Instruments

Bio-Logic SAS
1, rue de l'Europe
F-38640 Claix
France

Tel: +33 476 98 68 31
Fax: +33 476 98 69 09
Web: www.bio-logic.info

SAS capital 337 000 €
SIRET 328 685 284 000 31
APE 2651B

EC DECLARATION OF CONFORMITY

N°: CETR_VMP3-BOOSTER_Rev. B

We,

Bio-Logic SAS
1, Rue de l'Europe
38840 Claix France

declare under our sole responsibility that the products,

VMP3-BOOSTER with 20A & cables

VMP3-BOOSTER with 2x2A, 5A, 10A & cables

are in conformity with the following standard(s) in accordance with the provisions of the Electromagnetic Compatibility Directive 2004/108/CE and the Low Voltage Directive 2006/95/CE.

Security: IEC 61010-1

EMC: IEC 61326

Emissions

EN 55022: Conducted Class B

EN 55022: Radiated Class A

EN 61000-3-2: Harmonic Current

Immunity

IEC 61000-4-2: ESD

IEC 61000-4-3: EM field

IEC 61000-4-4: Burst

IEC 61000-4-5: Surge

IEC 61000-4-6: Conducted RF


IEC 61000-4-8: Magnetic Field

IEC 61000-4-11: Voltage Dip/Short Interruptions

Date: March 9, 2010



J-P Ourdouillie, Compliance Manager



François Goy, President

Equipment installation

WARNING !: The instrument is safely grounded to the Earth through the protective conductor of the AC power cable.

Use only the power cord supplied with the instrument and designed for the good current rating (10 Amax) and be sure to connect it to a power source provided with protective earth contact.

Any interruption of the protective earth (grounding) conductor outside the instrument could result in personal injury.

General description

The equipment described in this manual has been designed in accordance with EN61010 and EN61326 and has been supplied in a safe condition. The equipment is intended for electrical measurements only. It should be used for no other purpose.

Intended use of the equipment

Boosters are an electrical laboratory equipment intended for professional and intended to be used in laboratories, commercial and light-industrial environments. Instrumentation and accessories shall not be connected to humans.

Instructions for use

To avoid injury to an operator the safety precautions given below, and throughout the manual, must be strictly adhered to, whenever the equipment is operated. Only advanced user can use the instrument.

Bio-Logic SAS accepts no responsibility for accidents or damage resulting from any failure to comply with these precautions.

GROUNDING

To minimize the hazard of electrical shock, it is essential that the equipment be connected to a protective ground through the AC supply cable. The continuity of the ground connection should be checked periodically.

ATMOSPHERE

You must never operate the equipment in corrosive atmosphere. Moreover if the equipment is exposed to a highly corrosive atmosphere, the components and the metallic parts can be corroded and can involve malfunction of the instrument.

The user must also be careful that the ventilation grids are not obstructed on the right and left sides and under the chassis. An external cleaning can be made with a vacuum cleaner if necessary.

Please consult our specialists to discuss the best location in your lab for the instrument (avoid glove box, hood, chemical products, ...).

AVOID UNSAFE EQUIPMENT

The equipment may be unsafe if any of the following statements apply:

- Equipment shows visible damage,
- Equipment has failed to perform an intended operation,
- Equipment has been stored in unfavourable conditions,
- Equipment has been subjected to physical stress.

In case of doubt as to the serviceability of the equipment, don't use it. Get it properly checked out by a qualified service technician.

LIVE CONDUCTORS

When the equipment is connected to its measurement inputs or supply, the opening of covers or removal of parts could expose live conductors. Only qualified personnel, who should refer to the relevant maintenance documentation, must do adjustments, maintenance or repair

EQUIPMENT MODIFICATION

To avoid introducing safety hazards, never install non-standard parts in the equipment, or make any unauthorised modification. To maintain safety, always return the equipment to Bio-Logic SAS for service and repair.

GUARANTEE

Guarantee and liability claims in the event of injury or material damage are excluded when they are the result of one of the following.

- Improper use of the device,
- Improper installation, operation or maintenance of the device,
- Operating the device when the safety and protective devices are defective and/or inoperable,
- Non-observance of the instructions in the manual with regard to transport, storage, installation,
- Unauthorized structural alterations to the device,
- Unauthorized modifications to the system settings,
- Inadequate monitoring of device components subject to wear,
- Improperly executed and unauthorized repairs,
- Unauthorized opening of the device or its components,
- Catastrophic events due to the effect of foreign bodies.

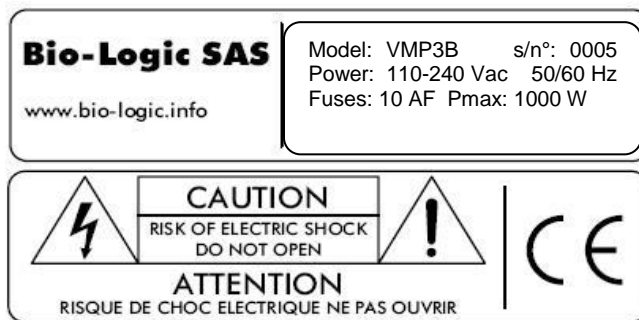
IN CASE OF PROBLEM

Information on your hardware and software configuration is necessary to analyze and finally solve the problem you encounter.

If you have any questions or if any problem occurs that is not mentioned in this document, please contact your local retailer. The highly qualified staff will be glad to help you.

Please keep information on the following at hand:

- Description of the error (the error message, mpr file, picture of setting or any other useful information) and of the context in which the error occurred. Try to remember all steps you had performed immediately before the error occurred. The more information on the actual situation you can provide, the easier it is to track the problem.
- The serial number of the device located on the rear panel device.



- The software and hardware version you are currently using. On the Help menu, click About. The displayed dialog box shows the version numbers.
- The operating system on the connected computer.
- The connection mode (Ethernet, LAN, USB) between computer and instrument.

General safety considerations



Class I

The instrument is safely grounded to the Earth through the protective conductor of the AC power cable.

Use only the power cord supplied with the instrument and designed for the good current rating (10 A max) and be sure to connect it to a power source provided with protective earth contact.

Any interruption of the protective earth (grounding) conductor outside the instrument could result in personal injury.



Guarantee and liability claims in the event of injury or material damage are excluded when they are the result of one of the following.

- Improper use of the device,
 - Improper installation, operation or maintenance of the device,
 - Operating the device when the safety and protective devices are defective and/or inoperable,
 - Non-observance of the instructions in the manual with regard to transport, storage, installation,
 - Unauthorised structural alterations to the device,
 - Unauthorised modifications to the system settings,
 - Inadequate monitoring of device components subject to wear,
 - Improperly executed and unauthorised repairs,
 - Unauthorised opening of the device or its components,
 - Catastrophic events due to the effect of foreign bodies.
-



ONLY QUALIFIED PERSONNEL should operate (or service) this equipment.

WARNING!

Do not connect the ground lead to a power source from the earth potential greater than +/- 10 Vdc

Operate on a non-flammable support

Heavy instrument: lift with caution



“To prevent exposure to magnetic field created around the cell cable during the experiment, it is recommended to maintain a distance of 20 cm between user and cable when experiment is running (ICNIRP Guidelines)”.

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1. Introduction

Historically, the first of our multi-channel instruments was designed to study intercalated compounds with long experiment times due to slow diffusion coefficients. It worked either in galvanostatic or potentiostatic mode (each channel was devoted to one mode). Then the interest for multichannel potentiostats increased with battery testing, corrosion study, and, recently biosensors development. Now our multichannel product range presents various very modular instruments that are both potentiostats/galvanostats. They can be used for most electrochemical applications from battery testing or intercalated compounds study to corrosion or multipitting. We can also mention electrochromics, fuel cells, capacitors, and biosensors study.

Bio-Logic instruments are very modular and sometimes current is needed for some application, then it is possible to couple each channel with current boosters (2, 5, 10, 20, 80, 100 A). This manual is dedicated to enlighten the working of 2, 5, 10 and 20 A boosters. Independent manuals dedicated to 80 and 100 A booster are also available.

The aim of this manual is to guide the user in the instrument installation and use.

WHEN AN USER RECEIVES A NEW UNIT FROM THE FACTORY, THE SOFTWARE AND FIRMWARE ARE INSTALLED AND UPGRADED. THE INSTRUMENT IS READY TO BE USED. IT DOES NOT NEED TO BE UPGRADED.



Fig. 1: VMP3 boosters.

1.1 General description

The VMP3 booster chassis (VMP3B) can hold up to 8 booster channels. Each channel booster is independent and need to be connected to one potentiostat/galvanostat channel.

1.2 Software features

Any electrochemical experiment is a set of open circuit sequences and galvanic sequences, measuring the potential in both cases, and imposed potential sequences, measuring the current.

Usual electrochemical techniques, such as Cyclic Voltammetry, Chronopotentiometry, etc..., are obtained by associations of elementary sequences, and appear as flow-diagrams combining these sequences.

The user can find more information about EC-Lab[®] software in the **EC-Lab[®] software user's manual** or about EC-Lab[®] Express software in the **EC-Lab[®] Express software user's manual**.

Conditional tests can be performed at various levels of any sequence on the working electrode potential or current, the counter electrode potential, or the external parameters. These conditional tests force the experiment to go to the next step, loop to a previous sequence or end the sequence.

The application software package provides useful protocols for general electrochemistry, corrosion, batteries, super-capacitors and custom applications. Standard graphic functions such as re-scaling, zoom, linear and log scales are available. Standard processed files can be created at the user's convenience upon running an experiment, for the purpose of real time display of the experiments in progress. Post processing is also possible using built-in options to create variables at the user's convenience, such as derivative or integral values, etc... Raw data and processed data can be exported as standard ASCII text files.

This design makes Bio-Logic instruments very versatile potentiostat, which can support most of the electrochemical applications from corrosion experiments to research on batteries, super-capacitors or electrochromics. It is also a very well adapted tool for electrodeposition and actuators applications.

It is assumed that the user is familiar with Microsoft Windows[®] and knows how to use the mouse and keyboard to access the drop-down menus.

1.3 Booster kit front panel

1.3.1 2 A and 5 A front panel

On the 2 A and 5 A booster kit front panel,

- 4 connectors are present:
 - 1 DB25 connector dedicated to connect booster kit and potentiostat/galvanostat channel board,
 - 2 DB9 connectors dedicated to connect cell cable, one male connector dedicated to current measurement and one female connector dedicated to voltage measurement,
 - 1 BNC connector (Open in) for security input.

- but also 3 LEDs:
 - two green LEDs V+ and V-, switched on when the operation of the booster is correct, switched off otherwise,
 - one red LED off, switched off when the operation of the booster is correct, switched on otherwise.

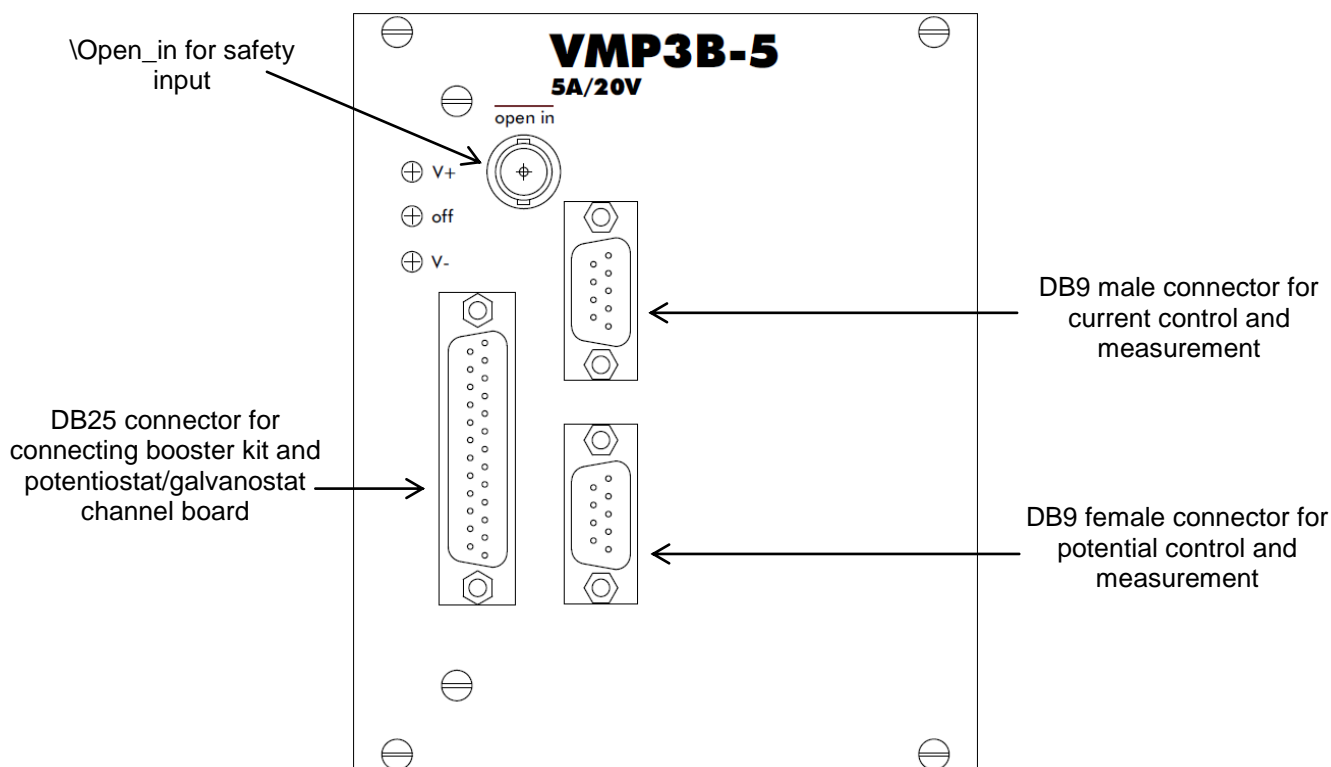


Fig. 2: 5 A front panel.

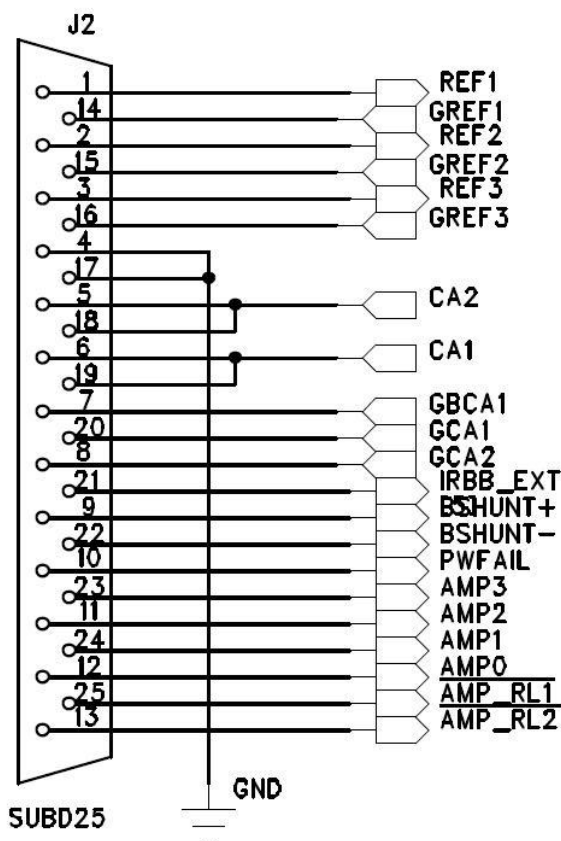


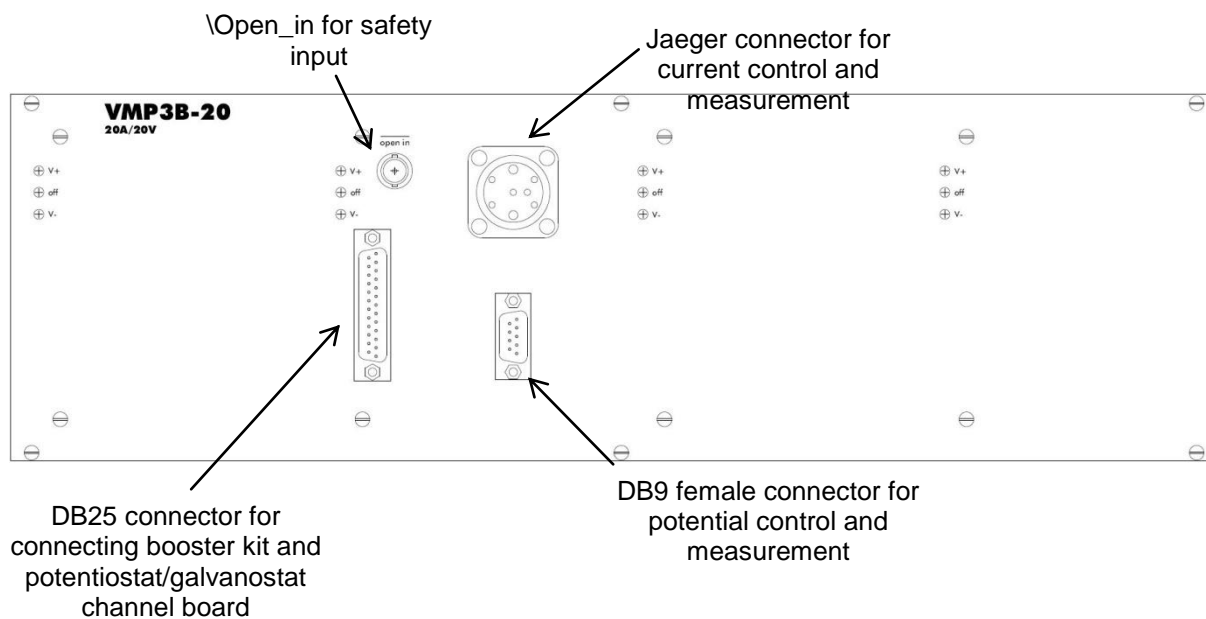
Fig. 3: DB25 connector.

Note: the 2 A booster is double then two modules are present in the same kit.

1.3.2 20 A and 10 A front panel

On the 10 A and 20 A booster kit front panel,

- 4 connectors are present:
 - 1 DB25 connector dedicated to connect booster kit and potentiostat/galvanostat channel board,
 - 1 female DB9 connector dedicated to connect cell cable and to voltage measurement,
 - 1 female Jaeger connector to connect cell cable and to current measurement,
 - 1 BNC connector (Open in) for security input.
- but also series of 3 LEDs:
 - two green LEDs V+ and V-, switched on when the operation of the booster is correct, switched off otherwise,
 - one red LED off, switched off when the operation of the booster is correct, switched off otherwise.



The DB25 connector is described Fig. 3.

1.4 VMP3 booster and cell connections

Two cables are used to connect the booster to the channel board of the Bio-Logic instrument: a connection cable and a cell cable.

The Bio-Logic instrument to booster cable is 0.8 m long with a DB25 connector on each side (connection cable).

The booster to cell cable is 1.5 m long (cell cable) with a DB9 connector on the booster side and 5 terminals to connect to the cell: 2 for the current (4 mm banana plugs) and 3 for the potential (2 mm banana plugs). A 4 mm banana plug is also available for Ground lead and for CE to Ground connection.

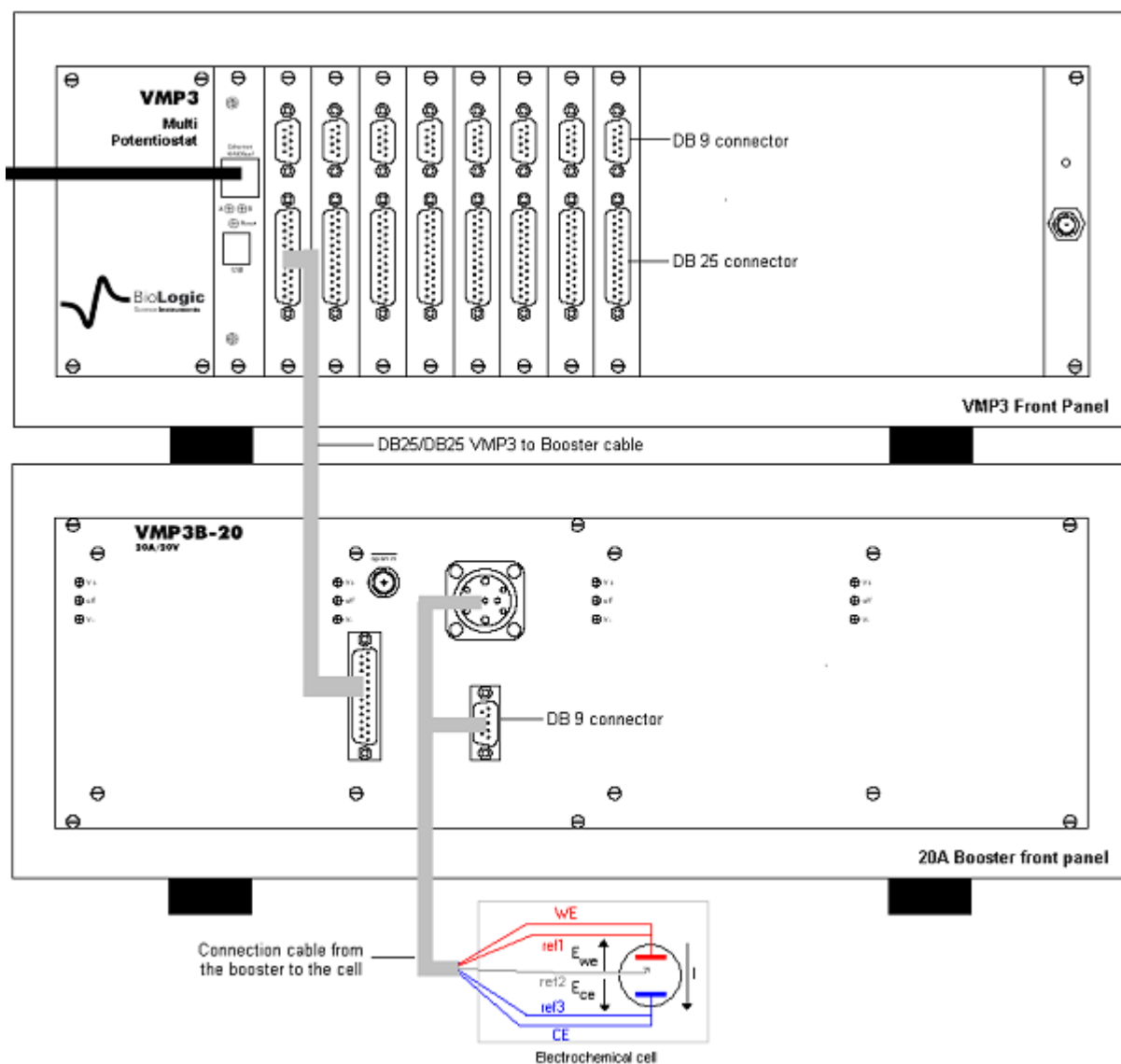


Fig. 4: VMP3 to booster and booster to cell connections.

1.5 Booster cable connection to the cell

This paragraph explains how to connect a booster channel to a cell using the cell cable provided with the instrument.

In the standard configuration, a booster channel has 6 lead connections to the electrochemical cell: 4 are used in the cell control loop (2 for the current and 2 for the potential) while the 5th lead permits simultaneous recording of a supplementary cell potential. Additionally a 6th ground lead is provided for cell shielding purposes or for particular cell arrangements such as multi-pitting protocols. This lead is especially used in the CE to ground mode. To be easily identified, each lead has an associated color and label as follows:

- **Ref1:** RED – Reference 1 for the control and measurement of the working electrode potential.
- **Ref2:** WHITE – Reference 2 for the control and measurement of the Reference electrode potential.
- **Ref3:** BLUE – Reference 3 for the control and measurement of the Counter electrode potential.
- **CA2:** RED – Control Booster for the current control and measurement flowing through the working electrode (in standard mode).
- **CA1:** BLUE – Control Booster for the current control and measurement flowing through the counter electrode (in standard mode).
- **GND:** BLACK – Ground connected to REF1 in the CE to Ground mode.

The internal structure of the Bio-Logic potentiostat/galvanostat board has led to the building of two different connection modes: “Standard” and “CE to Ground”.

1.5.1 Standard connection

A potentiostat/galvanostat board has the ability to link up with 2, 3 or 4 electrodes in different configurations depending on the electrochemical cell. In the standard mode, E_{we} and E_{ce} are measured as follows:

$$E_{we} = \text{Ref1} - \text{Ref2}$$

$$E_{ce} = \text{Ref3} - \text{Ref2}$$

The current (defined in the positive direction) crosses the electrochemical cell from CA2 to CA1. Three typical standard configurations are explained below.

1.5.1.1 Standard three-electrode connection

In the standard three-electrode connection mode typically used in analytical electrochemistry, or in corrosion experiments the working electrode is connected to Ref1+CA2. The counter-electrode is connected to Ref3+CA1 and the reference electrode is connected to Ref2.

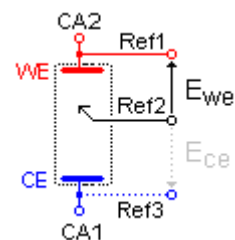


Fig. 5: Standard three-electrode connection for a classical metal-solution interface.

Another three-electrode connection with a reference electrode can be done, for example in batteries application. This connection allows the user to record/control simultaneously the positive and the negative part of the battery. For this, the following connection has to be done:

Connection of the positive electrode (WE) to Ref1+CA2,
 Connection of the negative electrode (CE) to Ref2+CA1,
 Connection of the reference electrode (REF) to Ref3.

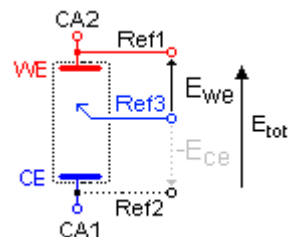


Fig. 6: Three-electrode connection with a reference electrode.

As the potential regulation is done between Ref1 and Ref2, the total potential of the battery will be displayed by default. The other parameters, such as the potential of the positive and the negative electrode versus the reference electrode, can be displayed by ticking the boxes Ece and Ewe-Ece in the Cell Characteristics windows.

By this way, in the data file, the following rows will be displayed:

- Ewe related to Ref1-Ref2 *i.e.* total potential of the battery,
- Ece related to Ref3-Ref2 *i.e.* – negative electrode potential vs. Reference,
- Ewe - Ece related to Ref1-Ref3 *i.e.* positive electrode potential vs. Reference electrode.

It is then possible to plot change of potential (positive, negative, totality) as a function of time or state of charge (SOC).

1.5.1.2 Two electrode connection to a battery cell

In the two-electrode connection mode the positive electrode of the battery is connected to Ref1+CA2. The potential control or measurement is performed between Ref1 and Ref2 and the controlled or measured current crosses the cell from CA2 to CA1. So the negative electrode must be connected to Ref2+ Ref3+CA1. In particular cases, in order to study the battery positive and negative electrode materials, the user inserts a reference electrode. Then a three-electrode assembly is required (refer to the previous part).

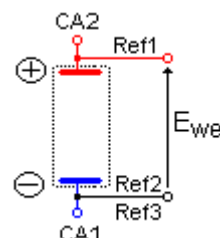


Fig. 7: Two-electrode connection to a battery cell.

1.5.1.3 Four-electrode connection for liquid-liquid interfaces

In the four-electrode connection mode the user has the ability to record the liquid-liquid interface potential (E_{ce}).

In the standard connection mode, Ref1 should always be connected to WE (or to the positive electrode) for proper cell isolation. However, to avoid IR drop in connections it is recommended to connect REF directly on the cell electrode and not on the CA2 cable.

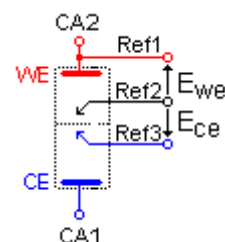


Fig. 8: Four-electrode connection for a liquid – liquid interface.

Note: Connecting Ref3 to CA1 adds parallel impedance. It is better to avoid it for accurate impedance measurement. So for impedance measurement, it would be better to disconnect REF3 from the cell if E_{ce} measurement is not required. Notice that in that case, it is recommended to connect Ref3 to the ground cable.

1.5.2 CE to Ground connection mode

This connection mode is chosen in the preliminary settings of the software EC-Lab[®] or EC-Lab[®] Express. This mode of connexion is dedicated to special applications such as bipotentiostat mode or grounded cell. For example, in the bipotentiostat mode two working electrodes are present in the same bath whereas only one counter electrode and one reference electrode are used.

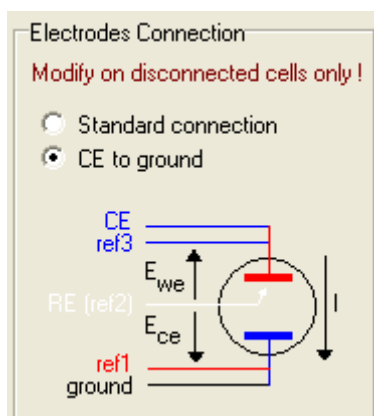


Fig. 9: CE to Ground connection mode.

1.6 Power supply

Power supply connections are on the rear panel of the booster units.

2. Advanced features

2.1 External device control and recording

2.1.1 General description

EC-Lab[®] software offers the ability for the user to control external devices such as rotating electrodes and thermostatic baths and record external analog signals through the auxiliary DB9 connector. The user has to configure the output to control an external device and Analog In1 and Analog In2 inputs to record external signals. Our instruments can control and record analog signals from – 10 to + 10 V. Most of the external devices work in a 0 to + 5 V range. The figure below shows the external device window where the user sets parameters. Many instruments are already configured in the software to be controlled by our potentiostat. The list will be completed in the future versions of EC-Lab[®] software. To configure external devices select “**External Device**” in the “**Config**” menu. The following window appears:

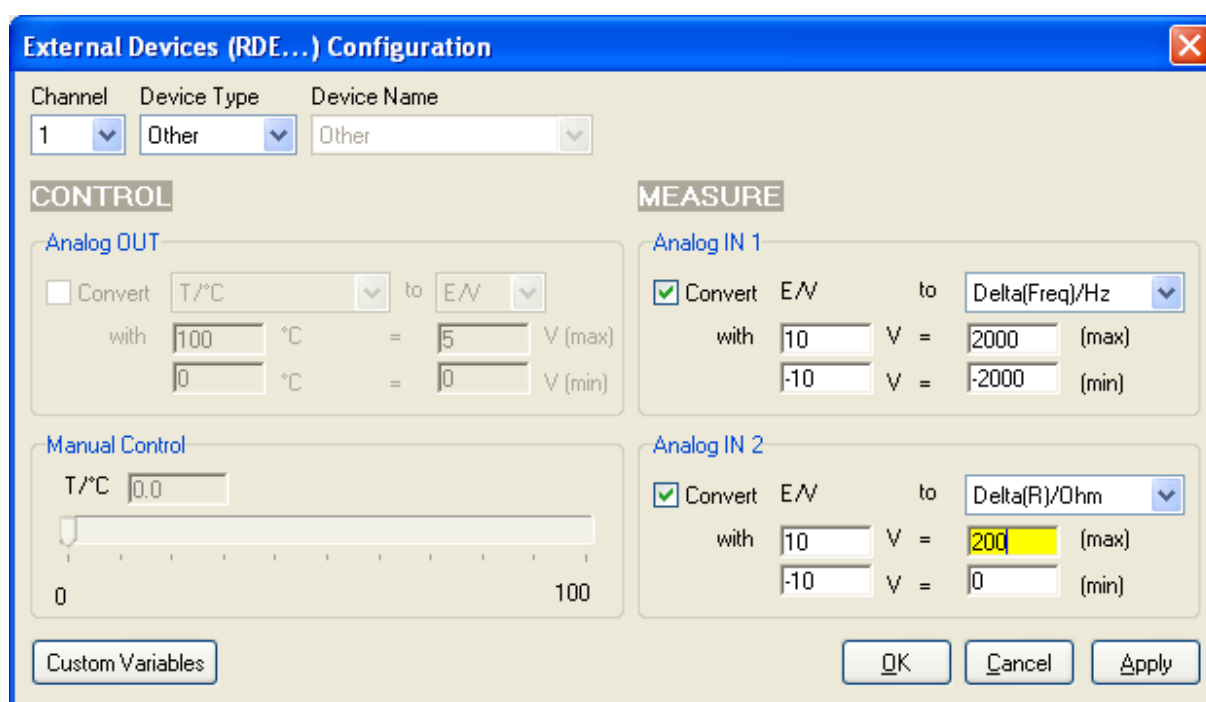


Fig. 10: External device configuration window.

The user must define several parameters to configure the external device to either be controlled via the analog output (left column) or to record/measure data via analog input 1 and 2 (right column). The configuration procedure is as follows:

- 1- Choose the channel to configure. Each channel can be configured for a specific device. One channel can control one device and the other one another device.
- 2- Select the Device Type in the list between None, Thermostat, RDE, QCM and other. According to the selected device type one or several device names are available.
- 3- Among the available devices some can be controlled with the analog output and some of them can only be used to record values with analog inputs 1 and 2. The user must tick the box to activate the input/output.

- 4- In the activated frame, the user must define the conversion between the input voltage and the variable to plot. This is a direct linear conversion in the range defined by the user between the min and the max value.
- 5- The user can also define the name and the unit of the variable he wants to display. Click on “**Custom Variables**”. The figure below is displayed:

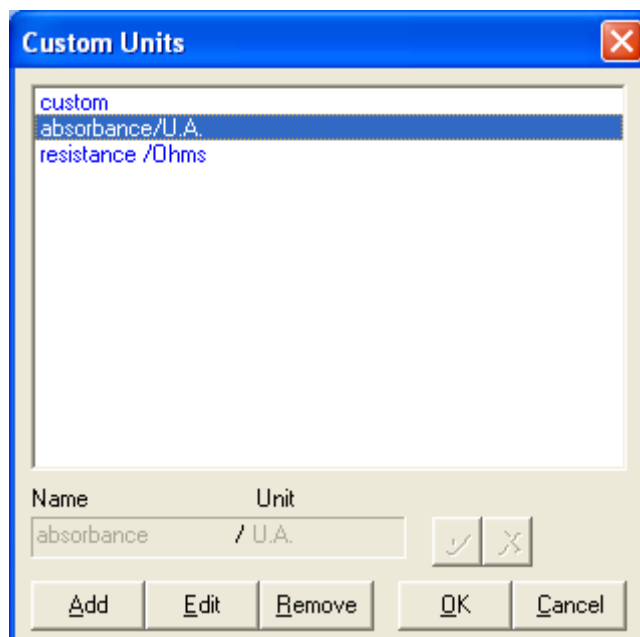



Fig. 11: Custom Units window to define new variables.

To create a new variable with its unit, click on “**Add**” and put the name and the unit of the new variable in the frame. Then click on  to validate. The new variable is displayed in the list in blue (as a custom variable) and can now be selected as the recorded variable for the analog inputs.

- 6- Finally click on “**Configure**” to configure the selected channel to record the auxiliary input signal

The new selected variables for Analog In1 and Analog In2 are automatically displayed on the “Cell characteristics” window and activated for recording. In the “**Selector**” the created variables are displayed and can be plotted. These auxiliary variables can be used in several protocols as conditional limits of an experiment.

Note:

- The parameters set in Analog In1 and Analog In2 to define the linear slope can be inverted to have an opposite variation of the recorded value with the plotted value.
- The configuration of external devices that can be controlled by the potentiostat (analog output) is described in detail in the corresponding sections of the manual.
- Manual control of external devices is also available on the right of the panel.
- When a channel has been configured to control an external device, this device can be seen in the global view.

2.1.2 Temperature control

Temperature control is possible with the auxiliary output voltage of a VMP3. Several thermostats have already been configured on the VMP3 such as Julabo series and Haake Phoenix series.

External Devices (RDE...) Configuration

Channel: 1 | Device Type: Thermostat | Device Name: Haake Phoenix series

CONTROL

Analog OUT

Convert T/°C to E/V

with 400 °C = 10 V (max)

-100 °C = 0 V (min)

Manual Control

T/°C: 0.0

-100 400

MEASURE

Analog IN 1

Convert E/V to T/°C

with 10 V = 400 °C (max)

0 V = -100 °C (min)

Analog IN 2

Convert E/V to T/°C

with 0 V = 0 °C (max)

0 V = 0 °C (min)

Custom Variables | OK | Cancel | Apply

Fig. 12: Haake Phoenix series thermostat control configuration with a VMP3.

The user can configure other thermostats to only record temperatures (Analog in) or to control (Analog Out) and record (Analog In) temperature.

3. The booster's accessories

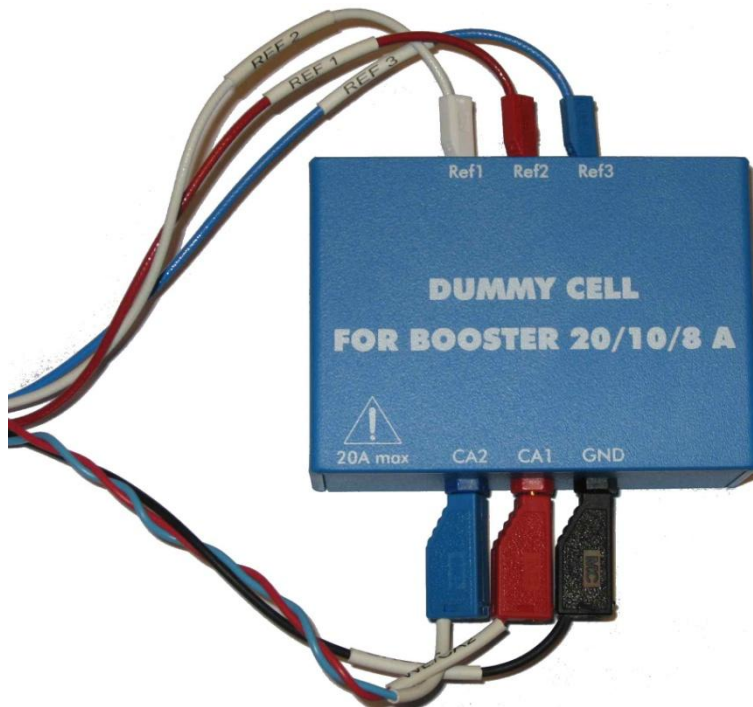
3.1 Z option for EIS measurement

The option for EIS measurement is available on the instrument connected to the booster kit. This option is included on the channel board when mentioned. Each of the channel boards can be provided with the EIS option. Test boxes for calibration check and user's training

3.2 Dummy cell for booster

The Dummy cell for booster is especially dedicated to check periodically a booster. Characteristics of this dummy cell are given in the following table:

Resistance/m Ω	Standard tolerance	Temperature coefficient
5	1%	+/- 50 ppm/ $^{\circ}$ C



3.3 Battery Holder



This accessory is especially dedicated to make battery testing easier. This holder is modular and it is compatible with a wide variety of battery types (coin cells, 18650 and 26650 cells). The BH-1 can accommodate up to 4 batteries in pairs of two. Perfect contact of the BH-1 connectors with the battery poles is ensured by spring-loaded connection points. Each of the batteries is secured in place by isolating separators specifically designed for each battery type.

It is possible to test many batteries simultaneously, for this it is possible to link the holders in series.

Note: this battery holder is only available for 2 A booster.

4. Equipement Maintenance

WARNING !: Before performing any maintenance, disconnect the line cord and all test cables.

Our instruments do not require a specific maintenance. Each booster board is calibrated at the factory before to be delivered to the customer. We also recommend a full check-up of the instrument (at the factory) every two years.

Ventilation:

The user must carefully check that the ventilation grids are not obstructed under the chassis. An external cleaning can be made with a vacuum cleaner if necessary.

Cleaning:

Ventilation grids: external cleaning can be made with a vacuum cleaner if necessary.

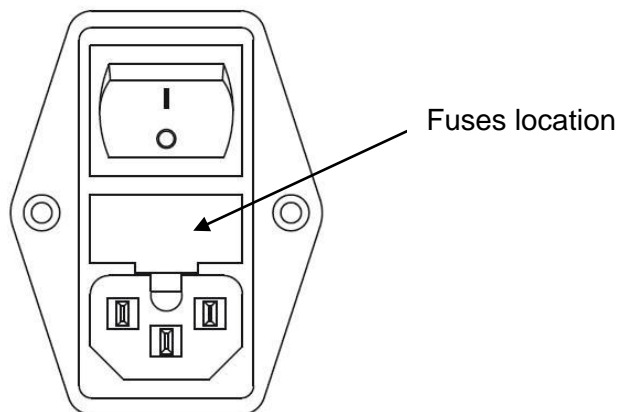
Use a damp cloth or mild, water-based cleaner to clean the instrument. Clean the exterior of the box only, never the circuit board. Do not apply cleaner directly to the box or allow liquids to enter or spill on the box.

Fuses:

WARNING !: To maintain protection from electric shock and fire, replace fuses, with the same rating and type.

Rating: 10 A Fast / 250 Vac

Size: 5-20 mm



5. Technical Specifications

5.1 Equipment Ratings

Electrical

- Input:
 - Input voltage range: 88 to 264 Vac
 - Power: 1000 W max
 - Frequency: 47 to 63 Hz
 - Fuses (Neutral +Phase): 2 x 10 AF-250 VAC (5x20 mm)
- Output:
 - ± 10 Vdc / 2 A with 2 A booster kit, ± 10 Vdc / 5 A with 5 A booster kit,
 - ± 10 Vdc / 10 A with 10 A booster kit, ± 10 Vdc / 20 A with 20 A booster kit

See "Booster channel specifications" chapter for detailed specifications

Environmental

- **Indoor use**
- **Operating Temperature:** 10°C to +40°C Indoor use
- **Storage Temperature:** 0°C to +50°C
- **Pollution degree:** 1 (no pollution or only dry)
- **Altitude:** <2000 m above sea level
- **Humidity:** 10% to 80% non-condensing
- **Case protection:** IP20
- **Warm-up:** 1 hour to rated accuracy
- **Cooling:** Internal DC Fans
- **Vibration:** not specified
- **Choke:** not specified

Mechanical

- **Size:** 280(H) x 490(W) x 460(D) mm
- **Weight:** 24 kg without cable

Safety complies with EN61010.

EMC complies with EN61326.

5.2 Booster channel specifications

SPECIFICATIONS		
Cell control		
	2/5 A	10/20 A
Connection	2, 3, 4 or 5 terminal leads (+ ground)	
Compliance	10 V range adjustable from ± 10 V to 0 – 20 V	
Maximum current	± 2 A / ± 5 A continuous	± 10 A / ± 20 A continuous
Maximum potential	± 20 V	
Rise Time and fall time		
- Potentio	15 μ s	25 μ s/60 s
- Galvano	40 μ s	50 μ s/120 μ s
Measurement		
Potential accuracy	< 0.1% FSR*	
Current accuracy	< 0.1% FSR*	
Potential noise (peak to peak 0-100 kHz)	0.6 mV	
Potential noise (peak to peak 0-100 kHz)	1 mA at 2 A/5 A	1 mA at 10 A/20 A
Electrometer		
Inputs	3 potential measurements	
Impedance	10^{10} Ω	
Bandwidth	1 MHz	
Auxiliary Inputs / Outputs		
1 external input	TTL level	
General		
Dimensions (W: 290/H: 130 x L)	105 mm	210 mm/430 mm
Weight	1 kg	2 kg/4.2 kg
EIS OPTION		
Impedance specifications (Z version only)		
Frequency range (accuracy 1%/1°)	10 μ Hz to 150 kHz/125 kHz	10 μ Hz to 80 kHz/30 kHz
Amplitude	1 mV to 1 V peak to peak (potentio mode) 0.1 % to 50 % of the current range (galvano mode)	
Accuracy	< 1 %, 1°	

*FSR: Full Scale Range
Specifications subject to change.

5.3 Safety precautions

To avoid electrical shocks:

- The equipment must be connected to a protective ground.
- The equipment must be disconnected from the power source before it is opened.

To avoid electrostatic shocks:

- Every lead from the VMP3 to the cells (or booster to cells) must be connected either to an electrochemical cell or to the testing box.

6. Troubleshooting

6.1 Data saving

Problem: Data cannot be saved from a given channel (this channel appears in yellow into EC-Lab[®], and the program displays an error message while attempting to save data):

Solution(s):

- ensure that the saved file has not be moved or destroyed, or opened by another application,
- if the saved file is on a network drive, ensure that you have the right to write data into the same directory (create and destroy a text file). Otherwise see your network authorizations....,
- in EC-Lab[®], select **File, Repair...** Then select the saved file and click on the **Repair** button,
- ensure that the computer's IP Address has not been modified since the beginning of the experiment,
- if the problem persists, contact us.

6.2 PC Disconnection

Problem: The PC is disconnected from the instrument ("Disconnected" is displayed in red on the EC-Lab[®] status bar):

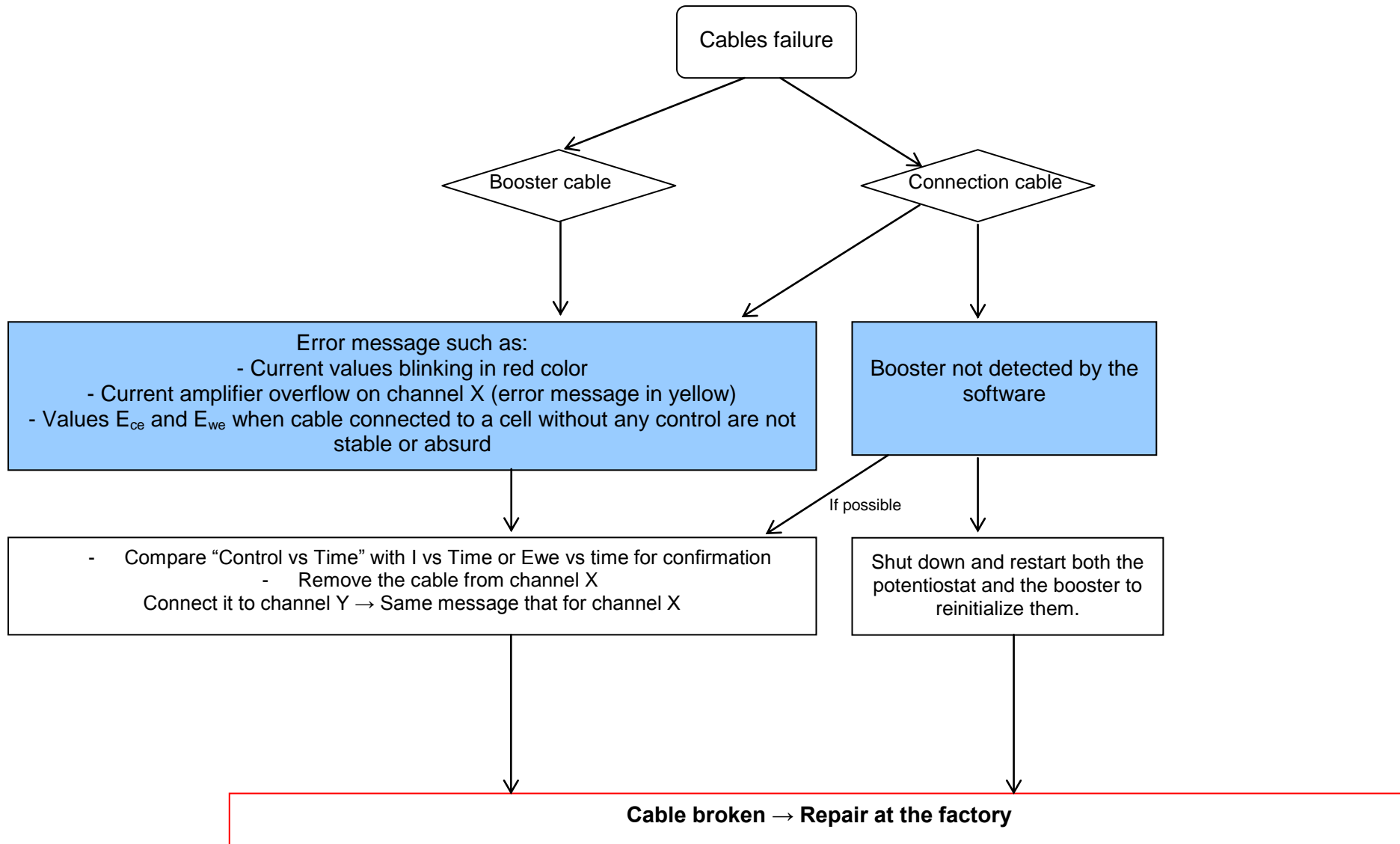
Solution(s):

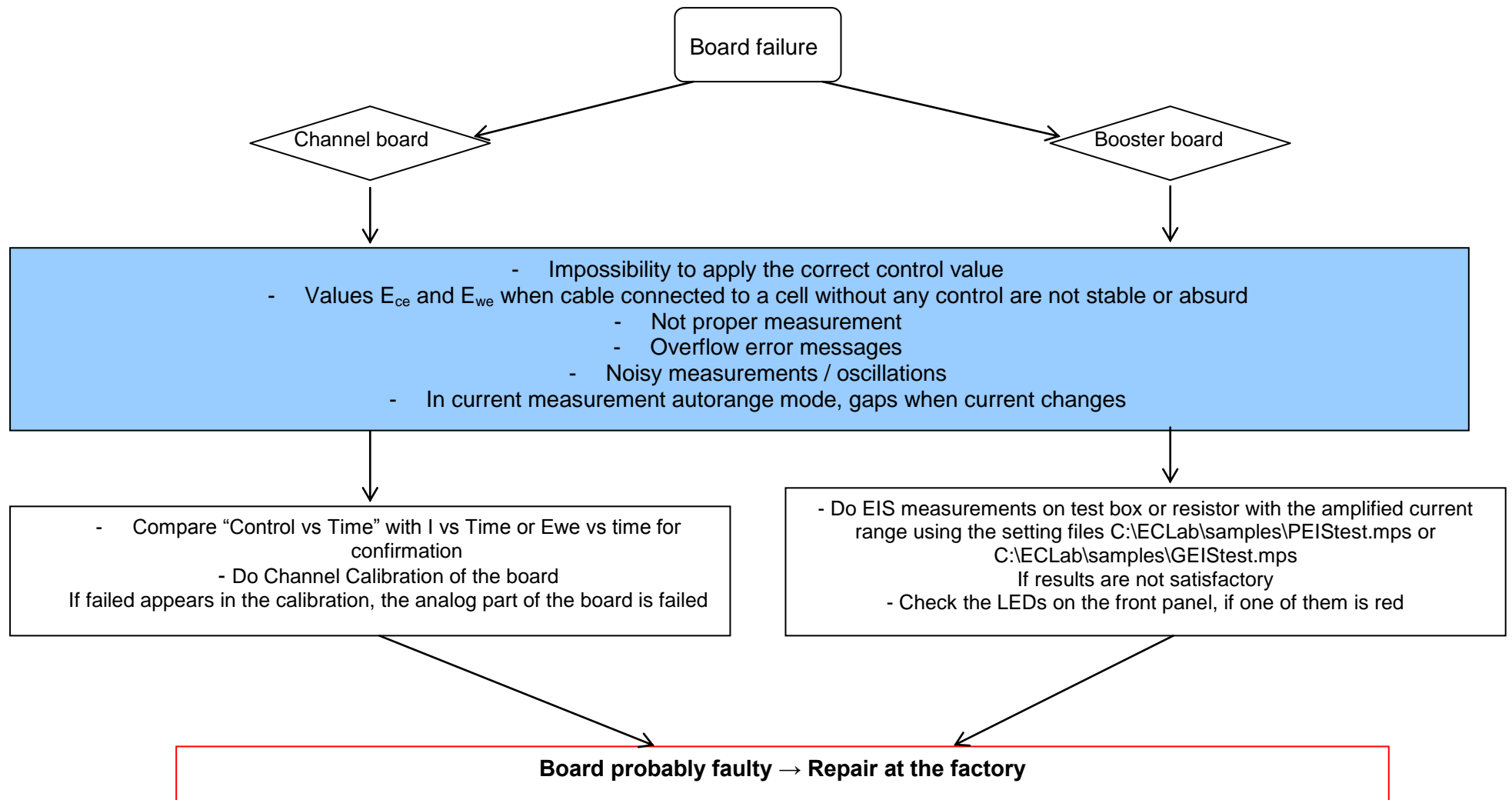
- check the PC – instrument connection,
 - direct connection: verify that the crossed Ethernet cable is plugged from both ends,
 - network connection: verify that the yellow led is blinking on the instrument front panel and that you can access to your network directories from the PC,
- check that the green led is blinking (this assumes that the multichannel potentiostat is always running properly),
- in the Tera Term Pro window type "r" or "R": this will restart the Ethernet connection program that is a part of the instrument firmware,
WARNING: this operation is not a simple task, so proceed like this only in case of trouble.
- if the problem persists, contact us.

6.3 Effects of computer save options on data recording

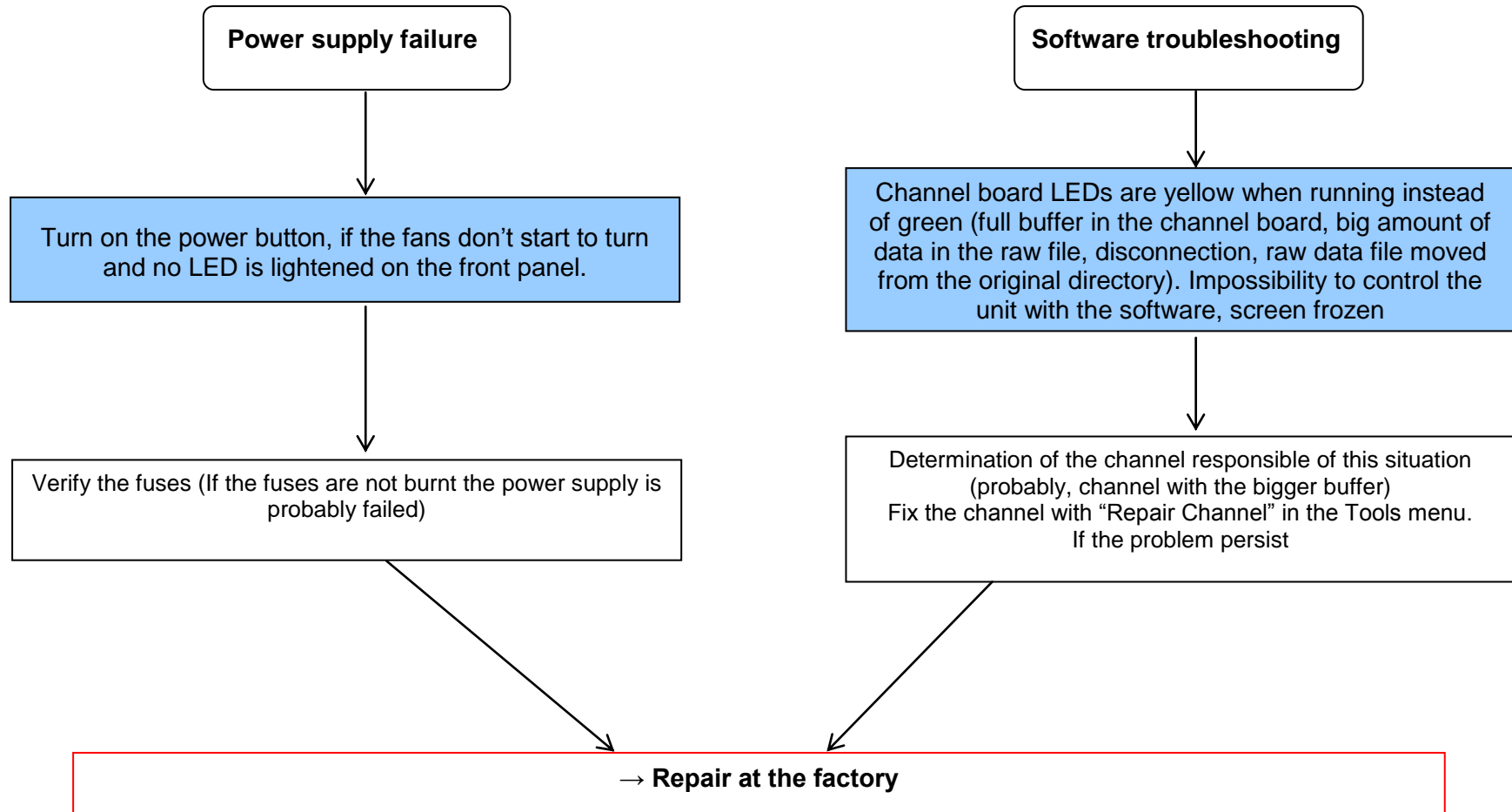
Electrochemical experiments often have a long duration (more than 24 hours). During the experiment, the computer should always be able to record the data points. If the user has enabled the power option for his hard disk, he risks being unable to record the data points. In order to avoid that, we advise the user to remove the power save option of his computer in the settings panel.

6.4 Preliminary checks





Note: if you send back a board to the factory don't forget to send cell cable associated with this board.



7. Glossary

This glossary is made to help the user understand most of the terms used in this instrument installation and configuration manual. The terms are defined in alphabetical order.

Booster: current power booster that can be added to each channel individually.

CE to ground connection: this mode allows the user to lead measurements on many working electrodes with one or many reference electrodes and one counter electrode connected to the ground.

Cell connection: connection of the instrument's channel board to the electrochemical cell with five leads.

DB25: connector with 25 pins on the instrument's front panel where the cable connecting the channel board and the electrochemical cell is set.

DB9: connector with 9 pins on the instrument's front panel used for connection.

Impedance: defined by the ratio E/I .

Specifications: Characteristics of the instrument such as cell control or current and potential measurement.

Triggers: option that allows the instrument to set a trigger out (TTL signal) at experiment start/stop or to wait for an external trigger in to start or stop the run.

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