



DC POWER SUPPLY PS-1000-ABOS/100V-10A/WB USER MANUAL



User Manual Reference: MU-RC2092-EN-00

PUISSANCE+

500 Avenue du Danemark- ZI Albasud - Secteur 3 - 82000 MONTAUBAN
Tel.: +33 (0)5.63.02.14.21 - Fax: +33 (0)5.63.02.14.61 - www.puissanceplus.com
SA with a capital of €256,000 - RCS MONTAUBAN B 390 722 999





MANUAL UPDATES

This document is the user manual. It describes how to start and stop the power supply and messages or indications that may appear on the equipment (touch screen).

DOCUMENT	REVISION	DATE	MODIFIED PAGES	MODIFICATION
MU-RC2092-EN	00	06/01/2017	All	Initial Version.



TABLE OF CONTENTS

1. PREAMBLE	5
1.1 Legal notices	5
1.2 Warranty	5
1.3 Waste Electrical and Electronic Equipment (WEEE)	5
2. SAFETY	6
2.1 General	6
2.2 Before applying power	6
2.3 Ground the instrument	6
2.4 Fuse	6
2.5 Do not remove the instrument cover	6
2.6 Do not modify the instrument	6
2.7 In case of damage	6
2.8 Safety symbols	7
2.8.1 Connection to the mechanical earth	7
2.8.2 Electrical shock danger/hazard	7
2.8.3 General warning	7
3. PRESENTATION	8
3.1 General	8
3.2 Hardware description	8
3.2.1 Mechanical description	8
3.2.2 Front face description	9
3.2.3 Rear face description	10
3.3 Functional description	12
3.4 Electrical characteristics	12
3.4.1 Mains characteristics	12
3.4.2 Output characteristics	13
3.4.3 Other characteristics - Environnement	15
4. INSTALLATION AND IMPLEMENTATION	16
4.1 General information	16
4.2 Components and accessories supplied with the instrument	16
4.3 Inspection the unit	16
4.4 Environment / ambient conditions of use	16
4.5 Power supply installation	16
4.6 Implementation	17
4.6.1 General	17
4.6.2 On/Off procedure	17
4.7 Recommendations	17
4.7.1 Load output wiring	17
4.7.2 Remote recopy wiring	17
4.8 Load connection	18
4.8.1 Remote regulation in local mode	18
4.8.2 Remote regulation in remote mode	18
5. USING THE GENERATOR	19
5.1 General	19
5.2 Using the touch screen	19
5.3 Start screen	22
5.4 General menu	23
5.4.1 "PS1000-ABOS..." tab	24
5.4.2 "System..." tab	25



5.5	Using the power supply	26
5.5.1	Programming the power supply	26
5.5.2	Using the Profile screen	28
5.6	Setting of Ethernet link	30
5.7	Setting of serial RS232 link	31
5.8	Fan settings	32
5.9	Status of power supply	33
5.10	The configuration of the touch screen	34
6.	PROGRAMMATION	35
6.1	Ethernet link	35
6.2	RS232 link	35
6.3	Programmables parameters for the Ethernet and RS232 links	35
6.4	List of commands:	36
6.5	List of error codes	38
6.6	Viewing parameters	39
7.	MAINTENANCE	41
7.1	Cleaning	41
7.2	Fans	41
7.3	Fuse	41
8.	STORAGE CONDITIONS	42
9.	APPENDIX 1 : MECHANICAL DIMENSIONING	43

LIST OF ILLUSTRATIONS

Figure 1 : Power supply front face.....	9
Figure 2 : Power supply rear face	10
Figure 3 : Functional description	12
Figure 4 : Keyboard MMI.....	19
Figure 5 : Example of error message	20
Figure 6 : Access to the general information MMI	21
Figure 7 : General information MMI.....	21
Figure 8 : Start screen	22
Figure 9 : General menu	23
Figure 10 : PS1000-ABOS... menu.....	24
Figure 11 : System... menu	25
Figure 12 : Setting menu.....	27
Figure 13 : Voltage profile (curve) screen	28
Figure 14 : Ethernet settings menu	30
Figure 15 : RS232 settings menu.....	31
Figure 16 : Fan settings menu.....	32
Figure 17 : Selftest menu	33
Figure 18 : Touch screen settings menu	34
Figure 19 : Mechanical dimensioning – Front face	43
Figure 20 : Mechanical dimensioning – Upper view	43

1. PREAMBLE

1.1 Legal notices

No part of this document may be photocopied, reproduced, or translated to another language without the prior agreement and written consent PUISSANCE +.

1.2 Warranty

The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions.

PUISSANCE + is not responsible if the instrument is used in a dangerous manner, either alone or in conjunction with other equipment. High voltages are present in the instrument making it dangerous if used in conditions not specified by PUISSANCE +. Safety symbols affixed to the instrument indicate these dangerous voltages.

1.3 Waste Electrical and Electronic Equipment (WEEE)

The product label (see below) indicates that you must not discard this electrical/electronic product in domestic household waste.

At the end of their life cycle, you have to eliminate any equipment intended for destruction correctly in order to avoid all attack against the Environment and Human Health. Contact the local authority for advice on recycling.



2. SAFETY

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings or instructions elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. PUISSANCE + assumes no liability for the customer's failure to comply with these requirements.

2.1 General

Do not use this product in any manner not specified by PUISSANCE +. The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

CAUTION: The perforated panels must be protected by a device to prevent falling object indoors during transport.

2.2 Before applying power

Verify that all safety precautions are taken. Make all connections to the unit before applying power. Note the instrument's external markings described paragraph 2.8 Safety symbols

2.3 Ground the instrument

A general terminal mechanical ground is available at the rear of the instrument to perform, for example, a separate wiring of earth in a bay.

2.4 Fuse

WARNING: The power supply contains an internal fuse that is not accessible to customers. In case of problems, please contact customer support.

2.5 Do not remove the instrument cover

Only qualified, service-trained personnel who are aware of the hazards involved should remove instrument covers. Always disconnect the power cable and any external circuits before removing the instrument cover.

2.6 Do not modify the instrument

Do not install substitute parts or perform any unauthorized modification to the product. Return the product to PUISSANCE + for service and repair to ensure that safety features are maintained.

2.7 In case of damage

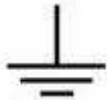
Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

2.8 **Safety symbols**

A set of labels affixed on the instrument summarizes and reminds the safety instructions to be obeyed when working on the bench. To make formatting of this document easier, the scale of the labels shown herein differs from that of the real labels.

2.8.1 **Connection to the mechanical earth**

The symbol below indicates that it is not necessary to connect the instrument to the ground because the leakage current is lower than 0.5 mA.



2.8.2 **Electrical shock danger/hazard**

The symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



2.8.3 **General warning**

This symbol indicates that the user must refer to the manual or caution information to avoid personal injury or damage the product.



3. PRESENTATION

3.1 General

The PS-1000-ABOS/100V-10A is a DC power supply developed by the Company PUISSANCE +.

The product is based on linear regulation products, with programmable voltage and/or current, and high electrical performance to meet the requirements of the equipment incorporated into automatic test systems.

Moreover, to ensure a maximum safety, the product is provided with different protections including severe conditions (temperature high environment, short circuit at the output, etc.):

- Protection of transistors by limiting the power dissipated through an ultra-fast electronics detector.
- Thermal protection against overheating of the power electronics thermal protector.
- AC protection switch / thermal-magnetic circuit breaker.

The power supply PS-1000-ABOS/100V-10A is equipped with an user interface on a graphic touch screen positioned on the front panel for control and adjustment levels of voltages, as well as the functions of management.

This generator is equipped with a forced ventilation low noise for extracting the heat generated internally by the various components. The rotational speed of the fans can be controlled through the user interface. The direction of ventilation is oriented to evacuate hot air from the front to the rear of the rack.

The power supply can be used in:

- Local control:
The control with graphics and touch screen device disposed in front panel gives access to all control functions and the display of measurements.
- Remote control:
The control device includes an Ethernet TCP/IP and a RS232 interfaces for drive using the supervision PC.

3.2 Hardware description

3.2.1 Mechanical description

The power supply PS-1000-ABOS/100V-10A is integrated in a rectangular frame with the following characteristics:

- Total height: 177 mm (4 U),
- Total width: 483 mm,
- Depth: 494 mm (excluding connectors and handles),
- Weight: 33 kg,
- Lower cover, 2 mm steel-sheet,
- Upper cover, electro galvanized steel-sheet, 1.5 mm thick,
- Front panel, painted made 4 mm thick aluminum,
- Rear panel made of Korundal (aluminum), 4 mm thick,
- Front panel finishes: paint, color grey RAL 7035.

3.2.2 Front face description

The front face of the power supply includes various interfaces allowing the user to visualise the status of the power supply and to access to the various manual controls.

For this, it includes:

- a TFT 5.6 inch touchscreen (PL1). It allows the user to know the status and mode of operation of the power supply and to control voltage and current levels,
- an ON/OFF switch (S1).

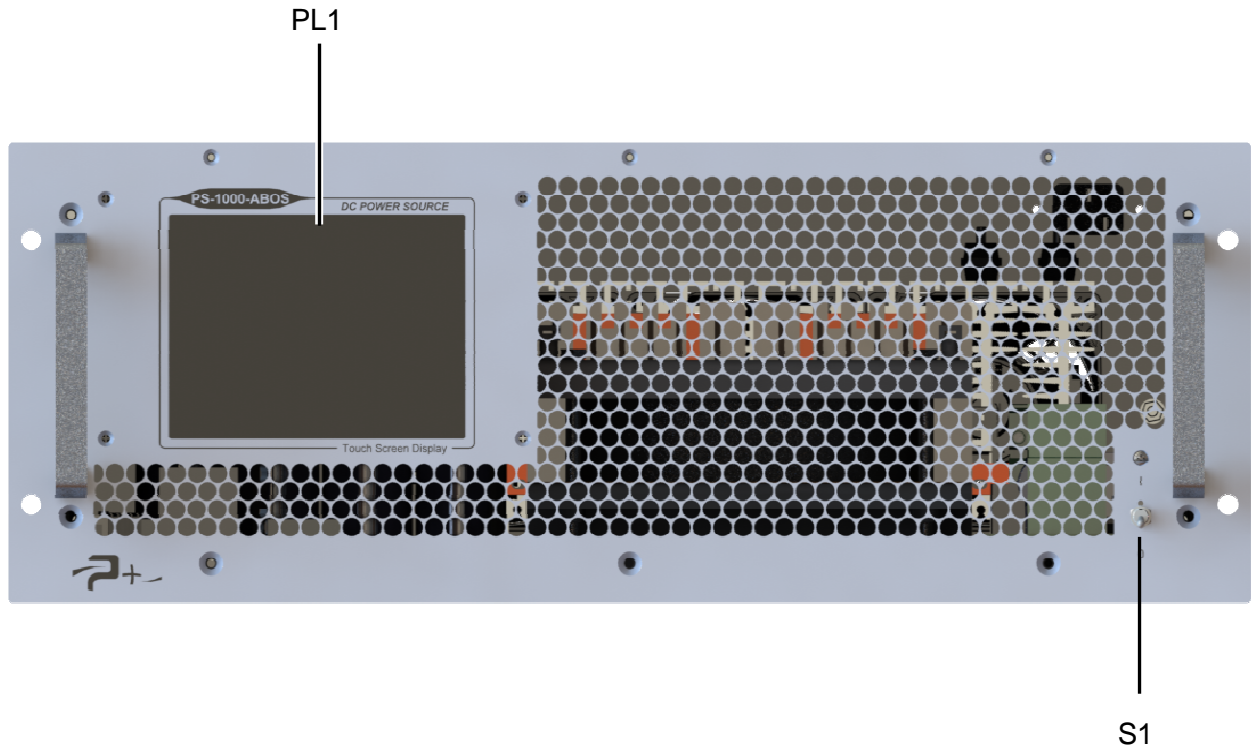


Figure 1 : Power supply front face

3.2.3 Rear face description

The rear face of the power supply comprises the various interfaces to perform its electrical connection. It also includes the air outlet grids behind which the hot air exhaust fans are located.

These interfaces are:

- J1: mains input connector,
- J2: power output connector,
- J4: Ethernet TCP/communication connector,
- J7: RS232 connector,
- E1: electrical shock danger/hazard label,
- E2: general terminal mechanical ground to perform, for example, a separate wiring of earth in a bay.

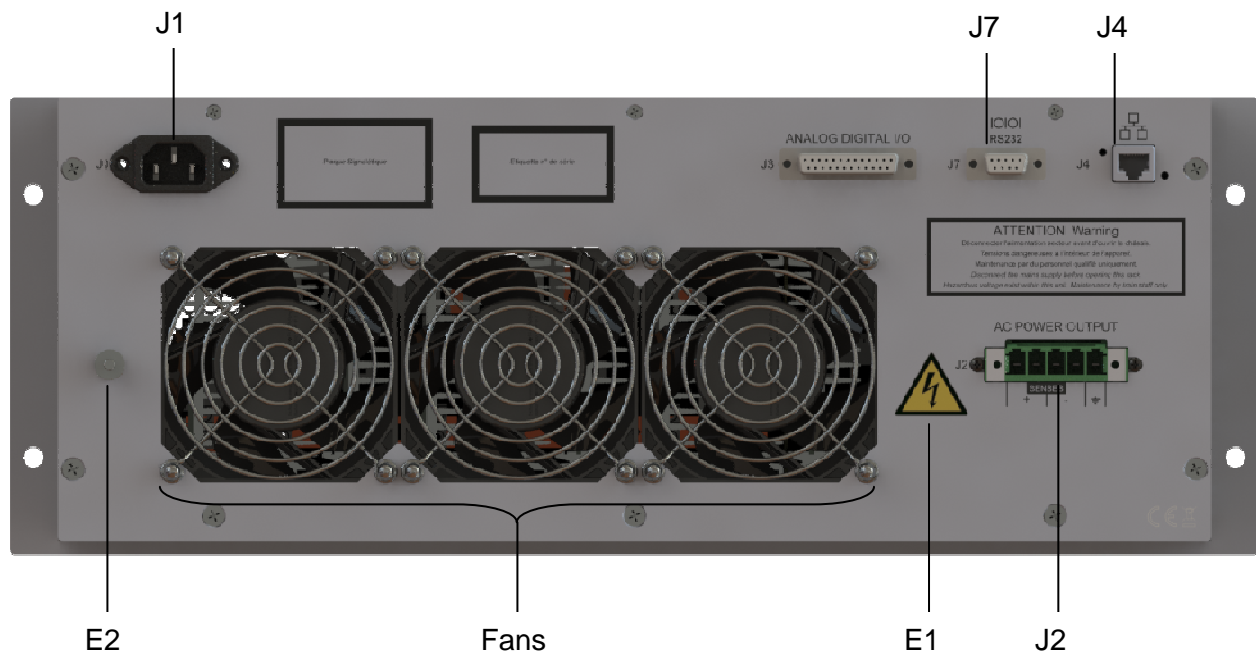


Figure 2 : Power supply rear face

3.2.3.1 Mains input (J1)

J1 connector:

- Receptacle: BULGIN PX0580/63

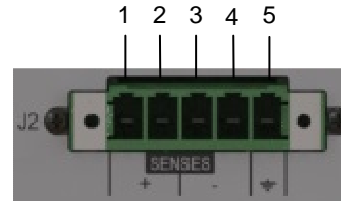
3.2.3.2 Power output (J2)

J2 connector:

- Receptacle: PHOENIX DFK-PC5/5-STF-7.62
Plug: PHOENIX PC 5/5-STF1-7.62

J2 connector pin-out :

- | | |
|---|----------------|
| 1 | Power output + |
| 2 | Sense + |
| 3 | Sense - |
| 4 | Power output - |
| 5 | Earth |



3.2.3.3 Ethernet connector (J4)

J4 connector:

- Receptacle: Amphenol MRJ-5780-01.
RJ45 female 8 contacts, an Ethernet cable category 5 (at least) should be used for remote control using Ethernet TCP/IP.

3.2.3.4 RS232 connector (J7)

J7 connector:

- Receptacle: FCT F09S0G1A.

3.3 Functional description

The power supply is composed of all the elements common to a power supply with serial control:

- The input relay,
- The input transformer,
- The rectifiers,
- Filtering,
- The power block,
- The cards (regulation, μ Processor, driver).

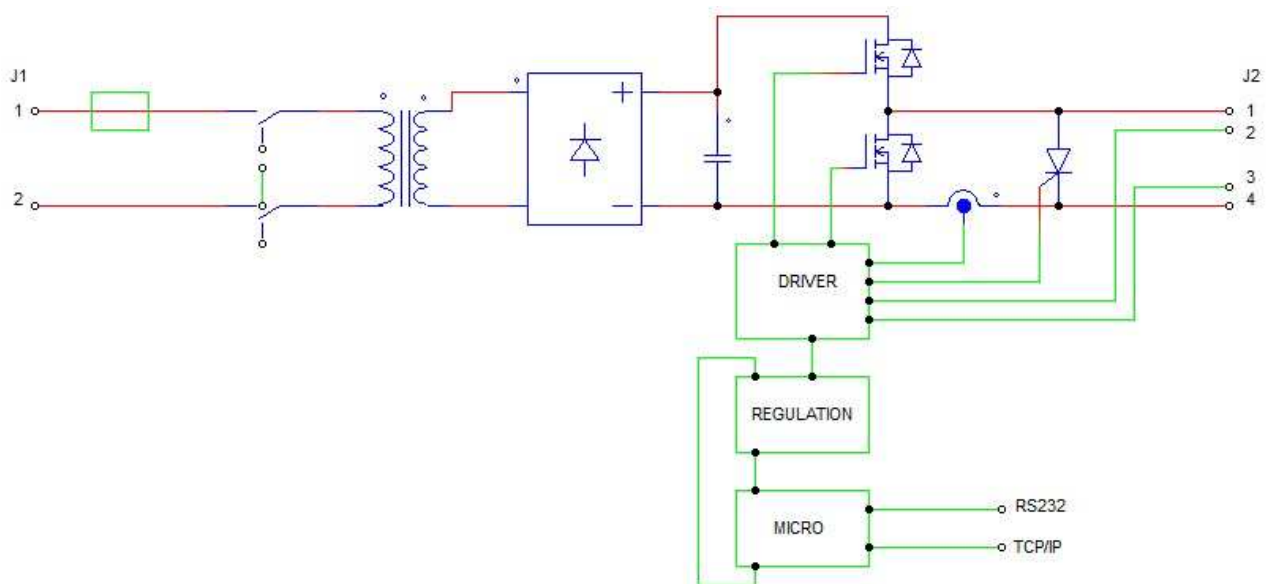


Figure 3 : Functional description

3.4 Electrical characteristics

3.4.1 Mains characteristics

- Input voltage: $V_E = 230 \text{ Vrms} +6\% -10\%$.
- Input frequency: from 45 to 65 Hz.
- Nominal current: 8 Arms.
- Dielectric strength: $> 2 \text{ 500 Vrms}$ during one minute mains output versus outputs connected to the mechanical ground.
- Insulation: $Z > 100 \text{ M}\Omega$ under 500 V DC between output and mechanical ground.

3.4.2 Output characteristics

- Rated characteristics of outputs:
 - Voltage, V_o : 100 Vdc,
 - Current, I_o : 10 A.
- Voltage mode operation characteristics:
 - Accuracy:
 - Typical $\leq (2.10^{-4} \text{ rated } V_o) + (2.10^{-4} \text{ prog } V_o)$
 - Max. $\leq (4.10^{-4} \text{ rated } V_o) + (4.10^{-4} \text{ prog } V_o)$
 - Function regulation factor with respect to +6%/-10% mains voltage variation (with $I_o = \text{rated } I_o$) :
 - Typical $\leq 5.10^{-5} \text{ rated } V_o$
 - Max. $\leq 10^{-4} \text{ rated } V_o$
 - Function regulation factor with respect to 0% to 100% rated I_o variation:
 - Typical $\leq 5.10^{-5} \text{ rated } V_o$
 - Max. $\leq 10^{-4} \text{ rated } V_o$
 - Noise and ripple (for rated V_o and rated I_o):

Conditions: wired output condenser, 0V output, connected to mechanical ground.

- typical RMS $\leq 10^{-4} \text{ rated } V_o$
 - max. RMS $\leq 2.10^{-4} \text{ rated } V_o$
 - Typical peak-to-peak: $\leq 10^{-3} \text{ rated } V_o$
 - Max. peak-to-peak: $\leq 1.5.10^{-3} \text{ rated } V_o$
- Temperature coefficient:
 - Typical $\leq 50 \text{ ppm rated } V_o / ^\circ\text{C}$
 - Max. $\leq 100 \text{ ppm rated } V_o / ^\circ\text{C}$
- Stability over 8 hours (after the first 15 minutes of operation):
 - Typical $\leq 2.10^{-4} \text{ rated } V_o$
 - Max. $\leq 5.10^{-4} \text{ rated } V_o$
- Current mode operating characteristics:
 - Accuracy :
 - Typical $\leq (5.10^{-4} \text{ max } I_o) + (5.10^{-4} \text{ prog } I_o)$
 - Max. $\leq (10^{-3} \text{ max } I_o) + (10^{-3} \text{ prog } I_o)$
 - Function regulation factor with respect to +6%/-10% mains voltage variation:
 - Typical $\leq 5.10^{-5} \text{ max } I_o$
 - Max. $\leq 10^{-4} \text{ max } I_o$
 - Function regulation factor from 10% to 100% rated V_o :
 - Typical $\leq 5.10^{-4} \text{ max } I_o$
 - Max. $\leq 10^{-3} \text{ max } I_o$
 - Noise and ripple (for rated V_o and rated I_o) :

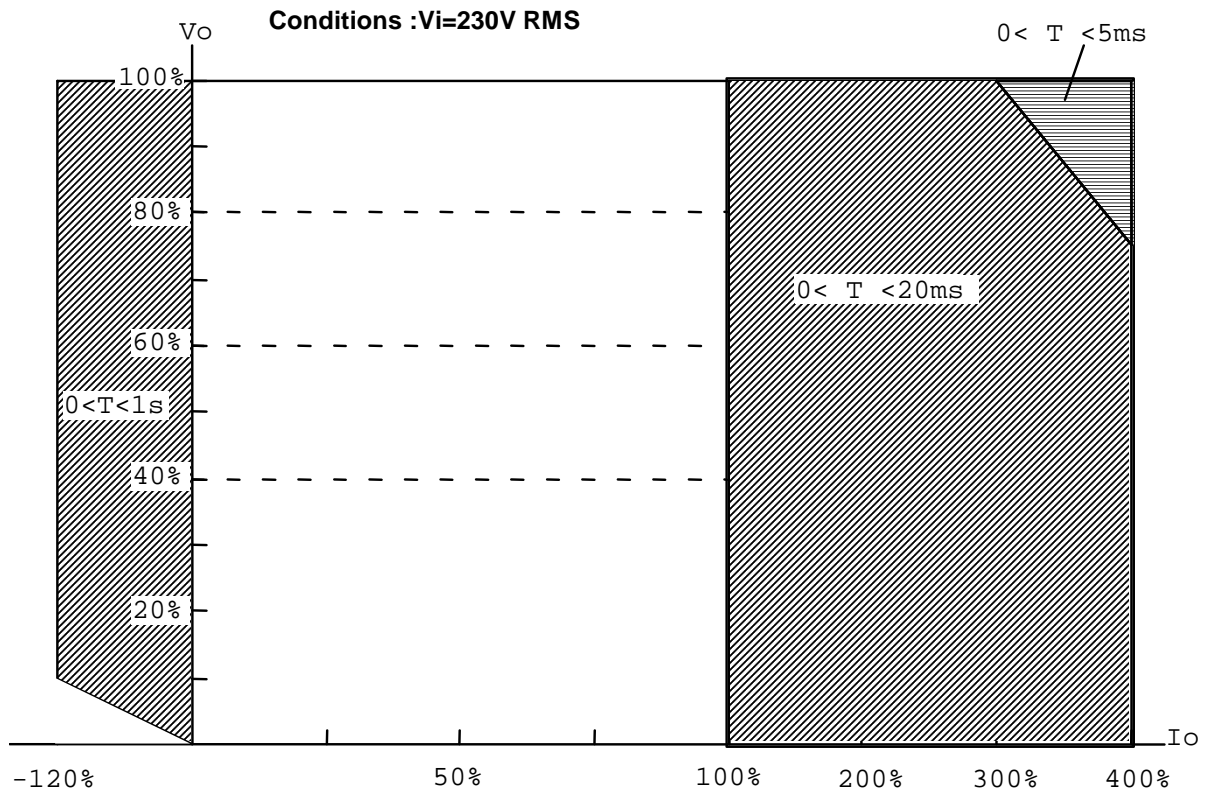
Conditions: wired output condenser, 0V output, connected to mechanical ground.

- typical RMS $\leq 2.10^{-4}$ max Io
 - max. RMS $\leq 5.10^{-4}$ max Io
 - Typical peak to peak: $\leq 2.10^{-3}$ max Io
 - Max. peak to peak: $\leq 5.10^{-3}$ max Io
- Temperature coefficient:
 - Typical ≤ 100 ppm max Io/°C
 - Max. ≤ 200 ppm max Io/°C
- Stability over 8H (after first 15 minutes of operation):
 - Typical $\leq 5.10^{-4}$ max Io
 - Max. $\leq 10^{-3}$ max Io
- Remote regulation in remote mode:
 - Possibility for output voltage drop compensation of 0.5 V / line (i.e. 1 V total) for $V_o = \text{rated } V_o$, and up to 2 V / line (i.e. 4 V total) for V_o ranging from 0 V to rated $V_o - 3$ V.
 - Maximum remote regulation distance: 30 m.

3.4.3 Other characteristics - Environnement

- Operating Temperature: 0 °C to 40 °C.
- Storage Temperature: -10 °C to 60 °C.
- Humidity: 90% at 45°C.

The power supply is equipped with a forced ventilation system. Fresh air is drawn in from the front panel; the hot air is expelled through the rear fans grids.



The above curve show operating ranges according to ambient operating temperature. Such a current derating ensures **continuous** load operation of the power supply unit without thermal circuit breaking. This implies that if the connected load is **intermittent** and of short duration (e.g. a few seconds per minute), the derating of the current is no longer applied.

4. INSTALLATION AND IMPLEMENTATION

4.1 General information

The power supply is equipped with two handles on the front panel for easy transport.

It is recommended not to block the ventilation grids located on the front and on the rear of the power supply. Obstruction of these grids would result in an increase of the temperature inside the power supply and therefore a risk of malfunction.

4.2 Components and accessories supplied with the instrument

The power supply is delivered with the connector to realise the output power cable.

4.3 Inspection the unit

When you receive your power supply, inspect it for any obvious damage that may have occurred during shipment. Carry out a quick appearance check of connector's condition to find any possible defects (connector shell broken, contacts twisted, coaxial contacts damaged, foreign bodies in the connectors).

Until you have checked out the power supply, save the shipping carton and packing materials in case the unit has to be returned

4.4 Environment / ambient conditions of use

The power supply should only be used indoors, on a stable, horizontal and hard support, in a properly illuminated room. The temperature must be comprised between 0 and +40 °C.

4.5 Power supply installation

If the power supply is installed in a test bench, the slides must be properly sized to support their weight.

REMINDER: Take into account its high weight (approximately 33 kg). It must not be handled by a single person.

4.6 Implementation

4.6.1 General

To use the power supply, you must realise its power output cable. To perform its wiring, it is recommended to use a power cable with:

- 3 conductors (Blue + Brown + Yellow/Green) for the power output. The cable must be compatible with the IEC 60245 standard. Example: H07RNF 3G1.5 minimum.

The power supply must be:

- Protected by circuit breakers against overcurrent,
- Protected by a safety device. It must prevent anyone from switching the power supply on while a maintenance intervention or any other task is performed.

CAUTION : Electrical Shock Hazard. Always turn off the power before making the electrical connection of the connectors on the rear panel.
Any connection must be performed by staff trained and empowered, 15 minutes after disconnecting from the mains supply.

- Connect the various cables to their destination and finally connect the power supply cable to its source.

4.6.2 On/Off procedure

Once all the operations necessary for the implementation done, you can turn on the power. To do this, set the power-on switch on front side up.

After starting the power supply, check the result of the selftest on the screen (see 5.9 Status of power supply).

To turn the power off, move the switch down.

WARNING: It is mandatory to wait until the end of a cycle of generation before turning off the power supply using the switch.

For operation with remote communication control Ethernet, the application manager communication must wait for complete starting of the power supply to start communicating.

4.7 Recommendations

In order to reduce or even to eliminate the influence of radio disturbances on the operation of the unit, which might result in degraded performances, several precautions must be taken with the external power supply wiring according to the severity of the environment:

4.7.1 Load output wiring

Connections between the power output and the load should be performed preferably with twisted pairs. If possible, the negative output should be connected to the ground (via the mechanical ground), either through a direct connection (connection between 2 and 5 of J2), or through a 1 μ F capacitor.

4.7.2 Remote recopy wiring

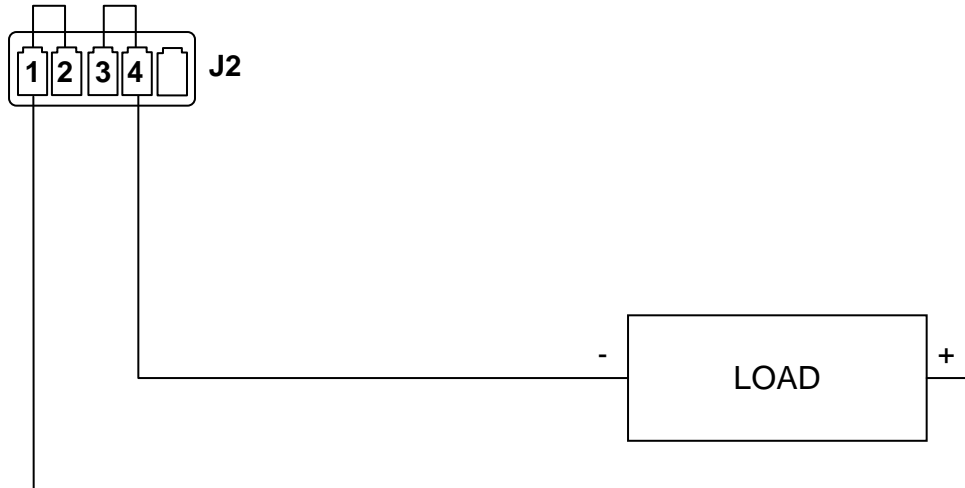
These connections shall be performed using twisted-shielded wires, with the shielding being connected to the ground (via the mechanical ground).

4.8 Load connection

4.8.1 Remote regulation in local mode

This simple load connection mode is designed for a resistive primary component load located near the power supply unit, or for a load requiring constant current operation.

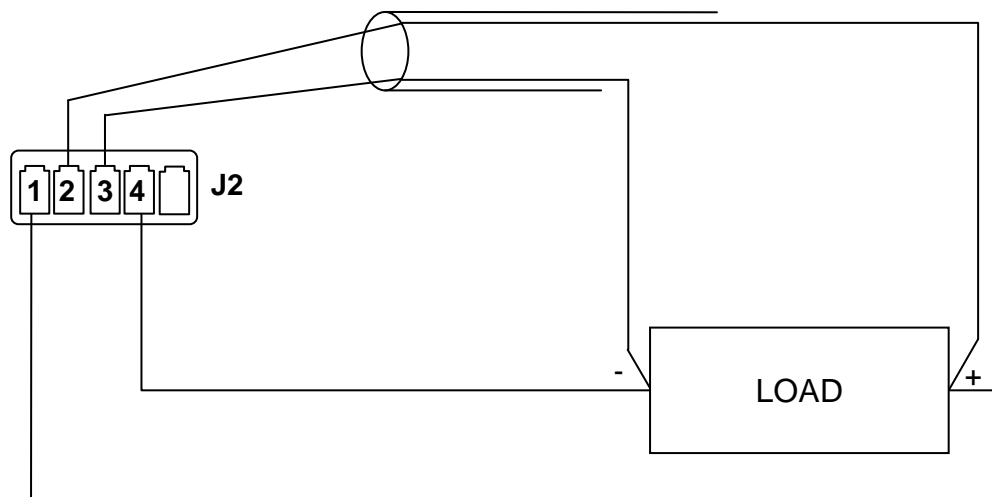
Implementation:



4.8.2 Remote regulation in remote mode

Remote regulation in remote mode is used to compensate significant voltage drops in the connections between the load and the power supply unit (long wires). Recopies must therefore be brought from the power supply unit to the load.

Implementation:



5. USING THE GENERATOR

5.1 General

The specific functions of this power supply are accessible via its touch screen and provide access to advanced features of the power supply. The corresponding parameters are described § 6.66.4.

The overcurrent function (SI) is designed to program an overcurrent comprised between 0 and 40A, for a duration $\leq 200\text{ms}$.

This function is active if the overcurrent threshold is higher than the programmed current. If it is the case, the power supply unit allows an output current equal to the SI threshold during up to 200 ms consecutively. Once this time has elapsed, the output current is automatically returned to the programmed current.

In order to allow overcurrent again, the power supply unit must switch to voltage mode (output $I < \text{programmed } I$) during 100 ms.

5.2 Using the touch screen

The power supply uses a control card fitted with a touch screen. This screen may be operated with a finger or a stylus by a “click” on the selected object.

Numbers are entered using a keyboard which is as follows:

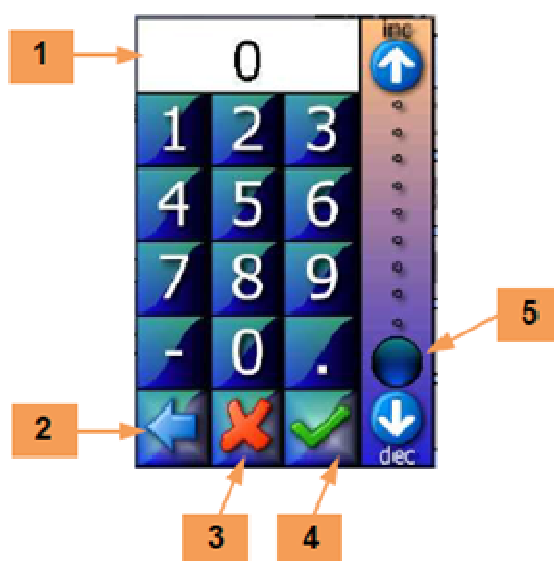


Figure 4 : Keyboard MMI

Zone **1** receives the value entered. **2** button deletes the previous character.

The **3** button closes the window without validating. The **4** button validates data entry.

Scale **5** allows a summary entry of the value between 0 and 100% of the limits of the programmable parameter.

In case of failure or warning, the software displays a message on the touch screen in a message popup (for example):

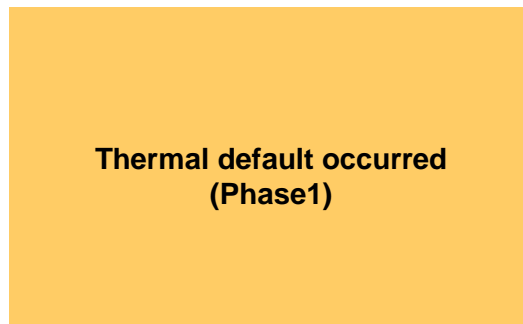


Figure 5 : Example of error message

The display remains in this status until the popup has not been acknowledged.

Acknowledge is done by a simple “click” on the popup.

If the fault disappears before acknowledge, the message changes to inform of the disappearance of the fault but the popup remains displayed: it must still be acknowledged. This principle allows knowing that a fault has been detected, although it has disappeared.

On the various screens appears the following button:



Figure 6 : Access to the general information MMI

Pressing this button displays:

- Coordinates of Puissance on **6** area,
- The name of the product in area **7**,
- The serial number of the product in area **8**,
- The revision of software installed in area **9**.

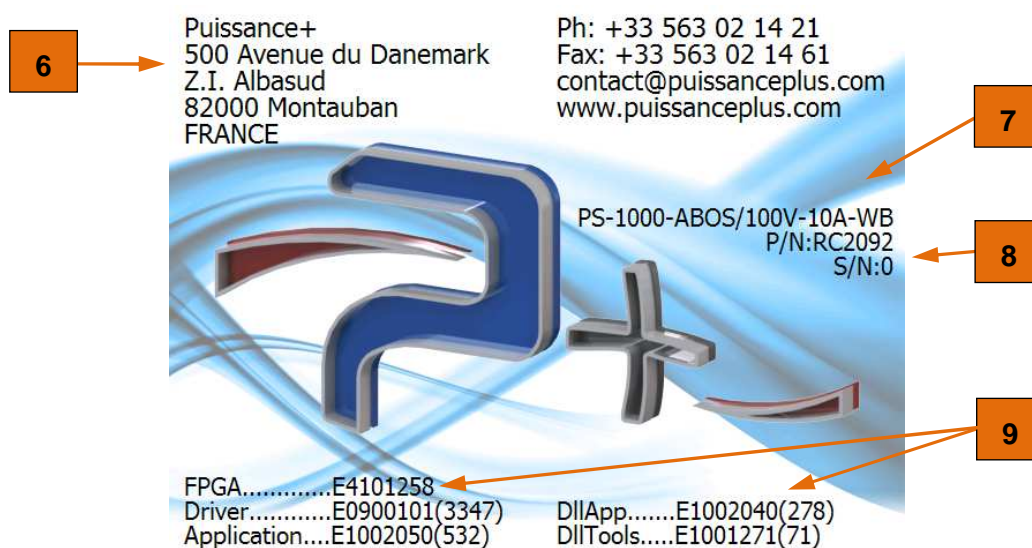


Figure 7 : General information MMI

A “click” on this screen clears it and returns to the previous screen.

5.3 Start screen

When the power supply starts, the following screen (power supply settings screen) is displayed:

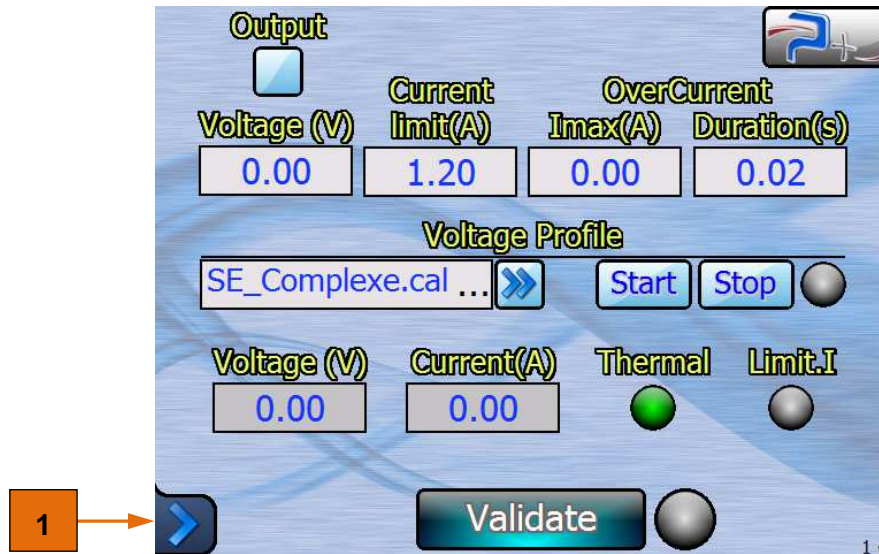


Figure 8 : Start screen

The blue arrow **1** in the lower left corner of the screen gives access to the general menu (see § 5.4 General menu).

5.4 General menu

This menu is opened clicking the blue arrow **1** in the lower left corner (see 5.3 Start screen).

The general software menu is divided in three main tabs:

- Tab "**PS-1000-ABOS...**" **1** displaying the buttons giving access to the power supply settings and measurements (see 5.4.1 "PS1000-ABOS..." tab).
- Tab "**System...**" **2** displaying the functions which can be configured to control the power supply (see 5.4.2 "System..." tab),
- Tab "**Maintenance...**" **3** providing access to the "factory setup" of the system. This access is password-protected and reserved for Puisance +.

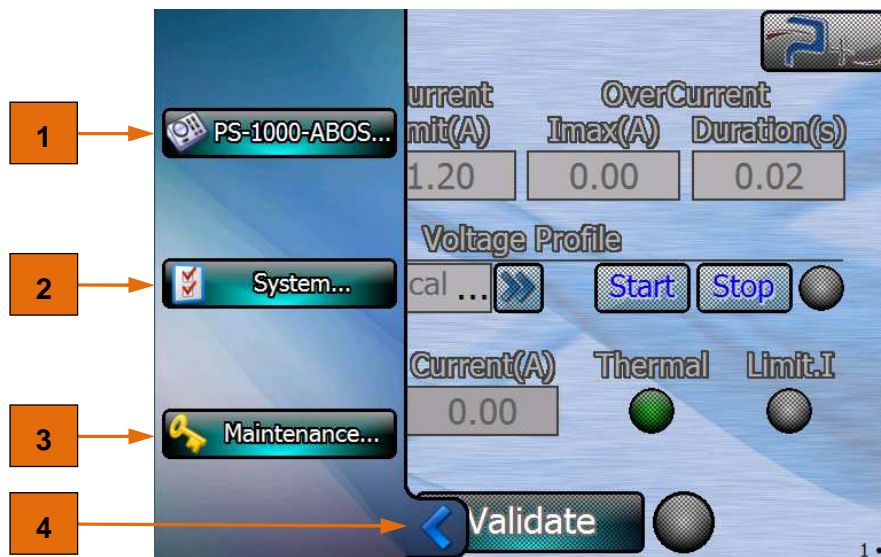


Figure 9 : General menu

The blue arrow **4** in the lower left corner of the screen returns to the power supply settings screen (see 5.3 Start screen).

5.4.1 “PS1000-ABOS...” tab

The “PS1000-ABOS...” tab comprises:

The ProgMeas 1 button to access the screen (see § 0

- Programming the power supply) used to set the power supply,
- The **Profile 2** button to access the screen (see § 5.5.2 Using the Profile screen) used to manage the voltage curves.

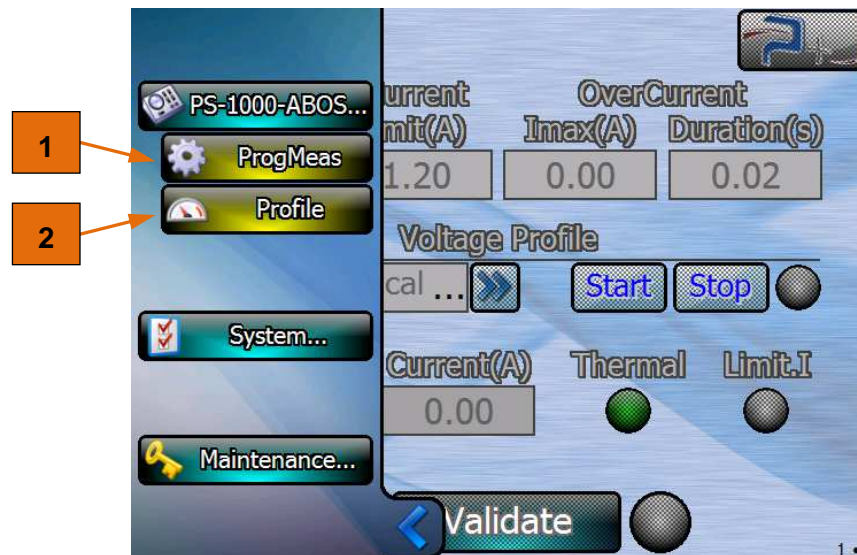


Figure 10 : PS1000-ABOS... menu

5.4.2 "System..." tab

The "**System...**" tab comprises the buttons giving access to the configuration screens of the different controls of the power supply. The five configuration screens are:

- "**Ethernet**" screen, accessible using **1** button, allows the configuration of the Ethernet link (see § 5.6 Setting of Ethernet link),
- "**RS232**" screen accessible using **2** button, allows the configuration of the RS232 serial link (see § 5.7 Setting of serial RS232 link),
- "**Fan Setting**" screen accessible using **3** button, allows the configuration of air forced cooling (see § 5.8 Fan settings),
- "**SelfTest**" screen accessible using **4** button, displays the result of the self-test of the source (see § 5.9 Status of power supply),
- "**Screen Calib.**" screen, accessible using the **5** button, allows the adjustment of the touch screen (see § 5.10 The configuration of the touch screen).

When one of these screens is displayed, the corresponding screen number appears at the bottom right (1 • • • • for the Ethernet screen and so on).

Note: Once the first configuration screen is displayed, switching to the following configuration screen may also be made by a horizontal sweep on the screen with a finger or a stylus.

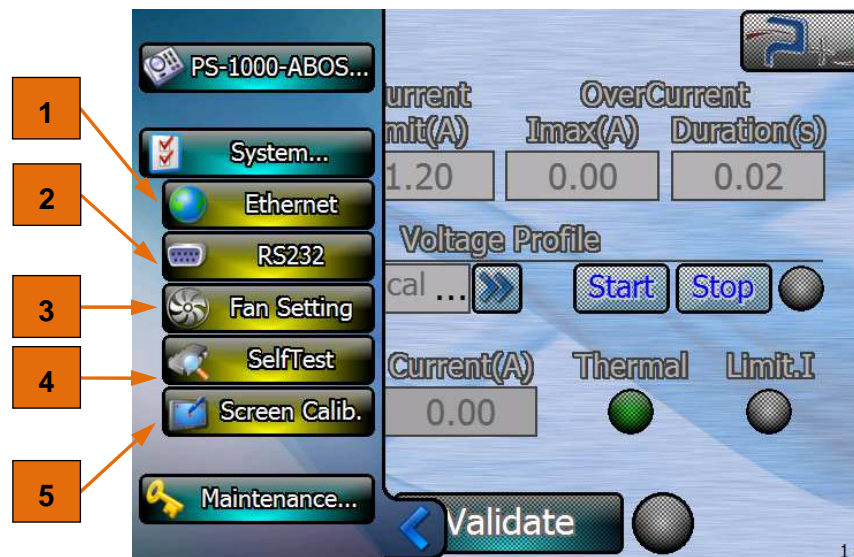


Figure 11 : System... menu

5.5 Using the power supply

The power supply can be programmed either in constant voltage/current mode or with a curve ("Profile" mode). The "profile" mode allows the generating voltages according a voltage curve.

5.5.1 Programming the power supply

This menu is opened clicking the **ProgMeas** button **1** described § 5.4.1 " PS1000-ABOS..." tab.

This screen is divided in three areas:

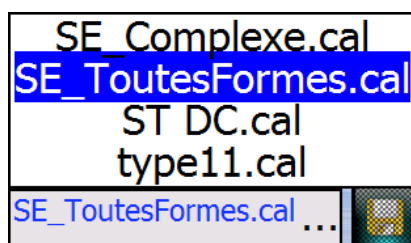
- The upper to control the power supply,
- The central to select a voltage curve to generate,
- The lower displaying the power supply state and the measurement values.

Control area:

- **Voltage (V)** **1** allows selecting the voltage to generate from 0 to 110V,
- **Current Limit(A)** **2** allows adjusting the current limitation from 0 to 10A,
- **OverCurrent I_{max}(A)** **3** and **Duration(s)** **4** allows selecting the overcurrent amplitude and its duration.
- **Output** **16** check box allows the activation of the power supply.

Voltage profile (curve) area:

- The field **15** allows the selection of an existing voltage profile to generate,



- The **Start** **5** button launches the generation of the voltage profile selected. At the end of the generation, the power supply returns to the voltage/current programming mode,
- The **Stop** **6** button stops the generation of the voltage profile in progress,
- The light **7** indicates the voltages generation status,
- The button **11** gives access to the Profile screen to create a new voltage profile.

Display area:

- **Voltage (V)** **14** and **Current(A)** **13** indicate the measurement values,
- **Thermal** **9** indicates an overheat detected on the transistor heat sink,
- **Limit.I** **8** indicates that a current limit is reach. In this case, voltage is reduced to have output current at the defined limit.

Once the parameters are entered, click the button **Validate** **12** to program the power supply. The light **10** indicates the validation status:

- Grey indicates that the parameters are not already programmed,
- Green indicates that the parameters are well programmed,
- Blue indicates that changes are in progress,
- Red indicates that errors occurred during programming. The parameters are not correctly programmed and have to be programmed again.

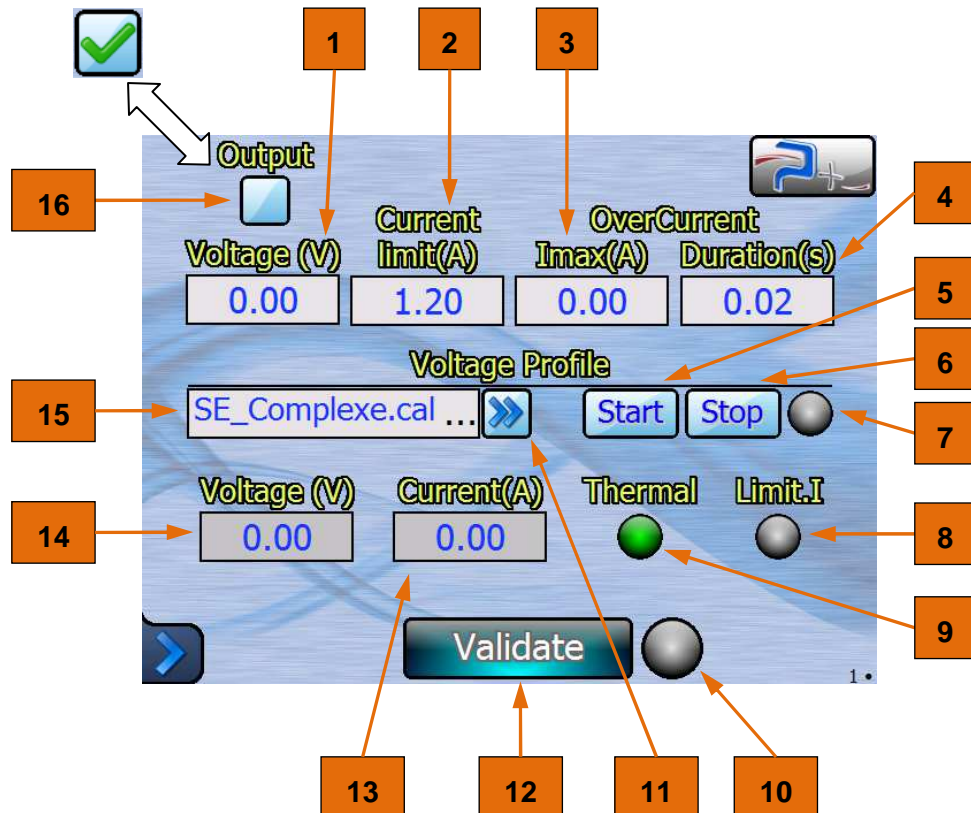


Figure 12 : Setting menu

5.5.2 Using the Profile screen

The profile screen allows creating or modifying or deleting voltage curves.

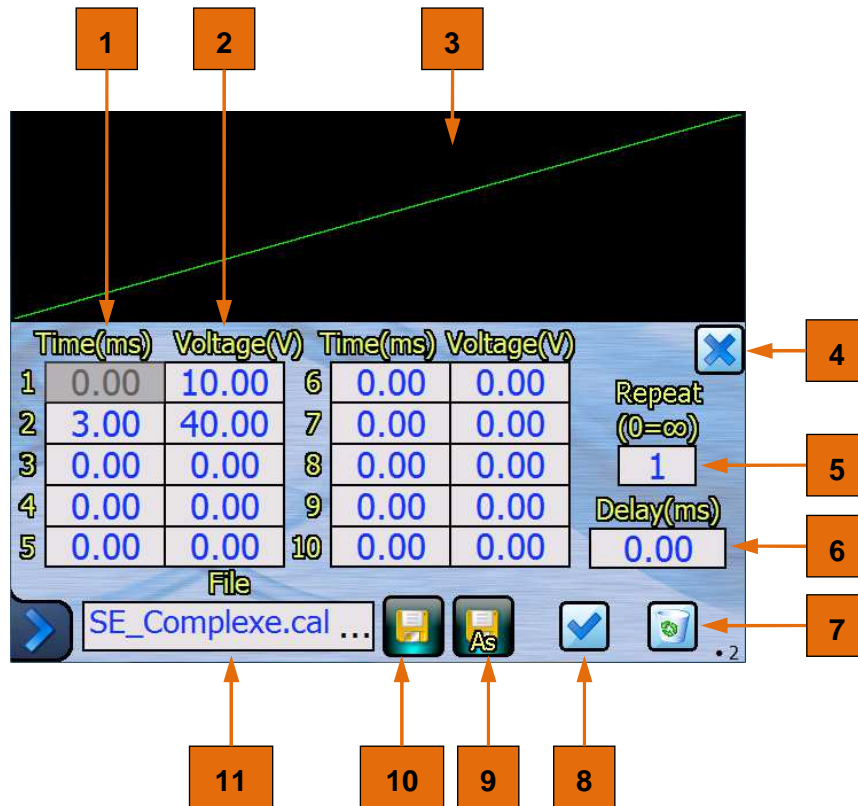


Figure 13 : Voltage profile (curve) screen

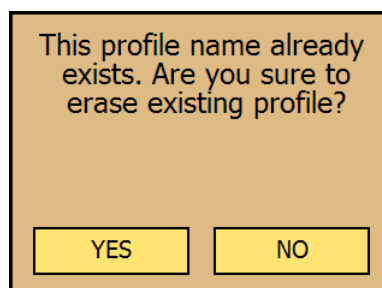
To create a new curve complete the fields **Time(ms)** 1 and **Voltage(V)** 2, the corresponding curve appears on the screen 3. The time values must be increasing.

Note: .The number of files must be limited to 20.

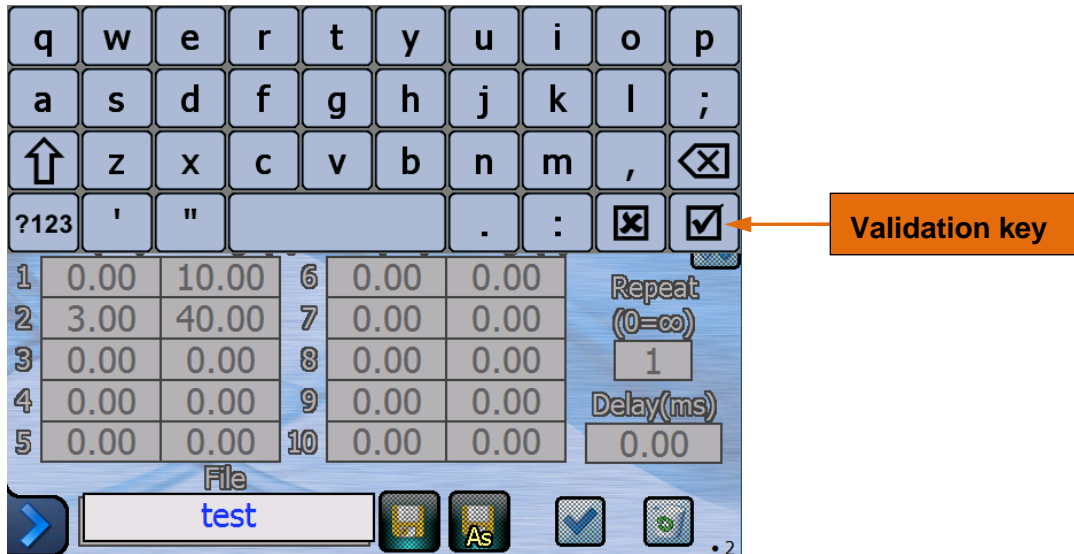
.When Repeat is different to 1, if the user wants to resume generation in voltage/current mode after generating a curve, it is necessary that the last value of the curve is equal to the programmed **Voltage (V)**.

The management of the curve is made using the following buttons and fields:

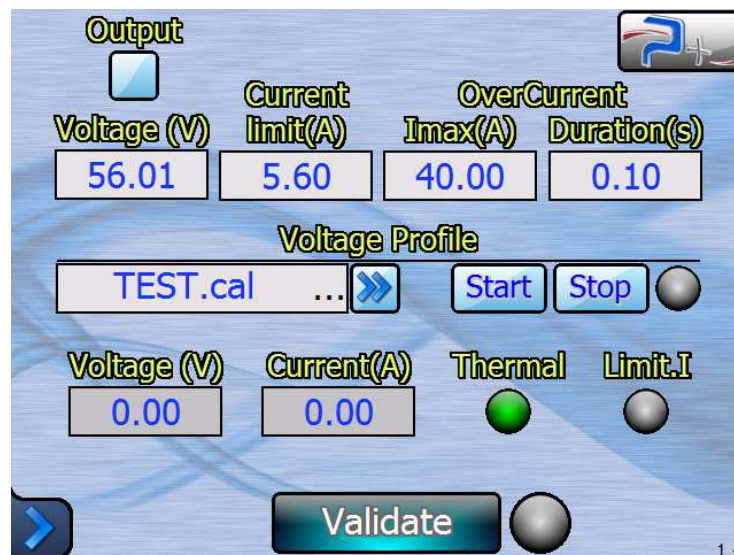
- The button 4 allows resetting the fields **Time(ms)** 1 and **Voltage(V)** 2,
 - The field **Repeat** 5 is used to set the number of repeat of a voltage curve,
 - The field **Delay(ms)** 6 is used to set the delay between each voltage curve repeat,
 - The field 11 gives access to a registered voltage profile,
 - The button 9 and 10 allows to "Save as" or "Save" the voltage curve,
- If a curve with the same name exists the following message comes into view:



Then enter the name of the new curve and validate the typing,



- The button **8** returns to the power supply setting screen to apply the voltage curve:



- The button **7** is used to delete the selected curve.

5.6 Setting of Ethernet link

This menu is opened clicking the “Ethernet” button **1** described § 5.4.2 “System...” tab.

These parameters must be modified only in accordance with your network administrator

The button “Touch Screen” **1** of the panel below displays the operating mode, Local (Touch screen field = **ON**) or Remote (Touch screen field = **OFF**). The power supply switches to remote mode as soon as it receives a valid command frame.



In remote mode, the screens remain accessible but no command can be entered (a red indicator recalls it). Pressing this button allows to return to mode LOCAL (touch screen enabled).

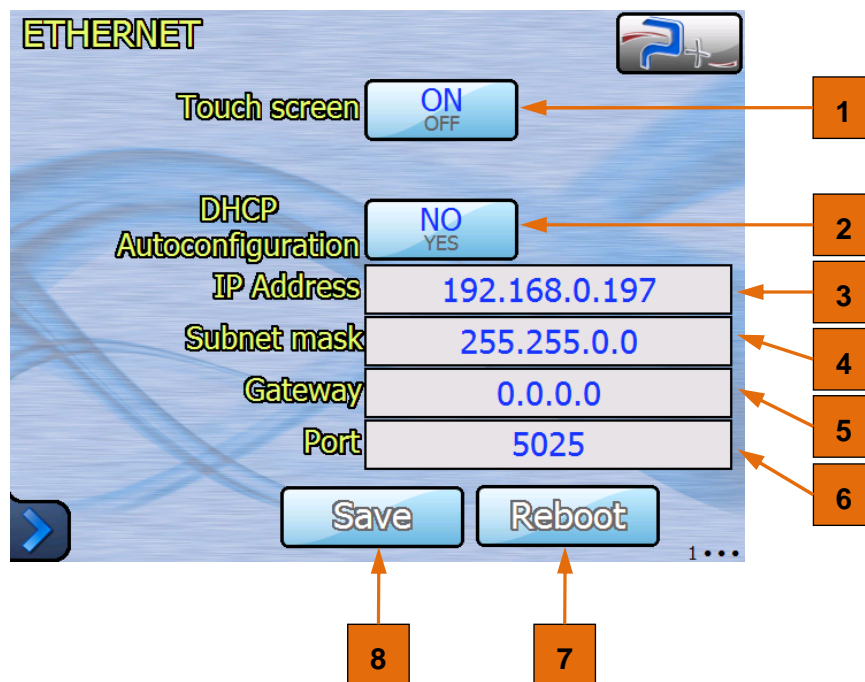


Figure 14 : Ethernet settings menu

The Button “DHCP Autoconfiguration” **2** selects the choice of assigning an IP address:

- Obtained automatically if **YES** (DHCP mode),
- Manual specification if **NO**.

If the “DHCP Autoconfiguration” field **2** specification is manual, the input boxes “IP Address” **3**, “Subnet mask” **4** and “Gateway” **5** must be filled.

Field “Port” **6** should be informed in all cases.

After changing one of these parameters, click the **Save** **8** button to record your new configuration.

After recording, this new configuration will be taken into account only during a restart of the control card. It can be forced, without turning off the power supply, clicking the **Reboot** **7** button.

5.7 Setting of serial RS232 link

This menu is opened clicking the “**RS232**” button **3** described § 5.4.2 “System...” tab.

The button “**Touch screen**” **1** of the panel below displays the operating mode, Local (**Touch screen** field = **ON** → screen is **Enable**) or Remote (**Touch screen** field = **OFF** → screen is **Disable**). The power supply switches to remote mode as soon as it receives a valid command frame.



In remote mode, the screens remain accessible but no command can be entered (a red indicator recalls it). Pressing this button allows to return to mode LOCAL (touch screen enabled).

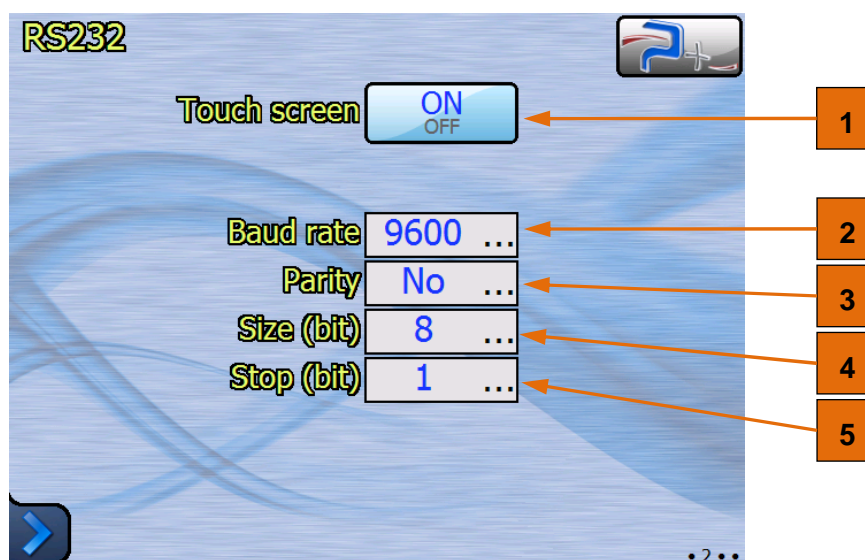


Figure 15 : RS232 settings menu

The “**Baud rate**” menu **2** selects the communications speed. The allowed values are 4800, 9600 (default), 19200, 38400, 57600 and 115200 baud.

The “**Parity**” **3** menu allows to set the parity among three possibilities:

- “**No**” parity (default value),
- “**Odd**” odd parity,
- “**Even**” parity.

The menu “**Size (bit)**” **4** lets choose the number of data bits among two possibilities:

- “**7**”,
- “**8**” (default value).

The “**Stop (bit)**” menu **5** allows to choose the number of stop bits among three possibilities:

- “**1**” (default value),
- “**1.5**”
- “**2**”.

Taking account of the modifications is immediate and does not require a restart of the power supply. The changes are stored in non-volatile memory: they are kept upon the power-off of the power supply.

5.8 Fan settings

This menu is opened clicking the “**Fan Setting**” button **4** described § 5.4.2 “System...” tab.

This power supply manages the speed of the fans, from 0% to 100%, according to the temperature of the elements of power.

The box “**Thermal(°C)**” **8** allows the input of the expected temperature. As soon as the indicator exceeds this value, fans start.

The boxes “**Regul T° Kp**” **7** and “**Regul T° Ki**” **6** are for fans speed.

The boxes “**Fan min speed(%)**” **5** and “**Fan max speed(%)**” **4** are maximal and minimal values of fans speed.

The indicator “**Fan speed(%)**” **3** displays actual fans speed.

The button “**Autospeed**” **2** allows to enable or disable automatic fans regulation. It may be interesting to force fans speed for more efficient cooling after a thermal alarm for example.

The “**Measure**” **1** indicator displays the actual temperature.



**It is more efficient to use power supply with “Autospeed” ON.
A regulated ventilation too slightly will involve a more important risk of thermal alarm.**

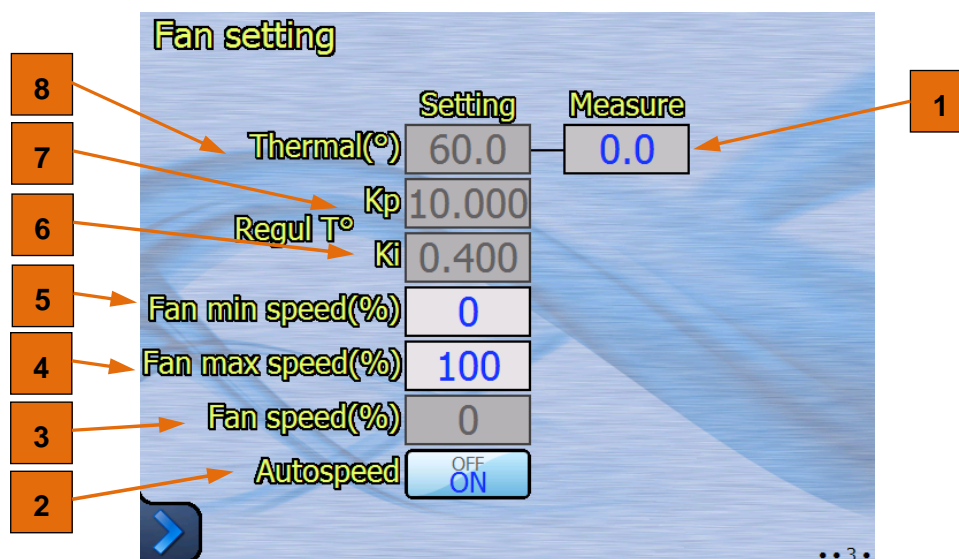


Figure 16 : Fan settings menu

5.9 Status of power supply

This menu is opened clicking the “**SelfTest**” button **5** described § 5.4.2 “System...” tab.

Light is green on normal operation, red in case of failure.

Light **1** is for amplifier card.

Light **2** is for synthesizer card.

This self-test is made only upon starting the software. It is necessary to restart the software to run a new self-test.

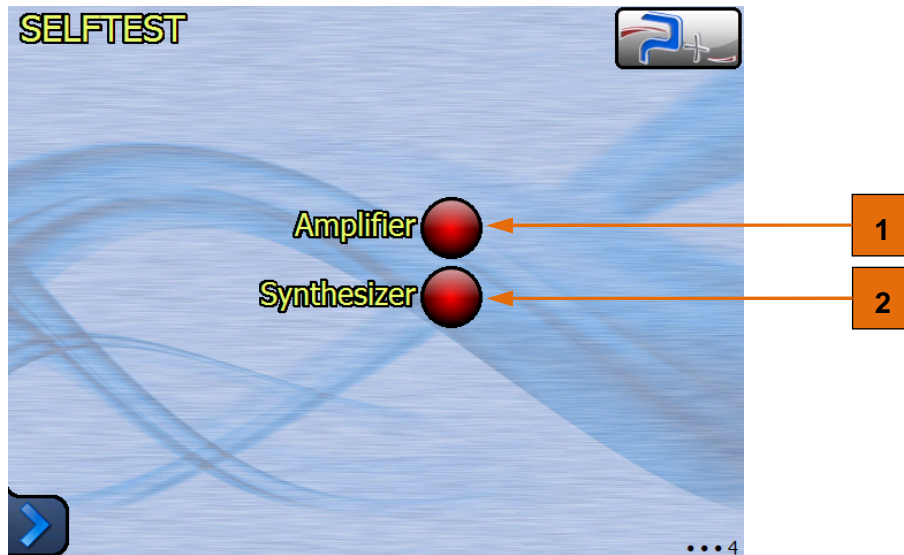


Figure 17 : Selftest menu

5.10 The configuration of the touch screen

This menu is opened clicking the “**Screen Calib.**” button **6** described § 5.4.2 “System...” tab.

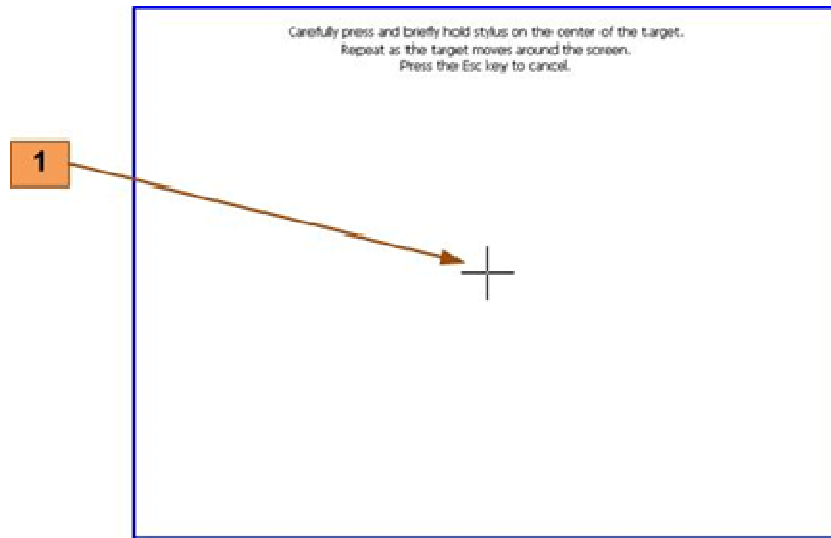


Figure 18 : Touch screen settings menu

The operator has just click the cross **1** which will appear in different places on the screen then to match the image to display with the size of the screen.

6. PROGRAMMATION

The remote control is performed using a TCP/IP communication on Ethernet bus or a serial communication on RS232.

6.1 Ethernet link

It is configured by the "Ethernet" page described in § 5.6 Setting of Ethernet link.

Ethernet is the physical standard used to transmit commands that can fly the generator via a LAN.

The instrument uses standard architecture client/server **TCP/IP WinSock** on the chosen port. The instrument behaves as a **Server**, to which equipment seeking to control the generator will come to connect as a **Client** by opening a **socket** communication.

The commands are ASCII strings transported on the TCP protocol.

6.2 RS232 link

Communication is configurable (speed, parity, data bits, stop bits) by the "Serial Port" page described in § 5.7 Setting of serial RS232 link.

The commands are ASCII character strings terminated with CR characters (ASCII code 0x13) and LF (ASCII code 0x10).

6.3 Programmables parameters for the Ethernet and RS232 links

They begin with the characters "P" and are positioned following the syntax:

→ 'keyword = value' (followed by LF)

They are followed by a reply from the current generator:

← 'OK' (followed by LF) if the order is correct

or

← "ERRxxx" (followed by LF) if the order is not correct. The error codes are described in § 6.5 List of error codes.

Coherence is in the format of the command: command is fully in (literal) standard.

Example for an analog value standard:

→ P_123CurrLimit = 2.9 (followed by LF)

← OK (followed by LF)



6.4 List of commands:

NOTE: Non-volatile configuration communication parameters: the set value is saved in non-volatile memory. The software takes this value each start or reboot. The "Default value" column shows values taken at each start or reboot.

Parameter		Panel	Possible Programming Values	Conversion Standard/hexa	Default value	Volatile
Adr	Name					
00h	P_SysDisplay	None	ProgMeas Profile Ethernet RS232 Fan Selftest Debug1 Debug2	ProgMeas/00h Profile/01h Ethernet/40h RS232/41h Fan/44h Selftest/46h Debug1/50h Debug2/51h	ProgMeas	YES
01h	*RST	None	/	/	/	YES
02h	*IDN	None	PUISSANCE-PLUS, RC2092,0,E1002040 + E0900101 + E4101258 + E1002050 + E1001271	/	/	/
03h	OPC	None	No Yes	No/0000h Yes/0001h	Yes	YES
04h	P_Output	ProgMeas	OFF ON	OFF/0000h ON/0001h	OFF	YES
05h	P_CurrLimit	ProgMeas	Min : 00.00A Max : 10.00A	ReAn= Hexa*40.00/FFFh	01.20A	NO
06h	P_OverILimit	ProgMeas	Min : 00.00A Max : 40.00A	ReAn= Hexa*40.00/FFFh	00.00A	NO
07h	P_OverIDur	ProgMeas	Min : 0.02s Max : 0.20s	/	0.02s	NO
08h	P_DCVoltValue	ProgMeas	Min : 000.00V Max : 110.00V	Hexa= PrAn*FFFh/max	000.00V	NO
09h	P_ProfilName	ProgMeas	FileName	FileName/0000h	Empty	NO
0Ah	P_ProfilStart	ProgMeas	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
0Bh	P_ProfilStop	ProgMeas	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
0Ch	M_ProfilStatus	ProgMeas	OFF ON	OFF/0000h ON/0001h	OFF	YES
0Dh	M_VoltValue	ProgMeas	Min : 000.00V Max : 110.00V	Hexa= PrAn*FFFh/max		
0Eh	M_CurrValue	ProgMeas	Min : 00.00A Max : 40.00A	ReAn= Hexa*max/FFFh		
0Fh	M_Thermal	ProgMeas	(Red) KO (Green) OK	KO/0001h OK/0000h		
10h	M_LimitI	ProgMeas	(Gray) OFF (Red) ON	OFF/0000h ON/0001h		
20h to 2Ah	P_ProfilTime xx to xx = 01 to 10	Profile	Min : 000000.00ms Max : 999999.99ms	/	0	NO



Parameter		Panel	Possible Programming Values	Conversion Standard/hexa	Default value	Volatile
Adr	Name					
30h To 3Ah	P_ProfilVolt xx xx = 01 to 10	Profile	Min : 000.00V Max : 100.00V	/	0	NO
40h	P_ProfilRepeatN	Profile	Min : 000 Max : 999	/	0	NO
41h	P_ProfilRepeatD	Profile	Min : 000000.00ms Max : 999999.99ms	/	0	NO
42h	P_ProfilNewName	ProgMeas	Entre new name	Entre new name/0000h	Empty	YES
43h	P_ProfilSave	ProgMeas	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
44h	P_ProfilSaveAs	ProgMeas	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
45h	P_ProfilReset	ProgMeas	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
46h	P_ProfilDelete	ProgMeas	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
47h	P_ProfilSelect	ProgMeas	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
8CCh	MD5	None	MD5Value	MD5Value/0000h	Empty	YES
8CDh	P_Validate	Prog	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
8CEh	M_Status	Prog	(Red) KO (Green) OK (Gray) Modified (Bleu) Running	KO/0000h OK/0001h Modified/0002h Running/0003h		
8CFh	P_AbortAction Not available	None	OFF ON Automatic reset to OFF	OFF/0000h ON/0001h	OFF	YES
8D0h	A_Amplifier	SelfTest	(Red) KO (Green) OK (Orange) Warning	KO/0000h OK/0001h Warning/0002h		
8D1h	A_Synthesizer	SelfTest	(Red) KO (Green) OK (Orange) Warning	KO/0000h OK/0001h Warning/0002h		
900h	P_FanAutoSpeed	Fan	OFF ON	OFF/0001h ON/0000h	ON	NO
902h	P_FanMinSpeed	Fan	Min : 000% Max : 050%	Hexa= PrAn*64h/Max	0%	NO
903h	P_FanSpeed Not available when P_FanAutoSpeed=ON	Fan	Min : 000% Max : 100%	Hexa= PrAn*64h/Max	0%	NO
904h	P_FanMaxSpeed	Fan	Min : 050% Max : 100%	Hexa= PrAn*64h/Max	100%	NO
905h	P_ThermInput System parameter	None	Min : 0 Max : 15	Hexa= PrAn*15/Max	2	YES
906h	M_ThermalValue	Fan	Min : 000.0°C Max : 100.0°C	ReAn= Hexa*Max/03FFh		
90Ah	P_ThermalSet	Fan	Min : 000.0°C Max : 100.0°C	Hexa= PrAn*0FFFh/Max	60°C	NO



Parameter		Panel	Possible Programming Values	Conversion Standard/hexa	Default value	Volatile
Adr	Name					
90Bh	C_FanRegkp	Fan	Min : 000.000 Max : 100.000	/	10	NO
90Ch	C_FanRegki	Fan	Min : 000.000 Max : 100.000	/	0.5	NO
910h	P_RS232_Speed	RS232	4800 9600 19200 38400 57600 115200	4800/0000h 9600/0001h 19200/0002h 38400/0003h 57600/0004h 115200/0005h	9600	NO
911h	P_RS232_Parity	RS232	No Odd Even	No/0000h Odd/0001h Even/0002h	No	NO
912h	P_RS232_Data	RS232	7 8	7/0007h 8/0008h	8	NO
913h	P_RS232_Stop	RS232	1 1.5 2	1/0000h 1.5/0001h 2/0002h	1	NO

Table 1: list of parameters or commands

6.5 List of error codes

Error codes

In the event of faulty operation, the generator returns an error in the form ERRxxx instead of OK.

Possible values are:

```
#define ERRVAL_BAD_PARAMETER          0x001
#define ERRVAL_BAD_FORMAT_OR_COMMAND 0x002
#define ERRVAL_BAD_VALUE              0x004
#define ERRVAL_SYSTEM_ERROR           0x008
#define ERRVAL_SENDRREAD_TIMEOUT      0x010
#define ERRVAL_DISABLED_PARAM_OR_CONNECT 0x020
#define CKSUM_ERROR                   0x040
#define ID_ERROR                      0x080
#define ERRVAL_ANOTHER_ACTION_RUNNING 0x100
#define ERRVAL_INACCESSIBLEINOUT     0x200
```

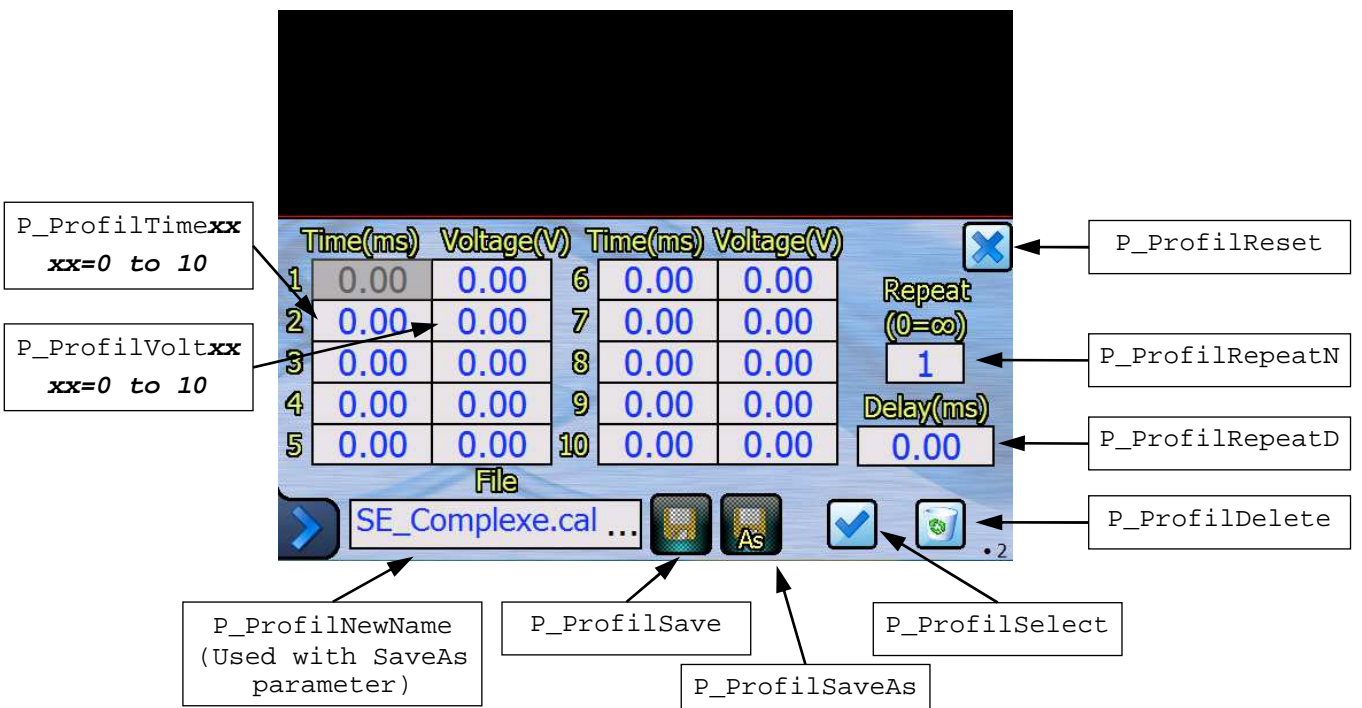
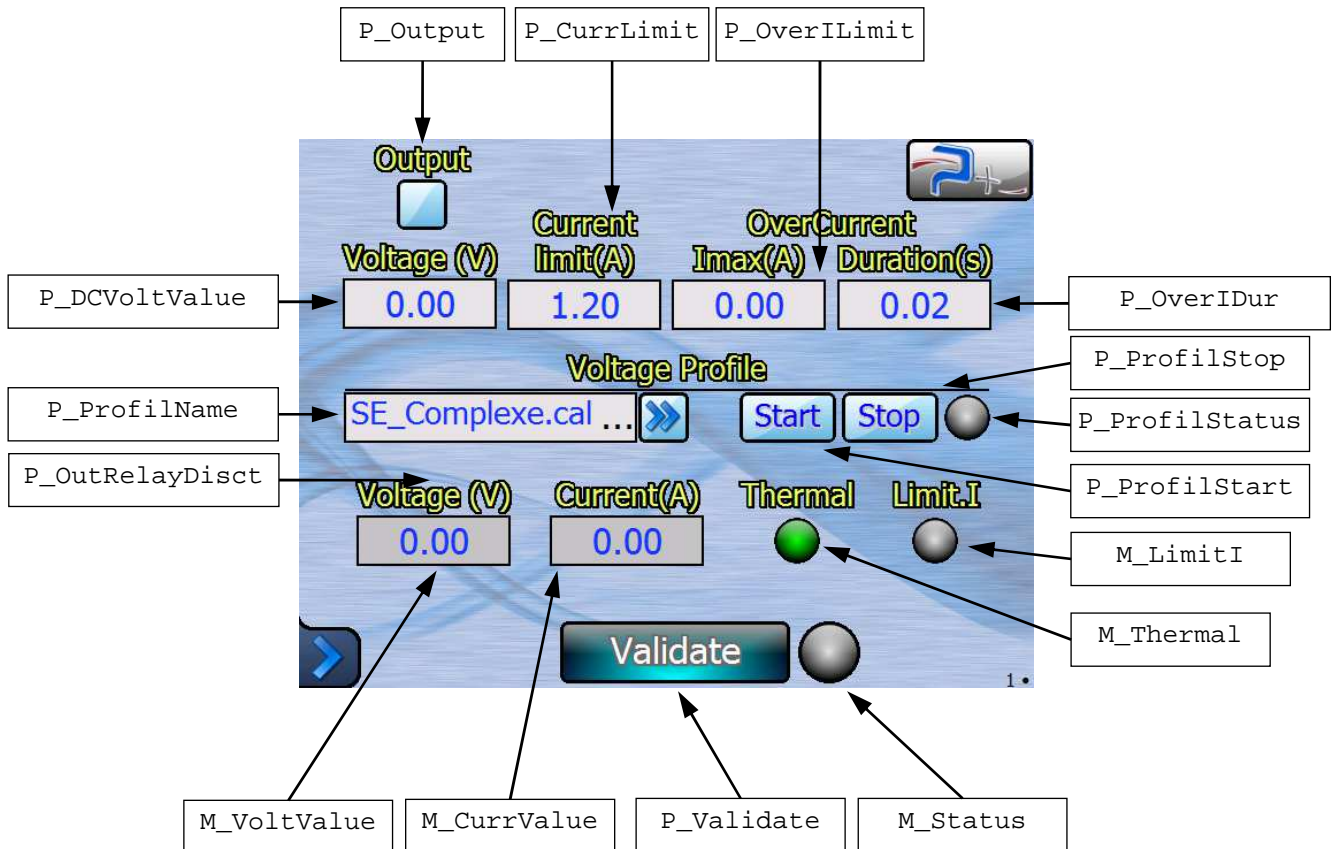
List of internal communication errors

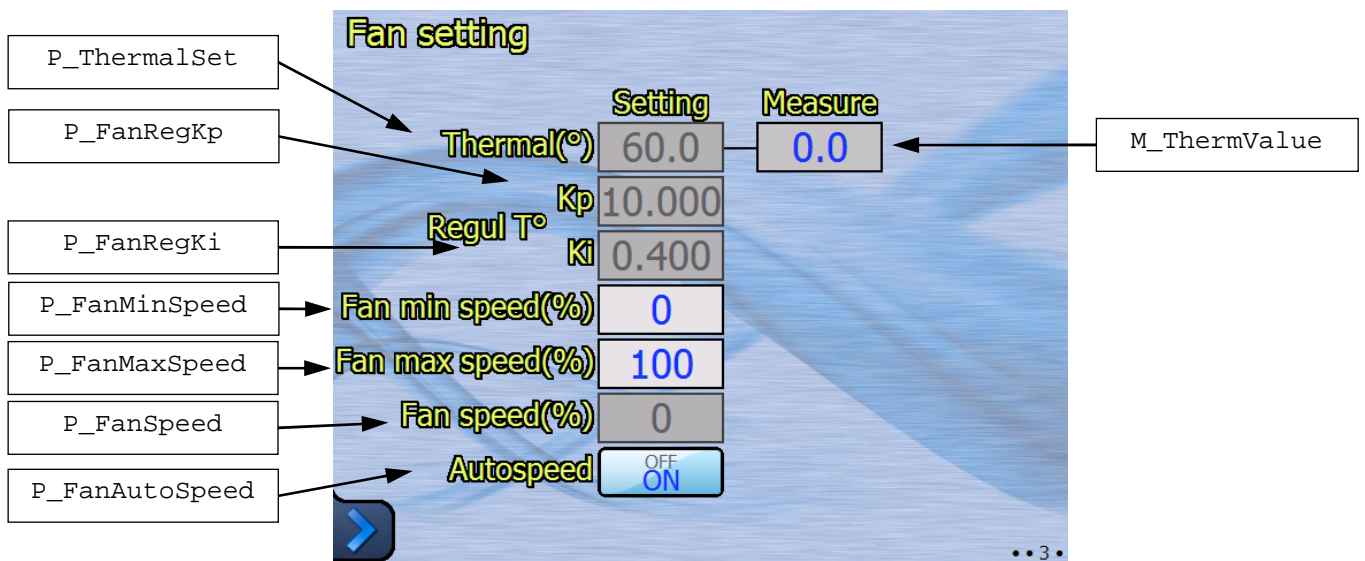
```
#define FPGA_FO_DEVICEIO_ERROR_CODE 0x010000
#define FPGA_FO_BUSY_ERROR_CODE     0x020000
#define FPGA_FO_NODATA_ERROR_CODE   0x040000
#define FPGA_FO_TIMEOUT_ERROR_CODE  0x080000
```

6.6 Viewing parameters

The parameter "P_SysDisplay" corresponds to the passage from the programming page to the measurement page of the interface.

The correspondence between the screens and the programming parameters is given in the following figures.







7. MAINTENANCE

In principle, PUISSANCE + power supply requires no maintenance or metrological verification.

However according to the conditions and time of operation of the power supply, check the cleanliness of ventilation and air extraction grids regularly.

7.1 Cleaning

RISK OF ELECTRIC SHOCK: To prevent electrical shock, disconnect the power supply from the mains before cleaning it.

Using the vacuum cleaner, crevice attachment, and the soft bristle brush, clean away any dust and residue from the front panel air intakes of the power supply.

Using surface mark remover, cleaning swabs, and a lint free cloth, clean any residue from the power supply air intakes.

WARNING: Do not spray surface cleaner directly into the Power Supplies. Spray the cleaner onto the cloth or swab, then use the moistened item to clean the power supply.

7.2 Fans

Visually check the fans for correct operation (their grids are located at the rear of the power supply). Make sure that there are no abnormal noises.

7.3 Fuse

WARNING : The power supply contains an internal fuse that is not accessible to customers. In case of problems, please contact customer support.



8. STORAGE CONDITIONS

During storage, power supply should be stored in their original packaging with all guards in place. Accessories / cables or connectors must also be stored in the same package.

They must be stored on shelves, away from humidity and at a temperature between - 40 ° C and + 85 ° C.

9. APPENDIX 1 : MECHANICAL DIMENSIONING

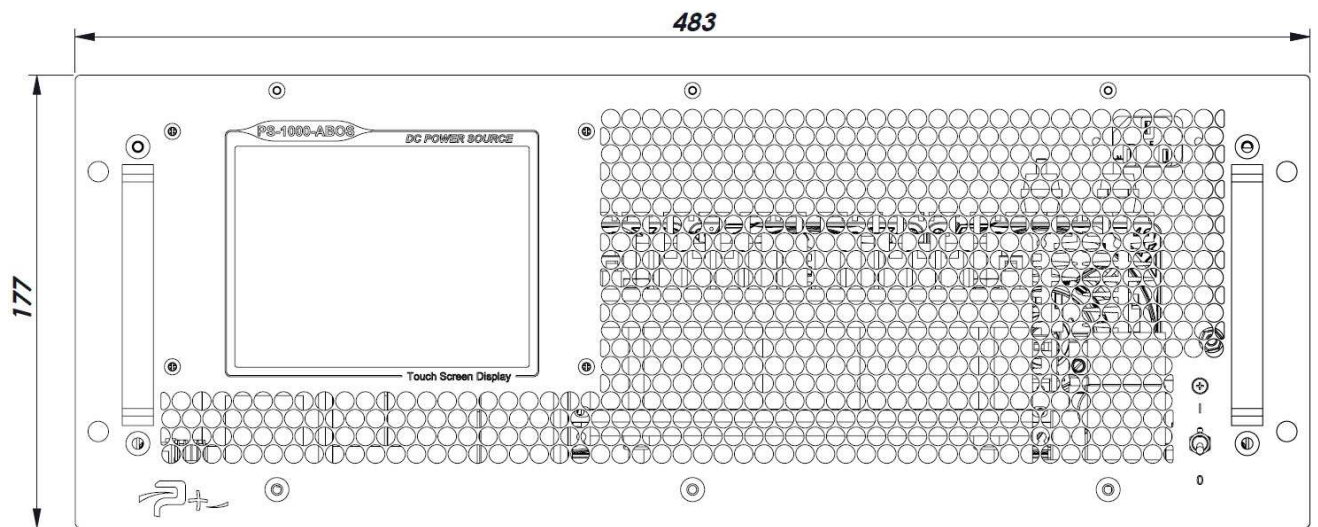


Figure 19 : Mechanical dimensioning – Front face

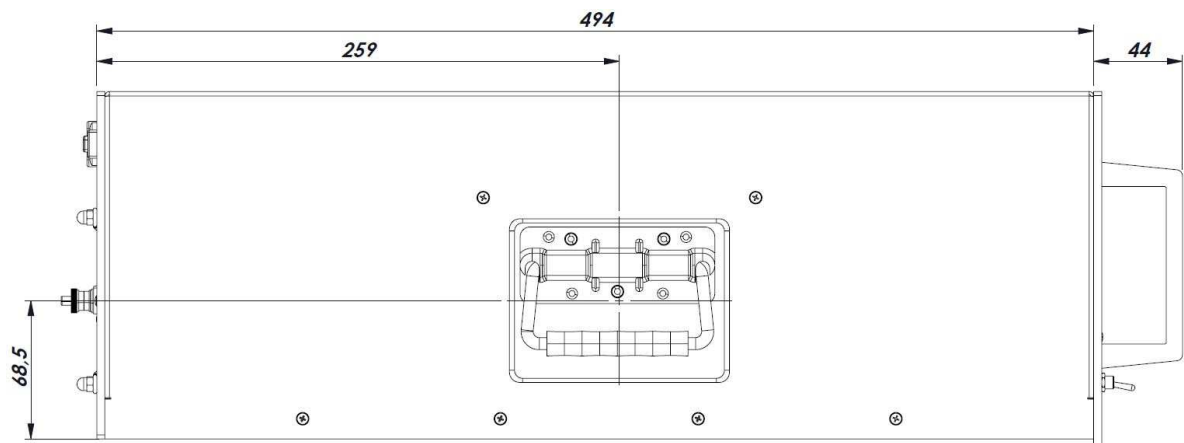


Figure 20 : Mechanical dimensioning – Upper view