



SPHEREA
PUISSANCE PLUS

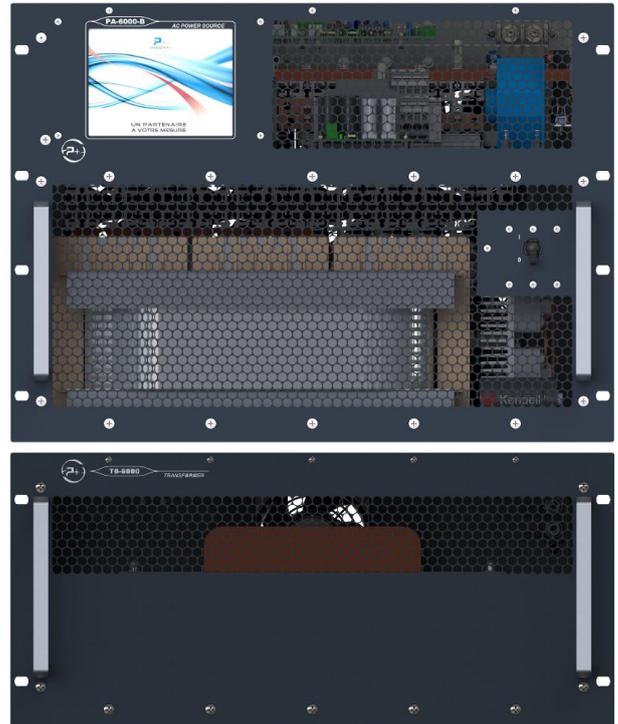
AC CURRENT / VOLTAGE GENERATOR SEVERAL RANGES - 6000VA

APPLICATIONS

- Normative tests of breakers
- Endurance tests
- Current relays tests
- Calibration of current sensors and wattmeter
- Generation of magnetic field

PERFORMANCES

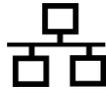
- Wide range of current
- Parallel connection allowed
- One insulated output:
 - From mains
 - From analog input
- 50 dB dynamic range
- Build-up time of the current < 1 ms
- "Open loop" protection
- Includes an AF synthesizer from 20 to 5 kHz
- Very low distortion < 0.3%
- Low noise S/B > 80 dB
- High accuracy < 0.2%
- High stability < 0.1%



Non-contractual picture



TOUCHSCREEN



ETHERNET



RS232

DESCRIPTION

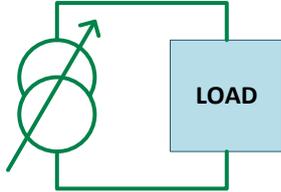
- The AC generator "POC-PS-6000" is built using a power bloc in linear technology and a **current regulation** or a **voltage regulation**. It is suitable for any application that requires an accurate and stable output, including when there is a load impedance variation.
- Thanks to the linear technology, it generates almost no electrical pollution and can be used in anechoic chamber.
- Its 0-24V insulated digital bus allow a use directly controlled by a PLC on a production line.
- To ensure a high precision on its entire output range, this generator is composed of a power amplifier and an output transformer.
 - A first transformer proposes eight ranges of voltage-current from 260V-25A to 10V-600A,
 - A second one proposes two ranges 520V-12.5A and 130V-50A,
 - Amplifier can be used alone without transformer and has one range, 130V-50A.
- Several generators can be connected in parallel to increase the output current (in current regulation).
- Entirely self-sufficient thanks to its touch-screen control / command card, it also can be remotely controlled for an easy integration into an automatic system using the TCP/IP Protocol on an Ethernet link, or SCPI on a RS232 link.





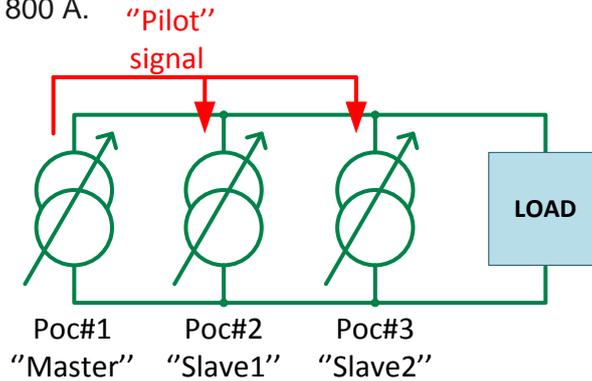
APPLICATIONS

Single-phase use



The "POC-6000" generator can be used alone to test all kind of loads like fuse, relay contact, circuit-breaker pole...

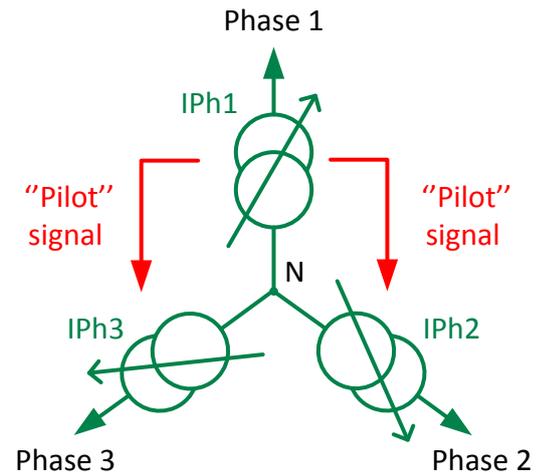
Up to three "POC-6000" can be connected in parallel to increase the current up to 1800 A.



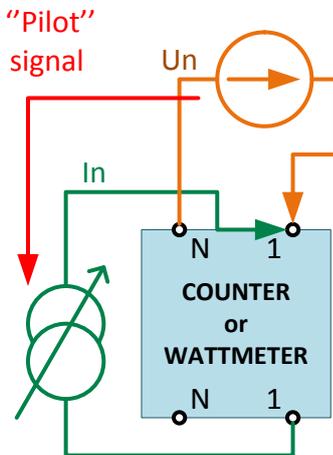
Balanced three-phase use: test of differential, three-pole and four-pole breakers

Three generators "POC-6000" can be associated to create a three-phase current generator:

- The "cold poles" are connected to each other
- The POC-6000 "Phase 1" generate "Pilot" signals for POC-6000 "phase 2" and POC-6000 "phase 3".
Dephasing can be fixed to 120° between phases or modified to create unbalanced systems



Single-phase fictive power generator



Used with a voltage source, the POC-6000 allows to control and calibrate electric meter and wattmeter.

Its output is isolated from ground, which allows a 350 VRMS voltage between the output and ground (or mechanical grounding).

HOW TO PILOT THE GENERATOR

The current generator is equipped with a control/command card with touchscreen.

It has 3 operating modes:

- **Local control:**
The control/command card with touchscreen on front panel allows access to all the commands and display of the measurements.
- **Remote control through communication protocol:**
An Ethernet TCP/IP interface and a RS232 interface allow the remote control with a PC. The generator can be directly controlled via TCP/IP or SCPI instructions or using our OPS software.
- **Remote control through a PLC:**
On a connector on rear panel, the generator has a set of digital inputs and outputs for control. These inputs and outputs allow a direct control for a use in an automatic system.

SOFTWARE POSSIBILITIES

The software has 5 main screens:

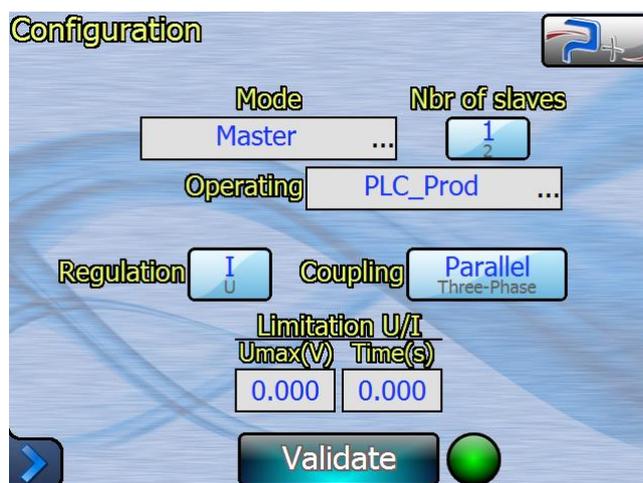
- Configuration screen
- Static screen
- Measurement screen
- Sequence screen
- Targeting screen

CONFIGURATION screen

The configuration screen allows to create un network with several generators, working as “Master / Slave”, and to choose the functioning modes:

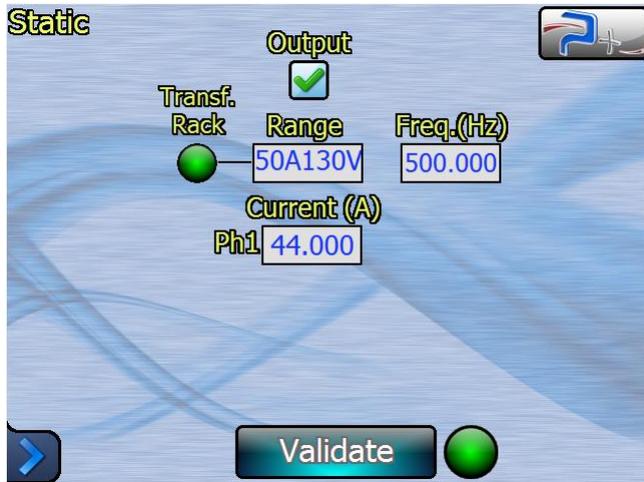
- PLC Prod (production),
- PLC TARGETING (dichotomy used for thresholds research),
- LOCAL (validation, tests).

This screen also allows to select the number of slaves and their coupling, the regulation mode “U” (voltage) or “I” (current) and the limitations in voltage or current regulations.



In “PLC PROD” and “PLC TARGETTING” modes, only the setpoints given by the digital inputs and the Ethernet link coming from the PLC are taken into account, the setpoints programmed on the touch-screen are deactivated.

In “LOCAL” mode, only the setpoints programmed on the touch-screen are taken into account, digital inputs are not considered.



STATIC screen

The user programs here:

- The output relay, ON or OFF,
- The output range,
- The frequency,
- The current or voltage value.

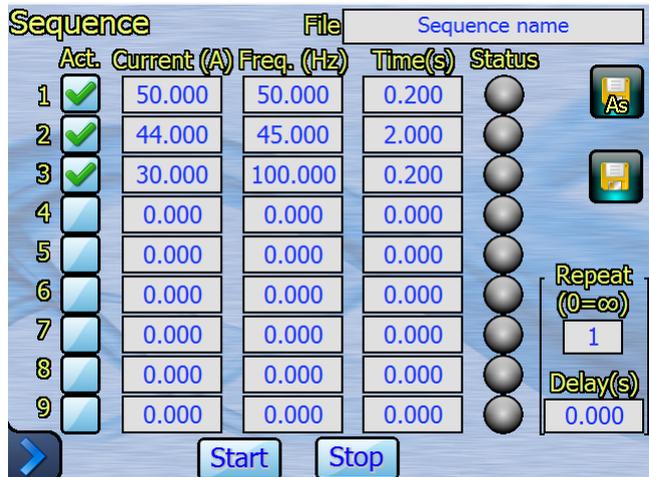
SEQUENCE screen

The user can program a sequence made of up to 9 steps in amplitude, frequency and duration.

Each step can be enabled or disabled.

The sequence can be stored in the flash memory in the generator.

It can be executed several times with a delay between each execution.



MEASUREMENT screen

As the generator includes an acquisition board, this screen shows:

- The frequency,
- The current and voltage value,
- The power, active, apparent and the power factor (exact measurement of the cosine of dephasing between voltage and current),
- Distortion,
- Generation duration (useful parameter when testing breakers).



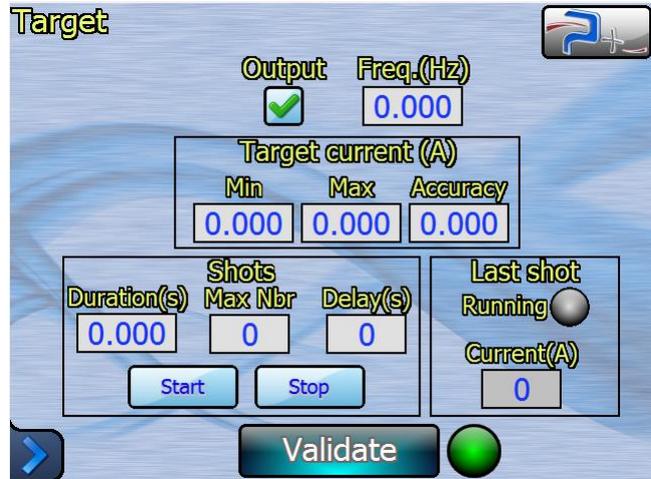
TARGETING screen

In TARGETING mode, are programmed:

- Amplitude and duration of the 1st generation (MINI) and of the 2nd generation (MAXI),
- The expected accuracy in Amps,
- The duration of each shot,
- The maximum number of shots,
- The time between the two shots,

The generation operates a series of spaced "shots" which amplitude is:

- MINI
- MAXI
- $\frac{1}{2}$ (MINI + MAXI)



According to the level of the "Increase / Decrease" digital input, the next current is different:

- If this input is at high level, the current of next shot will be $\frac{3}{4}$ (MINI + MAXI)
- If this input is at low level, the current of next shot will be $\frac{1}{4}$ (MINI + MAXI)

And so on for the following iterations.

If the difference between the current of the last shot and the next current is less than the expected accuracy, the loop stops.

Digital inputs and outputs

This screen is very useful in maintenance phase or during the adjustment of the communication between the PLC and the generator.

This screen allows:

- Manual action on the outputs by checkboxes: the output is at the high level if the box is checked, at the low level if unchecked
- A status control of inputs: the light is green when the input is at high level and turned off (gray) when the input is at low level.



FEATURES

OUTPUT: POWER			
Power	260V-600A ref	520V-50A ref	Without transformer
Rated power	6000 VA per output		
Output	On transformer		Direct
Regulation	Voltage or Current selectable on front panel		
Load impedance			
Minimum value (1)	1 mΩ		
Ranges Voltage-Current	260V-600A ref	520V-50A ref	10V-600A
Ranges quantity	8	2	2
Ranges (VRMS / ARMS)	260 V - 25 A	-	-
	130 V - 50 A	130 V - 50 A	130 V - 50 A
	85 V - 75 A	-	-
	65 V - 100 A	-	-
	40 V - 150 A	-	-
	30 V - 200 A	-	-
	20 V - 300 A	-	-
	10 V - 600 A	-	10 V - 600 A
-	520 V - 12.5 A	-	-
Voltage / Current frequency			
Frequency range	25 to 5000 Hz		
Resolution	0.1 Hz		
Voltage / Current accuracy			
Typical	0.1% of range + 0.1% of programmed value		
Distortion at full power			
Max	< 0.3%		
Output regulation for a mains variation of +6% -10%			
Max	< 0.1% of rated voltage or current		
Noise			
Max RMS	0.02% of rated voltage or current		
Max peak to peak	0.2% of rated voltage or current		
Time necessary to obtain a stabilized current amplitude			
Max	½ period		
Variation regarding temperature			
Typical	50 ppm/°C		
Stability after 15 minutes of operation			
Max	< 0.1% of rated current		
Insulation of output versus case ground			
Measured at 500 VDC	> 100 MΩ		

Notes:



- (1) Using current regulation, in no way the load resistance of the current generator shall be less than this value, otherwise the device could be damaged.



OUTPUT: TIME AND FREQUENCY	
Bandwidth	
Full scale (2)	25 Hz to 5000 Hz
Small signals at -3 dB	25 kHz
Variation time of full scale using a square pilot signal	
Rise time 10% / 90%	< 10 μ s (voltage regulation) < 50 μ s (current regulation)
Fall time 10% / 90%	< 10 μ s (voltage regulation) < 50 μ s (current regulation)
Transfer time	< 10 μ s (voltage regulation) < 50 μ s (current regulation)
Transition from Q1 to Q4	< 10 μ s

Notes:

- (3) Amplifiers are able to generate a signal at 5 kHz.
At 5 kHz, amplitude is reduced of around 15%:

OUTPUT: IMAGES AND MEASURES	
Images outputs (3)	
Voltage image	0~ \pm 10 V peak
Current image	0~ \pm 10 V peak
Typical accuracy of measurement on touchscreen	
Voltage measure	0.3% of range + 0.3% of measured value
Current measure	0.3% of range + 0.3% of measured value

Notes:

- (4) Analog outputs "Image" are insulated of power outputs.

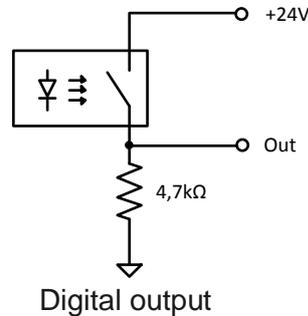
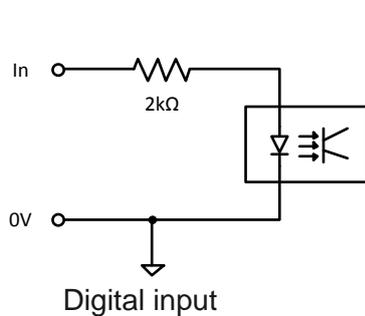
INPUT: AMPLITUDE AND FREQUENCY	
Input signal amplitude (external generator)	
Insulation (4)	> 10 M Ω
Voltage (full output scale)	7,07 VRMS / \pm 10V peak
Max voltage	\pm 15 V peak
Input impedance	10 k Ω
Input signal frequency	
Fundamental	25 to 5000 Hz
Harmonics (small signals)	Max 50 kHz

Notes:

- (5) "Pilot" analog inputs are insulated from power outputs.

DIGITAL INPUTS AND OUTPUTS

Principle of inputs and outputs



DIGITAL INPUTS AND OUTPUTS	
Digital inputs	
Quantity	8
Max voltage	+ 24 VDC (high level)
Type	Optocoupler
Input current	Limited by an internal resistor of 2 kΩ
Digital outputs	
Quantity	8
Rated voltage	+ 24 VDC (high level)
Type	Opto-switch
Max current	10 mA
Low level	Guaranteed by an internal resistor of 4.7 kΩ

Assignment of the inputs

- Selection of the range (3 inputs)
- Start/Stop
- Fault message
- Inhibition of output (security)
- Increase / Decrease (used in targeting mode)

Assignment of the outputs

- Selection of the range (3 outputs)
- In progress generation
- Open loop
- Voltage fault
- Thermal fault



MAINS POWER SUPPLY	
Mains network	
Number of phases	Three-Phase + Earth without Neutral
Voltage	400 VRMS \pm 10%
Frequency	47 - 63 Hz
Input current	
Max at full output power	16 ARMS per phase
Protection	Magneto-thermal breaker
Inrush current	Limited to 2 x max current by varistors
Dielectric strength mains input versus outputs connected to case ground	
Measured at 2500 VRMS / 50Hz	Current < 10 mA

MECANICAL		
Material and surface treatment		
Front panel	Aluminum painted RAL7021	
Rear panel	Aluminum anodized black	
Dimensions and weight	Amplifier rack	Transformer rack
Width	483 mm (19 inches)	
Depth	600 mm	
Height	355 mm (8U)	222 mm (5U)
Weight	120 kg	60 kg
Power connections		
Mains on amplifier rack	Plug MARECHAL 01N8017 (provided)	
	Cover MARECHAL 01NA401710 (provided)	
Current output	Copper bars on 260V-600A reference	
	Terminal block on 520V-50A reference	

ENVIRONMENTAL	
Temperature and humidity	
Stockage temperature	-10°C à +85°C
Operation temperature	+0°C à +40°C
Humidity	10% - 90% non-condensing
Noise (fans at full speed)	
Measured at 1 m	< 70 dBA
Marking	
Marking	CE
Protection	IP20

PROTECTIONS

In voltage regulation, against overload: current limitation

Amplifiers in linear technology can generate up to four times their rated power during short time. They are using a voltage regulation with current limitation: if current is higher than programmed value, a timer starts. At the end of a programmable time between 0.1 and 5 seconds, output voltage decreases to limit current to the programmed value.

In voltage regulation, against short-circuit on output: automatic output switch-off

Output is switched off on all phases et must be reactivated using touchscreen or an external command.

In Current regulation, against overvoltage: automatic output switch-off

If output voltage exceeds the max available value, output is switched off and must be reactivated using touchscreen or an external command.

In both regulation modes, against overtemperature: automatic output switch-off

A temperature sensor is installed on each power part. It switches off output in case of overheating. After cooling, output must be reactivated using touchscreen or an external command.

WARNING



In current regulation, when using generator with high output frequency, user must beforehand calculate the impedance of the load including the impedance of the cables. For example, a common cable may have an inductance of 10 μH / m.

At 5000 Hz, it means an impedance of: $10 \cdot 10^{-6} \times 2 \times \pi \times 5000 = 0.314 \Omega / \text{m}$

At high frequency, we recommend to use cables with very low inductance and wired using a specific way. Please consult us for recommendations.

ORDER INFORMATION

POC-6000-AC-260V-600A-8G

Voltage and Current generator and its output transformer
Eight ranges, using Voltage or Current regulation

POC-6000-AC-520V-50A-2G

Voltage and Current generator and its output transformer
Two ranges, using Voltage or Current regulation

POC-6000-AC-10V-600A-2G

Voltage and Current generator and its output transformer
Two ranges, using Voltage or Current regulation

DELIVERIES

The generator is delivered with its user manual, its performances list (acceptance test report), its UE declaration.

Specification may change without notice