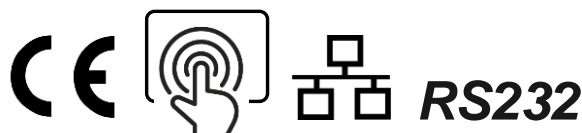




PERFORMANCES

- High accuracy
- High stability
- Fast transients
- High inrush current facilities
- Wide bandwidth
- Very low distortion
- Very low output impedance
- Low noise
- Quadrant change without transition
- Voltage regulation and current limitation



APPLICATIONS

- One insulated output
- AC, AC+DC, DC
- Avionic networks 300-800-1200Hz
- Industrial networks 50-60 Hz
- Tests in accordance with standards ABD100.1.8 / MIL-STD-704
- Disturbed networks
- AC or DC motor simulation
- Non-linear loads
- Harmonics generation

DESCRIPTION

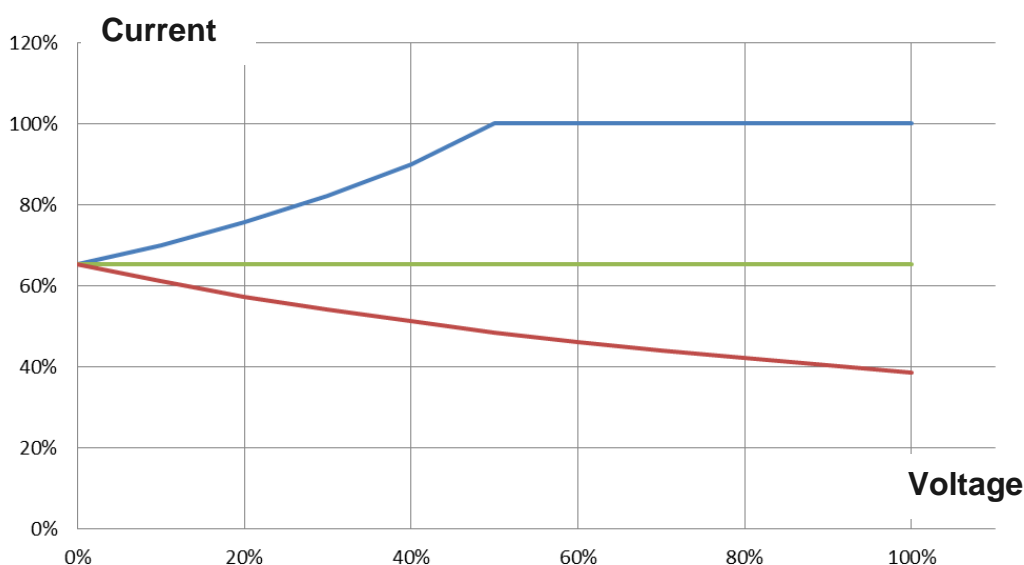
- PA-2000 is a « 4 quadrants » power amplifier, AC+DC, single-phase, operating in voltage regulation:
 - An analog input receives its « pilot » signal which amplitude is 0~±10 V peak
 - After insulation, the equipment amplifies this signal depending on selected range with a very short transition time,
 - Two analog outputs insulated from power output return images of voltage and current with an amplitude of 0 ~ ±10 V peak.
- Built in linear technology, these amplifiers have high dynamics, a very low distortion over a wide frequency band and bandwidth. This technology also allows them to provide power up to 4 times their rated power peaks.
- Linear technology allows a quick and easy integration for "Real time" or "Hardware In the Loop" applications in combination with simulators.
- Entirely self-sufficient with local control on touch screen, they can be controlled remotely from a supervisor system via an Ethernet or RS232 link for an easy integration in a complex test system.

CONTINUOUS OPERATION

These diagrams indicate the relation between the current and the voltage when operating either in generation or in absorption mode, for various values of dephasing between voltage and current.

Permanent operating is allowed « below » the curves. The limitations are due to the heating of the power transistors. An operating “above” the curves will cause:

- Either an immediate disconnection: overcurrent protection in case of current higher than the limits
- Or a disconnection after a certain period: thermal protection in case of overheating of power components



Blue trace: dephasing between voltage and current is zero. PF power factor is equal to 1 (generation on resistive load).

Green trace: dephasing between voltage and current is 90°. PF power factor is equal to 0 (generation on inductive load).

Red trace: dephasing between voltage and current is 180°. PF power factor is equal to -1 (full absorption).

PROTECTIONS

Against overloads: voltage limitation. In case of temporary overload, the voltage decreases to limit the current.

Against output short-circuit: power block is switched off. The output is switched off and will have to be reactivated by the touch screen or an external command.

Against overheating: power block is switched off. A temperature sensor is placed on every power part. It switches off the output of the amplifier in case of overheating.

COMMON FEATURES OF ALL OF THE AMPLIFIERS

POWER OUTPUT	Power	
	Nominal power	2000 VA
	Voltage and current	
	Ranges	135 V 270 V
	Voltage (VRMS)	0~135 0~270
	Current (ARMS)	0~15,4 0~7,7
	Peak current (1)	46 A peak 23 A peak
	Voltage (VDC)	0~±190 0~±380
	Current (ADC)	0~±15,4 0~±7,7
	Voltage accuracy (regulation)	
	Typical	0,1% of the range + 0,1% of programmed value
	Resolution	12 bits
	Current accuracy (limitation)	
	Typical	0,1% of the range + 0,1% of programmed value
	Resolution	12 bits
	Voltage distortion at full output power	
	Typical	< 0,3%
	Max	< 0,7%
	Voltage regulation for a mains variation of +6% / -10%	
	Max	< 0,1% of nominal voltage
	Voltage regulation for a current variation from 0 to 100%	
	Max	< 0,1% of nominal voltage
	Residual noise	
	Max RMS	0,02% of nominal voltage
	Max peak to peak	0,3% of nominal voltage
	Bandwidth	
	Full scale	DC and 40 Hz to 3.5 kHz
	Small signals at -3 dB	25 kHz
	Variation with a square signal pilot	
	Rise time 10% / 90%	< 10 µs
	Fall time 10% / 90%	< 10 µs
	Transfer time	< 10 µs
	Transition from Q1 to Q4	< 10µs
Variation according to temperature		
Typical	50 ppm/°C	
Max	100 ppm/°C	
Stability after 15 minutes of operation		
Max	< 0,05% of nominal voltage	
Insulation of the output versus case ground		
Measure at 500 VDC	> 100 MΩ	
Images output (2)		
Voltage	Max 6,7 VRMS	
Current	Max 6,5 VRMS	
Accuracy of the measurements displayed on the touch screen		
Voltage measure	0,3% of the range + 0,3% of measure	
Current measure	0,3% of the range + 0,3% of measure	

Notes:

- (1) Peak current is limited to 100 ms.
- (2) The image outputs have the same reference and are isolated from power outputs.

COMMON FEATURES OF THESE AMPLIFIERS (follow)

“PILOT” INPUT	Input signal amplitude (external feature)	
	Insulation	> 10 MΩ (2)
	Voltage (full output scale)	7,07 VRMS / ± 10V peak
	Max voltage	± 15 V peak
	Input impedance	10 kΩ
	Input signal frequency	
	Fundamental	40 – 3,5kHz
	Harmonics (small signals)	Max 50 kHz

MAINS	Mains network	
	Number of phases	single phase Ph + N + E
	Voltage (VRMS) (7)	230 ±10%
	Frequency	47 - 63 Hz
	Input current	
	Max at full output power (8)	12 ARMS
	Protection	Magneto thermal breaker
	Inrush current	Limited to 2 x Max current
	Dielectric strength of the mains input versus the output connected to the case ground	
	Measure at 2500 VRMS/50Hz	Current < 10 mA

Notes:

- (3) The analog inputs have the same reference and are insulated from power outputs.
- (4) Option “PA-RC-MAINS” adapts mains input of the amplifier to a 210 VRMS between phases network.
- (5) The currents are indicated for a use on a 230VRMS between phase and Neutral network.

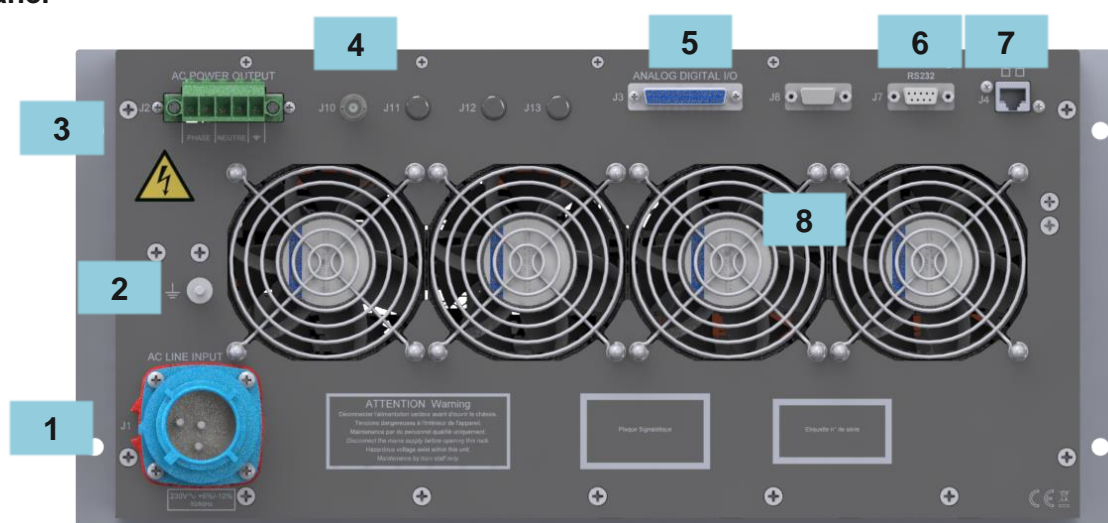
ENVIRONMENTAL	Metallic parts treatment	
	Front panel	Aluminum painted RAL7021
	Rear panel	Black anodized aluminum
	Temperature and humidity	
	Storage temperature	-10°C to +85°C
	Operating temperature	+0°C to +40°C
	Humidity	10% - 90% non-condensing
	Sound level (fans at full speed)	
	Measured at 1 m	< 70 dBA
	Marking	
	Marking	CE
	Protection index	IP20

MECHANICAL CHARACTERISTICS OF PA-2000

PA-2000 amplifiers are racks. They can be installed in a 19 inches cabinet without other accessories (slides are not provided).

MECHANICS	Dimensions and weight	
	Width	483 mm (19 inches)
	Depth (connectors excluded)	600 mm
	Height	222 mm (5U)
	Weight	62 kg

Rear panel



Non-contractual picture

- 1** Mains socket (connector is provided)
- 2** Earth pin
- 3** Output power Phase + Neutral + Earth and « sense » (connector is provided)
- 4** Insulated BNC socket input of « Pilot » signal for amplifier
- 5** SUBD female 25 pins connector, output of analog images
- 6** SUBD female 9 pins connector for RS232 serial link
- 7** RJ45 connector for Ethernet link
- 8** Fans with variable speed (speed is adjusted in accordance with heat to dissipate)

LOCAL OR REMOTE

Managed by a Control Board, the amplifiers have two operating modes:

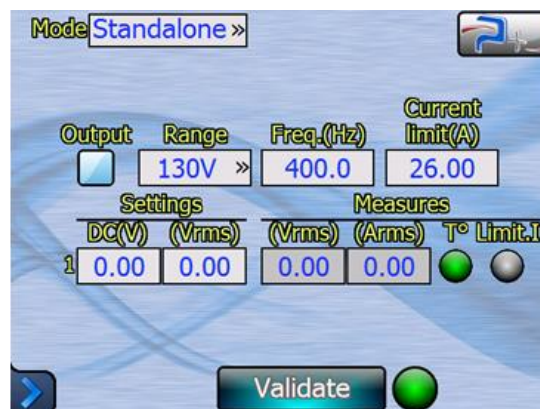
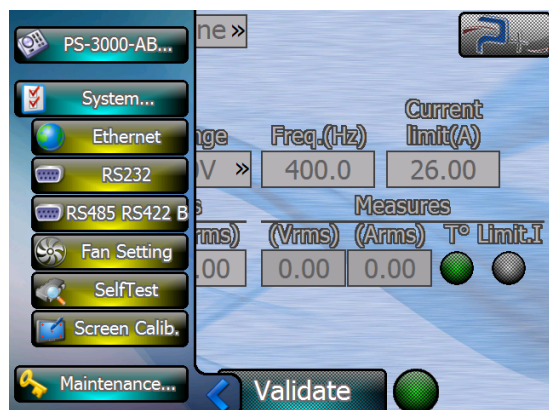
- **Local control:** The control device equipped with a graphical touch screen disposed in front panel gives access to all the control functions and the display of the measures.
- **Remote control:** The control device has one TCP/IP Ethernet interface and two serial interfaces, RS232 and RS485, for a control through a remote PC. Control can be done either using Puissance+ OPS3 software (not supplied), either directly via instructions TCP/IP or RS232 / RS485 using customer software.

EXAMPLES OF LOCAL CONTROL: SINGLE-PHASE AMPLIFIER

On the main screen, graphical objects (boxes, input boxes and dropdowns) are to set it up.

Fields return the instantaneous values of voltage and current.

LEDs indicate status: thermal default, overcurrent detected...



Other screens are to set up communications links or for the management of variable speed fans.

ORDER INFORMATION

PA-2000-AC-DC-270V-15.4A-2G

2000 VA amplifier, two ranges, 135V-15.4A and 270V-7.7A

AVAILABLE OPTIONS (to order separately)

PA-RC-BW: small signals bandwidth increased from 25 kHz to 50 kHz

PA-RC-L65: power block replacement to increase absorption capability from 35% to 65%

Specification may change without notice