



Amplifiers catalog (list, options and performances)

CT0004-01 2020-01-17
ENGLISH CATALOG PA

Any previous revision is obsolete



SPHEREA
PUISSANCE PLUS

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Our DNA

With an original positioning of both **Production and Service R&D**, skills in **power electronics, analog, digital, measurement, and programming** fields, Puissance Plus is for 25 years as a reference in:

- Design of electronic equipment
- Energy conversion
- Power electronic instrumentation
- Integration of emulation systems

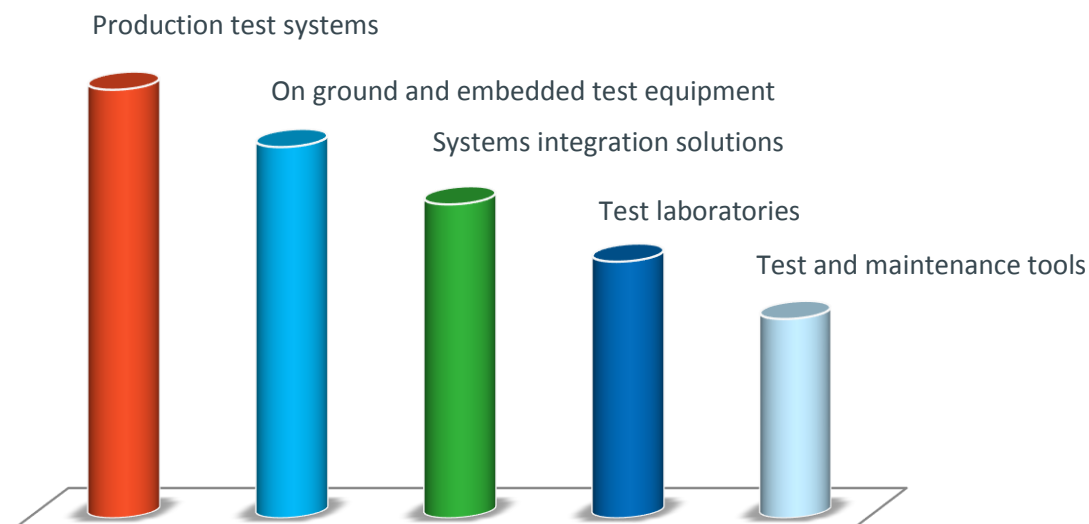


60 employees



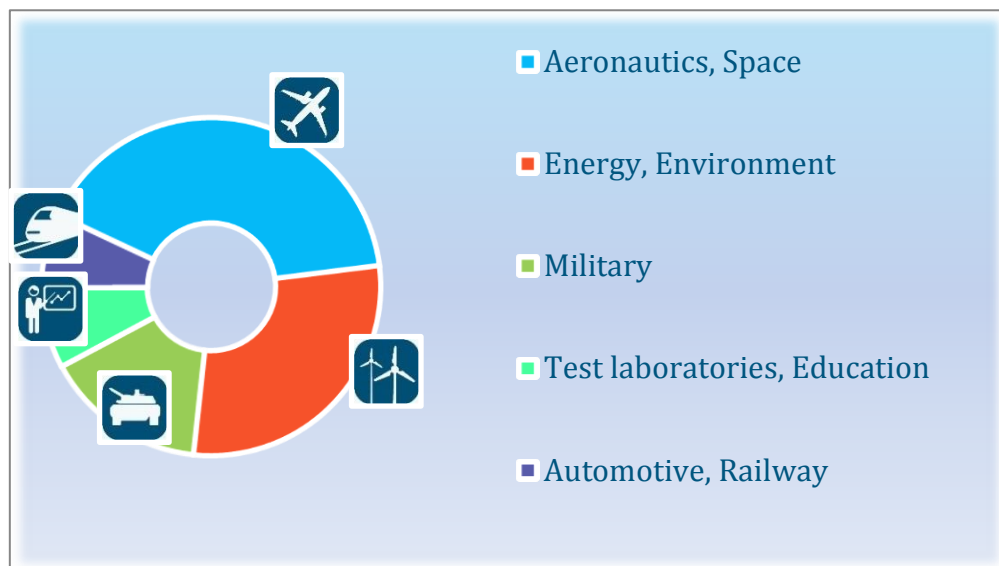
5,5 M€

Our **industrial know-how** is exercised within the business of critical systems and services.
Our equipment is integrated into:



A strong expertise for your productivity

Our technical expertise allows to propose innovative and efficient solutions in many fields of activity.



Our massive investment in R&T for development and integration of new technologies allows to complement our offer and create new products in order to help our customers further. Research areas are currently with research laboratories and institutional organizations.

Our equipment allows the qualification of your products according to worldwide Standards:

- Aeronautics: ABD100, DO160, MIL-STD-704
- Breakers: IEC61008, IEC61009, IEC60947, IEC60898, NFC62411, IEC62423, DIN VDE 0664-400
- Military: AIR2021, STANAG4370, MIL1275
- Automotive: LV123, LV124, LV148, ISO 16750, ISO 7637



SPHEREA
PUISSANCE PLUS

Flexibility of a SME

Power of a group



Operational Maintenance Condition

- Preventive maintenance
- Troubleshooting maintenance
- Phone assistance
- Maintenance training
- Obsolescence management
- Spares



Quality at the heart of our business

RoHS II



As a manufacturer of EEE (Electrical and Electronic Equipment), Puissance Plus is committed to an assessment of **compliance with the 2011/65 / EU Directive**, known as **RoHS II**

ISO 9001 - Version 2015

Through SPHEREA Test & Services group PUISSANCE+ supports you throughout the world



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Functions list

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References list

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PA-3000-AC-DC-200V-17A-2G-UI	Amplifier 3000 VA	5-2
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PA-3x1000-AC-DC-260V-7.7A	Amplifier 3x1 kVA	7-4
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PA-3x140-AC-DC-240V-0.58A	Amplifier 3x140 VA	7-2
PA-3x2000-AC-DC-270V-8.4A	Amplifier 3x2 kVA	7-5
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WHAT DOES MEAN "4 QUADRANTS"?

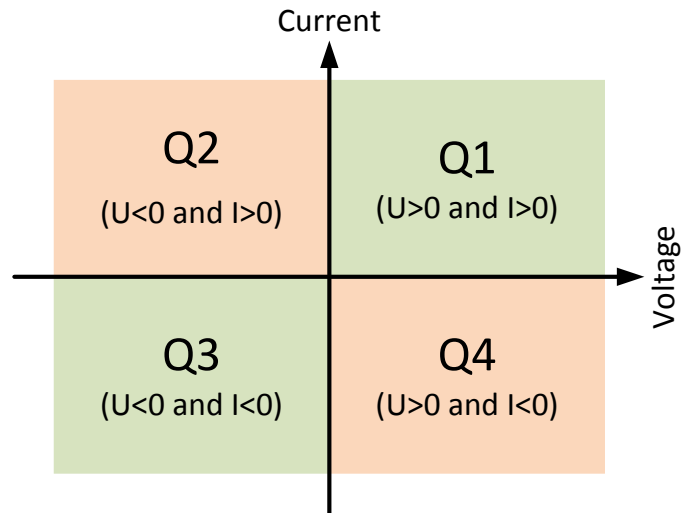
The amplifiers operate in voltage regulation with current limitation or in current regulation with voltage limitation.

In "Q1" and "Q3" areas, the amplifier behaves as a "GENERATOR or SOURCE":

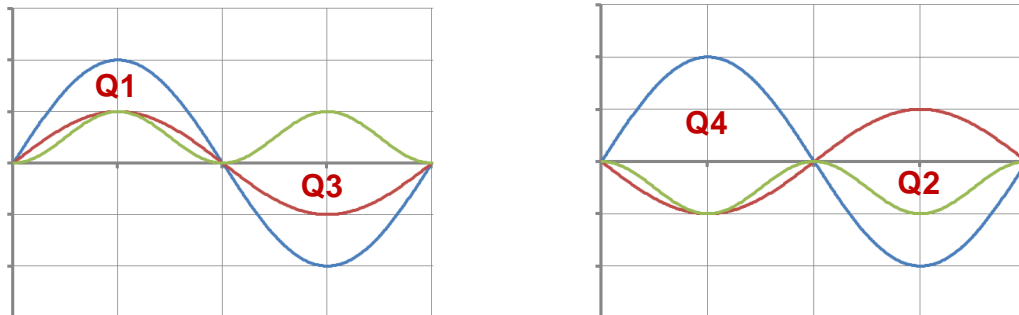
- the instantaneous power is positive.

In "Q2" and "Q4" areas, the amplifier behaves as a "ABSORBER or SINK":

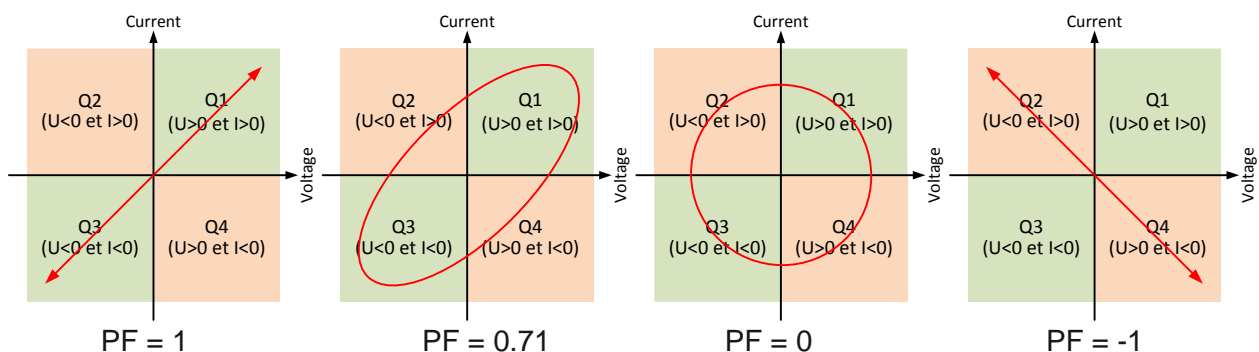
- the instantaneous power is negative.
- The amplifier is considered as a reversible power supply.



On a time scale, voltage in **Blue trace**, current in **Red trace**, power in **Green trace**:

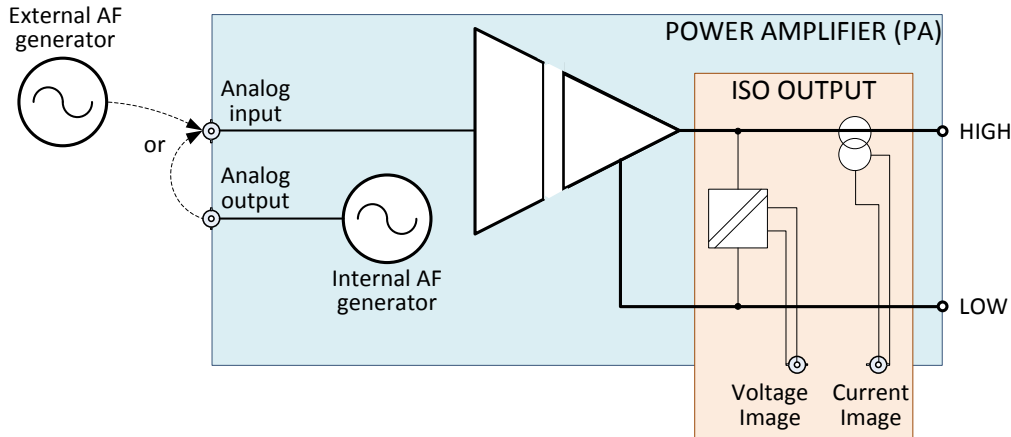


Examples of quadrants transitions regarding power factor values:





BUILDING A ONE-PHASE AMPLIFIER



Analog output images 0~±10V of voltage and current are included in all our amplifiers.

One amplifier is made of:

- One AF synthesizer
 - AC, DC signal or customized waveform
 - Amplitude 0~±10V peak
- One "Pilot" input
 - Amplitude 0~±10V peak
 - Impedance 10 kΩ
- One power output
 - Insulated from "Pilot" input
 - Insulated from case ground
- Two "Image" outputs insulated from power output
 - Voltage image
 - Current image,
 - Amplitude 0~±10V peak
- Two measurement devices:
 - Measurement of output voltage
 - Measurement of output current

Control / command:

- Local control with a touchscreen width 5,7 inch
- Remote control through RS232 and Ethernet

A dual-phase amplifier is made of two one-phase amplifiers, electrically separated from each other. A three-phase amplifier is made of three amplifiers, usually connected in STAR.

When a three-phase amplifier is used in AC with its AF internal synthesizer, the dephasing between phases is also programmable.

PA-

PA-2x

PA-3x

PA-Nx

En savoir plus



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One-Phase amplifiers

“PA”

POWER 2000 VA



Designation	PA-2000-AC-DC-270V-15.4A
Characteristics	AC: 135V-15.4A and 270V-7.7A DC: \pm 135V-15.4A and \pm 270V-7.7A
Special features	Two ranges
Format	Width 19” Height 5U
Data sheet	Amplifiers 4Q AC DC Single phase 2000VA
Documentation	-
Technical reference	RC2091A

Options for this device:

PA-RC-BW bandwidth extended from 25 kHz to 50 kHz

PA-RC-L65 65% absorption.

Replacement of the power blocks by a more powerful model to reach a 65% absorption (instead of 35% for a standard model)



SPHEREA
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One-Phase amplifiers

“PA”

POWER 3000 VA



PA-

PA-2x

PA-3x

PA-Nx

En savoir plus

Designation	PA-3000-AC-DC-200V-17A-2G-UI
Characteristics	AC: 100V-17A and 200V-8.5A DC: ±140V-24A and ±280V-12A
Special features	Three amplifiers can be connected in mode "Master" and "Slave" to build a three-phase system. Can be used in voltage regulation and in current regulation
Format	Width 19" Height 5U
Data sheet	Amplifiers 4Q AC DC Single phase 3000VA
Documentation	User manual MU-RC2218-EN
Technical reference	RC2218

Options for this device:

PA-RC-BW bandwidth extended
From 25 kHz to 50 kHz

PA-RC-L100 100% absorption.

Integration of the amplifiers in a cabinet, height 29U (1570 mm), equipped with power resistors to reach a 100% absorption (instead of 35% for standard model)





SPHEREA
PUISSANCE PLUS

One-Phase amplifiers

“PA”

POWER 3000 VA



Designation	PA-3000-AC-DC-270V-24A-2G
Characteristics	AC: 135V-24A and 270V-12A DC: \pm 135V-24A and \pm 270V-12A
Special features	Three amplifiers can be connected in mode "Master" and "Slave" to build a three-phase system. Can be used in voltage regulation only.
Format	Width 19" Height 5U
Data sheet	Amplifiers 4Q AC DC Single phase 3000VA
Documentation	User manual MU-RC2173-EN
Technical reference	RC2173

Options for this device:

PA-RC-BW bandwidth extended
From 25 kHz to 50 kHz

PA-RC-L100 100% absorption.

Integration of the amplifiers in a cabinet, height 29U (1570 mm), equipped with power resistors to reach a 100% absorption (instead of 35% for standard model)



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One-Phase amplifiers

“PA”

POWER 3000 VA



Designation	PA-3000-AC-DC-360V-17A-2G
Characteristics	AC: 180V-17A and 360V-8.5A DC: ±180V-17A and ±360V-8.5A
Special features	Three amplifiers can be connected in configuration "Master" and "Slave" to build a three-phase system. Can be used in voltage regulation only.
Format	Width 19" Height 5U
Data sheet	Amplifiers 4Q AC DC Single phase 3000VA
Documentation	User manual MU-RC2228-EN
Technical reference	RC2228

Options for this device:

PA-RC-BW bandwidth extended
From 25 kHz to 50 kHz

PA-RC-L100 100% absorption.

Integration of the amplifiers in a cabinet, height 29U (1570 mm), equipped with power resistors to reach a 100% absorption (instead of 35% for standard model)

PA-

PA-2x

PA-3x

PA-Nx

En savoir plus



SPHEREA
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One-Phase amplifiers

“PA”

POWER 6000 VA



Designation	PA-6000-AC-DC-130V-50A-UI
Characteristics	Voltage regulation: 0 to 130V Current regulation: 0 to 50A
Special features	An output transformer can be added to increase the output voltage up to 520V
Format	Width 19” Height 8U
Data sheet	Amplifiers 4Q AC DC Single phase 6000VA
Documentation	-
Technical reference	RC2223

Options for this device:

PA-6000-RC2239 output transformer (5U rack)

It allows 2 voltage ranges, 520V-12.5A and 130V-50A



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One-Phase amplifiers

“PA”

POWER 6000 VA



Designation	PA-6000-AC-DC-270V-22A-UI
Characteristics	AC: 270V-22A DC: ±380V-22A
Special features	The user can choose between voltage regulation AND current regulation
Format	Width 19” Height 8U
Data sheet	Amplifiers 4Q AC DC Single phase 6000VA
Documentation	-
Technical reference	RC2242

Options for this device:

None

PA-
PA-2x
PA-3x
PA-Nx
En savoir plus





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One-Phase amplifiers

“PA”

POWER 15000 to 24000 VA

Designation	<p>PA -15000-AC-DC-400V-112A-4G</p> <p>PA -20000-AC-DC-400V-120A-4G</p> <p>PA -24000-AC-DC-400V-120A-4G</p>
Characteristics	<p>Four voltage ranges in AC: 130V, 200V, 260V and 400V</p> <p>Four voltage ranges in DC: 190V, 280V, 380V and 560V</p>
Special features	40% to 50% absorption
Format	Width 800 mm Height 38U
Data sheet	Amplifiers 4Q AC DC Single phase 15-20-24kVA
Documentation	-
Technical reference	<p>AC0301 (PA-15000)</p> <p>AC0302 (PA-20000)</p> <p>AC0303 (PA-24000)</p>



Options for this device:

PA-AC-ACQ add a power analyzer

It allows measurements of frequency, voltage, current, power, distortion and a frequential analysis (Fourier Form Transform).

PA-AC-L100 resistive load

A resistor is inserted between output of the amplifier and use. It increases absorption capability.

PA-AC-MAINS customized mains input

An adaptation of mains input to your network can be proposed - Please consult us.

PA-AC-RI current regulation

Add a current regulation in addition of voltage regulation

PA-

PA-2x

PA-3x

PA-Nx

En savoir plus

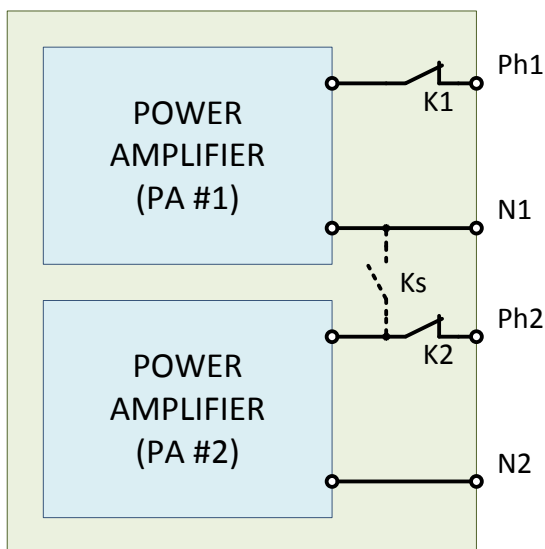


BUILDING A DUAL-PHASE AMPLIFIER

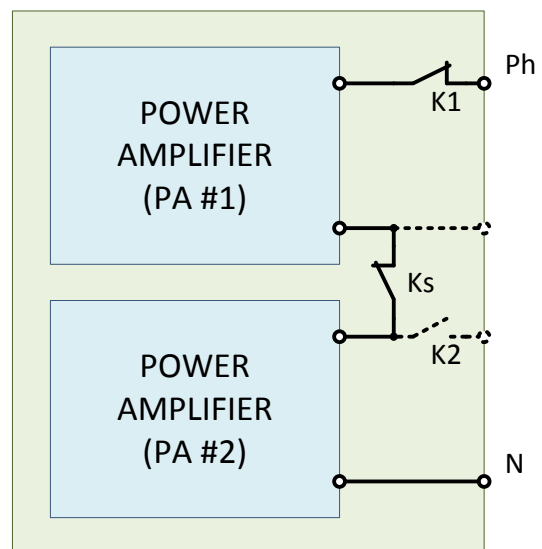
A Dual-phase amplifier is made of two Single-Phase amplifiers in the same rack.

Internal relays are used to connect or disconnect outputs and create a Single-Phase amplifier.

Amplifiers are working in voltage regulation only.



Dual-Phase use
Amplifiers are used separately.



Single-Phase use
Amplifiers are in-series.



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Dual Phase amplifiers

“PA-2x”

POWER 2x450 VA



Designation	PA-2x450-AC-DC-900V-2A-4G
Characteristics	AC: 225V-2A, 450V-2A, 675V-1A and 900V-1A DC: 315V-2A, 630V-2A, 945V-1A and 1260V-1A
Special features	Power output on front panel and on rear panel Pilot inputs and images of voltage and current on front panel
Format	Width 19” Height 5U
Data sheet	Dual power amplifier 2x450VA-AC-DC-900V-2A-4G
Documentation	-
Technical reference	RC2225

Options for this device:

None

PA-

PA-2x

PA-3x

PA-Nx

En savoir plus





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Three-Phase amplifiers

“PA-3x”

POWER 3x100 VA



Designation	POC-2x100-AC-8V-12.5A-2G POC-3x100-AC-8V-12.5A-2G
Characteristics	Two ranges: 2.5A and 12.5A
Special features	AC only in current regulation Internal synthesizer
Format	Width 19” Height 3U
Data sheet	Modular AC current generator 100VA
Documentation	User Manual MU-RC2015-EN
Technical reference	RC2015 (three modules) RC2015A (two modules)

Options for this device:

POC-100-AC-DC-8V-12.5A-2G add a power module
Add a third module in RC2015A rack



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Three-Phase amplifiers

“PA-3x”

POWER 3x140 VA



Designation	PA-3x140-AC-DC-240V-0.58A
Characteristics	One range: 240V-0.58A
Special features	AC and DC Internal synthesizer
Format	Width 19” Height 3U
Data sheet	Modular voltage generator-amplifier 140VA
Documentation	-
Technical reference	RC2247A

Options for this device:

None

PA-

PA-2x

PA-3x

PA-Nx

En savoir plus



POWER 3x750 VA



Designation	PA-3x750-AC-300V-5A-3G
Characteristics	3 ranges:75V-5A, 150V-5A, 300V-2.5A
Special features	AC output only Without touchscreen Gains can be adjusted using a potentiometer for each phase
Format	Width 19” Height 5U
Data sheet	AC Three phases amplifier 3x750VA Fixed gain
Documentation	User manual MU-RC2219-EN
Technical reference	RC2219A

Options for this device:

AC0289 integration in a cabinet

Mounting of two amplifiers with a set of thermal and differential breakers, an automatic "switch off" function, and an emergency management.

PA-3x750-BS banana sockets

Power outputs are installed on front panel too on banana sockets and each output can be disconnected using a mechanical breaker

PA-3x750-DC usable in AC and DC

Adaptation of regulation loop to use this amplifier in AC, in DC or in AC+DC



POWER 3x1000 VA



Designation	PA-3x1000-AC-DC-260V-7.7A-2G
Characteristics	Two AC ranges: 130V-7,7A et 260V-3,8A
Special features	Using its internal synthesizer, it is possible to generate a signal with predefined harmonics. It is possible to amplify a DC signal using an external pilot signal
Format	Width 19” Height 5U
Data sheet	Amplifiers 4Q AC DC Three phases 1000VA 2000VA
Documentation	-
Technical reference	RC2101A

Options for this device:

PA-3xRC-BW bandwidth extended
From 25 kHz to 50 kHz

PA-3xRC-L65 65% absorption.
Replacement of the power blocks by a more powerful model to reach a 65% absorption (instead of 35% for a standard model)

PA-

PA-2x

PA-3x

PA-Nx

En savoir plus



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Three-Phase amplifiers

“PA-3x”

POWER 3x2000 VA



Designation	PA-3x2000-AC-DC-270V-8.4A
Characteristics	AC: 270V-8,4A DC: ±270V-8,4A
Special features	It is possible to generate an AC+DC signal using the internal synthesizer
Format	Width 19” Height 8U
Data sheet	Amplifiers 4Q AC DC Three phases 1000VA 2000VA
Documentation	User manual MU-RC2090-EN
Technical reference	RC2090

Options for this device:

PA-3xRC-BW bandwidth extended
From 25 kHz to 50 kHz

PA-3xRC-L65 65% absorption.

Replacement of the power blocks by a more powerful model to reach a 65% absorption (instead of 35% for a standard model)



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Three-Phase amplifiers

“PA-3x”

POWER 3x3000 VA



PA-

PA-2x

PA-3x

PA-Nx

En savoir plus

Designation	PA-3x3000-AC-DC-200V-17A-2G-UI
Characteristics	AC: 100V-17A and 200V-8.5A DC: ±140V-24A and ±280V-12A
Special features	This amplifier is composed of three single-phase amplifiers PA-3000, reference RC2218 described in page 5-7, integrated in a cabinet. This cabinet is equipped for 100% absorption.
Format	Width 19” Height 29U
Data sheet	Amplifiers 4Q AC DC Three phases 3000VA
Documentation	-
Technical reference	AC0304

Options for this device:

PA-3xRC-BW bandwidth extended
From 25 kHz to 50 kHz

PA-3xRC-L100 100% absorption
Resistors integrated in the equipment to have 100% absorption.
This option is included in this device





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Three-Phase amplifiers

“PA-3x”

POWER 3x3000 VA



Designation	PA-3x3000-AC-DC-270V-24A-2G
Characteristics	AC: 135V-24A and 270V-12A DC: ±135V-24A and ±270V-12A
Special features	This amplifier is composed of three single-phase amplifiers PA-3000, reference RC2173 described in page 6-7, integrated in a cabinet. This cabinet is equipped for 100% absorption.
Format	Width 19" Height 29U
Data sheet	Amplifiers 4Q AC DC Three phases 3000VA
Documentation	User manual MU-AC0274-EN
Technical reference	AC0274

Options for this device:

PA-3xRC-BW bandwidth extended
From 25 kHz to 50 kHz

PA-3xRC-L100 100% absorption
Resistors integrated in the equipment to have 100% absorption.
This option is included in this device





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Three-Phase amplifiers

“PA-3x”

POWER 3x3000 VA



PA-

PA-2x

PA-3x

PA-Nx

En savoir plus

Designation	PA-3x3000-AC-DC-360V-17A-2G
Characteristics	AC: 180V-17A and 360V-8.5A DC: ±180V-17A and ±360V-8.5A
Special features	This amplifier is composed of three single-phase amplifiers PA-3000, reference RC2228 described in page 5-7, integrated in a cabinet. This cabinet is equipped for 100% absorption
Format	Width 19" Height 29U
Data sheet	Amplifiers 4Q AC DC Three phases 3000VA
Documentation	-
Technical reference	AC0306

Options for this device:

PA-3xRC-BW bandwidth extended
From 25 kHz to 50 kHz

PA-3xRC-L100 100% absorption
Resistors integrated in the equipment to have 100% absorption.
This option is included in this device



POWER 3x7000 VA

Designation	PA-3x7000-AC-DC-400V-54A-4G
Characteristics	<p>Four voltage ranges in LVAC: 135V-54A, 200V-36A, 270V-28A and 400V-18A (on 3 outputs)</p> <p>Four voltage ranges in HVAC: 270V-54A, 400V-36A, 540V-28A and 800V-18A (on 1 output)</p> <p>Four voltage ranges in LVDC: 180V-54A, 280V-36A, 360V-28A and 560V-18A (on 3 outputs)</p> <p>Four voltage ranges in HVDC: 360V-54A, 560V-36A, 720V-28A and 1120V-18A (on 1 output)</p>
Special features	<p>It is possible to add a set of resistors to have a full absorption (100%)</p> <p>Current regulation possible.</p> <p>In AC, possibility to use the amplifier as a passive load.</p>
Format	<p>Width 800 mm</p> <p>Height 38U or 43U</p>
Data sheet	<p>Amplifier 4Q AC DC Three phases 3x7kVA full absorption (when "PR" resistors are installed)</p> <p>or</p> <p>Amplifier 4Q AC DC Three phases 3x7kVA limited absorption (when "PR" resistors are not installed)</p>
Documentation	User manual MU-0011-EN
Technical reference	<p>AC0292 (full absorption)</p> <p>AC0291 (limited absorption)</p>





Options for this device:

PA-3X7K-BW bandwidth extended
 For small "signals"

PA-3X7K-PR resistors and diodes
 Included in the 3x7kVA FULL ABSORPTION amplifier only

PA-3X7K-CP passive load in current regulation
 Only available for the 3x7kVA FULL ABSORPTION amplifier

PA-3X7K-RI add of a current regulation
 Amplifier is able to use voltage or current regulation

PA-3X7K-MAINS mains adaptation
 For some specific mains, for example 115V L-N (200V L-L)

PA-
PA-2x
PA-3x
PA-Nx
En savoir plus



POWER 3x10000 VA

Designation	PA-3x10000-AC-DC-270V-37A
Characteristics	LVAC: 35V-37A and 270V-37A LVDC: 49V-37A and 380V-37A HVAC: 70V-37A and 540V-37A HVDC: 98V-37A and 760V-37A
Special features	The three phases can be connected in parallel to obtain only one power output of 30 kVA under 270 V.
Format	Width 800 mm Height 38U
Data sheet	AC DC 4Q amplifier 3x10kVA 2 ranges HP
Documentation	User manual MU-AC0288-EN
Technical reference	AC0288



Options for this device:

None



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Three-Phase amplifiers

“PA-3x”

Installations examples:



PA-

PA-2x

PA-3x

PA-Nx

En savoir plus





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Several outputs amplifiers

“PA-8x”

POWER 8x15 VA



Designation	PA-8x15-AC-DC-170V-0.1A
Characteristics	8 outputs Voltage regulation only
Special features	Connected directly using 68-pins plug Uses 8 analog outputs of NI card as pilots Uses 8 digital outputs to switch ON or OFF each amplifier Uses 8 digital inputs to read the status of each amplifier
Format	Width 483 mm Height 3U
Data sheet	AC voltage amplifier 8x15VA 170V 0.1A
Documentation	-
Technical reference	RC2059

Options for this device:

None



SPHEREA
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Several outputs amplifiers

“PA-8x”

POWER 8x15 VA



Designation	PA-8x15-AC-DC-3V-5A
Characteristics	8 outputs Current regulation only
Special features	Connected directly using 68-pins plug Uses 8 analog outputs as pilots Uses 8 digital outputs to switch ON or OFF each amplifier Uses 8 digital inputs to read the status of each amplifier
Format	Width 483 mm Height 3U
Data sheet	AC current amplifier 8x15VA 3V 5A
Documentation	-
Technical reference	RC2060

Options for this device:

None

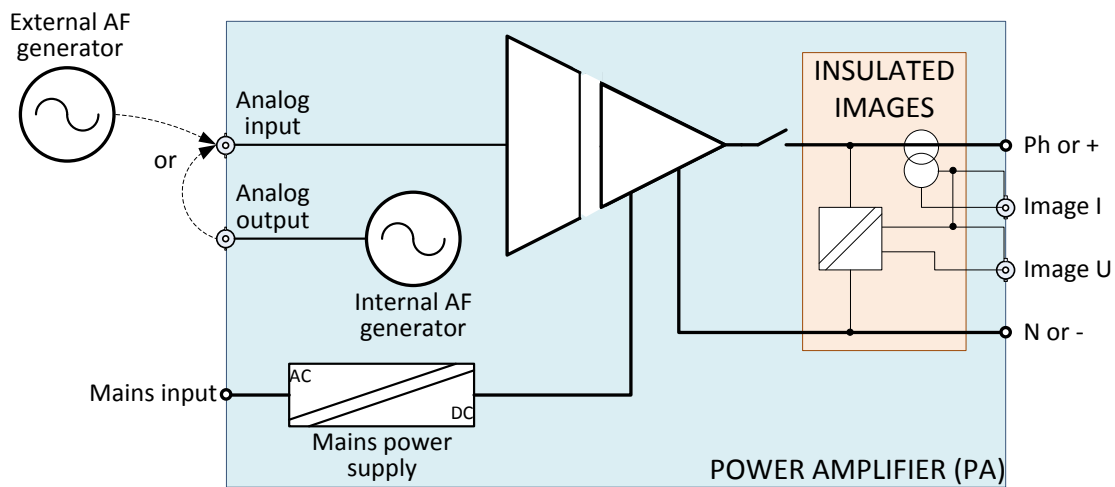
PA-
PA-2x
PA-3x
PA-Nx
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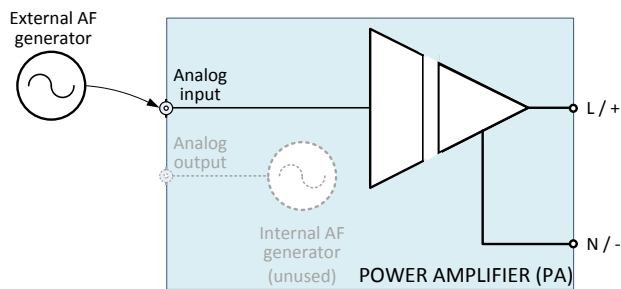
TO FIND OUT ABOUT OUR ACTIVITIES AND TECHNOLOGIES?

These few pages to give you some technical explanations and show you some achievements for which you can contact us...

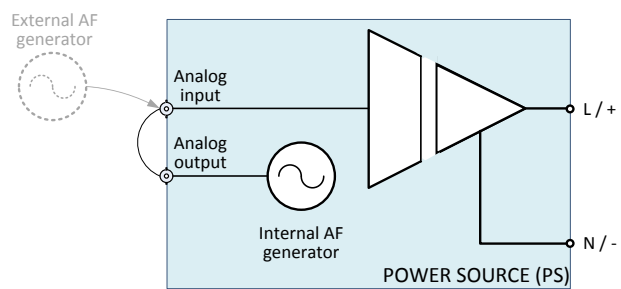
AMPLIFIER OR POWER SUPPLY?



Each amplifier includes its own internal synthesizer, its analog input, its power supply, its power output and its two “image” outputs.



Connecting an **external** AF generator, device is used as an **amplifier**.



Connecting the **internal** AF Generator, device is used as a **Power supply**.



A POWER PART IN LINEAR TECHNOLOGY

Power transistors connected in parallel are working in their linear conduction area. This regulation allows very fast voltage or current variations.

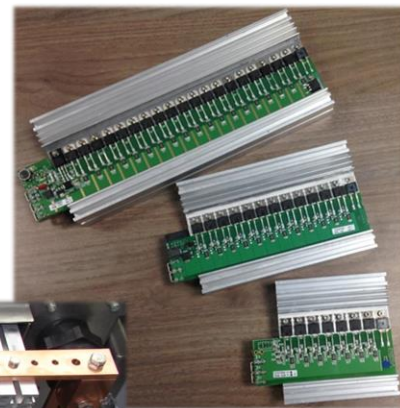
Two transistors technologies can be used: BIPOLAR or MOSFET.

- If transistors are MOSFET, when transistors lead, a current cross between Drain to Source. Transistors are working as a variable resistor controlled by the Grid voltage.
- If transistors are BIPOLAR, the conduction is drive by the Base current.

In fact, MOSFET are superior to BIPOLAR transistor (in linear application) because their safety area is power constant, where BIPOLAR safety area is declining when voltage increases. This advantage allows our power supplies to sustain short circuit without damage.

But, one thing is the power capacity, and another one is the drive, and of course the protection, of power elements. BIPOLAR transistors are easy to use when paralleling: "VBE" is similar between components. That is not the same way with MOSFET: "VGS" could be very different from one to another and cabling requires a big attention to avoid unbalanced current.

PUISSANCE+ has developed a power bloc with an ultrafast and precise current balancing which does not require complex control circuit. This allows to use more than thousand MOSFET in parallel with unbalancing inferior to 5%.



Example of a power bloc manufactured with more than 1000 transistors

PA-

PA-2x

PA-3x

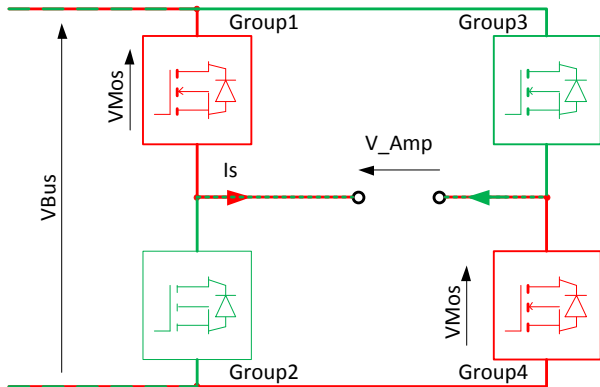
PA-Nx

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ABSORPTION LIMITATIONS OF AN AMPLIFIER

When amplifier is “Q1” or “Q3” areas:

(This picture is the internal structure of an amplifier in full bridge)



“Group1” and “Group4” generate positive half wave, “Group3” and “Group2” generate negative half wave. Output current “Is” is in phase with the output voltage “V_Amp”.

For example, for positive half wave:

$$V_{Bus} = V_{Mos} + V_{Amp} + V_{Mos}$$

$$V_{Mos} = (V_{Bus} - V_{Amp}) / 2$$

Instantaneous power dissipation in each group is:

$$P_{Mos} = V_{mos} \times I_s = (V_{Bus} - V_{Amp}) \times I_s / 2$$

The higher the output voltage is, the more the dissipation is important.

“VBus” is always adapted to output voltage and to reduce power dissipation regarding mains variation.

When amplifier is “Q2” or “Q4” areas:

Output current “Is” is in phase opposition with the output voltage “V_Amp”.

For example, for positive half wave:

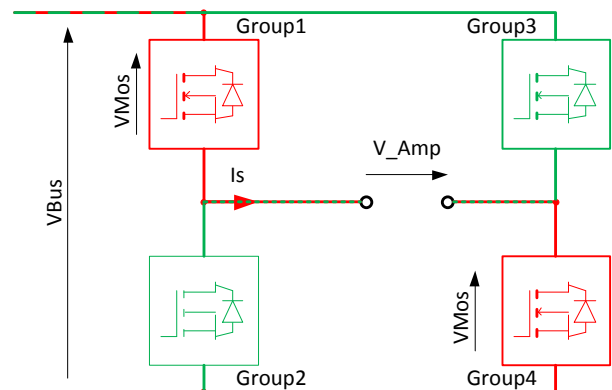
$$V_{Bus} = V_{Mos} - V_{Amp} + V_{Mos}$$

$$V_{Mos} = (V_{Bus} + V_{Amp}) / 2$$

Instantaneous power dissipation in each group of transistors is:

$$P_{Mos} = V_{mos} \times I_s = (V_{Bus} + V_{Amp}) \times I_s / 2$$

Power dissipation is more important.





SPHEREA
PUISSANCE PLUS

Find out more about

Used technologies

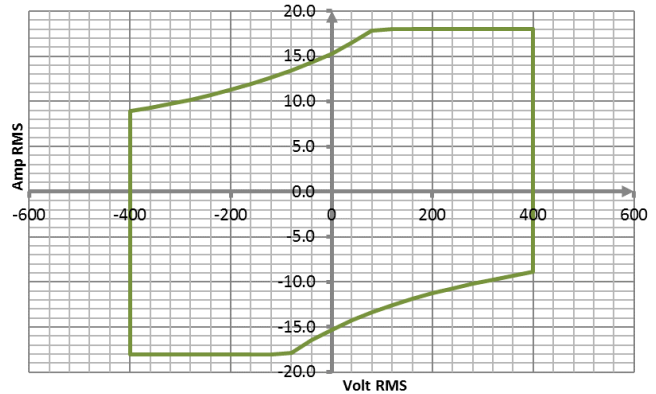
Example of a 7-kVA amplifier:

- V_Amp = 400 VRMS (peak = 560V)
- VBus = 620 VDC
- I_s = 18 ARMS
- 96 transistors in each group

In “Q1” and “Q3”:
Mean value of PMos is around 7,5 W in each transistor.

In “Q2” and “Q4”:
Theoretical mean value of PMos is around 45 W in each transistor. This value cannot be reached without instantaneous overheating and damage of transistors.

So, the maximum permanent current in absorption is limited between 40% and 50% of the rated power. An internal protection limits instantaneous power.



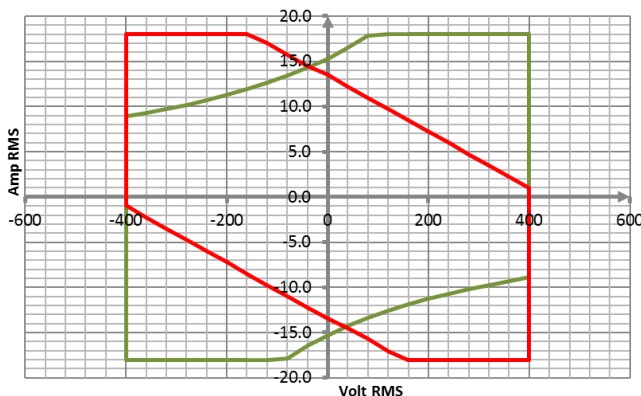
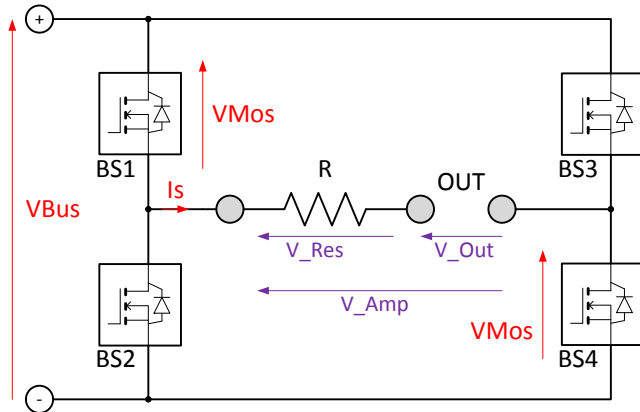
TWO WAYS TO INCREASE ABSORPTION POSSIBILITY

First solution using a set of resistors:

A set of resistors is connected in-series with the output of the amplifier.

In “Q1” and “Q3”, voltage is reduced due to the voltage drop in the resistors.
 $V_{Out} = V_{Amp} - V_{Res}$

In “Q2” and “Q4”, voltage on the output of the amplifier is not reduced by the voltage drop in the resistors.
 $V_{Amp} = V_{Out} - V_{Res}$



Example with a serial resistor of 32 ohms, the power dissipated in the transistor is reduced but “V_{Out}” is affected.

Permanent working areas are inverted:

- Full generation is not yet possible,
- Full absorption is now possible.

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PA-Nx

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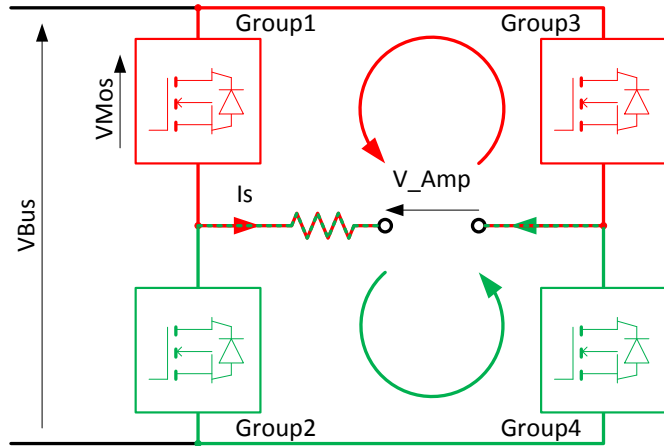


Second solution using a specific mode:

When using the optional mode “CP”, the amplifier works as a passive load in current regulation.

On positive halfwave, “Group1” and “Group3” are used. “Group1” regulates the current through diodes of “Group3”.

On negative halfwave, “Group2” and “Group4” are used. “Group1” regulates the current through diodes of “Group3”.



Power dissipation is limited:

$$V_{Mos} = V_{Amp} - V_{Res}$$

$$PMos = (V_{Amp} - V_{Res}) \times I_s$$

Advantage of this option is to reduce power dissipation in the room where are the amplifier. The disadvantage is that the power factor cannot be modified and is equal to -1.



“SMALL SIGNALS” BANDWIDTH

Blue trace:

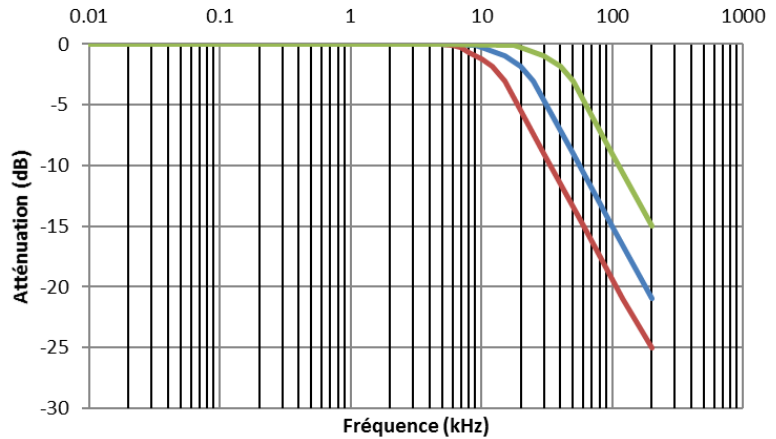
In voltage regulation, bandwidth at -3dB is 25 kHz.

Green trace:

In voltage regulation, with BW option, bandwidth at -3dB is 50 kHz.

Red trace:

In current regulation, bandwidth at -3dB is 15 kHz.



FALL TIME, RISE TIME, TRANSFER TIME

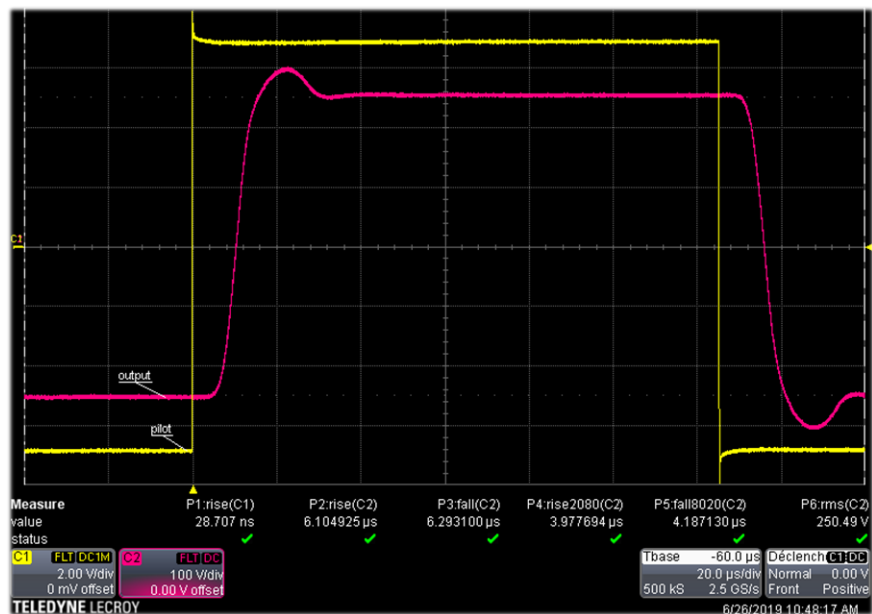
These measurements must be done using a "square" pilot signal.

According to the range used:

- Rise time 10% - 90%: $\leq 10 \mu s$
- Fall time 90% - 10%: $\leq 10 \mu s$
- Transfer time: $\leq 10 \mu s$

Example of measurement using a 3-kVA amplifier in range 260V

- Rise time: $6 \mu s$
- Fall time: $6 \mu s$



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PA-3x

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ACCESS MAP

