PS1215

Single Output - Dual Voltage
Low Noise Power Supply

CAENels
Gear For Science

User's Manual

LOW-NOISE FIXED VOLTAGE AC/DC

Rev. 1.4 – September 2017

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Document Revisions

Document Revision	Date	Comment
1.0	October 24th 2014	First Release
1.1	October 29th 2014	Manual graphics changed
1.2	December 2nd 2014	Updated the pin-out of the Output DC connector to match the names used in the datasheet
1.3	January 18th 2016	Y-Cable CT-I image and description changed
1.4	September 11th, 2017	Changed and added values on the output noise

Safety information - Warnings

CAEN ELS will repair or replace any product within the guarantee period if the Guarantor declares that the product is defective due to workmanship or materials and has not been caused by mishandling, negligence on behalf of the User, accident or any abnormal conditions or operations.

Please read carefully the manual before operating any part of the instrument

WARNING

High voltage inside, do NOT open the boxes

CAEN ELS s.r.l. declines all responsibility for damages or injuries caused by an improper use of the Modules due to negligence on behalf of the User. It is strongly recommended to read thoroughly this User's Manual before any kind of operation.

CAEN ELS s.r.l. reserves the right to change partially or entirely the contents of this Manual at any time and without giving any notice.

Disposal of the Product

The product must never be dumped in the Municipal Waste. Please check your local regulations for disposal of electronics products.

Read over the instruction manual carefully before using the instrument.
The following precautions should be strictly observed before using the PS1215:

WARNING

- Do not use this product in any manner not specified by the manufacturer. The protective features of this product may be impaired if it is used in a manner not specified in this manual.
- Do not use the device if it is damaged. Before you use the device, inspect the instrument for possible cracks or breaks before each use.
- Do not operate the device around explosives gas, vapor or dust.
- Always use the device with the cables provided.
- Turn off the device before establishing any connection.
- Do not operate the device with the cover removed or loosened.
- Do not install substitute parts or perform any unauthorized modification to the product.
- Return the product to the manufacturer for service and repair to ensure that safety features are maintained

CAUTION

- This device is designed for indoor use and in area with low condensation.

The following table shows the general environmental requirements for a correct operation of the instrument:

Environmental Conditions	Requirements
Operating Temperature	0°C to 50°C
Operating Humidity	30% to 85% RH (non-condensing)
Storage Temperature	-10°C to 60°C
Storage Humidity	5% to 90% RH (non-condensing)

1. Introduction

This chapter describes the general characteristics and main features of the PS1215 low-noise power supply.

1.1 The PS1215 Power Supply

CAEN ELS PS1215 is a single-output, dual-voltage mixed switching-linear power supply that is designed in order to obtain low-noise operation and high efficiency and it is especially suited for DCCT measurement systems where switching power supplies could corrupt measuring noise, accuracy and precision.

The power supply is housed in a robust and compact stainless steel box that can be placed next to the supplied device in order to reduce cable lengths and minimize consequent possible noise pick-up.

These power supplies are particularly designed for operation with the following CAEN ELS DC Current Transducers (DCCT):

- **CT-100-C, CT-100V-C**
- **CT-150-C, CT-150V-C**
- **CT-200, CT-200V**
- **CT-300, CT-300V**
- **CT-400, CT-400V**
- **CT-600, CT-600V**
- **CT-1000, CT-1000V**

All the above cited devices, combined with a PS1215 low-noise voltage power supply, guarantee their rated specifications.

1.2 The PS1215 at a Glance

The PS1215 linear power supply and its I/Os are represented in **Figure 1**:

Figure 1: overall view of a PS1215 power supply

The PS1215 is an isolated bipolar power supply, with a 3-pole output connector, specifically designed to supply DC Current Transducers (DCCT).

The AC Power Line input is placed on the left side of the box while the output connectors on the right side; LED monitors (indicating the presence of positive and negative voltage) are placed on the front side.

The PS1215 has a balanced bipolar output voltage, as indicated in the following **Table 1**:

	Negative Output Voltage	Positive Output Voltage
PS1215	-15 V	+15 V

Table 1: output voltage values

1.3 Technical Data

The PS1215 power supply has an output voltage accuracy of ±3% on both its positive and negative outputs.

Maximum peak-to-peak voltage noise measured at the device output terminals is rated at 4 mV. This value is measured over a 1 MHz bandwidth using a LeCroy MSO 44MXs-B, 400MHz, 5GS/s with AC Coupling at full load. Typical measurements of the power spectrum on each output are shown in **Figure 2**.

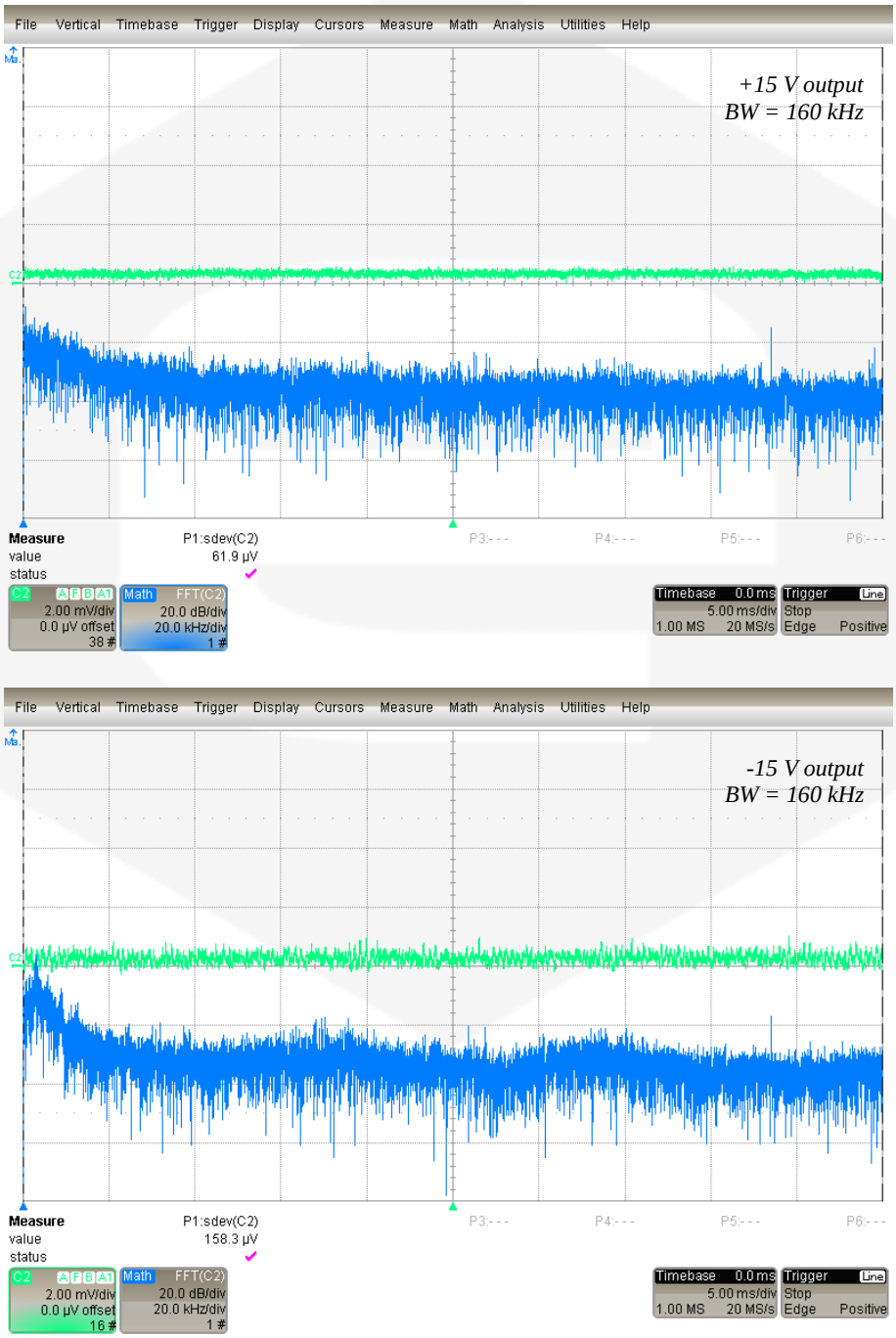

Figure 2: typical output noise - AC coupling

2. Safety

2.1 Injury Precautions

Prior to shipment this system was inspected and found free of mechanical or electrical defects. Upon unpacking of the system, inspect for any damage, which may have occurred in transit. The inspection should confirm that there is no exterior damage to the system such as broken connectors.

This section contains the fundamental safety rules for the installation and operation of the system. Read thoroughly this section before starting any procedure of installation or operation.

2.2 Caution

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with the safety precautions or warnings in this document violates safety standards of design, manufacture and intended use of this equipment and may impair the built-in protections within.

CAEN ELS s.r.l. shall not be liable for user's failure to comply with these requirements.

To avoid electrical shock or fire hazard, do not apply a power to a load that is outside the rated conditions.

Do Not Operate Without Covers.

To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

Do Not Operate in Wet/Damp Conditions.

To avoid electrical shock, do not operate this product in wet or damp conditions.

Do Not Operate in an Explosive Atmosphere.

To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

Do Not Operate With Suspected Failures.

If you suspect there is damage to this product, have it inspected by qualified service personnel.

2.3 Input Ratings

Do not use AC supply which is outside the limits for the input voltage and frequency ratings of this instrument. For input voltage and frequency rating of the module see **Table 4**: PS1215 power supply main specifications. For safety reasons, the mains supply voltage fluctuations should not exceed above voltage range.

2.4 Live Circuits

No internal adjustment or component replacement is allowed to non-CAEN ELS s.r.l. personnel. Never replace components with power cables connected.

In order to avoid injuries, always disconnect power plugs, let circuits discharge and remove external voltage source before touching components (wait 10 min at least).

2.5 Part Replacement and Modifications

Parts substitutions and modifications are allowed by authorized CAEN ELS s.r.l. service personnel only.

3. I/O Connectors

This chapter describes the I/O connectors, their corresponding pinout and their functionality.

3.1 AC Line Input Connector

The AC Line Input connector is in a standard IEC Male Socket as shown in **Figure 3**.

The PS1215 power supply is designed for universal AC input voltage range since it can operate with voltage from 90V to 260V and input frequency from 47 to 63 Hz. Under the value of 115V AC Mains input the Power Supply is subject to current (i.e. power) de-rating. See **Output Current Derating** chapter for further details.

Figure 3: AC Line input connector

3.2 Output

Output DC voltages are made available through a 3-pole connector with a screw locking. The pin-out of the connector (frontal view) is shown in **Figure 4**.

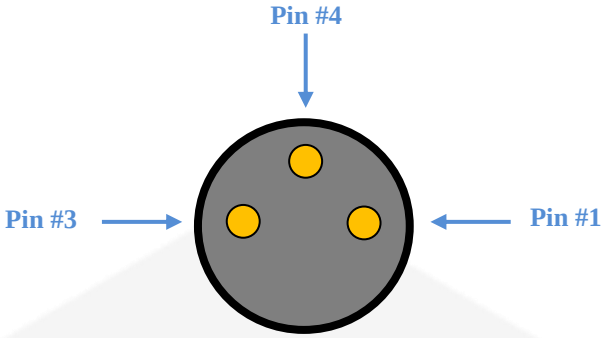

Figure 4: Output DC Connector (TE 1838839-1)

The output connector has the following pin-out:

Pin #	PS1215
1	+15V
3	-15V
4	GND

Table 2: PS1215 output D connector pin-out

The power supply is equipped with a cable for the connection to the DCCT. Two different cables can be plugged to the Output DC connector:

- **Y-Cable CT-V** (**Figure 6**): one side of the cable is terminated with a SUB-D connector for the direct connection of a DCCT CT-Series with voltage output (CT-xx00V). The other side is terminated with one connector that fits in the output DC connector of the PS1215 and one BNC connector for the reading of the output voltage that is fed from the DCCT Voltage Output. The SUB-D pin-out is shown in **Figure 5** and **Table 3**.

Y-Cable CT-I (

- **Figure 7**): one side of the cable is terminated with a SUB-D connector for the direct connection of a DCCT CT-Series with current output (CT-xx00). The other side is terminated with one connector that fits in the Output DC Connector of the PS1215 and two "banana" plugs to feed the customer external burden resistor. The SUB-D pin-out is shown in **Figure 5** and **Table 3**.

The standard factory length for both cables is 3 meters.

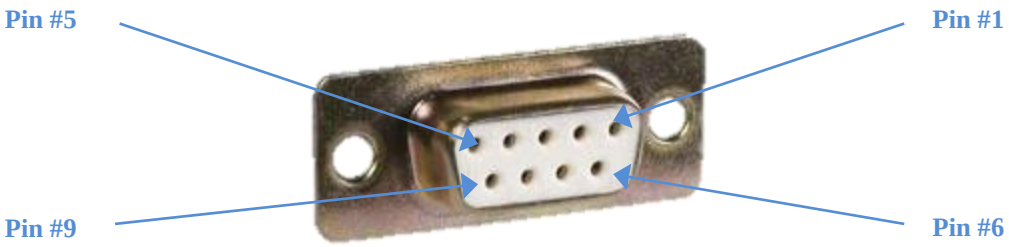

Figure 5: D-SUB 9-pin connector pin numbering

Pin #	Y-Cable CT-I	Y-Cable CT-V
1	I_S	BNC Ground
2	*nc*	BNC Central pin - Voltage
3	*nc*	
4	GND	
5	-15V	
6	I_S Return	*nc*
7	*nc*	BNC Ground
8	*nc*	
9	+15V	

Table 3: Y-Cable CT-I and CT-V pin-outs

Figure 6: Y Cable CT-V

Figure 7: Y Cable CT-I (**Red**: I_S, **Black**: I_S *return*, **Yellow**: *shield*)

3.3 Status LED

On a lateral side of the power supply, two LEDs turn off whenever the +15V or -15V voltages are not correctly regulated on the output cable.

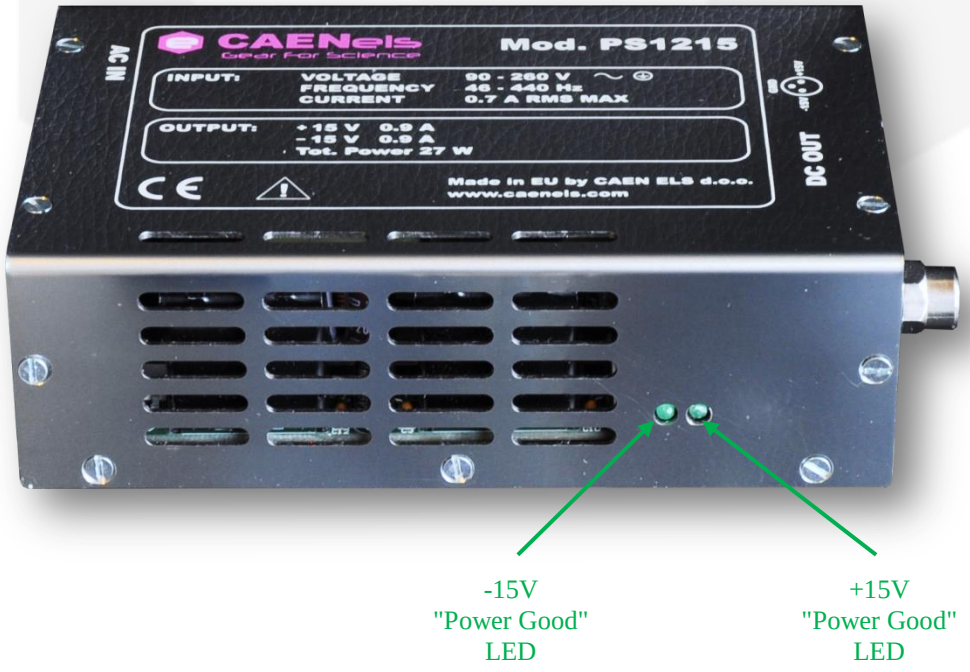

Figure 8: LED indicators for output voltage

3.4 Fixing

On the bottom side of the PS1215 four threaded M3×4mm holes can be used for fixing the power supply. These are indicated in the following **Figure 9**.

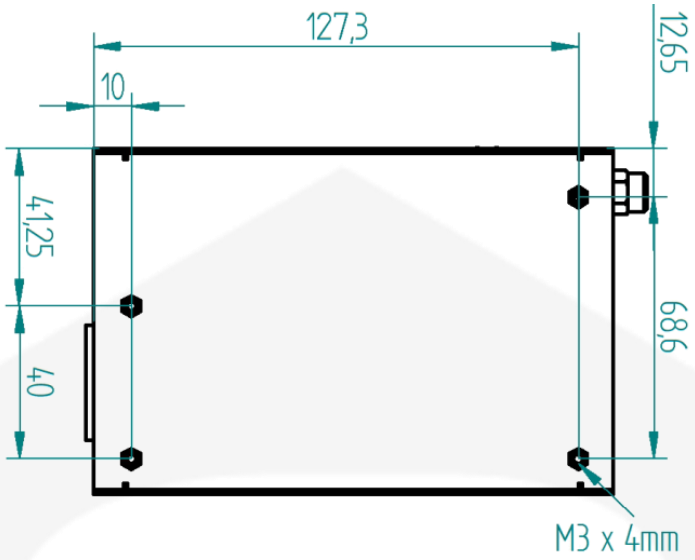

Figure 9: Threaded holes position on the PS1215 bottom

3.5 Mounting position

PS1215 shall **NOT be mounted** in the two following positions:

- bottom side of the box fixed to the celling (**Figure 10**);
- lateral side of the box that present ten ventilation holes faced to the top (**Figure 11**).

The RECOMMENDED mounting positions for increasing the heat dissipation and increasing reliability and life-time are:

- bottom side of the box fixed to the floor;
- lateral side of the box that present twenty ventilation holes faced to the top.

Figure 10: Ceiling mounting NOT allowed

Figure 11: Lateral mounting (ten ventilation holes faced to the top) NOT allowed

4. Technical Specifications

Technical Specifications for the PS1215 linear power supplies are presented in the following **Table 4**.

Technical Specifications	PS1215
Output Positive Voltage (±3%)	+15 V
Output Negative Voltage (±3%)	-15 V
Maximum Output Power	27 W
Maximum Output Current	+15V @ 900 mA -15V @ 900 mA
Output Ripple + Noise	< 0.001% $_{RMS}$ @ DC-100 kHz (typ.) 0.003% $_{RMS}$ @ DC-1 MHz 0.025% $_{P-P}$ @ DC-1 MHz
AC Line Voltage Input	90 – 260 V_{AC}
AC Line Frequency	47 - 63 Hz
Input to Output Isolation	3kV
Output to Earth-Case Isolation	500V
Hold-up time	16 ms typ. at 115 V_{AC}
Cooling	Natural convection
Dimensions	136.4 × 41 × 90.7 mm
Weight	600 g
Y-Cable length (CT-I and CT-V)	3m
Indicators	2 LEDs
Protections	Output short-circuit Output over-voltage
Operating Temperature Range	0°C – 50°C

Table 4: PS1215 power supply main specifications

5. Mechanical Dimensions

The PS1215 low-noise power supply mechanical dimensions are hereafter shown:

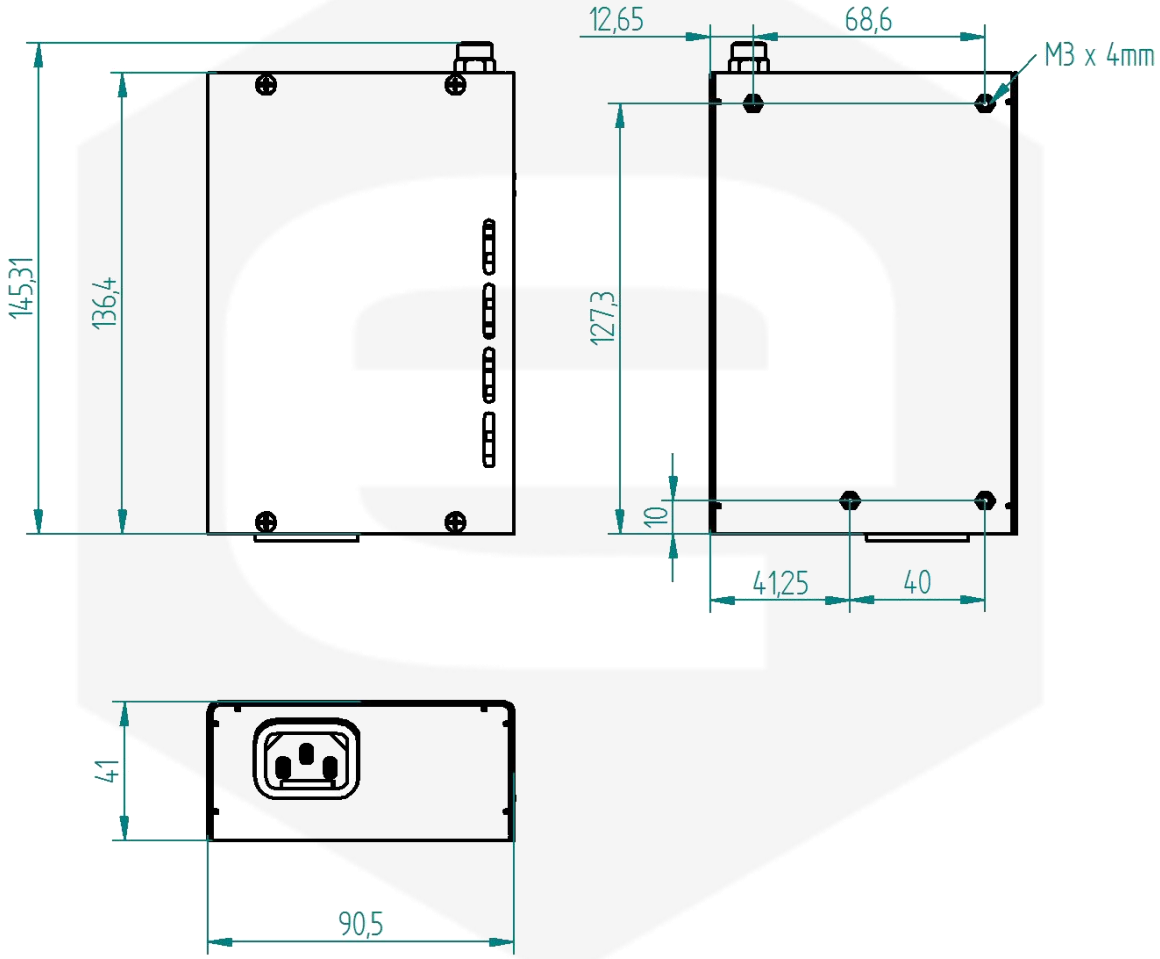

Figure 12: Mechanical drawings

6. Output Current Derating

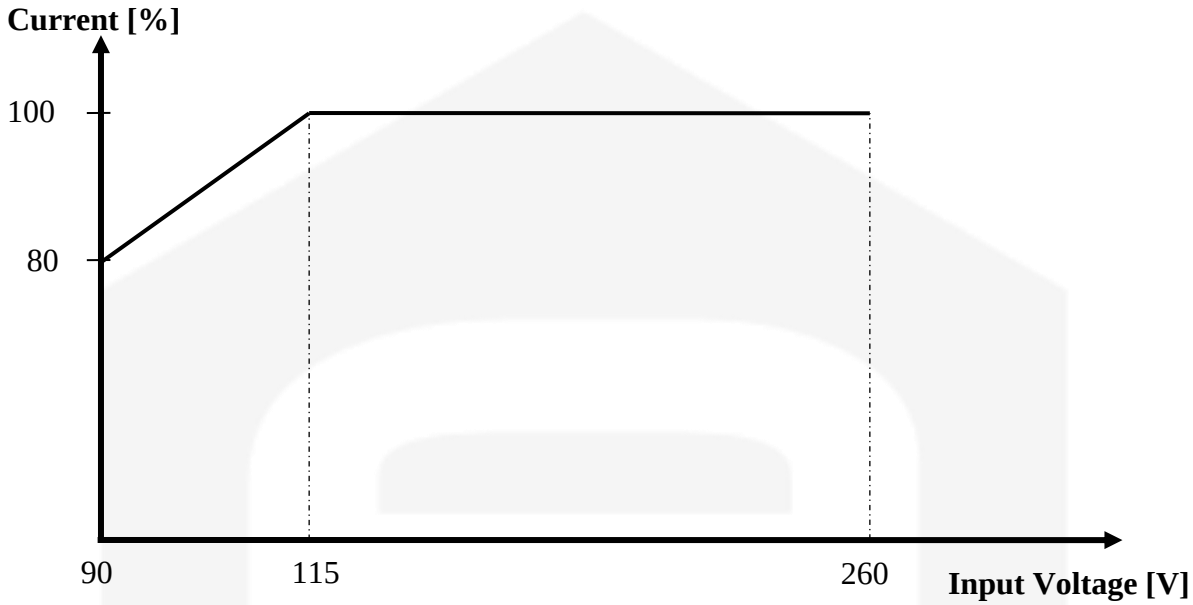

Figure 13: Output current versus input voltage at 60 Hz

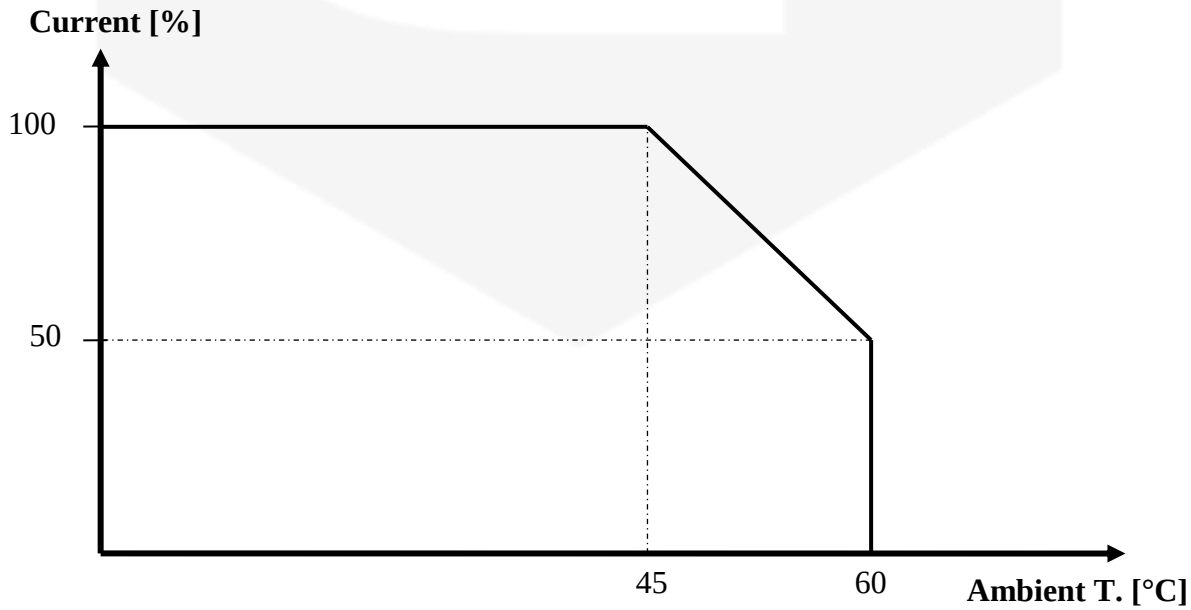

Figure 14: Output current versus ambient temperature

7. Ordering Codes

The PS1215 power supply can be ordered in three different codes, differing by the output cabling. Two versions are dedicated to operation together with the CAEN ELS current transducer series.

Model	Ordering Code	Description
PS1215	WPS1215XAAAA	*PS1215 - AC/DC Single Output - Dual Voltage ±15V Low Noise Power Supply - 27W max - 3m cable*
PS1215V	WPS1215VXAAA	*PS1215 - AC/DC Single Output - Dual Voltage ±15V Low Noise Power Supply - 27W max + Y-Cable CT-V: 3m cable with DB-9 and BNC (voltage output)*
PS1215I	WPS1215IXAAA	*PS1215 - AC/DC Single Output - Dual Voltage ±15V Low Noise Power Supply - 27W max + Y-Cable CT-I: 3m cable with DB-9 and "banana" plugs (current output)*