HDR20-5-12

230V_{ac} 20W 5V|9V|12V AC/DC NoElko Power Supply

HDR20-5-12:
A 230V_{ac} 20W 5V|9V|12V AC/DC NoElko Power Supply

Features

- 18mm DIN Rail width
- <50mW Standby Power @ 5 $V_{dc,out}$
- Long life / Electrolytic capacitor free
- Output Voltage selectable by switch:
  - 5 V_{dc} - 4 $A_{dc,max}$
  - 9 V_{dc} - 2.22 $A_{dc,max}$
  - 12 V_{dc} - 1.67 $A_{dc,max}$
- 207 V_{ac} to 253 V_{ac} input voltage range
- Output short circuit proof
- Active output overvoltage Protection
- Green Power LED

Product description

The HDR20-5-12 is 230V_{ac} power supply for DIN RAIL control cabinets. The output voltage is selectable by switch to 5V@4A_{max}, 9V@2.22A_{max} and 12V@1.67A_{max}. Thanks to the no-electrolytic-capacitor (NoElko) technology, exceptional reliability is achieved. An active output overvoltage protection discharges the output on overvoltage conditions.

The device is resilient to typical operating failures: Input transient protection, output short circuit, open circuit, moderate input transients and moderate output transients. A green power led indicates stable operation.

The device may be operated at ambient temperatures between -40°C and 50°C. Derating might be required.

Specification overview

Description	Value
Input	
Input Voltage Range (V_{ac})	207 - 253
Input Voltage Frequency (Hz)	49-61
Output	
Voltage (V)	5 / 9 / 12
Current (A)	4 / 2.22 / 1.67
Power Good Indicator	Green LED
Voltage Selection	Switch
Peak Efficiency	84 %
Protection	
Input Fuse	yes
Temperature Protection	yes
Short circuit protection	yes
Input Overvoltage supressor	MOV
Mechanical	
Dimensions LxWxH (mm)	17.6 x 106 x 60

Ordering information

Ordercode	Description
HDR20-5-12	230V_{ac} 20W 5V|9V|12V AC/DC NoElko Power Supply
Customisation available. Contact DPS.	

Engineering standards

Applied engineering standards	
IEC 55032	IEC 61000-4-2
IEC 61000-4-3	IEC 61000-4-4
IEC 61000-4-5	IEC 61000-4-6
IEC 61000-4-7	IEC 61000-4-8

1 Functional description

1.1 Overview

The HDR20-5-12 is 230V_{ac} power supply for DIN RAIL control cabinets. The output voltage is selectable by switch to 5V@4A_{max}, 9V@2.22A_{max} and 12V@1.67A_{max}. Thanks to the no-electrolytic-capacitor (NoElko) technology, exceptional reliability is achieved. An active output overvoltage protection discharges the output on overvoltage conditions.

The device is resilient to typical operating failures: Input transient protection, output short circuit, open circuit, moderate input transients and moderate output transients. A green power led indicates stable operation.

The device may be operated at ambient temperatures between -40°C and 50°C. Derating might be required.

Operating range: -40°C to 50°C. Temperature derating is required.

1.2 Protections

The following output protection mechanisms are implemented to ensure the reliable and safe operation of the HDR20-5-12:

- **Input Overvoltage Protection:** A Metal Oxide Varistor (MOV) safeguards the input against overvoltage conditions.
- **Output Short-Circuit Protection:** The HDR20-5-12 includes an overtemperature shut-down mechanism to prevent damage during short-circuit conditions.
- **Short-Circuit Resilience:** The output can withstand a short circuit indefinitely without adverse effects.
- **Open-Circuit Resilience:** The output can safely operate in an open-circuit condition for an unlimited duration.
- **Output Overvoltage Protection:** The HDR20-5-12 is equipped with active transient voltage protection. A high-power resistor discharges the output under overvoltage conditions.

1.3 Safety Advice / Risk of Destruction

This product is intended for professional users with adequate safety training in accordance with local regulations. Always disconnect the input supply voltage before performing any work on the HDR20-5-12. Do not open the device. Keep away from water.

1.4 Ordering Information

Ordercode	Output Voltage	EAN
HDR20-5-12	5 V, 9 V, 12 V	4262542250039
Customisation available. Contact DPS.		

Similar product		
Ordercode	**Output Voltage**	**EAN**
HDR20-15-30	15 V, 24 V, 30 V	4262542250046

2 Pinout

The pinout of the converter is depicted in Figure 1.

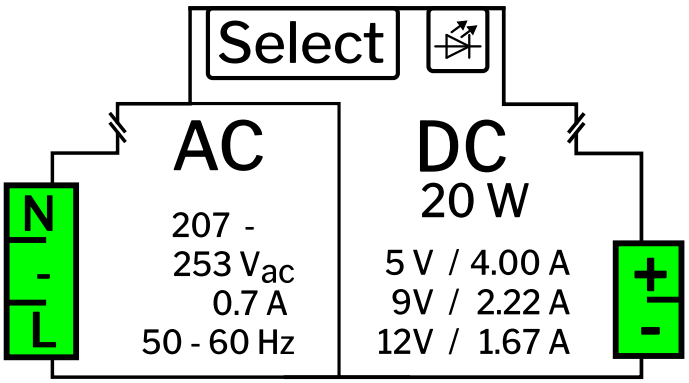

Figure 1: Pinout HDR20-5-12-5-12 1.

Pin	Functional Description
Input	
N	Neutral, AC input pin.
L	Line (Live), AC input pin.
	Note: N and L can be interchanged.
Output	
SELECT	Output power selection switch
+	Positive output terminal 5V.
-	Negative output terminal 5V.
Indicator	
LED	A green LED indicates that the output is functioning properly.

Table 1: Connector Descriptions and Functional Details

3 Specification

The specification for HDR20-5-12 is shown in the following table. Unless otherwise specified, the measurement conditions listed in Table 4 apply. All values refer to static conditions unless stated otherwise.

	Min	Typ	Max	Unit
Eingang Input				
Eingangsspannung U_{out}=5V Input Voltage Range	207		253	V_{dc}
Eingangskapazität Input Capacitance		4.7		µF
Standby Leistungsverbrauch Standby Power		50	60	mW
Eingangssicherung Input Fuse		750		mA
Startzeit Startup Time		300	500	ms
Ausgang Output				
Ausgangsspannung U_{out}=5 V Output Voltage U_{out}=5 V	4.8	5.2	5.5	V
Ausgangsstrom U_{out}=5 V Output Current U_{out}=5 V	0		4	A
Ausgangsspannung U_{out}=9 V Output Voltage U_{out}=9 V	8.5	9.2	9.8	V
Ausgangsstrom U_{out}=9 V Output Current U_{out}=9 V	0		2.22	A
Ausgangsspannung U_{out}=12 V Output Voltage U_{out}=12 V	11.5	12.2	12.8	V
Ausgangsstrom U_{out}=12 V Output Current U_{out}=12 V	0		1.67	A
Wandlungeffizienz Conversion Efficiency		80	84	%
Ausgangsüberspannungsschutz Output overvoltage protection	yes, active discharge with resistor			
Ausgangsentladewiderstand Output discharge resistor		10		Ω

	Min	Typ	Max	Unit
Gehäuse Case				
Montageform Mounting Type	Din Rail			
Teilungseinheiten Modular width units		1		
Montagebreite Mounting Width		17.6		mm
Montagelänge Mounting Length		106		mm
Montagehöhe Mounting Height		60		mm
Montagestil Mounting Style	Household Installation BOX			
Sicherheitsfeatures Safety Features				
Eingangsüberspannungsschutz Input overvoltage protection	yes			
Übertemperaturschutz Over temperature protection		110	120	°C
Kurzschlussschutz Short circuit protection	yes			
Leerlaufschutz Open circuit protection	yes			
Betriebsbedingungen Operating Conditions				
Temperaturbereich Temperature Range	-40		50	°C
Technische Merkmale Technical Characteristics				
Elektrolytkondensatoren Electrolytic Capacitors	No electrolytic capacitors			
Platinen Lackierung PCB conformal coating	No conformal coating.			

4 Measurements

4.1 Measurement Conditions

The measurement conditions are noted in table 4, if not otherwise noted in the specific measurement.

	Min	Typ	Max	Unit
Eingang Input				
Eingangsspannung Input Voltage	227	230	233	V_{ac}
Eingangsfrequenz Input Frequency	49	50	51	Hz
Umgebungsbedingungen Environment Conditions				
Temperatur Temperature	20		24	°C
Feuchtigkeit Humidity	30		90	$\%_{rel}$

Table 4: Measurement Conditions, if not otherwise noted.

4.2 Output Voltage Stability

The output voltage is measured across the operating range, as illustrated in Figure 2. The voltage levels are set to 5 V_{dc}, 9 V_{dc}, and 12 V_{dc}.

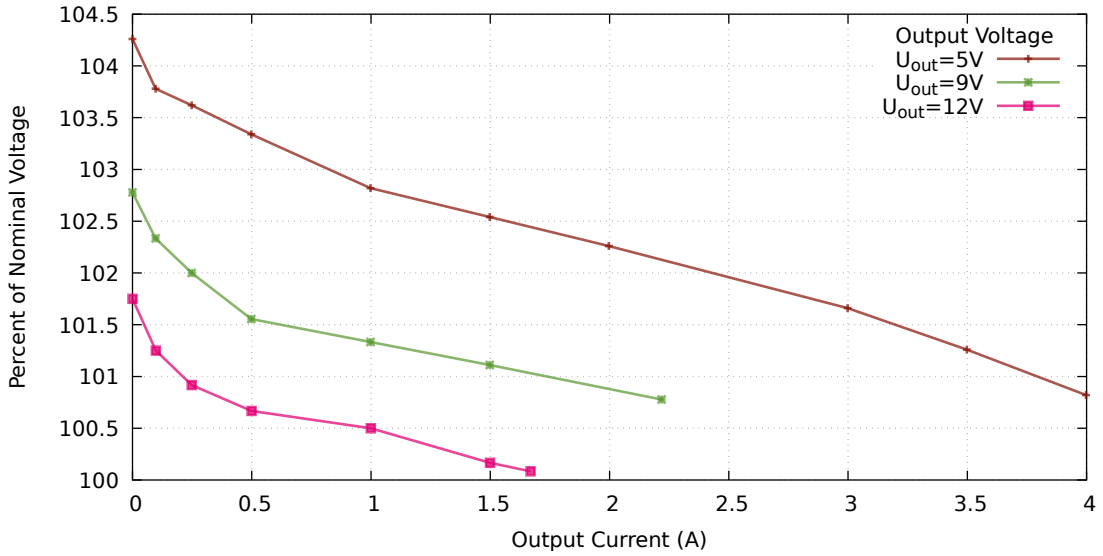

Figure 2: Relative output voltage stability over output current

4.3 Output Voltage Ripple

The output voltage ripple is measured across the operating range and presented in Figure 3. The voltage levels are set to 5 V_{dc}, 9 V_{dc}, and 12 V_{dc}.

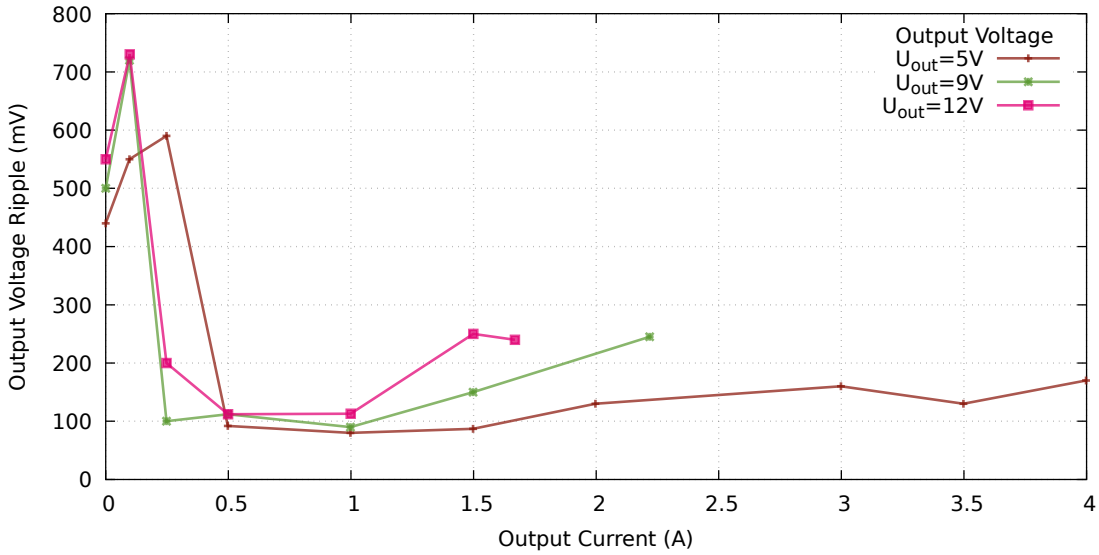

Figure 3: Output voltage ripple over the output current range.

4.4 Conversion Efficiency

The conversion efficiency is plotted over the output current range. The voltage levels are set to 5 V_{dc}, 9 V_{dc}, and 12 V_{dc}.

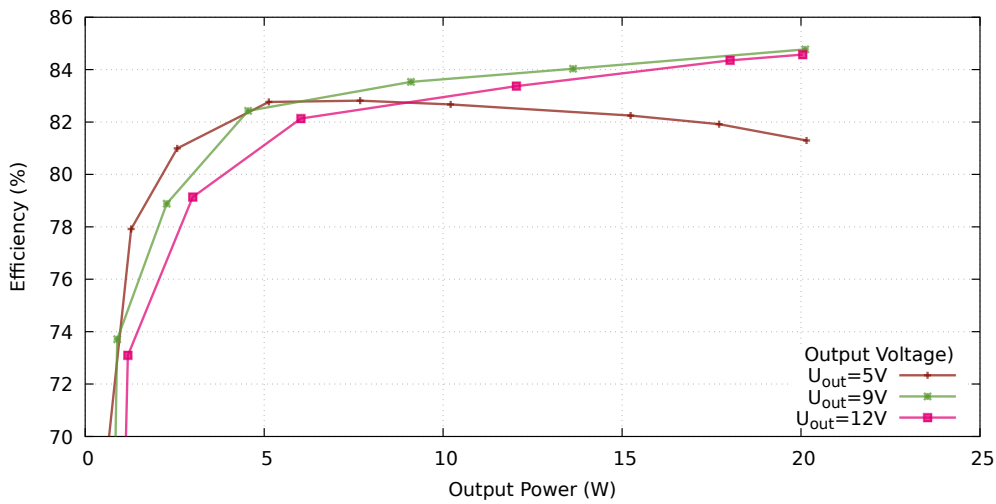

Figure 4: Conversion efficiency versus output current

4.5 Input Standby Power

The input standby power at various output voltages is plotted over the input voltage range, as shown in Figure 5.

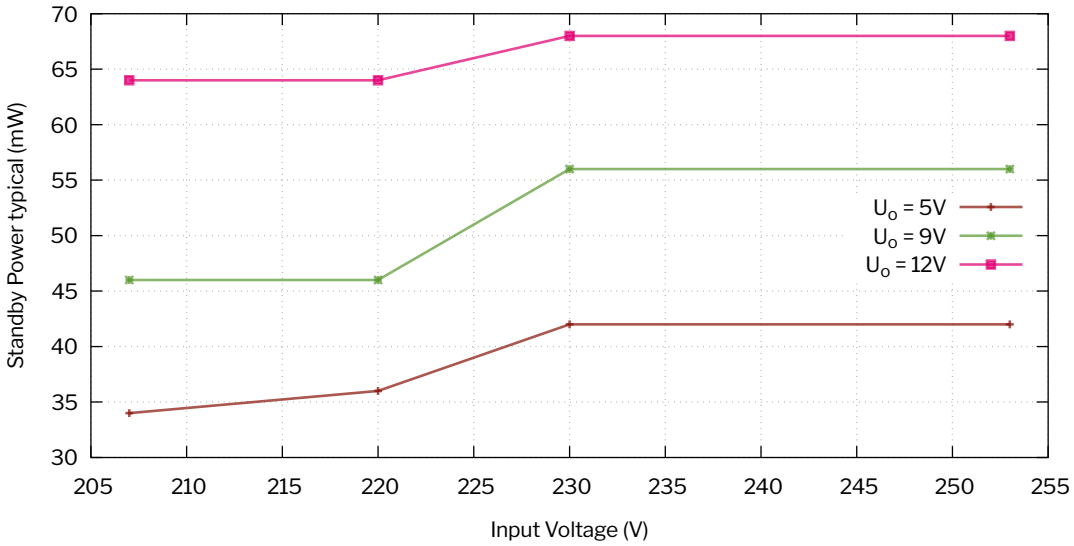

Figure 5: Standby power versus input voltage

4.6 Step Response

4.6.1 5 V

For the step response measurement at 5 V output voltage, the output current was changed from 0 A to 3 A. The output voltage response is shown in Figure 6. The rise and fall slope of the current was set to 2 A/ms.

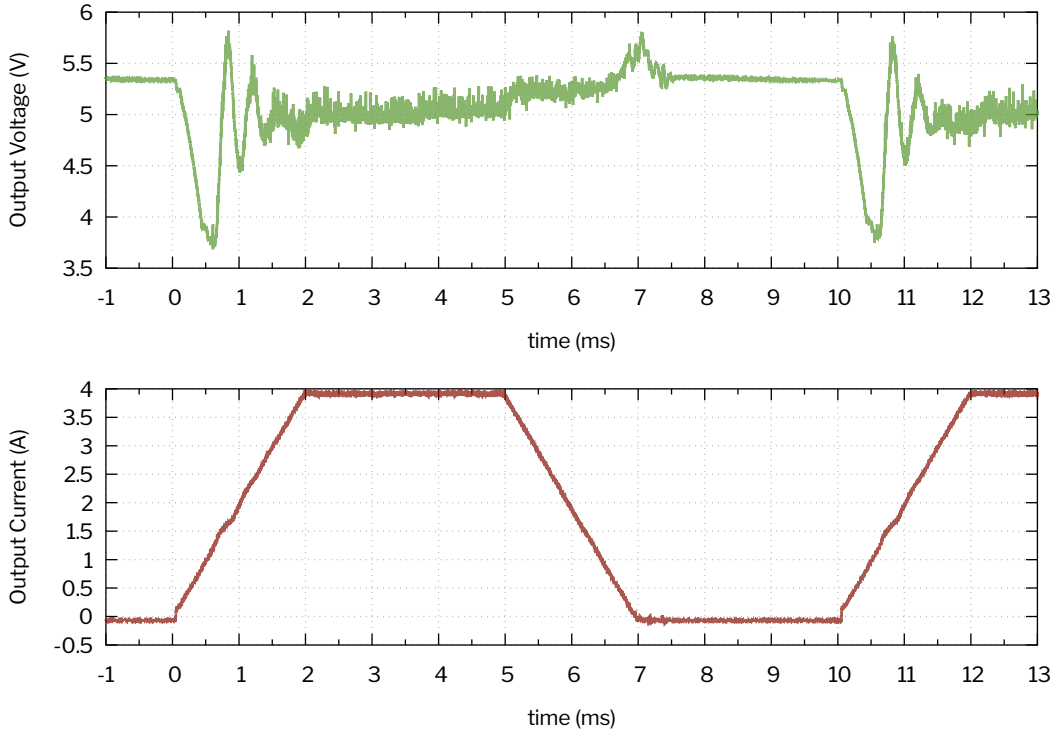

Figure 6: Transient response at U_{out} = 5 V

4.6.2 9 V

For the step response measurement at 9 V output voltage, the output current was changed from 0 A to 2.22 A. The output voltage response is shown in Figure 7. The rise and fall slope of the current was set to 2 A/ms.

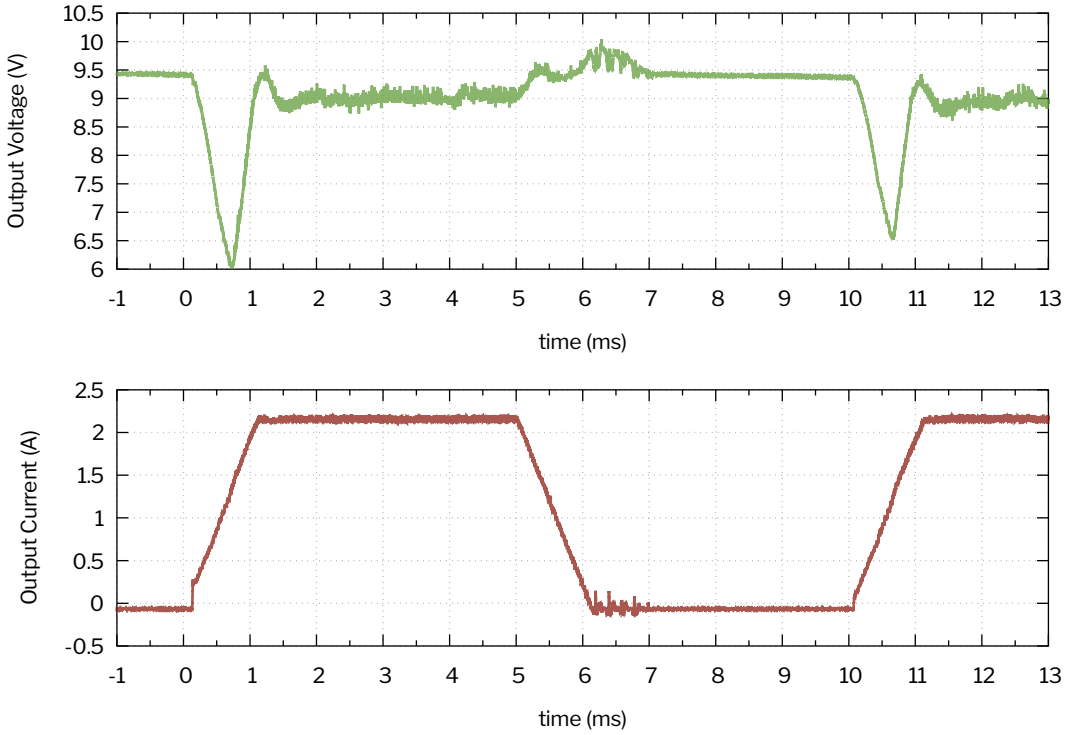

Figure 7: Transient response at U_{out} = 9 V

4.6.3 12 V

For the step response measurement at 12 V output voltage, the output current was changed from 0 A to 1.67 A. The output voltage response is shown in Figure 8. The rise and fall slope of the current was set to 2 A/ms.

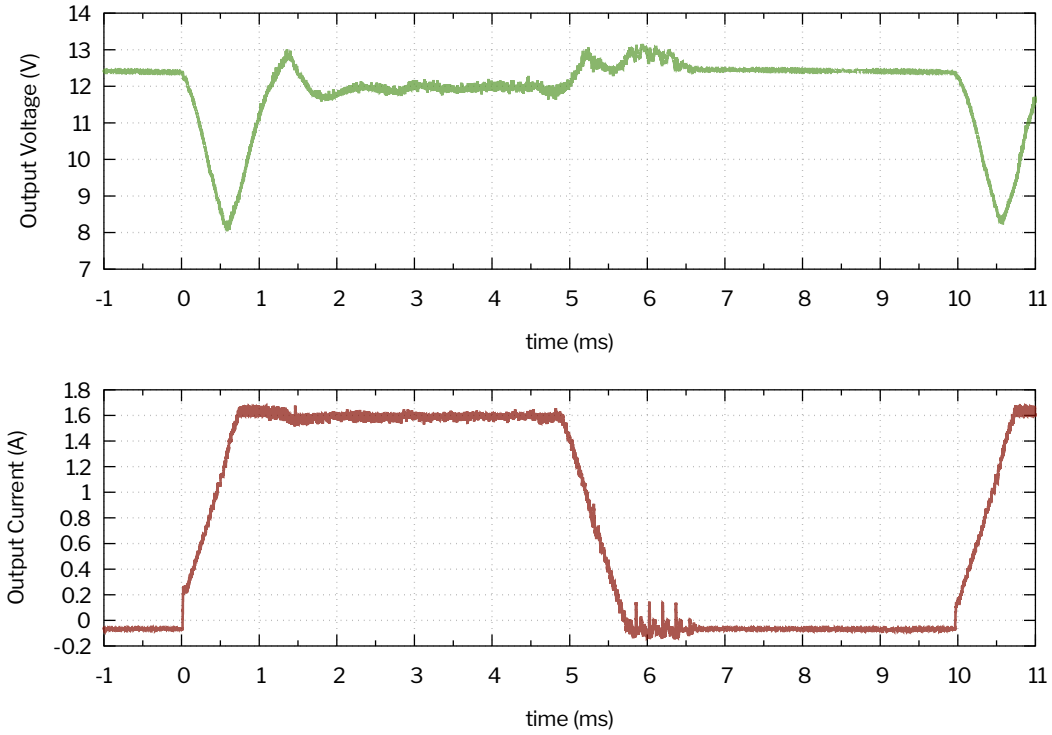

Figure 8: Transient response at U_{out} = 12 V

4.7 Power-On Behavior

The power supply is turned on with a target output voltage ($U_{out,set}$) of 5 V, 9 V, and 12 V.

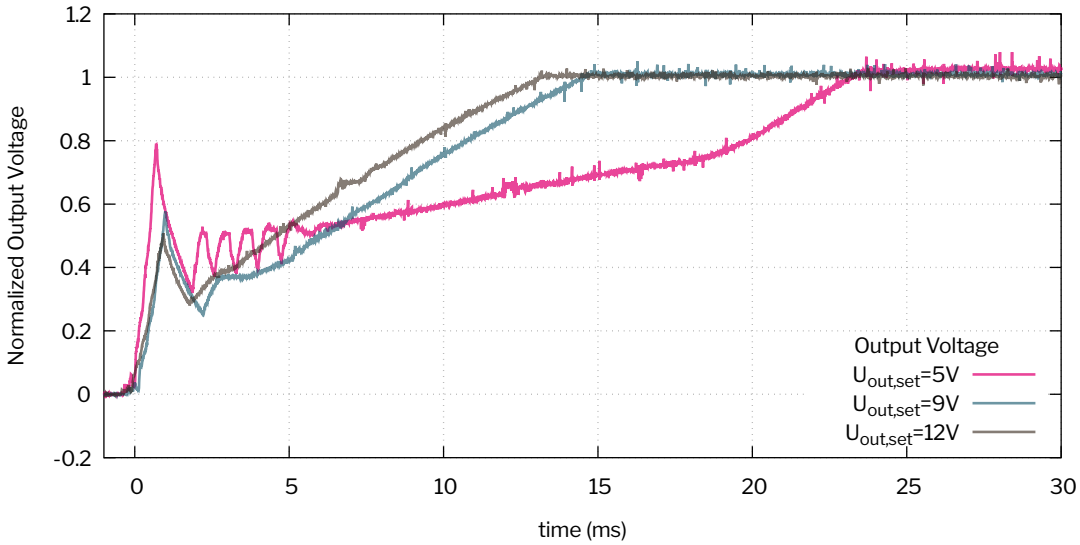

Figure 9: Output voltage of the HDR20-5-12 when the power is turned on.

4.8 Startup

The Startup time is defined as the time from the input voltage being present to 90% of the output voltage.

4.8.1 5 V

The startup time for U_{out}=5 V_{dc} is measured in Figure 10.

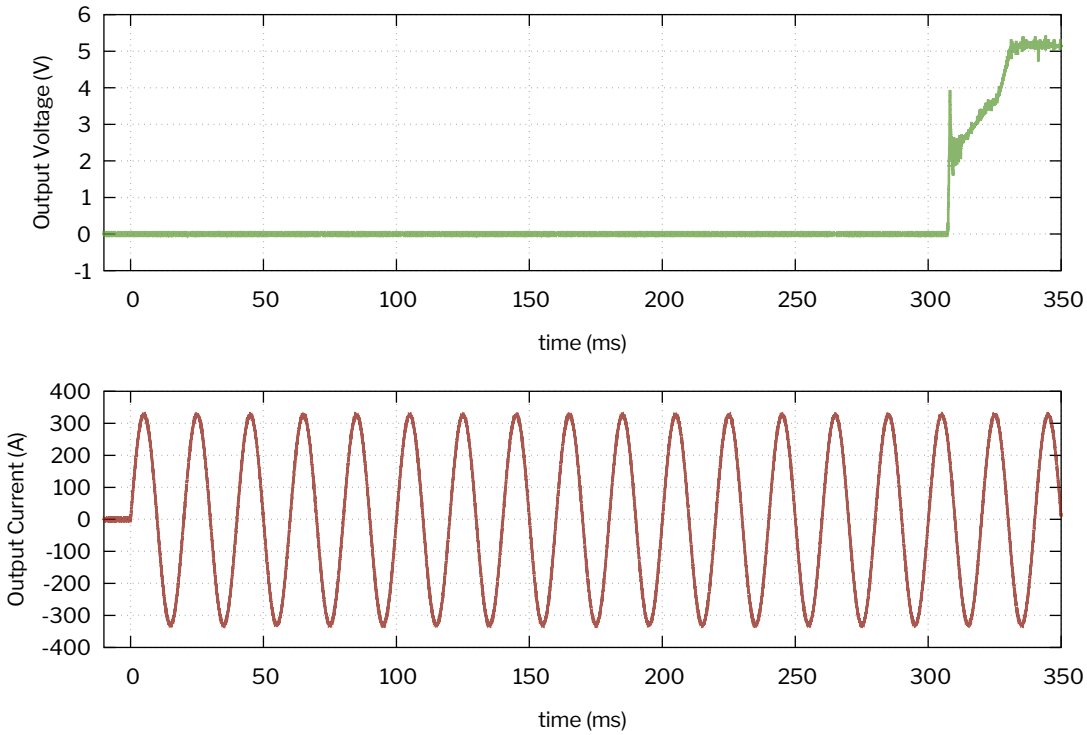

Figure 10: Startup time measurement for U_{out}=5 V.

4.8.2 9 V

The startup time for U_{out}=9 V_{dc} is measured in Figure 11.

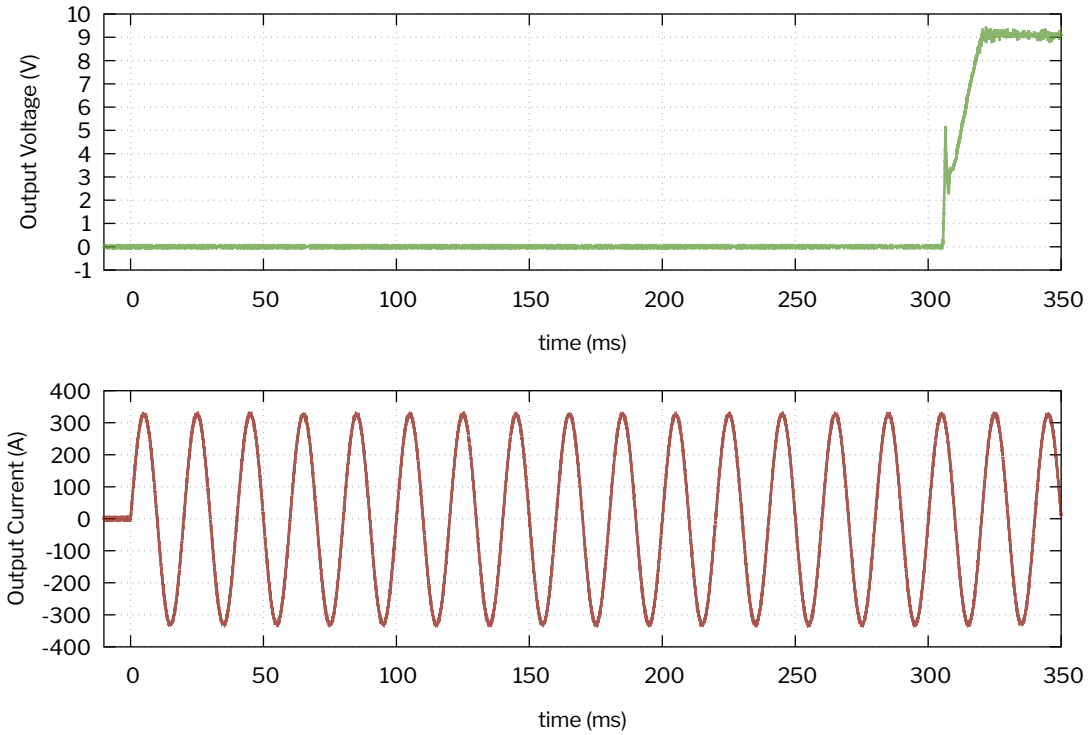

Figure 11: Startup time measurement for U_{out}=9 V.

4.8.3 12 V

The startup time for for U_{out}=12 V_{dc} is measured in Figure 12.

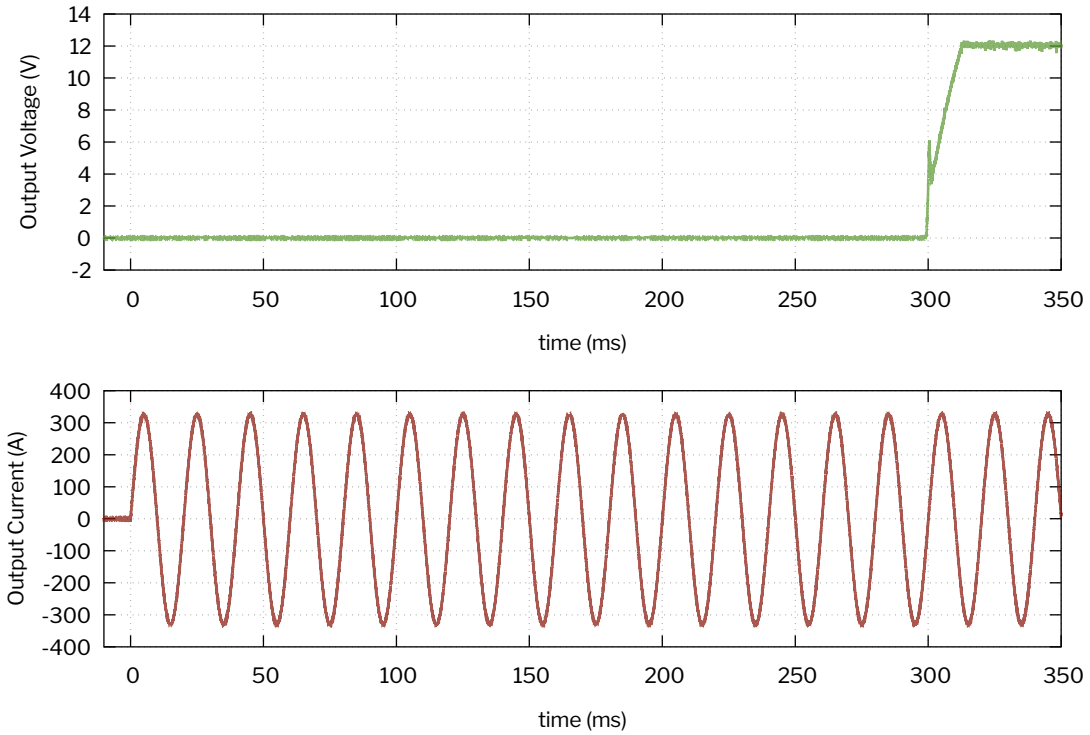

Figure 12: Startup time measurement for U_{out}=12 V.

5 EMC Measurements

5.1 AC Input

The average and quasipeak input EMC conducted line emission of HDR20-5-12 are depicted in 13.

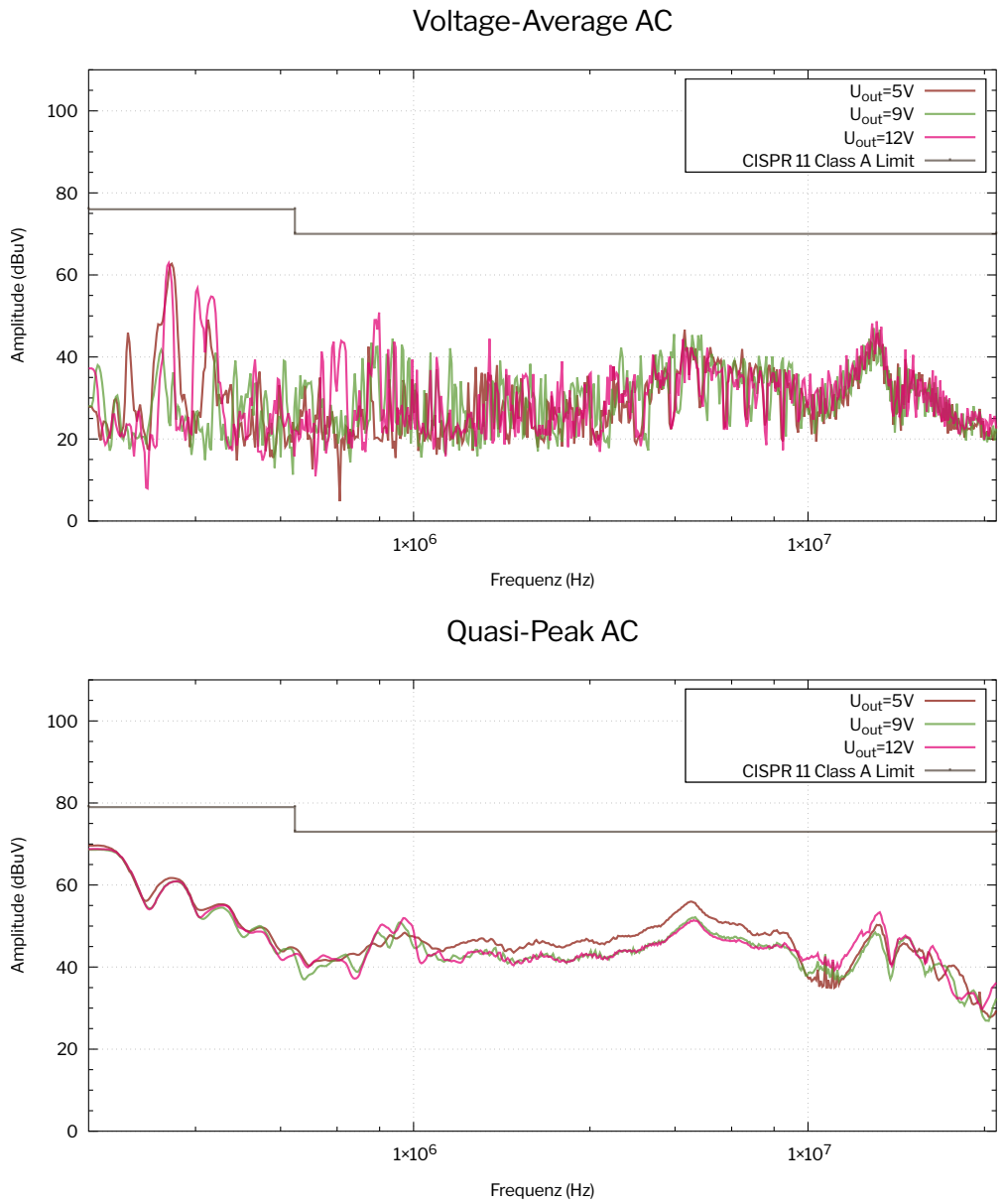

Figure 13: Input EMC Emission HDR20-5-12.

5.2 DC Output

The conducted line output emissions of HDR20-5-12 are depicted in Figure 14.

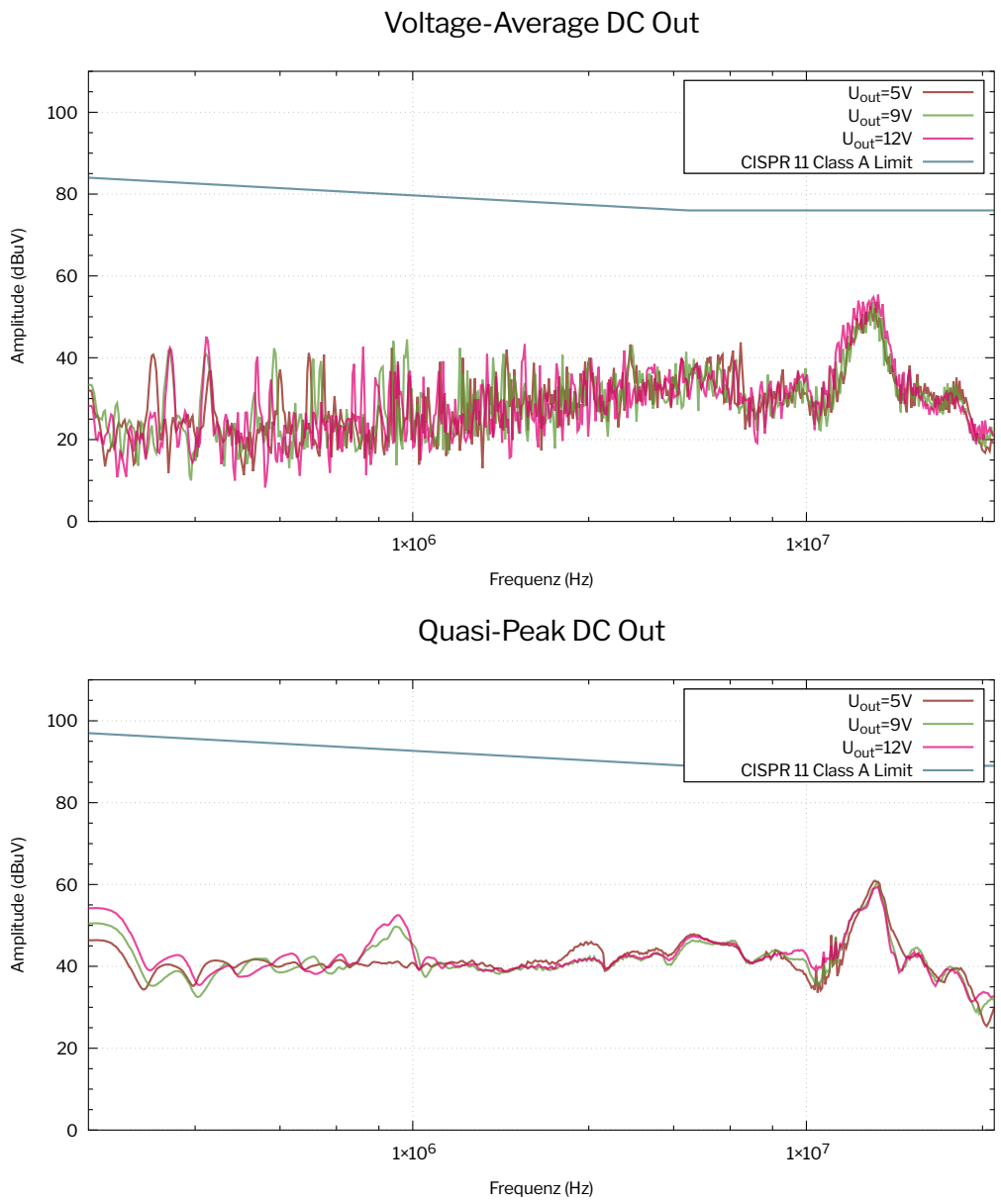

Figure 14: Output EMC Emission HDR20-5-12.

6 Case

The case drawing of the HDR20-5-12 is shown in Figure 15.

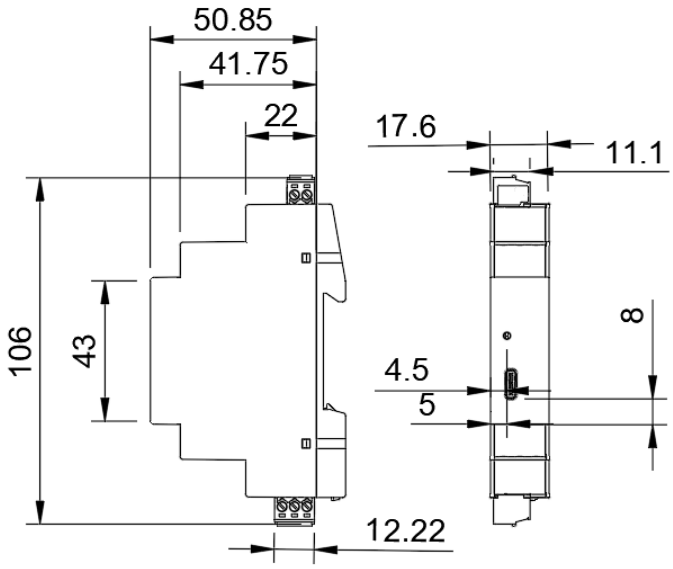

Figure 15: HDR20-5-12 Product drawing with dimensions.

7 Product label

The product label of the HDR20-5-12is depicted in the following Figure 16. The magenta cutouts show the position of the USB-C connector (large) and the LED (small).

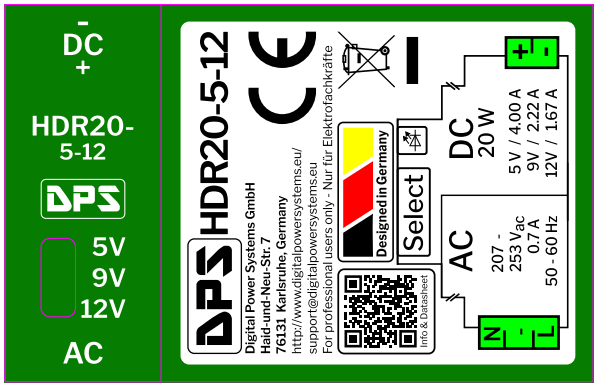

Figure 16: The product label HDR20-5-12(Revision 1).

8 Document

8.1 Latest Document Revision

The latest document revision can be downloaded here:

https://digitalpowersystems.eu/hdr20/

8.2 Datasheet Quality

Digital Power Systems aims for the highest datasheet quality. We value your feedback to improve this document. Please email your feedback to the following email address:

`datasheet (ät) digitalpowersystems (döt) eu`

8.3 Revision History

The revision history is depicted in the following table.

Date	Changes in Revision
9.05.2025	Initial release
11.09.2025	Updated EAN to GTIN

8.4 Contact Information

This is a product of the Digital Power Systems GmbH (DPS).

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