



HDR20-5-12

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



HDR20-5-12 product photograph

Feature Summary

- 17.6 mm DIN Rail width
- Standby power 42 mW typ. (U_{out} = 5 V)
- Long life: no electrolytic capacitors
- Switch-selectable output voltage:
 - 5 V_{dc} at up to 4 A_{dc}
 - 9 V_{dc} at up to 2.22 A_{dc}
 - 12 V_{dc} at up to 1.67 A_{dc}
- 207 V_{ac} to 253 V_{ac} input voltage range
- Short-circuit-proof output
- Active output overvoltage protection
- Green power LED

Product Description

The HDR20-5-12 by Digital Power Systems (DPS) is a 230 V_{ac} (207–253 V_{ac}), 20 W fly-back AC/DC (alternating to direct current) power supply for DIN Rail mounting in control cabinets. Input and output are galvanically isolated, and the design uses no electrolytic capacitors (NoElko technology) for high reliability. The constant-voltage (CV) output is selectable by switch: 5 V@4 A_{max}, 9 V@2.22 A_{max} or 12 V@1.67 A_{max} (factory setting 5 V). An active overvoltage protection discharges the output.

The power supply withstands input transients, output short circuits, open-circuit operation and moderate output transients. After a short circuit or an overtemperature shutdown it restarts automatically. A green power LED (light-emitting diode) indicates stable operation.

It delivers full rated power at –40 °C to 50 °C ambient without derating.

Specification Overview

Description	Value
Input	
Input Voltage Range (V _{ac})	207–253
Frequency (Hz)	49–61
Output	
Voltage (V)	5 / 9 / 12
Current (A): 4 / 2.22 / 1.67	
Peak Efficiency	85 %
Protection	
Input Fuse	yes
Temperature Protection	yes
Short-Circuit Protection	yes
Overvoltage Suppressor	Varistor
Mechanical	
W × H × D (mm): 17.6 × 106 × 50.85	
Weight (g)	68

Ordering Information

Order Code	Outputs
HDR20-5-12	5/9/12 V
HDR20-15-30	15/24/30 V
Customization available. Contact DPS.	

Engineering Standards

Applied Engineering Standards	
EN 55011 / CISPR 11	EN 61000-4-2
EN 61000-4-3	EN 61000-4-4
EN 61000-4-5	EN 61000-4-6
EN 61000-4-7	EN 61000-4-8
EN 61558-2-16	EN IEC 63000



1 Functional Description

1.1 Overview

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The power supply withstands input transients, output short circuits, open-circuit operation and moderate output transients. After a short circuit or an overtemperature shutdown it restarts automatically. A green power LED (light-emitting diode) indicates stable operation.

It delivers full rated power at –40 °C to 50 °C ambient without derating.

The ordering data in Table 1 give the European Article Number (EAN), which is the Global Trade Item Number (GTIN) of the power supply, and the HS code, the customs tariff number based on the Harmonized System (HS) of the World Customs Organization.

1.2 Protections

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

- **Input Fuse:** An input fuse, rated as given in Table 3, disconnects the power supply from the mains in the event of an internal fault.
- **Input Overvoltage Protection:** A metal oxide varistor (MOV) safeguards the input against overvoltage conditions.
- **Output Short-Circuit Protection:** The output can withstand a short circuit indefinitely without adverse effects. The power supply restarts automatically once the short circuit is removed.
- **Overtemperature Protection:** The HDR20-5-12 shuts down above the overtemperature threshold given in Table 3, which also protects it during sustained short-circuit conditions. It restarts automatically after cooling down.
- **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

The HDR20-5-12 must only be installed and operated by professional users with adequate safety training in accordance with local regulations. It must only be used indoors in dry locations and must be installed in a control cabinet or distribution box. Always disconnect the input supply voltage before performing any work on the HDR20-5-12. Do not open the power supply. Keep away from water.





1.4 Ordering Information

The following ordering options are available.

Order Code	Description	EAN	Weight	HS Code	Origin
HDR20-5-12	5/9/12 V	4262542250039	68 g	8504408390	Germany
Similar Products					
HDR20-15-30	15/24/30 V	4262542250046	68 g	8504408390	Germany
Customization available. Contact DPS.					

Table 1: Ordering information of the HDR20-5-12.



2 Pinout

The pinout of the HDR20-5-12 is depicted in Figure 1. The pins are described in Table 2.

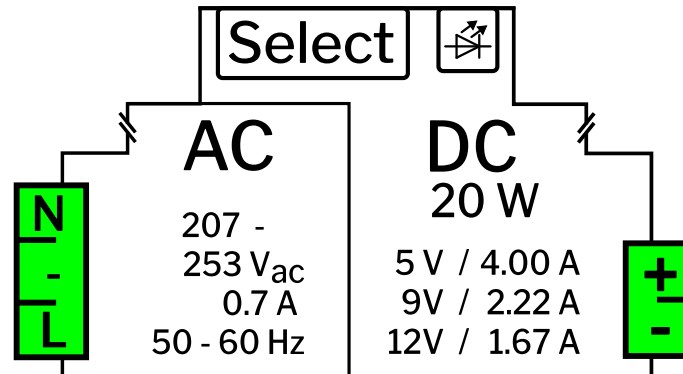


Figure 1: Pinout of the HDR20-5-12.

Pin	Functional Description
Input	
N	Neutral, AC input pin.
n.c.	Not connected (middle position of the AC terminal).
L	Line (Live), AC input pin.
<i>Note: N and L can be interchanged.</i>	
Output	
Select	Output voltage selection switch.
+	Positive output terminal.
-	Negative output terminal.
Indicator	
LED	A green LED indicates that the output is functioning properly.

Table 2: Pin description of the HDR20-5-12.



3 Specification

The specification for HDR20-5-12 is shown in Table 3. Unless otherwise specified, the measurement conditions listed in Table 4 apply. All values refer to static conditions unless stated otherwise. IP denotes the International Protection code (degree of protection), PCB the printed circuit board.

Parameter	Min	Typ	Max	Unit
Eingang Input				
Eingangsspannung Input Voltage Range	207		253	V _{ac}
Nenneingangsspannung Nominal Input Voltage		230		V _{ac}
Eingangsfrequenz Input Frequency Range	49		61	Hz
Nenneingangsfrequenz Nominal Input Frequency		50/60		Hz
Eingangsstrom Input Current			0.7	A _{ac}
Eingangskapazität Input Capacitance		4.7		μF
Standby-Leistungsverbrauch, alle Einstellungen Standby Power, All Settings	42		68	mW
Standby-Leistungsverbrauch U _{out} = 5 V Standby Power U _{out} = 5 V		42		mW
Standby-Leistungsverbrauch U _{out} = 9 V Standby Power U _{out} = 9 V		56		mW
Standby-Leistungsverbrauch U _{out} = 12 V Standby Power U _{out} = 12 V		68		mW
Eingangssicherung Input Fuse		750		mA
Startzeit Startup Time		300	500	ms





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Parameter	Min	Typ	Max	Unit
Ausgang Output				
Nennausgangsleistung Rated Output Power			20	W
Regelungsart Control	Constant voltage (CV)			
Ausgangsspannung U _{out} = 5 V Output Voltage U _{out} = 5 V	4.8	5.2	5.5	V _{dc}
Ausgangsstrom U _{out} = 5 V Output Current U _{out} = 5 V	0		4	A _{dc}
Ausgangsspannung U _{out} = 9 V Output Voltage U _{out} = 9 V	8.5	9.2	9.8	V _{dc}
Ausgangsstrom U _{out} = 9 V Output Current U _{out} = 9 V	0		2.22	A _{dc}
Ausgangsspannung U _{out} = 12 V Output Voltage U _{out} = 12 V	11.5	12.2	12.8	V _{dc}
Ausgangsstrom U _{out} = 12 V Output Current U _{out} = 12 V	0		1.67	A _{dc}
Wandlungseffizienz Conversion Efficiency		80	85	%
Ausgangsüberspannungsschutz Output Overvoltage Protection	yes, active discharge with resistor			
Ausgangsentladewiderstand Output Discharge Resistor		10		Ω
Gehäuse Case				
Montageform Mounting Type	DIN Rail			
Teilungseinheiten Modular Width Units		1		
Breite Width		17.6		mm
Höhe Height		106		mm
Tiefe Depth		50.85		mm
Gewicht Weight		68		g
Montagestil Mounting Style	Control cabinet / distribution box			
Schutzart Degree of Protection	IP20			





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Parameter	Min	Typ	Max	Unit
Sicherheitsfeatures				
Safety Features				
Galvanische Trennung Eingang/Ausgang Galvanic Isolation Input/Output	yes			
Eingangsüberspannungsschutz Input Overvoltage Protection	yes			
Übertemperaturschutz Overtemperature Protection		110	120	°C
Kurzschlusschutz Short-Circuit Protection	yes			
Leerlaufschutz Open-Circuit Protection	yes			
Wiederanlauf nach Kurzschluss Recovery after Short Circuit	automatic restart			
Wiederanlauf nach Übertemperatur Recovery after Overtemperature	automatic restart			
Betriebsbedingungen				
Operating Conditions				
Betriebstemperaturbereich Operating Temperature Range	−40		50	°C
Lagertemperatur Storage Temperature	−40		50	°C
Technische Merkmale				
Technical Characteristics				
Elektrolytkondensatoren Electrolytic Capacitors	No electrolytic capacitors			
Platinenlackierung PCB Conformal Coating	No conformal coating			

Table 3: Specification of the HDR20-5-12.



4 Measurements

4.1 Measurement Conditions

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

Parameter	Min	Typ	Max	Unit
Eingang Input				
Eingangsspannung Input Voltage	227	230	233	V _{ac}
Eingangsfrequenz Input Frequency	49	50	51	Hz
Umgebungsbedingungen Environmental 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}.

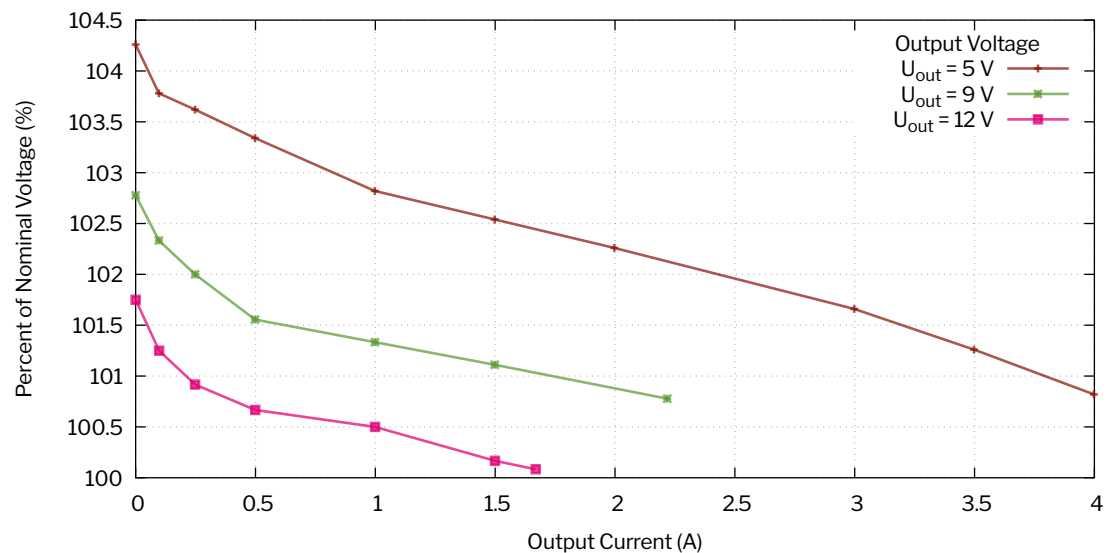


Figure 2: Relative output voltage stability over output current at 230 V_{ac} input, output set to 5 V_{dc}, 9 V_{dc} and 12 V_{dc}.



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}.

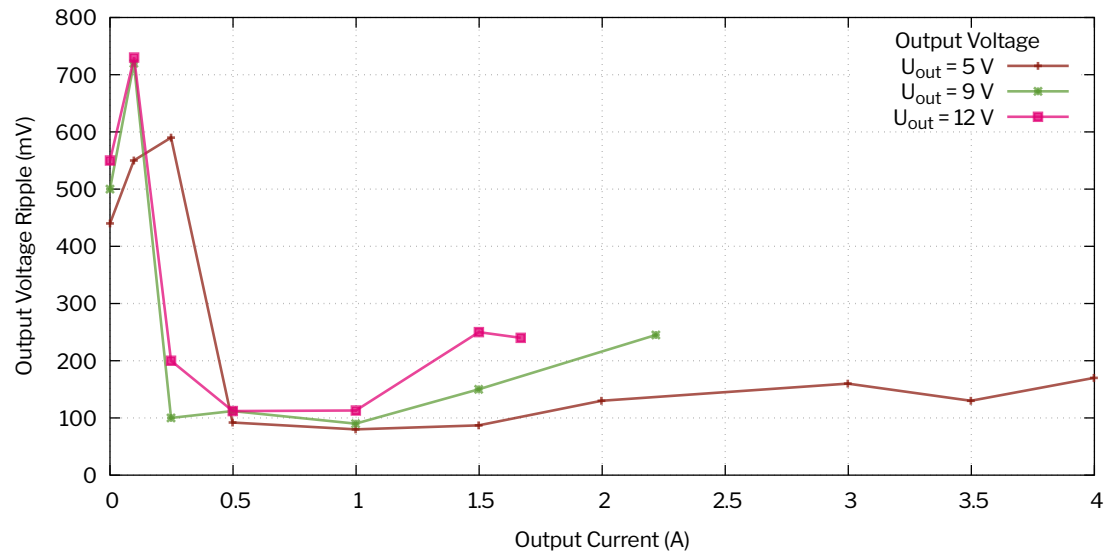


Figure 3: Output voltage ripple over the output current range at 230 V_{ac} input, output set to 5 V_{dc}, 9 V_{dc} and 12 V_{dc}.

4.4 Conversion Efficiency

The conversion efficiency is plotted over the output current range in Figure 4. Figure 5 shows the upper efficiency range enlarged. The voltage levels are set to 5 V_{dc}, 9 V_{dc}, and 12 V_{dc}.

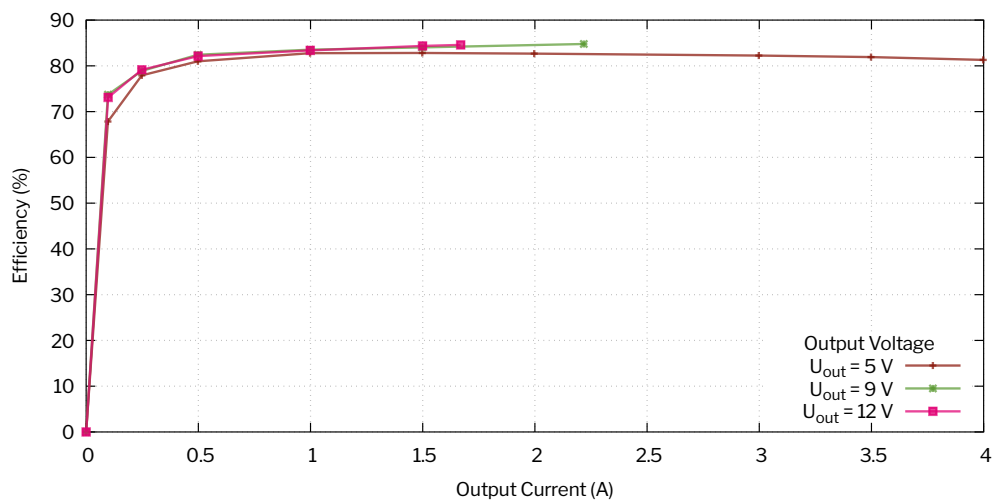


Figure 4: Conversion efficiency versus output current at 230 V_{ac} input.



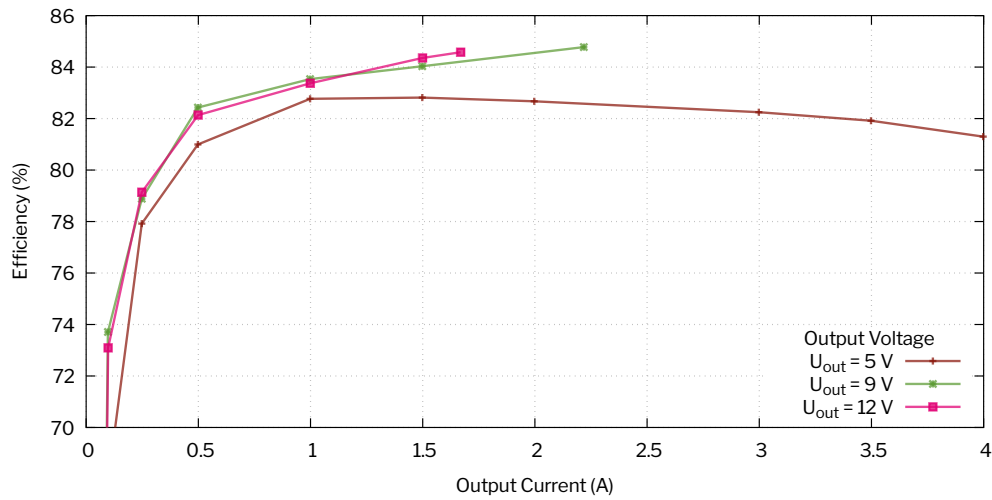


Figure 5: Conversion efficiency versus output current at 230 V_{ac} input, upper range (70 % to 86 %) enlarged.

4.5 Power Losses

The power losses are calculated from the efficiency η measured in Figure 4:

$$P_{\text{loss}} = P_{\text{out}} (1/\eta - 1)$$

They are plotted over the output power in Figure 6. The voltage levels are set to 5 V_{dc}, 9 V_{dc}, and 12 V_{dc}.

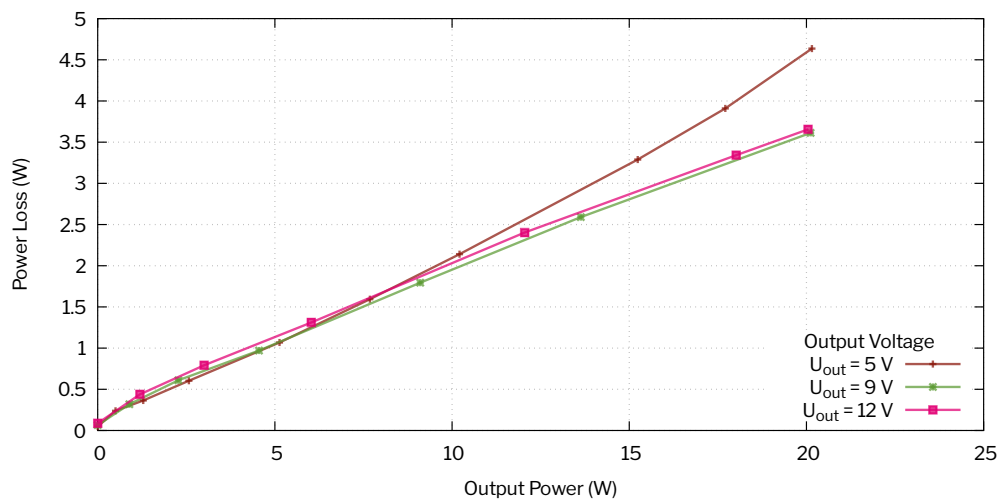


Figure 6: Power losses versus output power at 230 V_{ac} input.



4.6 Input Standby Power

The input standby power at various output voltages is plotted over the input voltage range, as shown in Figure 7.

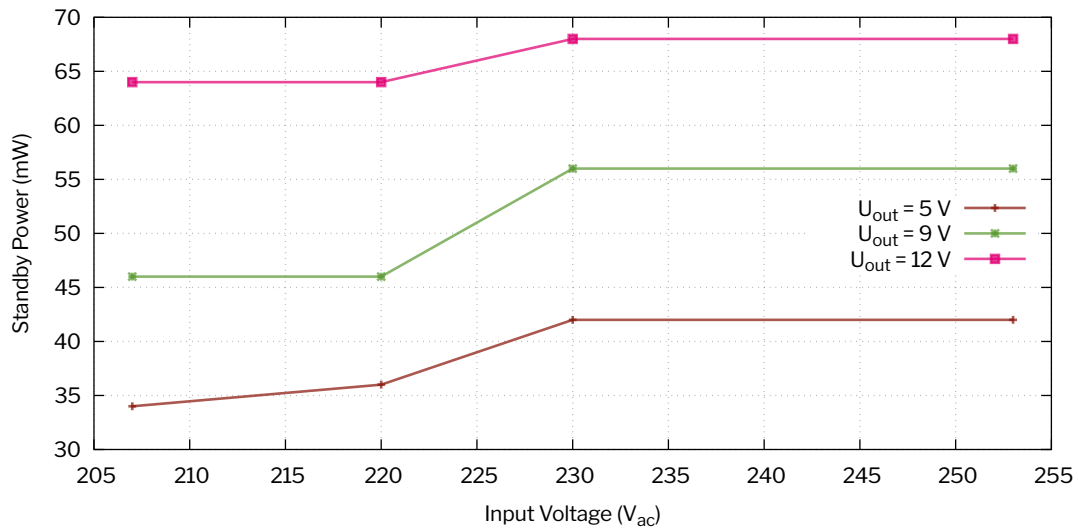


Figure 7: Standby power versus input voltage.



4.7 Step Response

4.7.1 5 V

For the step response measurement at 5 V output voltage, the output current was changed from 0 A to 4 A. The output voltage response is shown in Figure 8. The rise and fall slope of the current was set to 2 A/ms.

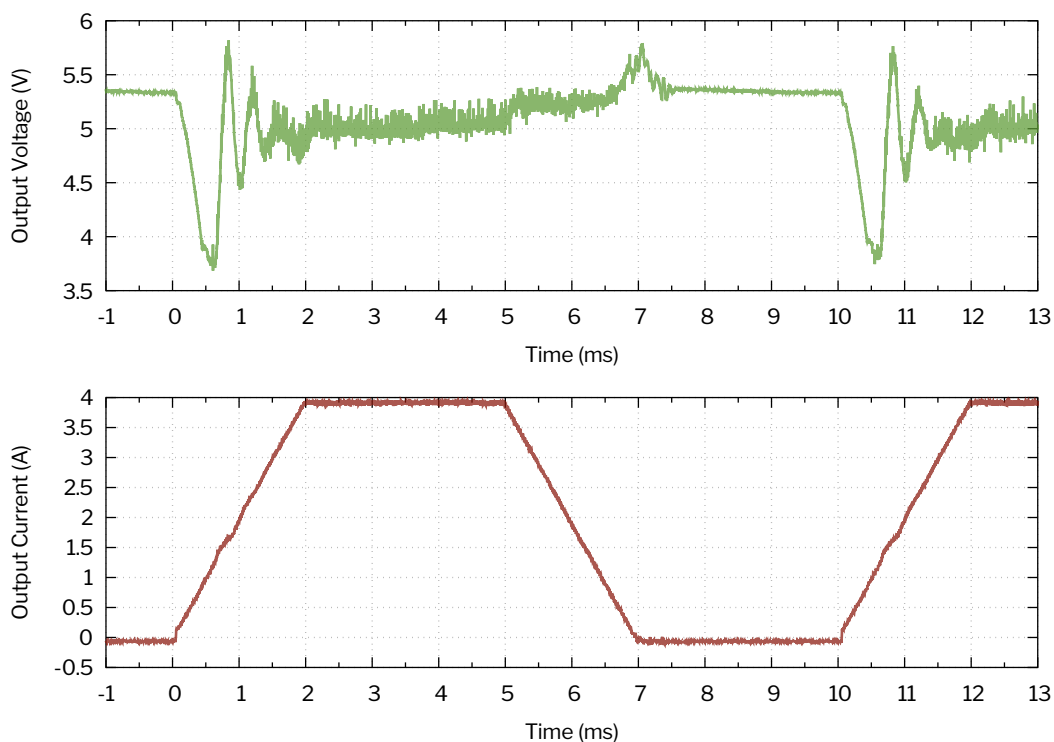


Figure 8: Transient response at $U_{\text{out}} = 5 \text{ V}$.



4.7.2 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 9. The rise and fall slope of the current was set to 2 A/ms.

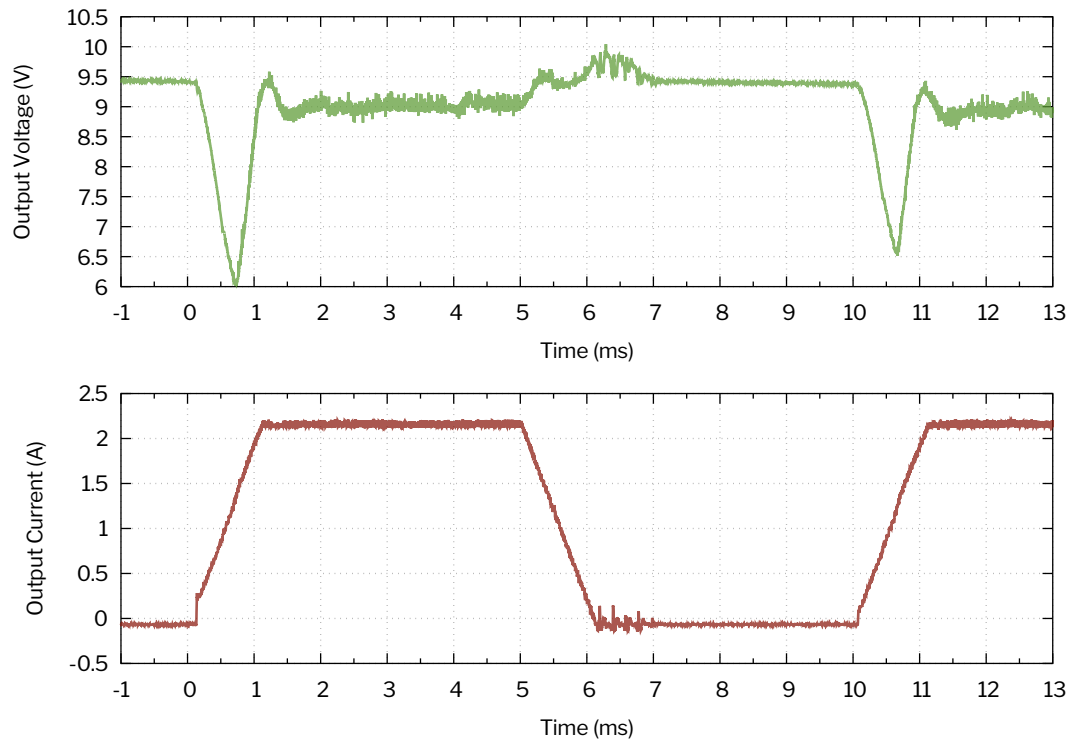


Figure 9: Transient response at $U_{\text{out}} = 9 \text{ V}$.



4.7.3 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 10. The rise and fall slope of the current was set to 2 A/ms.

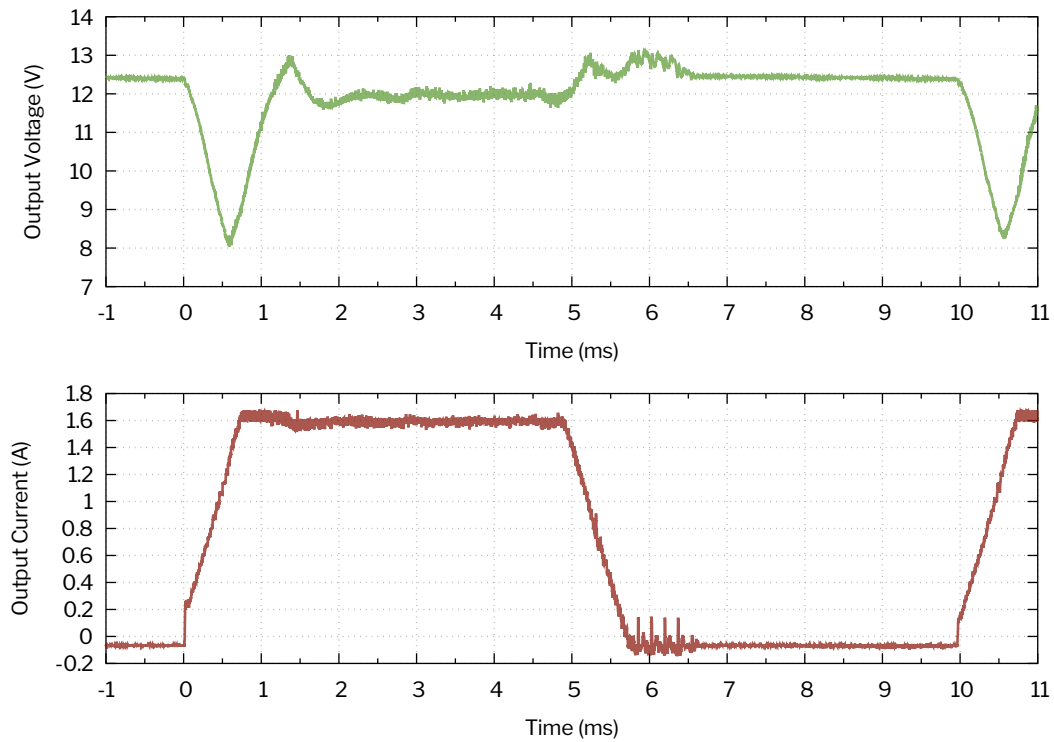


Figure 10: Transient response at $U_{\text{out}} = 12 \text{ V}$.



4.8 Power-On Behavior

The power supply is turned on with a target output voltage ($U_{\text{out,set}}$) of 5 V, 9 V, and 12 V. The normalized output voltage is shown in Figure 11.

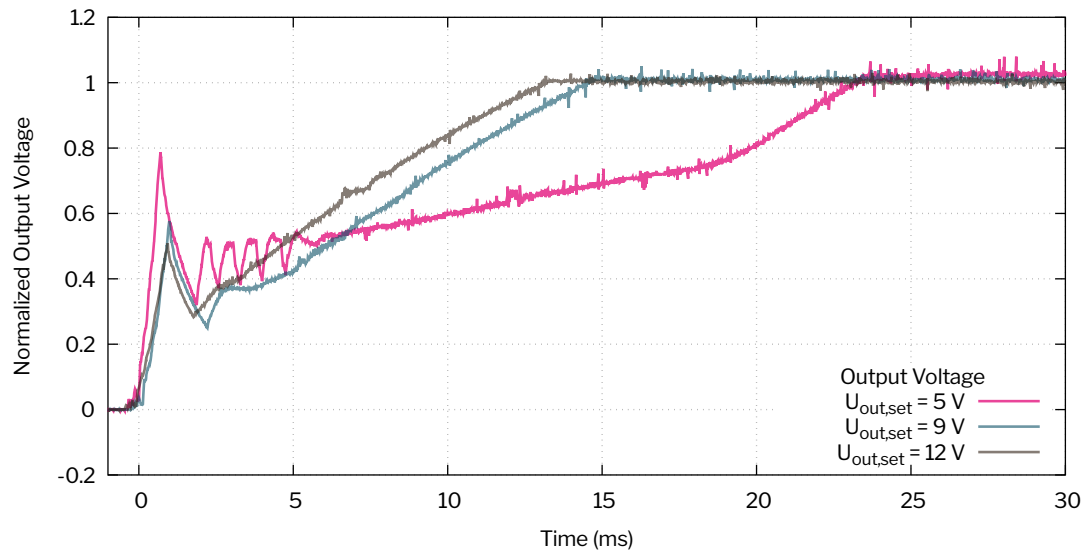


Figure 11: Output voltage of the HDR20-5-12 when the power is turned on.



4.9 Startup

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

4.9.1 5 V

The startup time for $U_{\text{out}} = 5 \text{ V}_{\text{dc}}$ is measured in Figure 12.

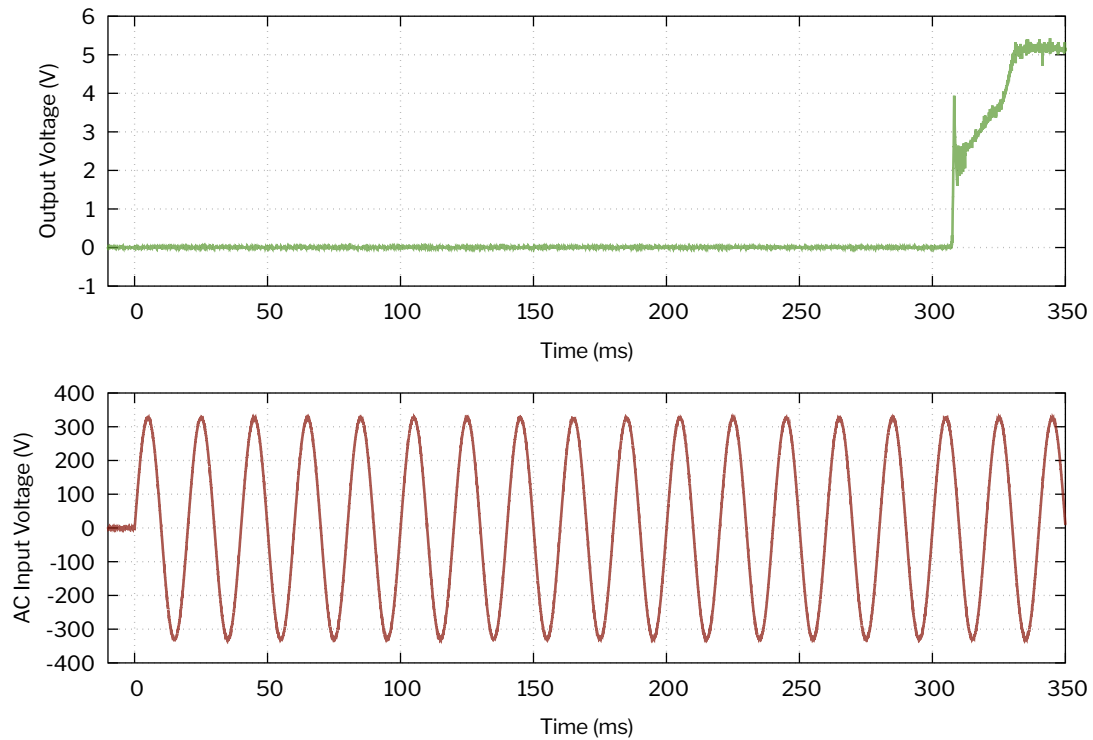


Figure 12: Startup time measurement for $U_{\text{out}} = 5 \text{ V}$.



4.9.2 9 V

The startup time for $U_{\text{out}} = 9 \text{ V}_{\text{dc}}$ is measured in Figure 13.

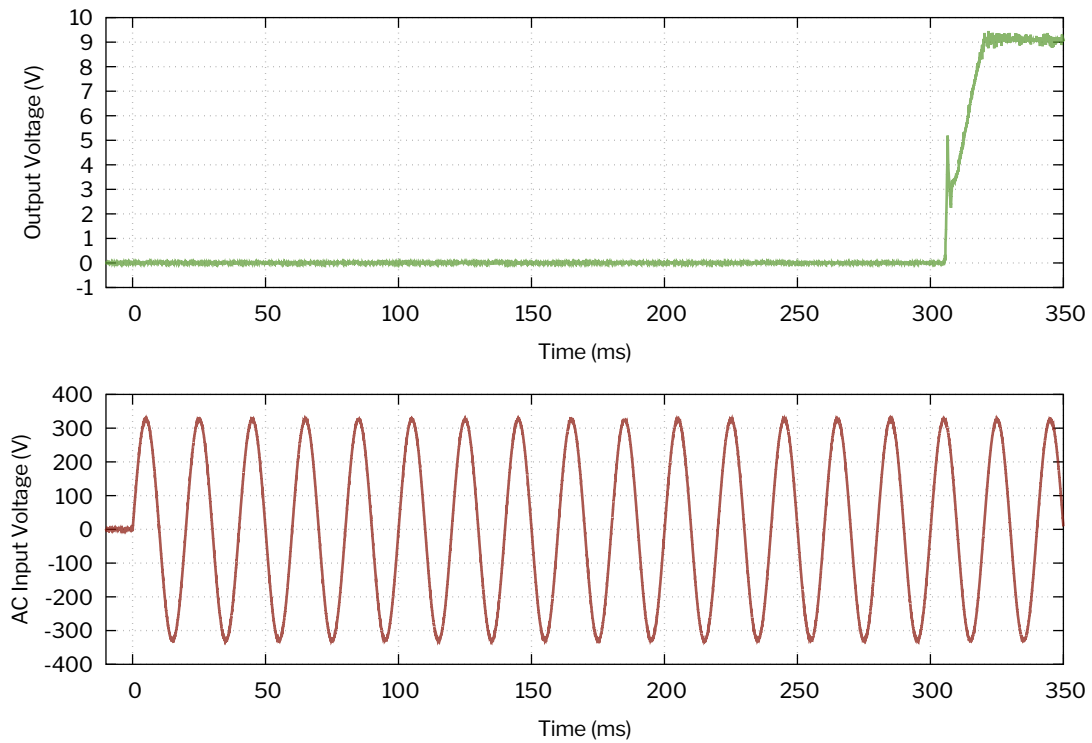


Figure 13: Startup time measurement for $U_{\text{out}} = 9 \text{ V}$.



4.9.3 12 V

The startup time for $U_{\text{out}} = 12 \text{ V}_{\text{dc}}$ is measured in Figure 14.

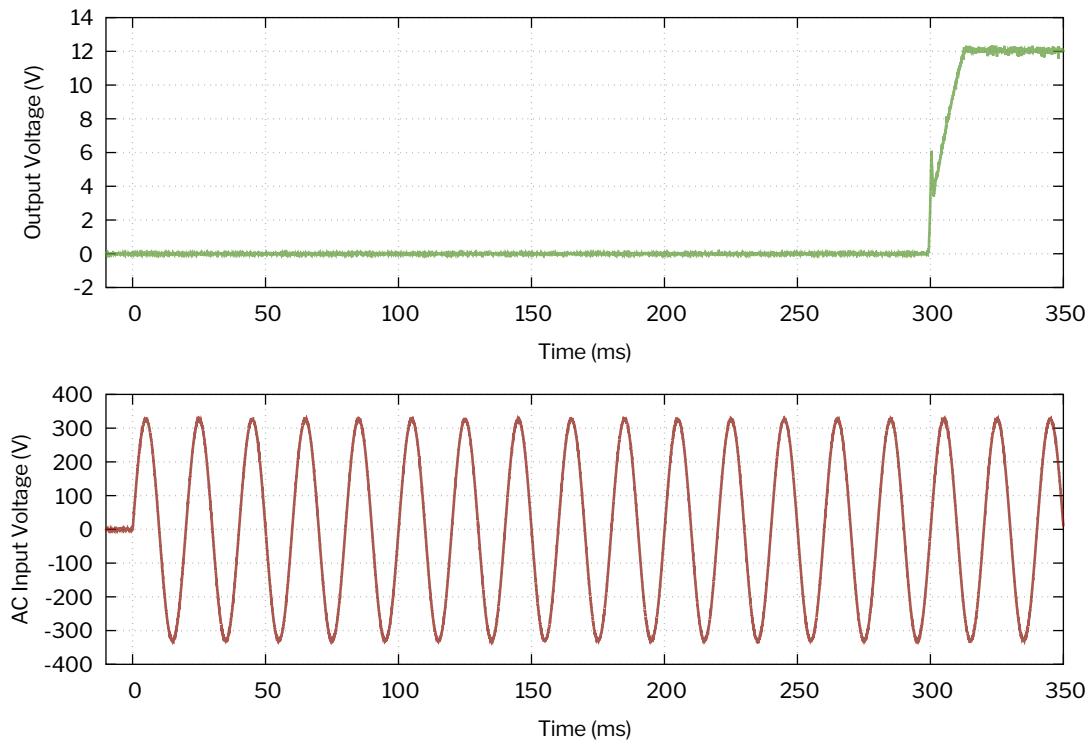


Figure 14: Startup time measurement for $U_{\text{out}} = 12 \text{ V}$.



5 EMC Measurements

The HDR20-5-12 complies with the electromagnetic compatibility (EMC) standards listed on the first page. Conducted emissions are assessed against the EN 55011 / CISPR 11 Class A (industrial) limits. The separate EU Declaration of Conformity is DPS-HDR20-5-12-CE.pdf.

5.1 AC Input

Figure 15 shows the AC input emissions with the average (AVG) and quasi-peak (QP) detectors.

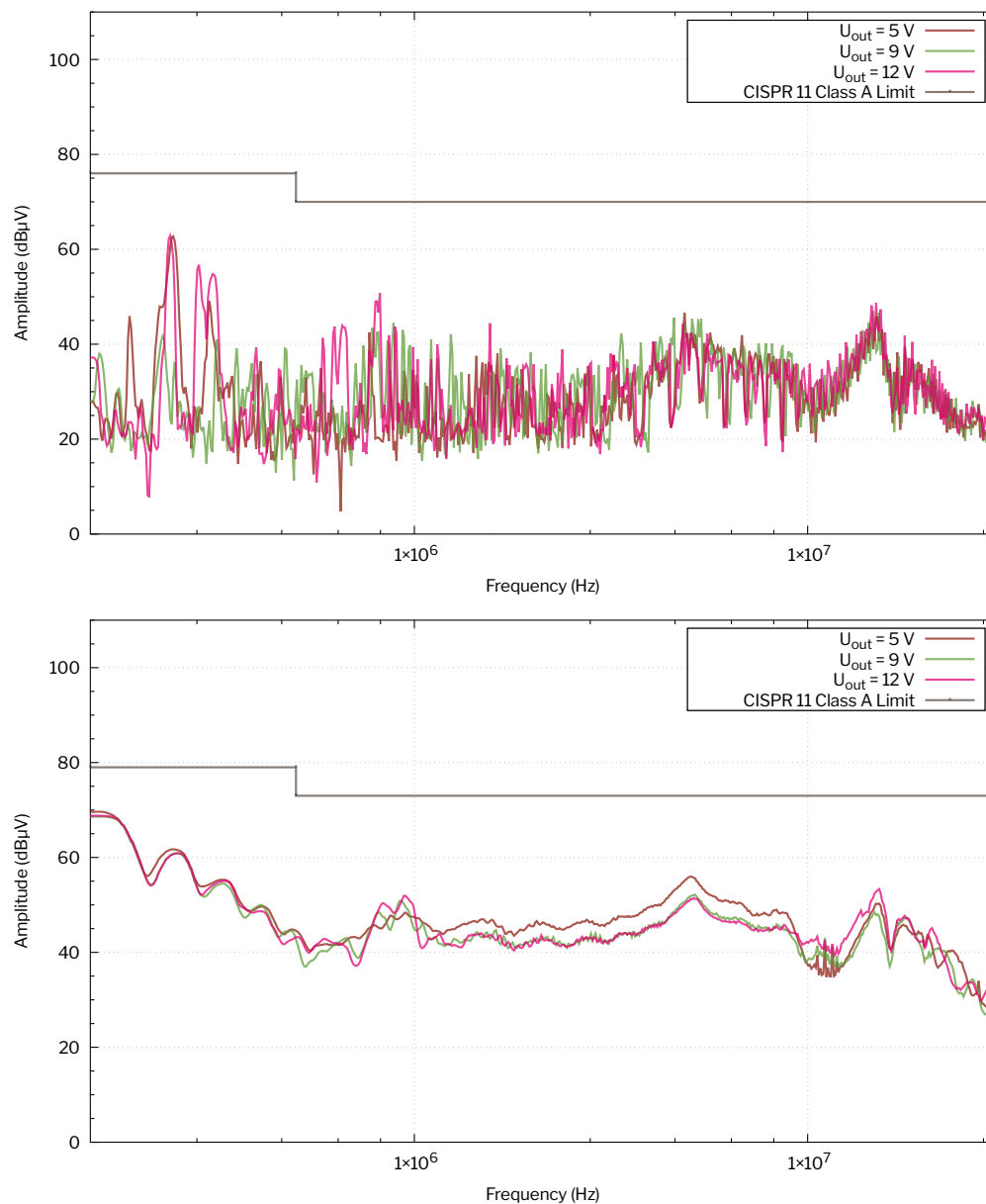


Figure 15: Input EMC emission at 230 V_{ac}, resistive load, rated current. Top: AVG, bottom: QP.



5.2 DC Output

The conducted line emissions at the DC output of the HDR20-5-12, measured with the AVG and QP detectors, are depicted in Figure 16.

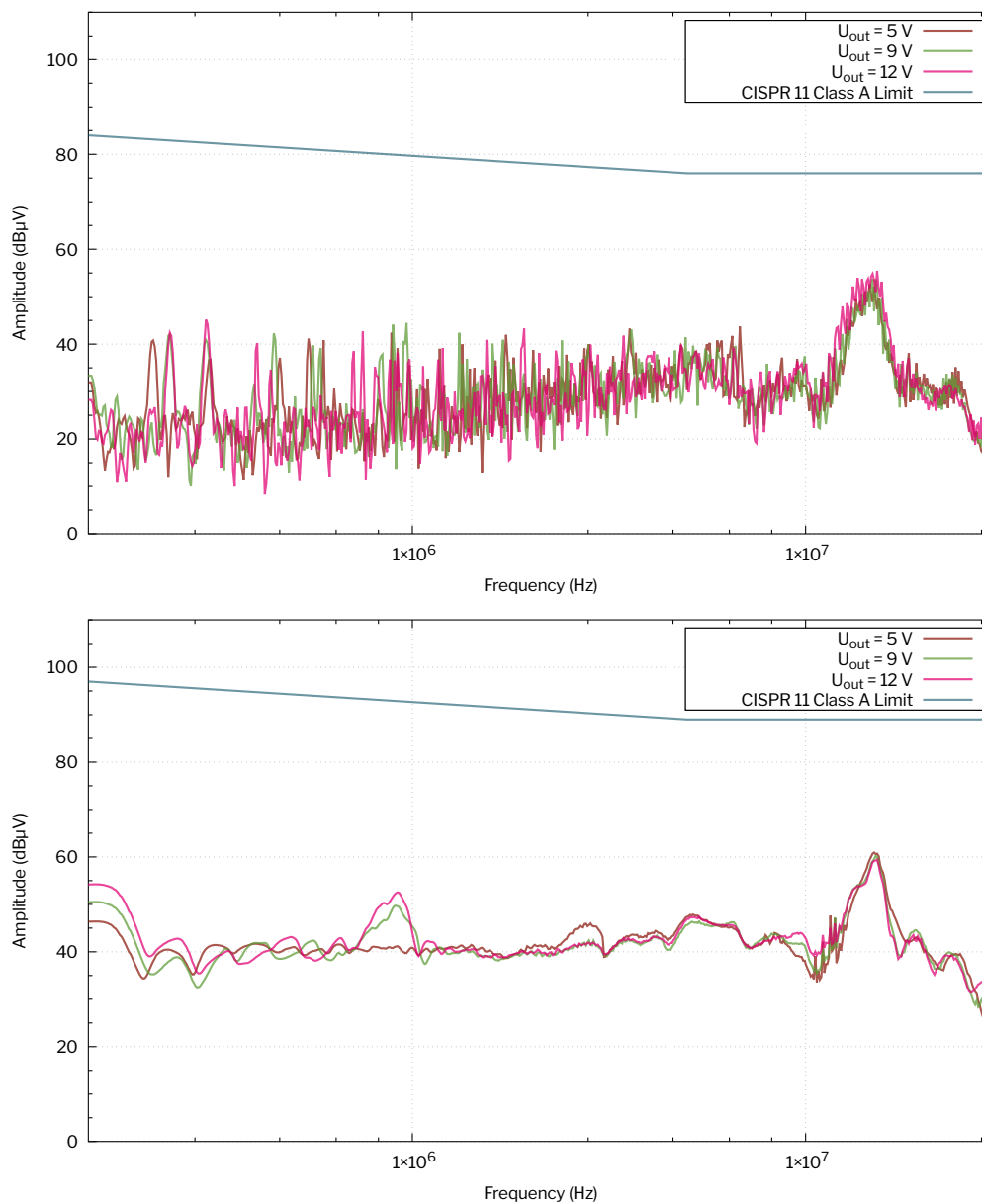


Figure 16: Output EMC emission of the HDR20-5-12. Measured at 230 V_{ac} input with a resistive load at rated output current. Top: AVG, bottom: QP.



6 Case

The case drawing of the HDR20-5-12 is shown in Figure 17.

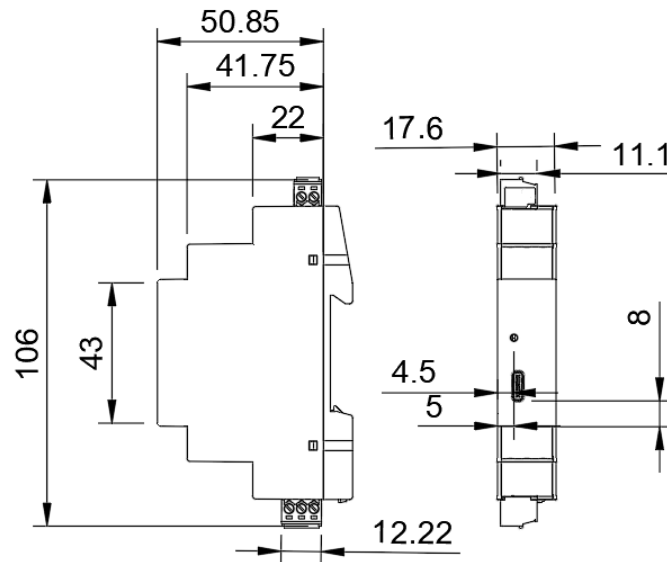


Figure 17: HDR20-5-12 product drawing with dimensions. All dimensions in mm.



7 Product Label

7.1 Revision 1 (current)

The product label of the HDR20-5-12 is depicted in Figure 18. The magenta cutouts show the position of the output voltage selection switch (large) and the LED (small).

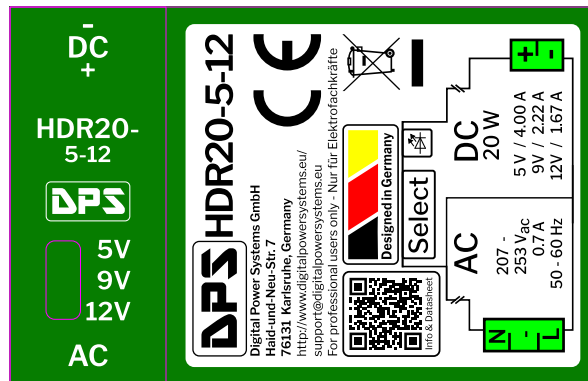


Figure 18: Current revision 1 product label of the HDR20-5-12.





8 Document

8.1 Latest Document Revision

The latest revision is available at <https://digitalpowersystems.eu/hdr20links/>.

8.2 Datasheet Quality

Please send feedback on this datasheet to datasheet@digitalpowersystems.eu or use the contact page: <https://digitalpowersystems.eu/contact-us/>.

8.3 Revision History

The revision history is listed in Table 5.

Date	Changes in Revision
09.05.2025	Initial release.
11.09.2025	EAN updated to GTIN.
31.07.2026	Corrected case dimensions. Added weight, customs data and the EU Declaration of Conformity as a separate document.
23.09.2026	New company address. Specification and functional description extended. Power loss plot added.
24.09.2026	Input current and input frequency added. Standby power range updated. Editorial corrections.

Table 5: Revision history of the HDR20-5-12.

8.4 Contact Information

This is a product of Digital Power Systems GmbH (DPS)
Bruchsaler Str. 18, 68753 Waghäusel-Kirrlach, Germany
HRB 738185 – Amtsgericht Mannheim, Geschäftsführer: Dr. Michael Heidinger
DPS website: digitalpowersystems.eu

