DPA148
1 AS-Interface-Output
DIN Rail Power Supply, 244 Watt

- **High efficiency: 88%**
- **ACin 115/230V manual switch**
- **WxHxD = 120x134x120mm**
- **Integrated data decoupling**
- **Meets EMV standards: EN 50081-1, EN 50082-2, NAMUR, EN 61000-4, VDE 0160/2**
- **Design meets VDE 0551**

Preliminary data sheet — Power Supply DPA148

The DPA148 is a very compact power supply designed for fieldbus applications in which power and data share the same twisted-pair.

The unit supplies power, decouples data from the power supply, and makes the two cables symmetrical with respect to the shield terminal. The decoupling allows the use of unshielded cables.

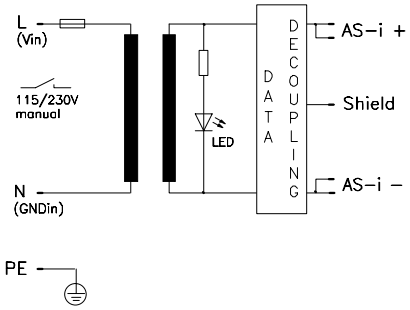
The PELV output circuit has electronic protection against overload and short-circuit. Isolation is equivalent to safety transformers as specified in VDE 0551.

Vout	Iout	Pout	Features	Order-No.
30.55V	**8A**	244W	OVP	**DPA148.141**

Warranty: 2 years from date of delivery.

See the web for current data sheet version:
www.puls.power.de

Schematic



Output

Voltage Vout		30.55V	Fixed.
Accuracy	max.	± 1.05V	includes: production-adjustment, line regulation, and load regulation.
Minimum load		None	Not necessary.
Output power Pout	max.	244W	Mounting side by side possible.
Noise, Ripple	max.	50mVpp	0...20MHz, constant current or R-load.
Modulation voltage	max.	5.6Vrms	Analogous 16Vpp sine.
Over-voltage protection	typ.	35V	Threshold accuracy ± 4%.
Derating		5W/K	+60° bis +70°C Ta.
Operating indicator		1 green LED	On the front.
Output circuit		PELV	VDE 0106.
Safety			VDE 0106, EN 60 950, VDE 0805.

The output is protected against open-circuit, short-circuit, and overload.

Input

Line input 1		100...127V AC	Switch position 115V.
· Range		88...132V AC	Full spec.
		80...150V AC	Derated, see page 2.
Line input 2		220...240V AC	Switch position 230V.
· Range		187...264V AC	Full spec.
		150...300V AC	Derated, see page 2.
Line frequency		47...63Hz	DC or 400Hz, see page 2.
Input current	max.	6.0Aeff. / 2.8Aeff.	@ 115 / 230V AC.
Noise suppression		EN 55 022/B	

Mechanical:	Al/Mg alloy housing, snap-on mounting for DIN rail TS35/7.5 (EN 55022), WxHxD =120 x 134 x 120mm, the depth includes the DIN-rail mounting, see page 4.
Weight:	App. 1200g
Screw terminals:	Input 1 terminal, max. 2.5/4mm^2 Output 2 terminals, each max. 2.5/4mm^2, see page 4

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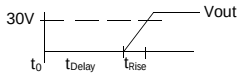
Output (continued)

Voltage regulation:					
· Line regulation		max.	%	± 0.2	88...132V AC / 187...264V AC, Iout = 8A.
· Load regulation stat.	ΔU_{stat}	max.	%	± 0.75	Iout = 50%, D Iout = ±50%.
· Temperature coefficient		typ.	%/K	± 0.02	
Ripple		max.	mVpp	50	0...20MHz, @ ACnom, Iout = 100%, R or I-load.
Current limitation					
· Threshold		min/max.	A	8.4/ 11.0	Fixed, 29V Z-load.
· Characteristic				See graph on page 3	
· Short-circuit		max.	A	25	
Start delay	t_{Delay}	typ.	s	1	After switch on.
Vout rise-up time	t_{Rise}	typ.	ms	100	Load 8A and C-load 15mF.
On and off characteristic					Approximately monotonic.



Input (continued)

AC input range 1 / 2	V AC	88...132 / 187...264	Full spec.
DC input range	V DC	250...300	Full spec.
Derated AC range 1 / 2	V AC	80...88 / 150...187, 150 / 300 for 0.5s	
Derated DC range	V DC	200...250	Power derating typ. 20%.
	V DC	300...370	Full spec, but air- and leakage distances not longer than stated in VDE 0805.
Frequency range	Hz	47...63	Full spec.
Derated frequency range	Hz	63...400	Increased leakage currents.
In-rush current	max. A	50	@ cold-start and 264V AC, NAMUR standard met (Ta = 25° C).
Hold-up time	min. ms	—	@ 88V AC, Iout = 8A.
	min. ms	20	@ 187V AC, Iout = 8A.
Power factor λ	typ.	0.6	@ 88V AC, Iout = 8A.
Internal fuse		5x20mm T8A/250V (IEC127/2-5)	To replace, see page 4.
Input range selection		Manual (230V AC set at factory)	115/230V switch, position in the unit.

Data Decoupling / Earth Symmetrization

According to AS-Interface-specifications

Output inductance	100µH ± 10%	Meassured between AS-i + und AS-i – .
Terminating impedance	2 x 39Ω ± 1%	As above.
Symmetry tolerance	± 1%	AS-i + / AS-i – to shield.
Electric strength	500V	As above.

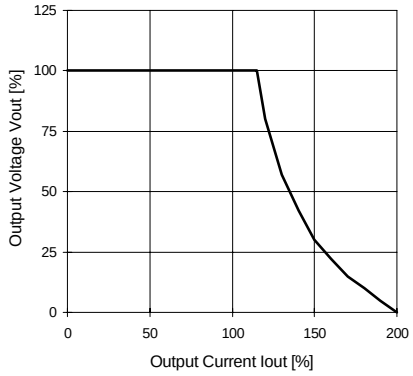
Electromagnetic Compatibility

Emissions according to EN 50081-1		EN 50081-2 is also satisfied.
· Radio interference, EN 55011, EN 55022	Class B	
Immunity according to EN 50082-2	No degradation of performance	EN 50082-1 is also satisfied.
· Electrostatic discharge ESD EN 61000-4-2	8kV direct discharge (level 4)	
	15kV air discharge (level 4)	
· Radiated fields, EN 61000-4-3	10V/m (level 3)	80MHz...1000MHz, ACin and Vout lines: l = 1m.
· Fast transients, EN 61000-4-4	4kV (level 4)	Coupled to ACin line.
	2kV (level 3)	Coupled to DCout line.
· Surge transients EN 61000-4-5	4kV (isolation class 4)	Common mode, unit on.
	2kV (isolation class 4)	Differential mode, unit on.
· Conducted disturb., EN 61000-4-6	10V (level 3)	150kHz...80MHz.
Immunity according to further standards		
· Transient voltage, IEC 255	5kV	Common mode, unit off.
· NAMUR-prescription	Satisfied	
· Transient resistance, VDE 0160 §5.3.1.1.2	750V / 1.3ms (class 2)	Valid for total load range.
· Over-voltage resistance (PULS standard)	150 / 300V AC / 0.5s	Switch position 115 / 230V AC.

Protection

Unit protection			
· Overload		Yes	See current limit.
· Short-circuit proof		Yes	Automatic voltage recovery.
· Open-circuit proof		Yes	
· Over-temperature (OTP)		—	
· Reverse battery prot.		Yes	
· ACin range selection		Manual	Switch for 115/230V AC.
Load protection			
· Over-voltage (OVP)		Yes	
Threshold	typ.	35V	
Accuracy	max.	± 4%	
Method		—	Independent second regulator.

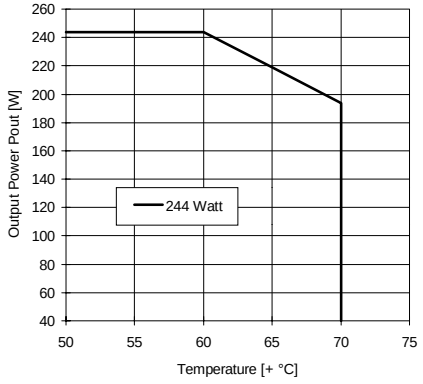
Typ. Output Characteristic



Safety

Electrical safety			
· Test voltage		3kV AC	Primary / secondary.
according to EN 60 950		2.5kV AC	Primary / PE.
for t = 2sec		500V AC	Secondary / PE.
· Air- and leakage distance		6.4 / 8mm	Primary / secondary.
		4mm	Primary / PE.
· Isolation resistance	min.	5MΩ	VDE 0551.
· Protection class		I	VDE 0106 part 1, IEC 536.
· PE resistance		< 0.1Ω	VDE 0805.
· Protection system		IP20	DIN 40050, IEC 529.
· Leakage current	max.	0.75mA	EN 60 950 (50Hz line frequency).
· Output circuit		PELV	VDE 0160.
· Over-voltage class		II	VDE 0110 part 1, IEC 664.
Touch safety		Finger test	VDE 0100 §6, EN 60 950, VBG4.
Penetration protection		> ∅ 3mm	e.g. screws, small parts etc.

Typ. Derating over Temperature



Operation and Ambient Area

Application class		KSF	DIN 40040.
Operation temperature	max.	–10° ... +70°C	Ta (measured at 1cm distance).
· Derated range		+60° ... +70°C	Derating, see diagram.
Storage temperature	typ.	–20° ... +100°C	Ta.
Humidity	max.	95%	Non-condensing.
Mechanical usage		Vertical	See page 4.
· Lateral spacing		None	No gap needed.
Cooling		Normal convection	Don't obstruct air flow.
Dirt protection level	max.	2	VDE 0110 part 1.
Vibration		0.075mm	IEC 68-2-6 (10...60Hz).
Shock		11ms / 15g	IEC 68-2-27 (3 shocks).
Operation height	max.	2,000m	Above sea level.

Efficiency

DPA.141	typ.	88%	@ 230V ACin, Iout = 100%.

Reliability and Lifetime

MTBF according to Siemens			
standard SN29500	typ.	200,000h	230VAC, Iout = 100%, +40°C Ta.
Only long life (> 2,000h @105° C) electrolytic capacitors are used.			
Function test		100%	Test certificate enclosed.
Run-in (burn-in)		24h	Full load, Ta = +60° C, on/off cycle.

This technical information is valid for +25° C ambient temperature and 5 min. run in time, unless otherwise stated.

Fuse

The PSU has electronic protection against external short-circuits. In case of an internal defect, a fuse disconnects the unit. It can only be replaced by opening the unit which should be done by the supplier.

Installation for Operating

Install DIN rail TS35/7.5 horizontally, ensuring correct orientation.
For other installation considerations consult your representative. Ensure free air flow.

Dimensions and Connections

Fully enclosed Al/Mg alloy housing. All mechanical dimensions are in mm.

1) Do not remove PE screws.

The shield terminal should be connected to earth or to the shield of the load cable.

Screw terminals:
On the front side. These accept wire of up to 4mm^2 cross section (single-core cable) or 2.5mm^2 cross section (multi-core flex).
Remove 9 to 15mm of insulation from wire.
Take care of standards which must be satisfied, e.g. VDE 0100 or EN 60 950.

Caution:
Do not remove any screws on box, as internal safety connections could be disconnected!

Operation without AS-Interface

When operating without AS-Interface (e.g. in a lab. test) you should connect a 470µF capacitor between AS-i + and AS-i –, because commercial lab-loads often tend to oscillate. They may resonate with the data decoupling, and the oscillations may exceed the permitted modulation voltage.

Modifications (contact supplier)

Other output voltages,
OEM-versions.

Schematic