DP157
1 Output
DIN Rail Power Supply, 240 Watt

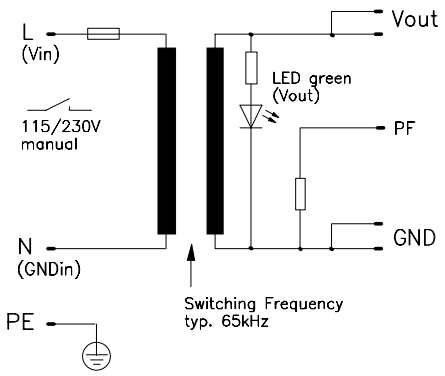
- **High efficiency: 88%**
- **ACin 115/230V manual switch**
- **WxHxD = 160x130x100mm**
- **Short-circuit protected**
- **Power Fail signal**
- **Meets EMV standards EN 50081-1 (EN 55022/B), EN 50082-2, EN 61000-4 and NAMUR**
- **Design meets VDE 0551**

Power Supply DP157

The DP157 is a compact and economical solution for supplying electronic controllers, sensors, actuators and other loads in industrial plants and environments. Output is stable over the total load range, with excellent ripple and noise values of < 25mVpp. Low weight and small size allow quick installation on DIN rails (TS35). In complex systems, the Power Fail signal can be very useful to start a controlled shut down process.

Changes of line voltage and other disturbances (according to EN 61000-4), and VDE 0160 pulses - class 2 for total load range!) are filtered and regulated by the power supply. The unit is also protected against overvoltage and short-circuits. Isolation is equivalent to safety transformers according to VDE 0551, and meets VBG 4.

Schematic:



Vout	Iout	Pout	Features	Order-No.
24V	**10A**	240W	PF, OVP	**DP157.132**

Warranty: 2 years from date of delivery.

Output

Voltage Vout			Fixed.
Accuracy	max.	± 2%	Includes: production-adjustment, line regulation, and load regulation.
Sense lines		None	Not available.
Minimum load		None	Not necessary.
Output power Pout	max.	240W	Mounting with 8mm lat. spacing.
	max.	192W	Mounting side by side.
Noise, Ripple	max.	25mVpp	20Hz...200kHz.
incl. spikes	max.	30mVpp	20Hz...20MHz.
Over-voltage protection	typ.	29.0V	Threshold accuracy ± 4%.
Derating		5W/K	+60° to +70°C Ta.
Operating indicator		1 green LED	On the front.
Isolation Vout to Vin		SELV	EN 60 950, VDE 0805.

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

Input

Line input AC 1		100...127V AC	Switch position 115V.
· Range		88...132V AC	Full spec.
		80...150V AC	Derated, see page 2.
Line input AC 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 rms.	max.	6.0Aeff. / 2.8Aeff.	@ 115 / 230V AC.
Noise suppression		EN 55 022/B	10kHz...30MHz, conducted.

Mechanical:	Al/Mg alloy housing, snap-on mounting for DIN rail TS35/7.5 (EN 50 022), WxHxD = 160 x 130 x 100mm, the depth includes the DIN-rail mounting, see page 4.
Weight:	App. 1100g
Screw terminals:	Input 1 terminal, max. 2.5/4mm^2, output 2 terminals, each max. 2.5/4mm^2, power fail 2 terminals, each max. 2.5/4mm^2, see page 4.

Specifications are valid at 230V AC, unless otherwise stated. They are subject to change without prior notice.

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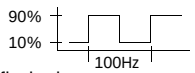
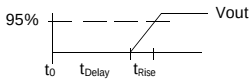
Output (continued)

				DP157.132	
Voltage regulation:					
· Line regulation		max.	%	± 0.2	88...132V AC / 187...264V AC, Iout = 100%.
· Load regulation stat.	ΔU_{stat}	max.	%	± 0.2	Iout = 50%, D Iout = ±50%.
· Load regulation dyn.	ΔU_{dyn}	max.	%	± 1	D Iout = 10%...90%...10%, rise time dt = typ. 20µs.
Response time	t_s	max.	µs	800	Till ΔVout is within < 0.5% of final value.
· Temperature coefficient		typ.	%/K	± 0.01	
Ripple		max.	mVpp	25	20Hz...200kHz, @AC nom, Iout = 100%.
· incl. spikes		max.	mVpp	30	20Hz...20MHz, @AC nom, Iout = 100%.
Current limitation					
· Threshold		min/max.	A	105% ... 120% of Iout	Fixed.
· Characteristic				See graph on page 3	
· Short-circuit		max.	A	180% of Iout	
Start delay	t_{Delay}	typ.	ms	50	After switch on.
Vout rise-up time	t_{Rise}	typ.	ms	35	
On and off characteristic					Approximately monotonic.
Power back immunity	U_{Back}	max.	V	28	Unit off/on.





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	176...250	Power derating typ. 20% (no start below 196V).
			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	Wait min. 30s before switching on again (cold-start), NAMUR standard met (Ta = 25° C).
Hold-up time		min.	ms	18	@ 88V AC, Iout = 100%.
		min.	ms	25	@ 187V AC, Iout = 100%, see figure on page 3.
Power factor	λ	typ.		0.67	@ 88V AC, Iout = 100%.
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 see page 4.

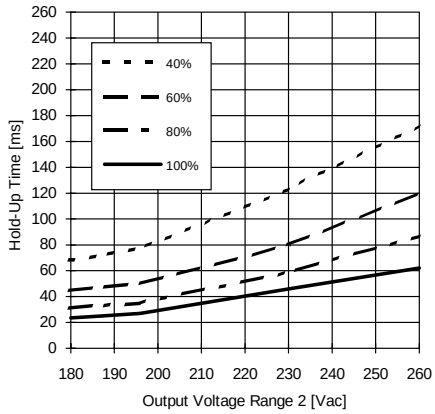
Logic Functions

Power Fail signal PF				Open-collector	I_{max} = 5mA.
· PF high if				ACin > 83/160V AC	
Hold-up time					@ 187V AC, Iout = 100%, Vout ≥ 0.95Vnom.
· from power failure to PF-signal		min.	ms	15	
· from PF-signal		min.	ms	5	

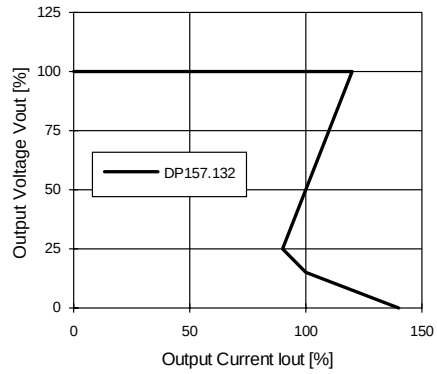
Electromagnetic Compatibility

Emissions according to EN 50081-1			EN 50081-2 is also satisfied
· Radio interference, EN 55011, EN 55022		Class B	For conducted emissions, 10kHz...30MHz,
		Class A	for radiated emissions, 30MHz...1000MHz,
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, Vout and signal lines: l = 1m.
· Fast transients, EN 61000-4-4		4kV (level 4)	Coupled to ACin line.
		2kV level 3)	Coupled to DCout line.
		2kV (level 4) cap. coupling	Coupled to Vout and signal lines.
· Surge transients, EN 61000-4-5		4kV (isolation class 4)	Common mode, unit on.
		2kV (isolation class 4)	Differential mode, unit on.
· Conducted disturb., ENV 50141 (draft of IEC 801-6)		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.

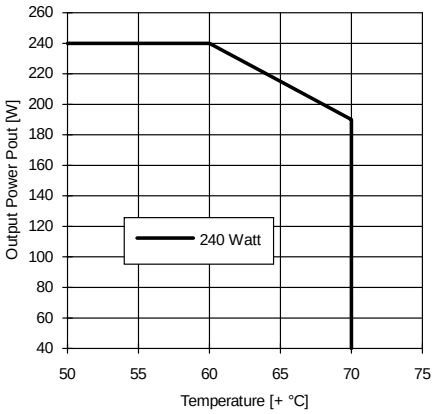
Minimum Hold-Up Time



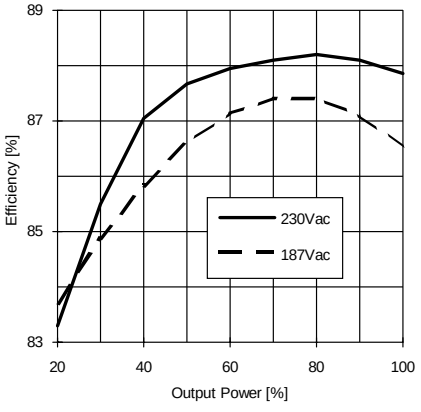
Typ. Output Characteristic



Typ. Derating over Temperature



Typ. Efficiency



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.	29.0V	
Accuracy	max.	± 4%	
Method		—	Independent second regulator.

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 (47...63Hz line) .
· Safe low voltage		SELV	EN 60 950, VDE 0805, 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.

Operation and Ambient Area

Application class		KSF	DIN 40040.
Operation temperature	max.	0° ... +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		0mm / 8mm	For 192W / 240W operation.
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 and Power Loss

DP157.132	typ.	88% / 33W	@ 230V ACin, Iout = 100%.

Reliability and Lifetime

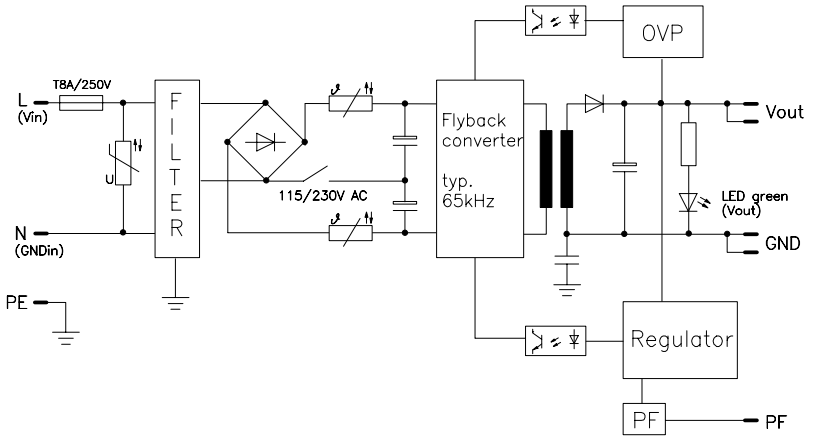
MTBF according to Siemens			
standard SN29500	typ.	300,000h	230VAC, Iout = 100%, +40°C Ta.
Only long life (> 2,000h @105° C) electrolytic capacitors are used.			
Function test		100%	Test certificate enclosed.
In-circuit test		Yes	
Run-in (burn-in)		24h	Full load, Ta = +60° C, on/off cycle.

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.

Schematic



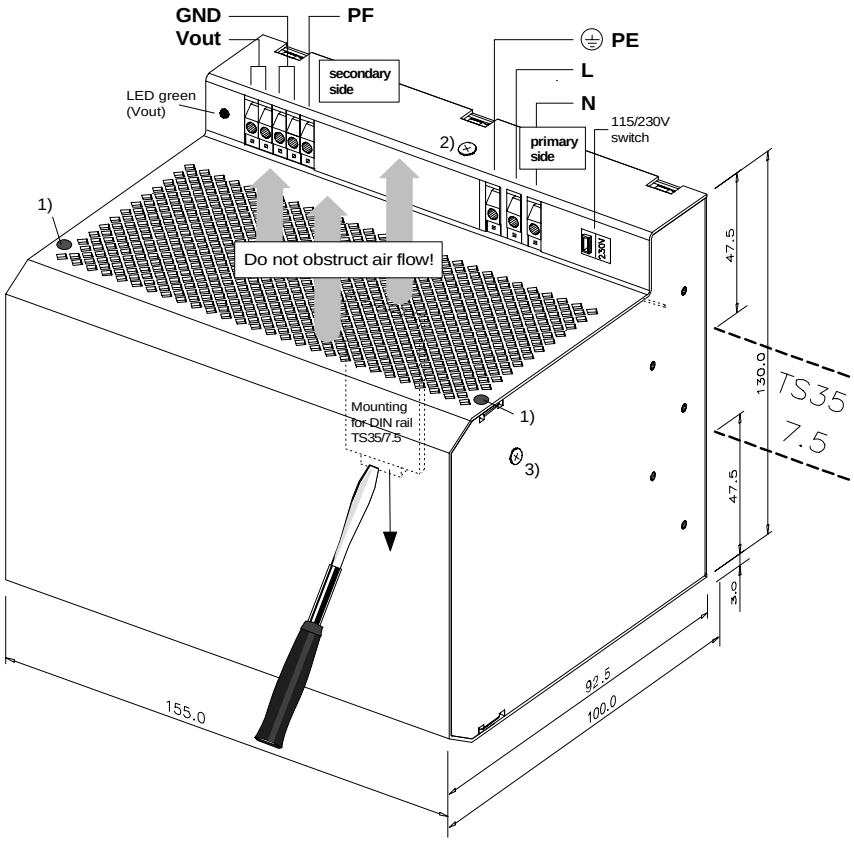
Installation for Operating

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) The height of the plastic studs is 3.5mm total for top and bottom.
2) Do not remove PE screw.
3) The height of this screw head is max. 2.5mm (both sides of the unit).



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 60950.

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

Modifications (contact supplier)

Other DC input ranges.
Other output voltages.
Lower cost versions.