AP136
1 Output
19" Power Supply, 50 Watt

PULS AP136

- **High efficiency: 80%**
- **ACin wide range: 88...265V AC**
  DCin wide range: 105...300V DC
- **8 HP plug in width**
- **H15 standard pinout**
- **Meets EMC standards**
  EN 50081-1 (EN 55 022/B), EN 50082-2, VDE 0160/1, EN 61000-4, NAMUR

EN 60 950

Data sheet — Power Supply AP136

This single-output power supply uses a bridge-mode wide-range converter. It operates with high efficiency over the total input and output range.

It can handle a wide input range (100 - 240V AC) without switch over. Hold-up time is >200ms at 230V AC.

EMC compatibilty is a major feature. It has low spurious noise with noise suppression class B. Noise immunity meets EN 61000-4 and VDE 0160 class 1, even at full load.

Over-voltage and over-temperature protection avoid problems even in extreme working environments.

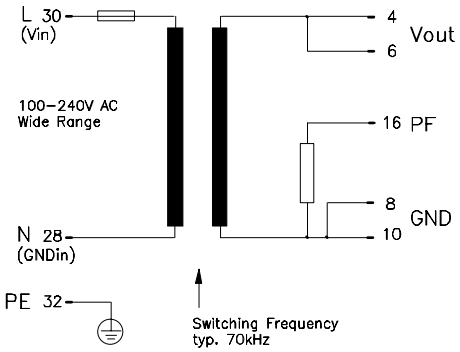
Vout	Iout	Pout	Features	Order-No.
5.15V	**10A**	50W	Wide input range, PF, OTP, OVP	**AP136.105**

"**F**" appended to Order-No. means: 8HP front panel included and fitted.

Accessories: H15 connector, 6.3mm flat contacts: **ZP100**
H15 connector with soldering pins: **ZP120**

Warranty: 2 years from date of delivery.

Schematic:



Output

Voltage Vout			Fixed.
Accuracy	max.	± 0.5%	Tuning tolerance.
Sense lines		None	Not available.
Minimum load		None	Not necessary.
Output power Pout	max.	50W	
Noise, Ripple	max.	20mVpp	20Hz...200kHz.
including spikes	max.	20mVpp	20Hz...20MHz.
Over-voltage protection	typ.	6.2V for Vout	Threshold accuracy ± 8%.
Derating		1.2W/K	+55°C 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.

Mechanical: 8HP/3U board (DIN 41494),
Al/Mg alloy cover for component side,
plastic cover for bottom side,
LxWxH = 171.93 x 40.64 x 110mm (100),
the length includes the connector, see page 4.

Weight: App. 400g

Connector: H15 (DIN 41612), coding option,
max. load per pin 11A @70° C.

Input

Line input AC		100...240V AC	Wide-range converter.
· Range		88...265V AC	Full spec.
Line input DC		275V DC	Wide-range converter.
· Range		105...300V DC	Full spec.
Line frequency		47...63Hz	DC or 400Hz, see page 2.
Input current	max.	1.5A	@ 88V AC.
Noise suppression		EN 55 022/B	10kHz...30MHz, conducted.

PULS Munich
Tel.: +49 (0)89 / 92 78-2 44
Page 1 / AP136_06.Mar.98
Arabellastraße 15
D- 81925 München
Fax: +49 (0)89 / 92 78-1 99

Output (continued)

				5.15V	
Voltage regulation:					
· Line regulation		max.	%	0.15	88...265V AC.
· Load regulation stat.	ΔU_{stat}	max.	%	± 0.8	Open-circuit to full load.
· Load regulation dyn.	ΔU_{dyn}	max.	%	± 7	10%...90%...10% load change.
Response time	t_s	max.	ms	5	Till ΔVout is within < 0.5% of final value.
· Temperature coefficient		typ.	%/K	± 0.015	
Ripple		max.	mVpp	20	20Hz...200kHz, @ ACnom, Iout = 100%.
· incl. spikes		max.	mVpp	20	20Hz...20MHz, @ ACnom, Iout = 100%.
Current limitation					
· Threshold		typ.	W	60	Fixed.
· Short-circuit		max.	A	22	No foldback till Vout1=3V, below that periodic restarts.
Start delay	t_{Delay}	typ.	s	1.2	After switch on.
Vout rise-up time	t_{Rise}	typ.	ms	35	
On and off characteristic				No overshoot	Approximately monotonic.
Load capacity		max.	µF	20,000	Do not exceed for safe start up.

Input (continued)

AC input range		V AC	88...265	Full spec.
DC input range		V DC	105...300	Full spec.
Derated DC range		V DC	75...105	Different values for hold-up time, input current, ripple, Pout; for details contact supplier (no start below 105V).
		V DC	300...380	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	Increase leakage currents.
In-rush current	max.	A	20	at cold-start, wait min. 30s before switching on again NAMUR standard met (Ta = 25° C).
Hold-up time	min.	ms	200	@ 230V AC, Iout = 100%, see graph on page 3.
	min.	ms	15	@ 88V AC, Iout = 100%, see graph on page 3.
Internal fuse			5x20mm T3.15A/250V	In the L line, as per IEC127/2-5. To replace, see page 4.
Input range selection			Wide range	

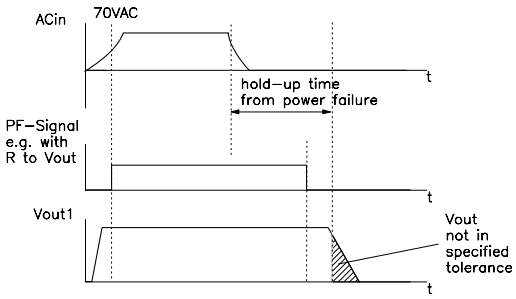
Logic Functions

Power Fail signal PF				Power fail	Open-collector signal (U_{max} = 30V, I_{max} = 5mA).
· PF high if				ACin > 70V AC	Open-collector.
Hold-up time					
· from Power failure to PF-signal	min.	ms	220		@ 230V ACin.
	min.	ms	35		@ 110V ACin.
	min.	ms	12		@ 88V ACin.
· from PF-signal	min.	ms	5		Iout = 10A, Vout ≥ 4.75V.

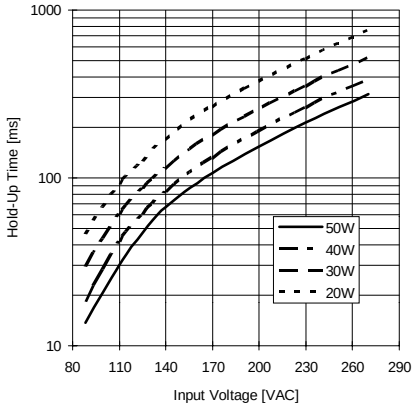
Electromagnetic Compatibility

Emissions according to EN 50081-1		EN 50081-2 is also fulfilled
· Radio interference, EN 55011, EN 55022	Class B	Conducted 10kHz...30MHz.
Immunity according to EN 50082-2		EN 50082-2 is also fulfilled
· 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)	To ACin, Vout and signal lines: length = 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.
· Transient voltage, IEC 255	5kV	Common mode, unit off.
· NAMUR-prescription	Satisfied	
· Transient resistance, VDE 0160 §5.3.1.1.2	750V / 0.3ms (class 1)	Valid for total load range.
· Over-voltage resistance (PULS standard)	300V AC / 0.5s	

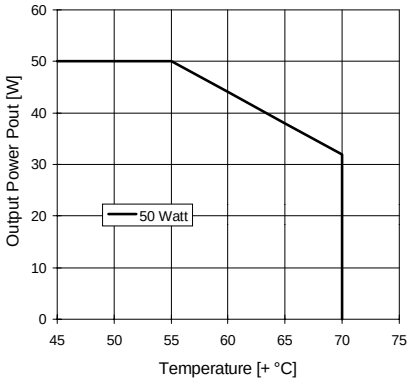
PF-Signal, PG-Signal and Hold-Up Time



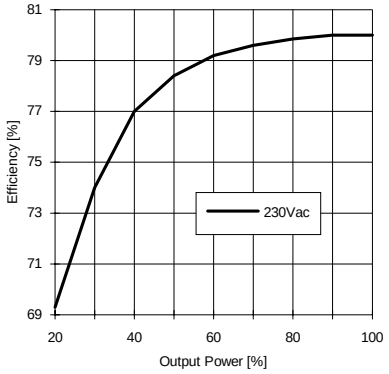
Min. Hold-Up Time



Typ. Derating over Temperature



Typ. Efficiency



Protection

Unit protection			
· Overload		Yes	Total-power limit.
· Short-circuit proof		Yes	
· Open-circuit proof		Yes	
· Over-temperature (OTP)	typ.	+ 90° C	Switch off.
(internal temperature)	typ.	+ 88° C	Switch on.
· Reverse battery protect.		Yes	
· ACin range selection		Wide range	
Load protection			
· Over-voltage (OVP)		Yes	Switch off.
Threshold	typ.	6.2V	
Accuracy	max.	± 8%	
Restart			Periodic.

Safety

Electrical safety			
· Test voltage (each unit)		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.	0.2mA	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).
· Derating range		+55° ... +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 and Power Loss

AP136.105	typ.	80% / 13W	@ 230V ACin, Pout = 100%.

Reliability and Lifetime

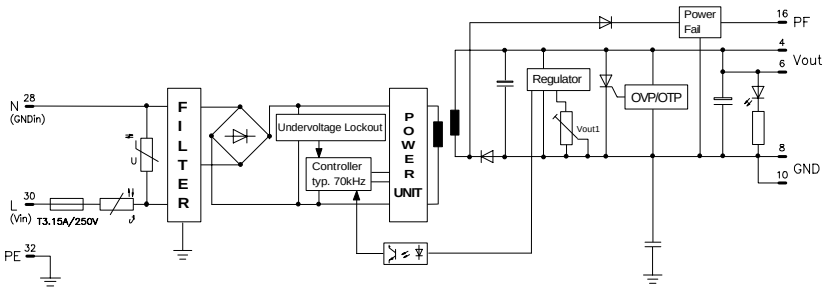
MTBF according to Siemens			
standard SN29500	typ.	300.000 h	230VAC, Iout = 100%, +40°C Ta.
Only long life (>2,000h @105° C) electrolytic capacitors are used.			
Function test		100%	Test certificate enclosed.
In-circuit test		Yes	
Run-in (burn-in)		24h	Full load, Ta = +55° C, on/off cycle.

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



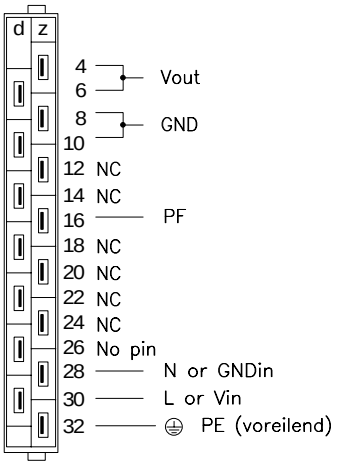
Installation for Operating

The unit is constructed for 19" systems:
Ensure that pin 4 of H15 connector is on top. For other installation considerations consult your representative. Ensure free air flow.

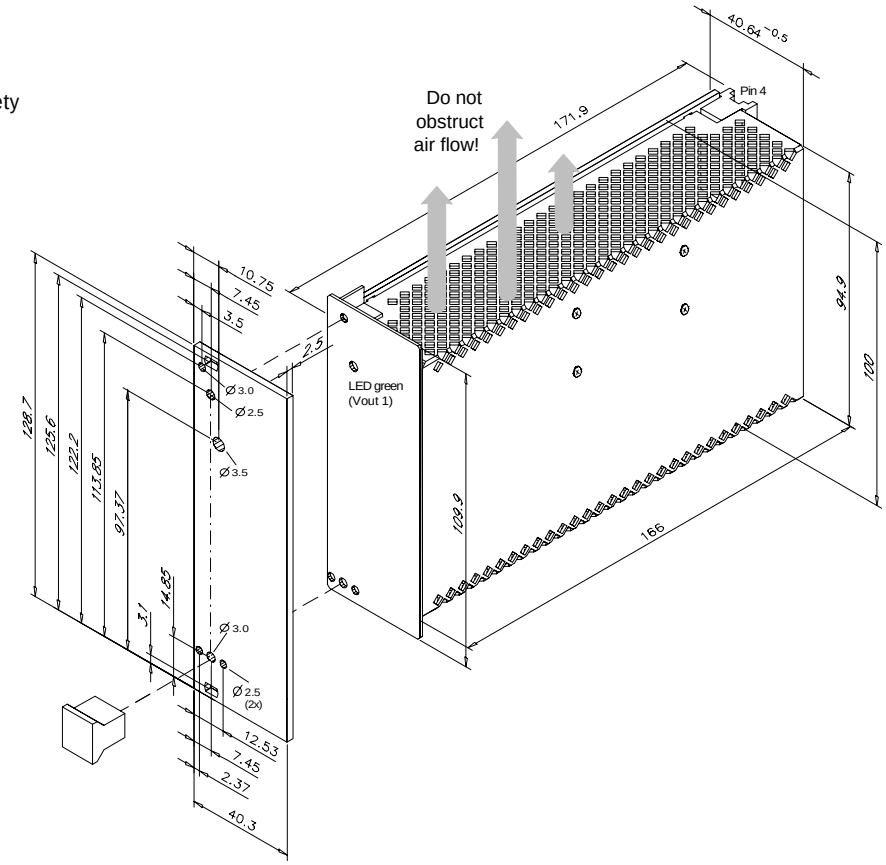
Dimensions and Connections

19" board, with Al/Mg alloy cover on component side, and a plastic cover on the bottom side. 8HP plug in width. See figure below for dimensions.

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



H15 pinout (DIN 41612)
NC = **N**o **C**onnection - Do not use!



Modifications (contact supplier)

Other output voltages.
Lower cost versions.

Accessory ZP510

Installation set for mounting on DIN rail.