AP486
4 Outputs
19" Power Supply, 130 Watt

- **High efficiency: 83%**
- **ACin wide range: 88...265V AC**
- **DCin wide range: 100...300V DC**
- **12 HP plug in width**
- **H15 standard pinout**
- **Power rail sharing**
- **Over Temperature Protection (OTP)**
- **Meets EMC standards: VDE 0160/2, EN 61000-4 NAMUR, EN 50081-1 (EN 55022/B) and EN 50082-2**

EN 60 950
EN 60 601-1

Power Supply AP486

This 4-output power supply uses a two-step wide-range converter. It operates over a wide range (88 - 265V AC) without any switch over. Hold-up time is 210ms at 230V AC and load distribution is flexible.

EMC compatibility is a major feature. It has low spurious noise, and noise suppression meets VDE 0871 class B.
Noise immunity meets EN 61000-4 and VDE 0160 class 2, even at full load. Over-voltage and over-temperature protection avoid problems in extreme working environments.

Vout [DC]	Iout	Pout	Features	Order-No.
Vout 1 **5.15V**	**10A**	51.5W	PF, OVP, OTP	**AP486.112**
2 **+12V**	**4A**	48W		
3 **–12V**	**4A**	48W		
4 **24V**	**5A**	120W		
Max. total power:		130W		
Vout 1 **5.15V**	**10A**	51.5W	PF, OVP, OTP	**AP486.122**
2 **+15V**	**4A**	60W		
3 **–15V**	**4A**	60W		
4 **24V**	**5A**	120W		
Max. total power:		130W		

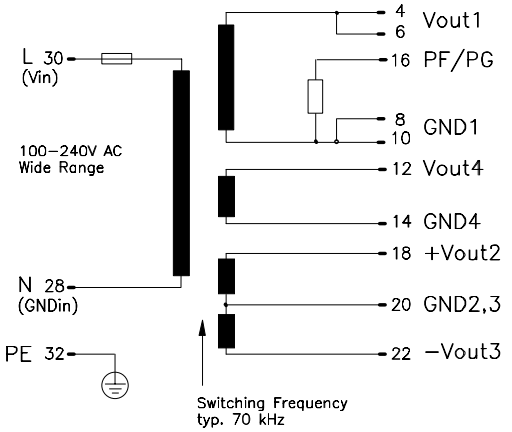
"**F**" appended to Order No. means front panel 12HP included and fitted.

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

Warranty: 2 years from date of delivery.

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

Schematic:



Output

Voltage Vout1,2,3,4				Fixed.
Accuracy	Vout1	max.	± 2%	Includes: production-adjustment,
	Vout2/3	max.	± 2% (.112: + 4%)	line regulation,
	Vout4	max.	± 2%	and load regulation.
Sense lines			None	Not available.
Minimum load			0.5A	To reach the specified values.
Output power	Pout	max.	130W	Total power.
Noise, Ripple Vout1/2/3/4		max.	20mVpp	20Hz...200kHz.
incl. spikes		max.	30mVpp	20Hz...20MHz.
Over-voltage protection		typ.	6.2V	Threshold accuracy ± 8%.
Derating			3 W/K	+55° to +70°C Ta.
Operating indicator			4 green LED	On the front, Vout1,2,3,4.
Isolation Vout to Vin			SELV	EN 60 950, VDE 0805.

All outputs are protected against open-circuit, short-circuit, and overload.

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		100...300V DC	Full spec.
Line frequency		47...63Hz	DC or 400Hz, see page 2.
Input current rms.	max.	2.6A / 1.4A	@ 115 / 230V AC.
Noise suppression		EN 55 022/B	10kHz...30MHz.

Mechanical: 12HP/3U board (DIN 41494),
Al/Mg alloy cover for component side,
plastic cover for bottom side,
LxWxH = 171.93 x 60.96 x 100mm,
the length includes the connector, see page 4.

Weight: App. 800g

Connector: H15 (DIN 41612), coding option,

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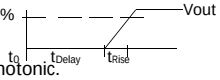
Output (continued)

				AP486.112			AP486.122			
				5.15V	±12V	24V	5.15V	±15V	24V	
Voltage regulation:										
· Line regulation		max.	%	0.3	4 (0.2)	1	0.3	4 (0.2)	1	88...265V AC, minimum load at Vout1, Iout = 100% (60%).
· Load regulation stat.	ΔU_{stat}	max.	%	±1	–0.5	–3	±1	–0.5	–3	Iout = 50%, Δ Iout = ±50%, minimum load at Vout1, @ 230 V AC.
· Load regulation dyn.	ΔU_{dyn}	max.	%	±7	±1	±1.5	±7	±1	±1.5	10%...90%...10% load change, rise time dt = typ. 20µs.
Response time	t_s	max.	ms	1	0.3	1	1	0.3	1	Till ΔVout is within < 0,5%of final value.
· Temperature coefficient		typ.	%/K	0.015			0.015			
Ripple		max.	mVpp	15	3	30	15	3	30	20Hz...200kHz, 230V AC, Iout = 100%.
		max.	mVpp	25	120 (3)	90	25	120 (3)	90	20Hz..200kHz, 88V AC, Iout = 100% (60%).
· incl. spikes		max.	mVpp	35	10	35	35	10	35	20Hz...20MHz, 230V AC, Iout = 100%.
		max.	mVpp	35	120 (10)	90	35	120 (10)	90	20Hz..20MHz, 88V AC, Iout = 100% (60%).
Current limitation										
· Threshold Vout1		typ.	A	14			14			Fixed.
· Threshold Vout1/2/3/4		typ.	W	145			145			Fixed, total power, exceeding leads to switch off with periodic restart.
· Current at overload		max.	A	18	14	7	18	11	7	
Minimum load Vout1		max.	A	0.5			0.5			Dependent on current at Vout2,3,4 and Vin.
Start delay	t_{Delay}	typ.	ms	750			750			After switch on.
Vout rise-up time	t_{Rise}	typ.	ms	10			10			Without C-Load.
On and off characteristic										Approximately monotonic.



Input (continued)

AC input range	V AC	88...265	Full spec.
DC-input range	V DC	100...300	Full spec.
Derated AC range	V AC	70...88	Diff. values for hold-up time, input current,
Derated DC range	V DC	85...100	ripple and Pout; for details contact supplier, (no start below 100V).
	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	Increased leakage current.
In-rush current	max. A	70	Wait min. 30s before switching on again, (cold-start).
Hold-up time	min. ms	15	@ 88V AC, Iout = 100%.
	min. ms	130	@ 196V AC, Iout = 100%, see page 3.
Power factor λ	typ.	0.65	@ 98V AC, Iout = 100%.
Internal fuse		5x20mm T4A/250V (IEC127/2-5)	To replace, see page 4.
Input range selection		Wide range	

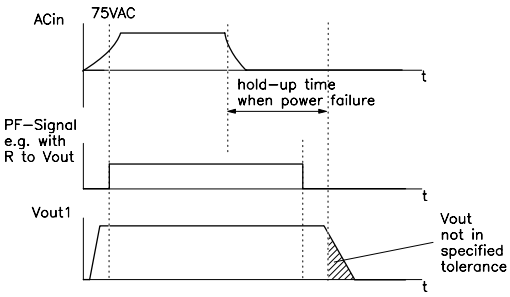
Logic Functions

Power Fail signal PF		Power fail + Vout1 watch	Open-collector signal (I_{max} = 5mA), see pg. 3
· PF low		5ms before Vout1 < 4.75V	
· PF high, if		ACin > 75V AC and Vout1 > 4.7V	
Hold-up time			See diagram on page 3, Iout = 100%.
· from power failure to PF-signal	min. ms	7	@ 88V ACin.
· from PF-signal	min. ms	5	

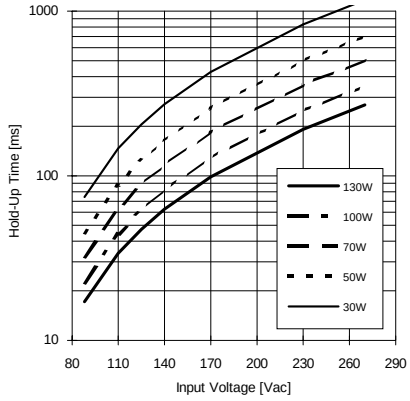
Electromagnetic Compatibility

Emissions according to 50081-1		EN 50081-2 is also satisfied
· Radio interference, EN 55 011, EN 55 022	Class B	Conducted 10kHz...30MHz.
Immunity according to 50082-2		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)	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-prescriptions	Satisfied	
· Over-voltage resistance (PULS standard)	300V AC / 0.5s	

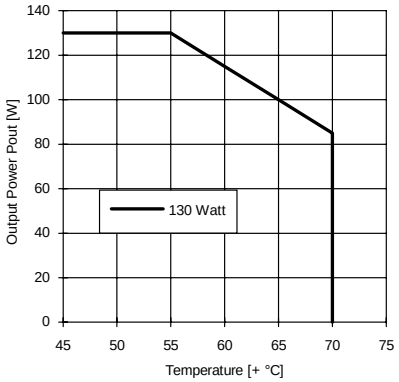
PF-Signal and Hold-Up Time



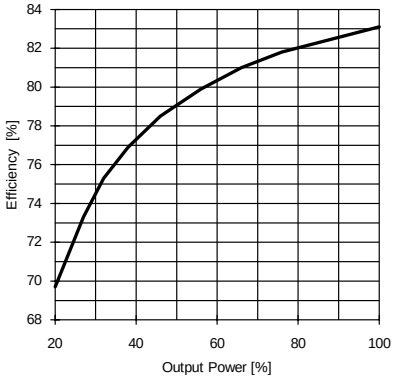
Min. Hold-Up Time



Typ. Derating over Temperature



Typ. Efficiency



Protection

Unit protection			
· Overload		Yes	Total-power limit.
· Short-circuit proof		Yes	Auto restart.
· Open-circuit proof		Yes	
· Over-temp. (OTP)	typ.	+105° C	Transformer temp, switch off,
	typ.	+100° C	Transformer temp, switch on, (automatically).
· Reverse battery prot.		Yes	
· ACin range selection		Wide range	
Load protection			
· Over-voltage (OVP)		Yes	
Threshold	typ.	6.2V	Valid for Vout 1.
Accuracy	max.	± 8%	
Method			By thyristor.

Safety

Electrical safety			
· Test voltage (each unit)		3kV AC	Primary / secondary.
according to EN 60 950		2.5kV AC	Primary / PE.
t = 2sec		500V AC	Secondary / PE.
· Air- and leakage distance		6.4 / 8mm	Primary / secondary.
		3.2 / 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.	0.45mA	EN 60 950 (47-63 Hz 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 (meassured 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		1 HP	Both sides of the unit.
Cooling		Normal convection	Do not 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

AP486.112	typ.	83% / 27W	@ 230V ACin, Iout = 100%.
AP486.122	typ.	83% / 27W	As above.

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.
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 5min. run in time, unless otherwise stated.

AP486 ◆ 4 Outputs ◆ 19" Power Supply ◆ 130 Watt

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

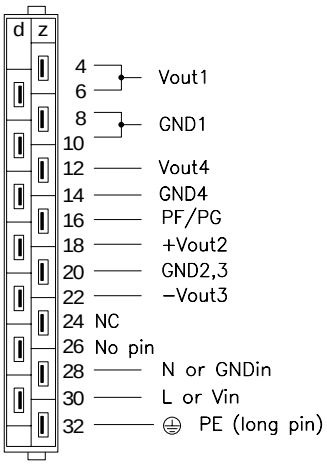
The unit is constructed for 19" systems:
Ensure that pin 4 of H15 connector is on top. For other installation considerations consult your representative. Ensure free air flow.

Dimensions and Connections

19" board, with Al/Mg alloy cover on component side, and a plastic cover on the bottom side. 12HP plug in width. See figure below for dimensions.

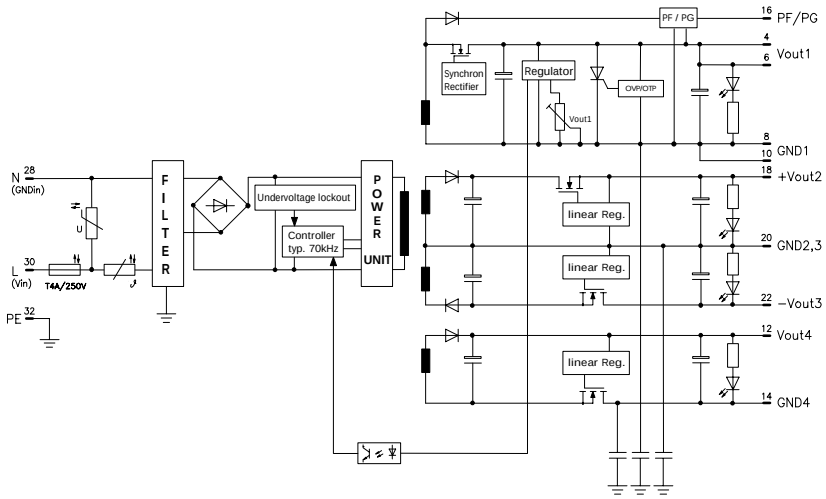
Caution:

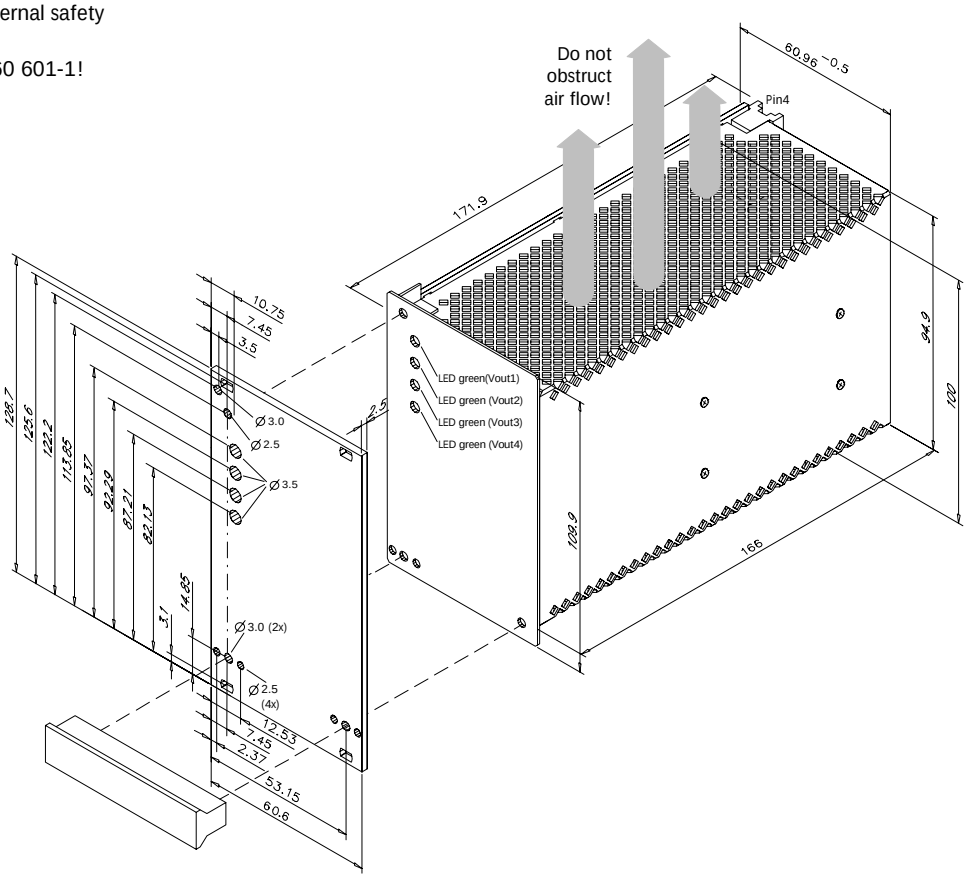
1) Do not remove any screws on box, as internal safety connections could be disconnected!
2) For medical use, install according to EN 60 601-1!
   This means for example:
   - double-pole-protection,
   - PE-resistance to case < 0.2Ω.



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

Schematic





Modifications (contact supplier)

Other output voltages.
Lower cost versions.

Accessory ZP510

Installation set for mounting on DIN rail.

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