

# AP157.507

## 1 Output

### 19" Power Supply, 240 Watt



- High efficiency: 88% (@ 24V)
- ACin 115/230V manual switch
- 14 HP plug in width
- H15 standard pinout
- Meets EMC standards  
EN 50081-1 (EN 55022/B), EN 50082-2  
EN 61000-4, NAMUR and VDE 0160/2



## Data Sheet

This 240W voltage-controlled power supply can supply up to 10A at 24V from a modest 14HP by 3U package for 19" racks. Output voltage is adjustable from 5.8 to 24V, inversely proportional to a control voltage of 0...10V.

Ripple and noise are less than 30mVpp over the entire load range. The unit has parallel-mode load sharing, over-voltage protection, and a remote shut-down input. The converter's high-efficiency of 88% results in long life, reliability and economy.

The unit satisfies all relevant safety and noise immunity regulations such as EN 61000-4 and VDE 0160 class 2 to full load. Construction and performance meet EN 60950, VDE 0805 and VBG 4.

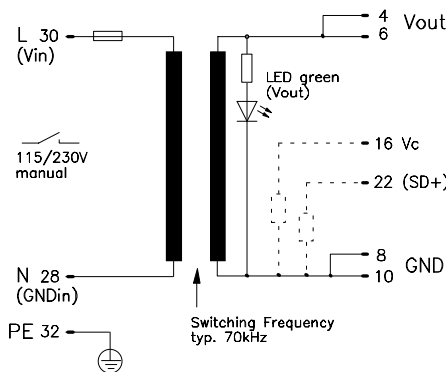
Vout	Iout	Pout	Features	Order-No.
5.8...24V	max. 10A	240W	Vout is adjustable via a control voltage (Vc = 0...10V DC), parallel mode, OVP, SD	AP157.507

"F" appended to Order-No. means: 14HP 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	5.8...24V DC	Adjustable via a control voltage (Vc = 0...10V DC), Vout is inversely proportional to Vc, see p. 3. @ open control voltage.
Vout	19.5V DC	Not available.
Sense lines	None	Not necessary.
Minimum load	None	Mounted without lateral spacing.
Output power Pout	max. 240W max. 192W	20Hz...200kHz. 20Hz...20MHz.
Noise, Ripple including spikes	max. 30mVpp max. 60mVpp	Threshold accuracy ±4%. +55°C to +70°C Ta.
Over-voltage protection	typ. 29.0V	On the front.
Derating	5W/K	EN 60 950, VDE 0805.
Operating indicator	1 green LED	
Isolation Vout to Vin	SELV	
The output is protected against open-circuit, short-circuit, and overload.		

- Mechanical: 14HP/3U board (DIN 41494), Al/Mg alloy cover for component side, plastic cover for bottom side, LxWxH = 171.93 x 71.12 x 110mm (100), the length includes the connector, see page 4.
- Weight: App. 860g
- Connector: H15 (DIN 41612), silver-plated, coding option, max. load per pin 11A @ 70° C.

## Input

Line input AC 1 · Range	100...120V AC 88...132V AC	Switch position 115V. Full spec.
Line input AC 2 · Range	80...150V AC 220...240V AC 187...264V AC	Derated, see page 2. Switch position 230V. Full spec.
Line frequency	150...300V AC	Derated, see page 2.
Input current rms.	47...63Hz	DC or 400Hz, see page 2.
Noise suppression	max. 6.0Aeff. / 2.8Aeff.	@ 115/230V AC.
	EN 55 022/B	10kHz...30MHz, conducted.

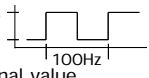
**Output (continued)**

**AP157.507**

**Voltage regulation:**

· Line regulation		max.	%	± 0.2
· Load regulation stat.	$\Delta U_{stat}$	max.	%	- 2
· Load regulation dyn.	$\Delta U_{dyn}$	max.	%	± 0.5
Response time	$t_s$	max.	$\mu s$	500
· Temperature coefficient		typ.	%/K	± 0.01

88...132V AC / 187...264V AC,  $I_{out} = 100\%$ .  
At a load change from 0 to 8A.  
 $D I_{out} = 10\%...90\%...10\%$ ,  $t_{rise} = 100\mu s$   
Till  $\Delta V_{out}$  is within < 0.5% of final value.



Ripple		max.	mVpp	30
· incl. spikes		max.	mVpp	60

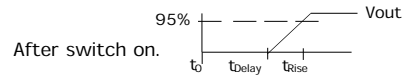
20Hz...200kHz, @ ACnom,  $I_{out} = 100\%$ .  
20Hz...20MHz, @ ACnom,  $I_{out} = 100\%$ .

**Current limitation**

· Threshold		min/max.	A	105% ... 120% of $I_{out}$
· Characteristic				See graph on page 3
· Short-circuit		max.	A	200% of $I_{out}$

Fixed.

Start delay	$t_{Delay}$	typ.	ms	50
Vout rise-up time	$t_{Rise}$	typ.	ms	35



After switch on.

On and off characteristic				
Power back immunity	$U_{Back}$	max.	V	1.2 x Vout

Approximately monotonic.  
Unit off/on.

**Input (continued)**

AC input range 1 / 2	V AC		88...132 / 187...264
DC input range	V DC		250...300
Derated AC range 1 / 2	V AC		80...88 / 150...187, 150 / 300 for 0.5s
Derated DC range	V DC		176...250
	V DC		300...370
Frequency range	Hz		47...63
Derated frequency range	Hz		63...400
In-rush current		max.	A 50
Hold-up time		min.	ms 18
		min.	ms 25
Power factor $\lambda$		typ.	0.67
Internal fuse			5x20mm T8A/250V (IEC127/2-5)
Input range selection			Manual (230V AC set at factory)

Full spec.  
Full spec. (Voltage Selector at '230V!')  
Power loss typ. 20% (no start below 196V).  
Full spec, but air- and leakage distances not longer than stated in VDE 0805.  
Full spec.  
Increase leakage currents.  
Wait min. 30s before switching on again (cold-start), NAMUR standard met ( $T_a = 25^\circ C$ ).  
@ 88V AC,  $I_{out} = 100\%$ .  
@ 187V AC,  $I_{out} = 100\%$ , Vout = 24V.  
@ 88V AC,  $I_{out} = 100\%$ , Vout = 24V.  
To replace, see page 4.  
115/230V AC switch, position see page 4.

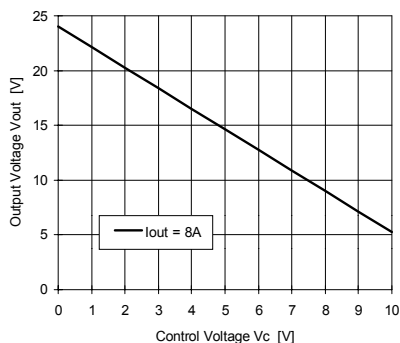
**Logic Functions**

SD remote shut down	Unit off	SD+ and +Vout connected (or TTL-level, high = unit off), residual voltage at switched off unit max. 1.5V.
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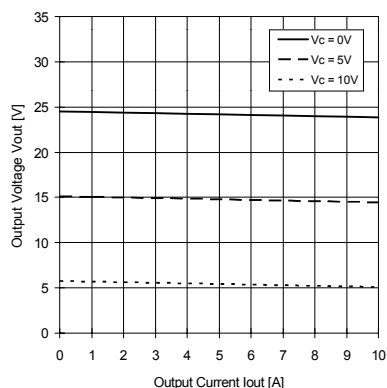
**Electromagnetic Compatibility**

Emissions according to EN 50081-1	Class B	EN 50081-2 is also satisfied
· Radio interference, EN 55011, EN 55022		Conducted 10kHz...30MHz.
Immunity according to EN 50082-2	8kV direct discharge (level 4)	EN 500825-1 is also satisfied
· Electrostatic discharge ESD, EN 61000-4-2	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.
· Surge transients, EN 61000-4-5	2kV (level 4) cap. coupling	Coupled to Vout and signal lines.
	4kV (Isolation class 4)	Common mode, unit on.
· Transient voltage, IEC 255	2kV (Isolation class 4)	Differential mode, unit on.
· NAMUR-prescription	5kV	Common mode, unit off.
· Transient resistance, VDE 0160 §5.3.1.1.2	Satisfied	
· Over-voltage resistance (PULS standard)	750V / 1.3ms (class 2)	Valid for total load range.
	150/300V AC / 0.5s	Switch position 115 / 230V AC.

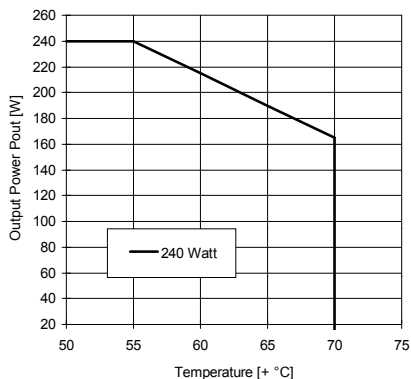
Typ. Control Characteristic



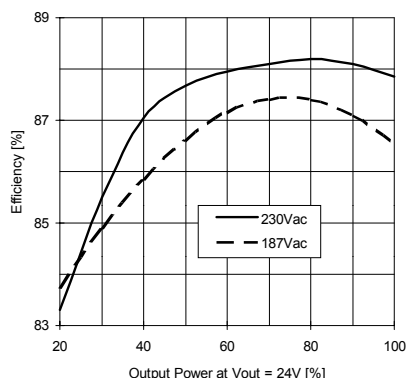
Typ. Output Characteristics



Typ. Derating over Temperature



Typ. Efficiency



Protection

Unit protection		
· Overload	Yes	See current limit.
· Short-circuit proof	Yes	Auto restart.
· Open-circuit proof	Yes	
· Over-temperature (OTP)	—	
· Reverse battery protect.	Yes	
· ACin range selection	Manual	Switch for 115/230V AC.
Load protection		
· Over-voltage (OVP)	Yes	
Threshold	typ. 28.8V	
Accuracy	max. ± 4%	
Restart		Automatic.
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		
· Penetration protection	Finger test > Ø 3mm	VDE 0100 §6, EN 60 950, VBG4. 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	1HP	To neighbouring units on the component side only, at full load.
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

AP157.507	typ. 88% / 33W	@ 230V ACin, Iout = 100%.
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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 = +55° C, on/off cycle.

**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**

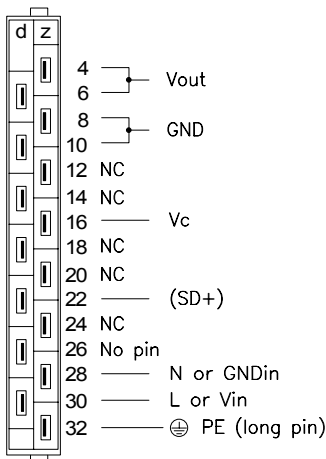
The unit is constructed for 19" systems:  
Ensure that pin 4 of H15 connector is on top. For other installation considerations consult your representative. Ensure free air flow.  
Important: Use non-conductive (plastic) guide rails only; conductive rails would inadmissibly reduce leakage distance.

**Dimensions and Connections**

19" board, with Al/Mg alloy cover on component side, and a plastic cover on the bottom side. 14HP plug in width. See figure below for dimensions.

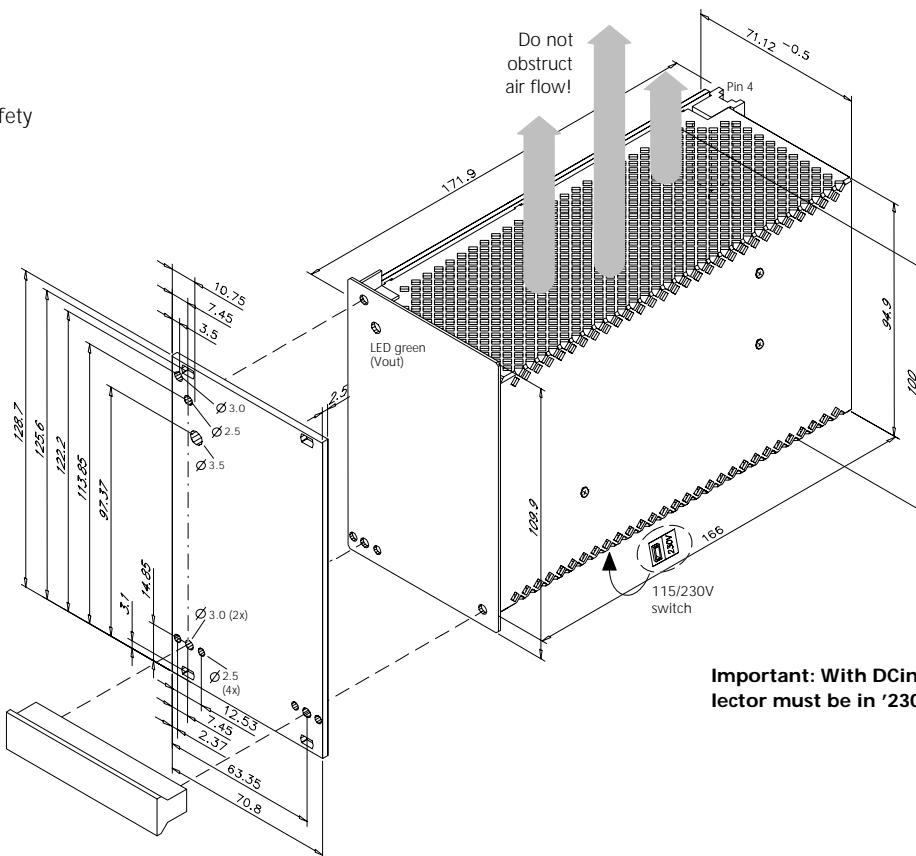
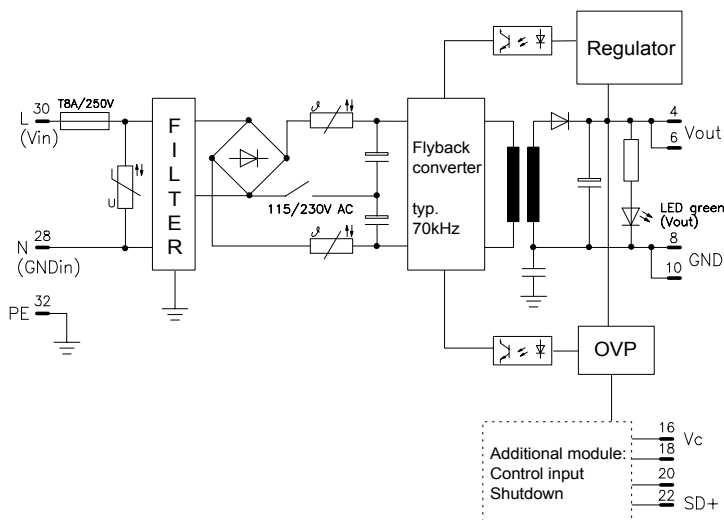
**Caution:**

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



H15 pinout (DIN 41612)  
NC = No Connection - Do not use!

**Schematic**



**Important: With DCin, voltage selector must be in '230V' position!**

**Modifications (contact supplier)**

**Accessory ZP510**

Installation set for mounting on DIN rail.