AP534
5 outputs
19" power supply, 120 W

- **Compact-PCI power supply unit**
- **Autorange: ACin 90...132 V / 198...264 V**
- **Compact: Only 3U/10HP**
- **Active load sharing, separately for 3.3V and 5V**
- **Active decoupling for redundant operation**
- **PFC (Power Factor Correction)**
- **Primary and secondary power-good signal**
- **Total EMC conformity**

EMV Low Volt.

UL1950 E137006 CUL/CSA-C22.2 No 950-M90

IEC60950

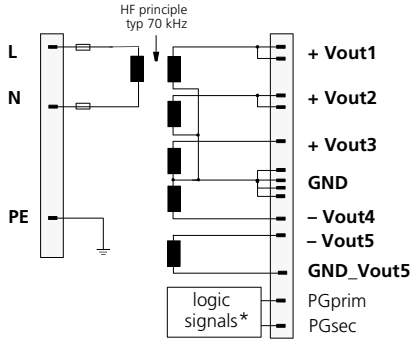
Data sheet

An efficient power supply reliably supplies Compact PCI systems on 115/230V networks now and in the future. Due to the five outputs with a very flexible load distribution, the units are well equipped for the current 5V processors as well as for the future 3,3V processors.

The unit is perfectly suited for redundant and/or parallel operation. All outputs are decoupled via FET or diodes. The active current sharing (separate balance line for 3.3V output and 5V output) ensures equal load distribution among the units with the result of a highly reliable operation and long lifetime of the units; besides, the units can thus be exchanged during operation (Hot-Swapping). The unit has a passive PFC in the 220/240V range.

Finally, the unit has an optional logic module with primary and secondary power good signalizing showing as to whether the input and output voltages are correct.

Schematic (symbolic)



Mechanical	10HP/3U Eurocard (DIN 41 494) Aluminum cover (AlMg3) on the compoment side, plastic cover on the solder side LxWxH= 188 mm x 51.0 mm x 128.5 mm (incl. handle and plug connector)
Weight	950 g
Plug-in connector	F48 connector (DIN 41 612) Coding possible Contact load capacity max. 4 A at +70°C

	Vout	Iout	Pout	Features	Order-No.
Vout1	**+5 V**	**20 A**	100 W	115/230V ACin, 3U/10HP	**AP534.106**
Vout2	**+3,3V**	**20 A**	66 W	logic, parallel operation,	
Vout3	**+12 V**	**0.5 A**	6 W	output decoupling,	
Vout4	**–12 V**	**0.5 A**	6 W	PFC at 230V AC	
Vout5	**–48 V**	**0.75 A**	36 W	Derating > 55°C: 50mA/K	

Maximum total capacity:
- 110W without forced air-cooling and with vertical mounting position (see diagram)
- 120W with forced air-cooling (10m³/h), no fixed mounting position

Warranty: 2 years from date of delivery.

Output

Voltage Vout1,2,3,4,5		see info box above	
∘ Accuracy	Vout1	+5%, –0%	load and line regulation
	Vout2	+5%, –2%	
	Vout3,4	±5%	
	Vout5	+18.8%, –15.6%	
Minimum load		—	not necessary
Output power	max.	see info box above	
Ripple. Vout1/2/3/4	max.	50 mV	20Hz...200kHz, I=I_{rated}
∘ including spikes	max.	50 mV	20Hz...20MHz, I=I_{rated}
Ripple Vout 5	typ.	100 mV	at nominal output power
∘ including spikes	max.	250 mV	at nominal output power
	max.	2 V	at no load of all outputs
Over-voltage protection	typ.	on request	
Derating		1 W/K	+25°C to +55°C T_{amb}
		2 W/K	+55°C to +70°C T_{amb}
Operating indicator		2 green LEDs	front panel, PGprim/PGsec (see below)
Isolation Vout against Vin		SELV	EN 60 950, VDE 0805
Parallel operation		yes	
∘ Load sharing		active, separated for Vout1 and Vout2	via balance lines; Hot-Swapping possible

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

Logic outputs/alarms		low at failure...	open collector outputs
∘ Prim. side: Power Good (PGprim)		... of the input	
∘ Second. side: Power Good (PGsec)		... of one output	

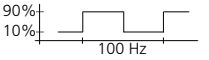
Input

Line input AC		100 - 120 V AC	
		220 - 240 V AC	
∘ Ranges		90...132 V AC	
		198...264 V AC	
PFC (Power Factor Correction)		acc. to EN 61000-3-2	
Input r.m.s. current	max.	2.55 A	at 90 V AC and 120 W
Noise suppression		EN 55 022/B	10kHz...30 MHz

Specifications valid for 230 V AC input voltage, +25°C ambient temperature, and 5 min run-in time, unless otherwise stated. They are subject to change without prior notice

Output (continued)

				5 V	3.3 V	±12 V	-48 V	
Voltage regulation:								
∘ Line regulation		max.	%	<0.1	<0.1	<0.1	<5.0	198 V AC...264 V AC (5V / 16A, 3.3V / 8A, ±12V / 0.5A, -48V / 0.3A)
∘ Load regulation stat.	ΔUstat	typ.	%	-2.3	-2.9	-5.2	-10	Δl=100%, measured output loaded only.
∘ Load regulation dyn.	ΔUdyn	typ.	%	±8	±8	±1,5	—	Iout =10%...90%...10% Rise/fall time dt=typ.20µs Measured output is loaded only.
Response time	t_s	typ.	*ms*	1.5	4	1	—	Measured output loaded only. Vout1 is only loaded with 5A during measurement of ±12V output.
Ripple/Noise		max.	mV_{PP}	50	50	50	typ. 100	20Hz...200kHz, I=$I_{Nom,}$ 264 V AC
∘ incl. Spikes		max.	mV_{PP}	50	50	50	typ. 2 V	20Hz...20MHz, I=$I_{Nom,}$ 264 V AC
Current limitation								
∘ Threshold		typ.		1.75	2.0	1.1	1.1	x I_{rated}
∘ Current at short-circuit		typ.		2.4	2.5	0.6	8	x $I_{rated.}$ Switch-off after typ. 12 ms, autom. restart after typ. 400 ms
∘ Characteristic								See diagramm on page 3
∘ Start delay		typ.	*s*	1	1	1	1	at 230 V AC and nominal load



Input (continued)

AC input range	*V AC*	90...132 / 198...264	Start guaranteed at > 88 V AC
Frequency range	*Hz*	47...63	Full spec
Inrush current	max. *A*	65	
Hold-up time	min. *ms*	20	at any rated input voltage
Internal fuse		5x20 mm, T3A15 / 250 V	In the L line and N line, Replacement: see note on page 4
Input range selection			Autorange

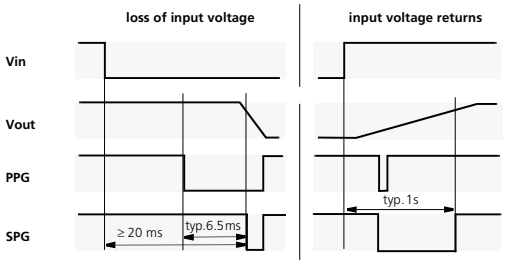
Logic functions

Primary Power-Good-Signal (PPG)			Nominal load
∘ PPG is low, if	typ. *V AC*	Input voltage <75	Open-collector signal (U_{max}=24 V, I_{max}= 50 mA) Primary Power-Good output is high-resistive
Secondary Power-Good-Signal (SPG)			Nominal load
∘ SPG is low, if	typ. **%**	Output voltage <85	Open-collector signal (U_{max}=24 V, I_{max}= 50 mA) Secondary Power-Good output is high-resistive

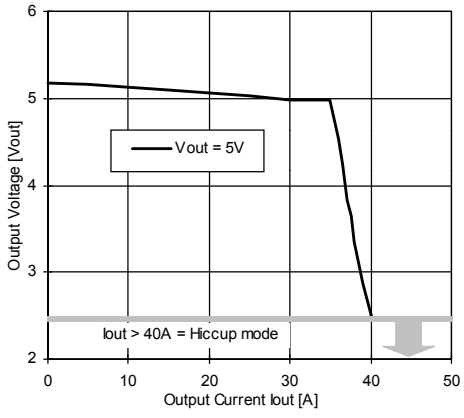
Elektromagnetic Compatibility (EMC)

Emissions (EN 50081-1)		
∘ Radio interference (EN 55011, EN 55022)	Class B	Conducted 10kHz...30MHz, radiated 30MHz...1GHz
Immunity (EN 50082-2)		
∘ Electrostatic Discharge ESD, EN 61000-4-2	8kV direct discharge (Level 4) 15kV air discharge (Level 4)	
∘ Radiated fields, EN 61000-4-3	1OV / m (Level 3)	
∘ Burst, EN 61000-4-4	4kV (Level 4)	Asym. and unsym. coupling to ACin line
∘ Surge transients, EN 61000-4-5	4kV (Installation class 4) 2kV (Installation class 4)	Common mode: L, N to PE, unit on Differential mode: L to N, unit on
∘ Conducted disturbances, EN 61000-4-6	10V (Level 3)	Input lines, 150 kHz...80MHz
∘ Transient voltage, IEC 255	5kV	Common mode: L, N to PE, unit off
∘ Over-voltage resistance (PULS standard)	300 V AC / 0.5 s	

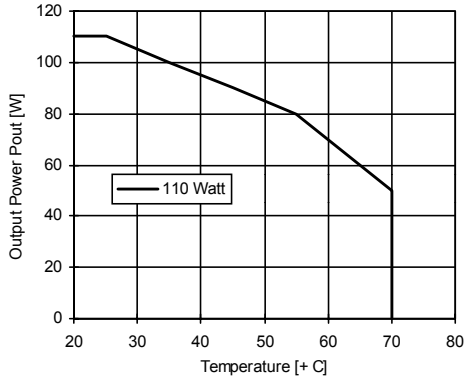
Logic signals



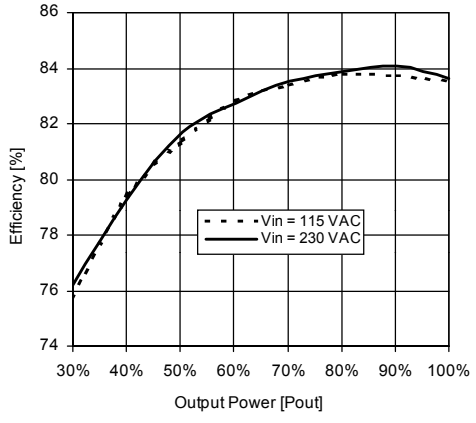
Ouput Characteristic (typ.)



Derating over Temperature



Efficiency (typ.)



Protection and Monitoring

Unit protection			
∘ Overload		yes	Total power limitation: Hiccup[1] after 0.4s
∘ Short-circuit proof		yes	Hiccup mode[1]
∘ Open-circuit proof		yes	
∘ Over-temperature (OTP)	typ.	90°C	
∘ ACin Autoselect		yes	
Load protection			
∘ Over-voltage prot. (OVP)		yes	Hiccup mode[1]
– Threshold	Vout1	6.39V ± 2.5%	
	Vout2	3.89 V ± 2.5%	
	Vout3	14.41 V ± 2.5%	
	Vout4	-14.99 V ± 2.5%	
	Vout5	-60.00V ± 5%	

Hiccup[1] = switch-off and cyclical restart attempts

Safety

Electrical Safety			
∘ Test voltage acc. to		3kV AC	Primary / secondary, each unit
EN 60 950 for t = 2sec		2.5kV AC	Primary / PE
		500V AC	Sceondary / PE
∘ Air- and leakage distance		5.0 / 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 40 050, IEC 529
∘ Leakage current	max.	0.75mA	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.

CE label

CE certification	according to low-voltage directive and EMC directive

Operation and Ambient Area

Application class		KSF	DIN 40 040
Operation temperature	max.	0° ... +70°C	T_{amb} (measured at 1cm distance)
∘ Derated range		+25 ... +70°C	Derating,see diagram
Storage temperature	typ.	-20° ... +100°C	T_{amb}
Humidity	max.	95%	non-condensing
Mechanical usage		Vertical	see page 4
∘ Lateral distance		≥1 TE	cover side, full load
Cooling		Normal convection	Do not obstruct air flow!
Dirt protection level	max.	2	VDE 0100 part 1
Vibration		0.075mm	IEC 68-2-6 (10-60Hz)
Shock		11 ms / 15g	IEC 68-2-27 (3 shocks)
Operation height	max.	2000m	above sea level, derating beyond

Efficiency and Power Loss

Efficiency	typ.	83%	@ 230V ACin, nominal load
Power loss	typ.	25 W	@ 230V ACin, nominal load

Reliability and Lifetime

MTBF (Siemensnorm SN29500)	*t.b.d.*	230VAC, Iout=100%, T_{amb}=+40°C
Electrolytic capacitors	Only longlife types are used (>3.000h/105°C)	
Function test	100%, each unit	
In-Circuit test	yes	
Run-in (Burn-in)	24h	Iout=100%, T_{amb}=+55°C, on/off-cycl.

AP534 5 outputs ◆ 19" power supply ◆ 120 W

Fuse

The unit has electronical protection against external short-circuits. In case of an internal defect, a fuse disconnects the unit. For safety reasons, the unit must be checked by the manufacturer then; therefore the fuse is not accessible for the user.

Installation for Operating

The unit is constructed for 19" systems: Insert unit to a corresponding slot.

- Convection cooling: Ensure that row 2 of F48 connector is on top.
- Forced air-cooling (10m3/h): No fixed mounting position.

For other installation consideration consult your representative. **Ensure free air flow!**

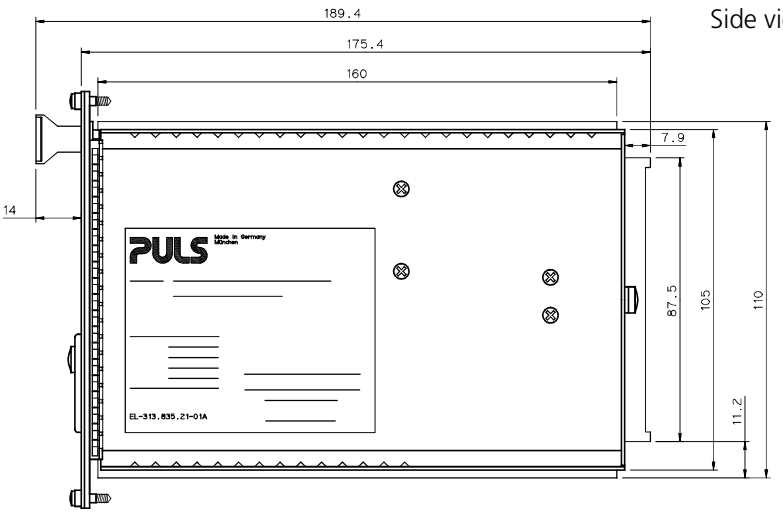
Dimensions and Connections

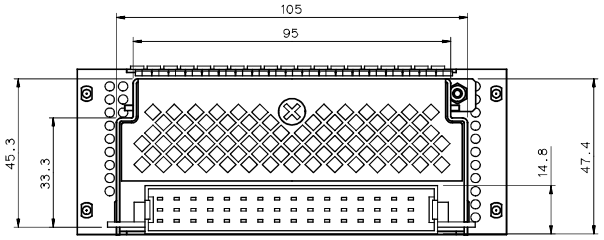
19" board with touch-safe aluminium cover on the component side and plastic cover on the bottom side. 10HP plug-in width, other dimensions see figure and page 1 (subject to change)

Caution:
Do not remove any screws on box, as internal safety connections could be disconnected (consult your representative for details).

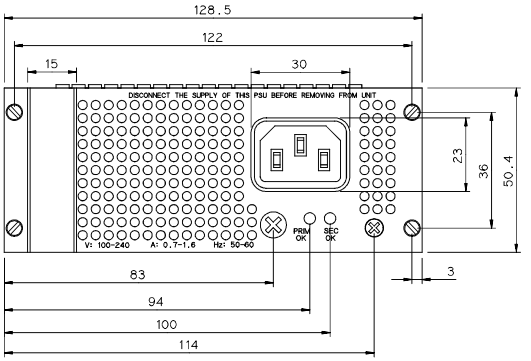
Mechanics

Side view



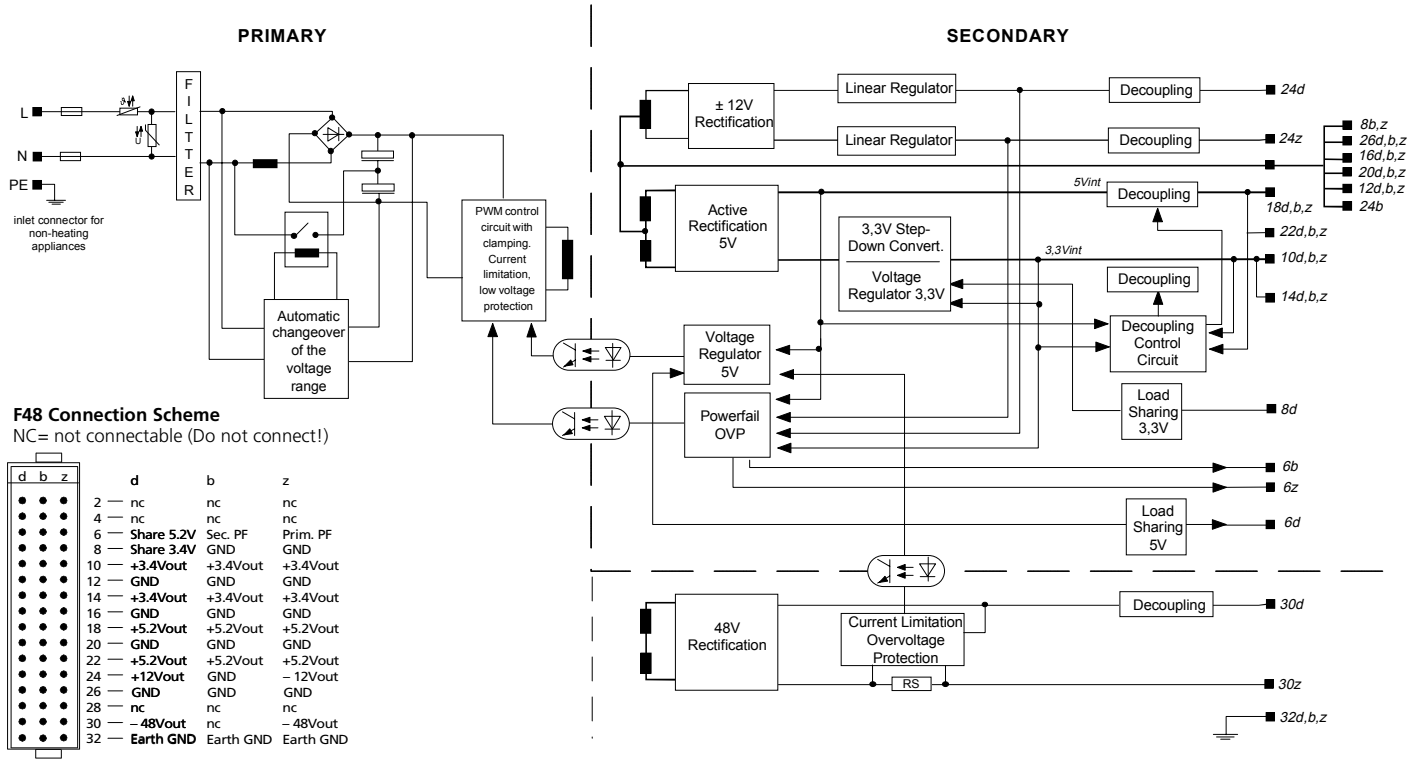


Rear view



Front view

Electrical Schematic



F48 Connection Scheme
NC= not connectable (Do not connect!)

	d	b	z
2	nc	nc	nc
4	nc	nc	nc
6	**Share 5.2V**	Sec. PF	Prim. PF
8	**Share 3.4V**	GND	GND
10	**+3.4Vout**	+3.4Vout	+3.4Vout
12	**GND**	GND	GND
14	**+3.4Vout**	+3.4Vout	+3.4Vout
16	**GND**	GND	GND
18	**+5.2Vout**	+5.2Vout	+5.2Vout
20	**GND**	GND	GND
22	**+5.2Vout**	+5.2Vout	+5.2Vout
24	**+12Vout**	GND	– 12Vout
26	**GND**	GND	GND
28	**nc**	nc	nc
30	**– 48Vout**	nc	– 48Vout
32	**Earth GND**	Earth GND	Earth GND