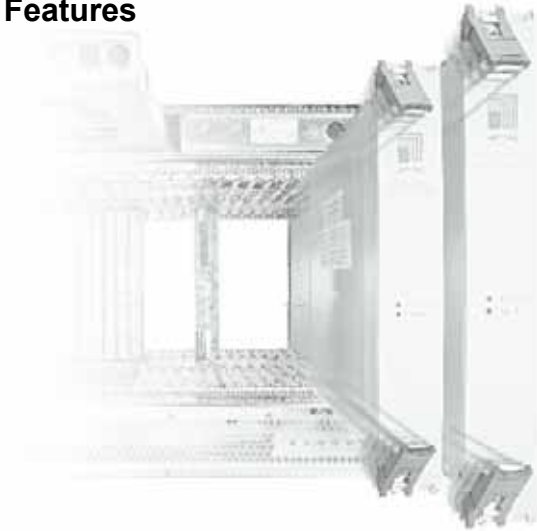


# Power supplies

## Features



Rittal offers an extensive range of power supply units in various designs.

The range includes 482.6 mm (19") compatible, Open Frame and PS/2 variants to supply DC voltage to controllers, systems and plant in many different areas.



### Open Frame (VME)



250/600/400/1000 W

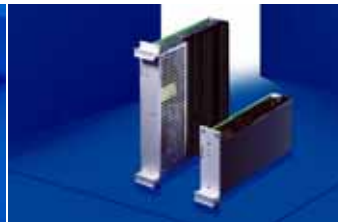
#### Design features

- Open Frame design
- Mounting on mounting base or subrack rear panel
- Cooling via fans
- Wide range input
- Aluminium housing
- 3 outputs

#### User benefits

- Minimal space requirements with a high power output
- Universal applications
- Approvals: UL 1950, IEC 60 950 and CSA 22.2 No. 234

### 3 U, 6 U (VME)



130/160 W, plug-in, integral VMEbus signalling

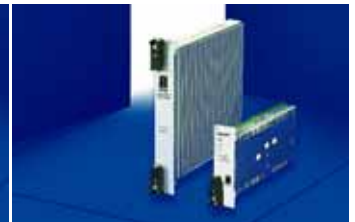
#### Design features

- 482.6 mm (19") module to IEC 60 297-3
- Mounting in the subrack with the aid of guide rails
- Connection via connectors H15, IEC 60 603-2
- 3 outputs

#### User benefits

- 482.6 mm (19") compatible
- Quick exchange
- Approvals: IEC 60 950

### 3 U, 6 U (CPCI)



175/200/250/350 W, plug-in

#### Design features

- 482.6 mm (19") module to IEC 60 297-3
- Mounting in the subrack with the aid of guide rails
- Positronic connector 47-pole PICMG 2.11
- 4 outputs

#### User benefits

- 482.6 (19") compatible
- Quick exchange
- Approvals: IEC 60 950 A1 – A4, CSA 22.2, UL 1950, CE
- PICMG specification



### PS/2 (AT/ATX)



250/300/400 W  
Power supplies for ATX and CPCI systems

#### Design features

- Open Frame design
- Mounting on a mounting plate or subrack rear panel
- Integral fan
- Sheet steel enclosure
- PFC active or passive
- Optional redundant design

#### User benefits

- Universal applications
- Approvals: CSA

### UPS



Uninterruptible power supply unit for installation in 5 1/4" vertical drive mountings. Guarantees power supply in the event of a mains failure (6 minutes).

#### Design features

- Installation in 1 or 2 standard 5 1/4" drive holders
- Integral batteries

#### User benefits

- Minimal space requirements
- Approvals: CE, IEC 60 950

### Redundant



2 x 300 W power supplies for RAID or ATX.

#### Design features

- Hot-swap version
- PFC active

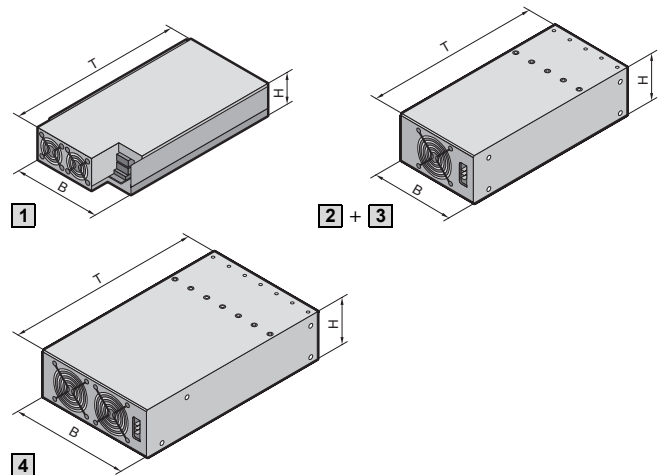
#### User benefits

- Universal applications
- Hot swap-compatible

B  
3.4

Power supplies

## Ripac power supplies – Open Frame



**Note:**  
Power supply 1000 W:  
48 V DC input on request.

**Detailed drawing,**  
see page 1265/1266.

	1	2	3	4
	250 W	400 W	600 W	1000 W
Height (H) mm	49.5	63.0	63.0	63.0
Width (B) mm	126.5	126.5	126.5	175.5
Depth (T) mm	259.5	279.0	323.0	283.5
Model No. RP 35 A	<b>3686.622</b>	–	–	–
Model No. RP 60 A	–	<b>3686.623</b>	–	–
Model No. RP 85 A	–	<b>3686.629</b>	<b>3686.624</b>	–
Model No. RP 110 A	–	–	–	<b>3686.625</b>

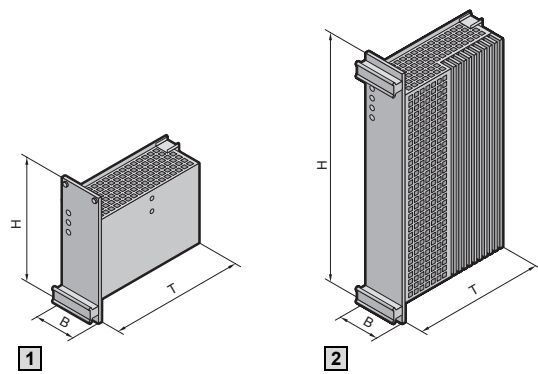
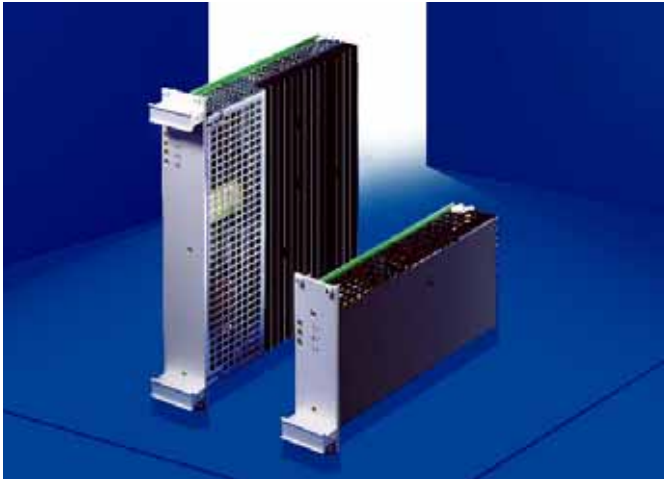
Output sizes	1			2			3			4		
Output	1	2	3	1	2	3	1	2	3	1	2	3
Output voltage	5 V	+12 V	–12 V	5 V	+12 V	–12 V	5 V	+12 V	–12 V	5 V	+12 V	–12 V
Output current	35 A	8 A		60 A 85 A	8 A		85 A	8 A		110 A	16 A	8 A
Maximum power output	250 W			400 W			600 W			1000 W		
Setting range of output voltage	5 – 5.5 V	9 – 15 V		2.5 – 5.7 V	5 – 16 V		± 10 %			4.5 – 5.5 V	9 – 15 V	5 – 15 V
Load compensation (load variation 0 – 100 %)	50 mV	± 3 %		< 0.5 %			< 0.5 %			< 0.5 %		
Line regulation (U <sub>e min.</sub> – U <sub>e max.</sub> )	± 50 mV or ± 3 %			< 25 mV	< 60 mV		< 25 mV	< 60 mV		< 0.5 %		
Base load	10 %	–		–			–			–		
Infeed compensation (Sense)	0.5 V	0.5 V	–	0.5 V	–		0.5 V	–		max. 0.5 V	1 V	
Residual ripple (max.)	1 %			1 %	2 %		1 %	2 %		1 %	2 %	
Temperature coefficient	0.02 %/°C			0.03 %/°C			0.03 %/°C			0.03 %/°C		
Oversvoltage protection	Yes											
Overload protection <sup>1)</sup>	Yes			Thermal current limiting			Yes					
Overload protection, thermal	–						In case of fan failure or overtemperature					
Overload protection, electronic	–						At 132 % U <sub>rated</sub> or short-circuit			Yes, each module separately		
<b>Input variables</b>												
Mains voltage U <sub>e</sub>	85 – 264 V AC; 120 – 340 V DC			90 – 264 V AC						150 – 264 V AC		
Mains frequency	45 – 65 Hz			47 – 63 Hz						–		
Power factor	EN 61 000-3-2			> 0.95						–		
Startup current limitation	< 40 A (cold start)			< 50 A						–		
Efficiency (typ.)	70 %			75 %						72 %		

**General specifications,** see page 1265/1266.

<sup>1)</sup> All outputs short-circuit resistant to a maximum of 30 sec.

# Power supplies

## Ripac power supplies for VME, plug-in



**Connector assignment,**  
see page 1267.

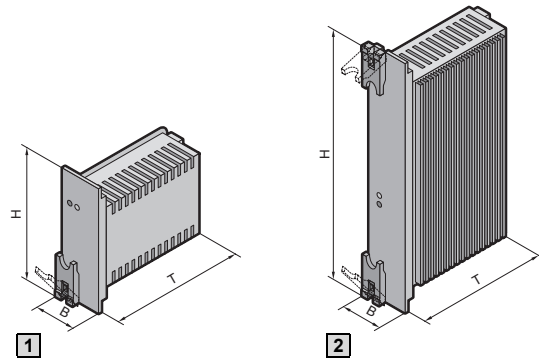
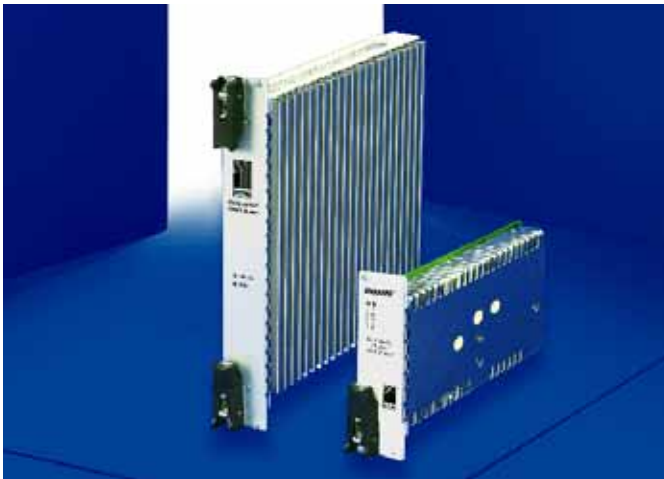
**Characteristic curve diagram,**  
see page 1267.

**Detailed drawing,**  
see page 1267.

B  
3.4

Power supplies

	1			2		
<b>Height (H)</b>	3 U			6 U		
<b>Width (B)</b>	10 HP	12 HP		8 HP	12 HP	
<b>Depth (T) mm</b>	170.0	170.0		170.0	170.0	
<b>Model No. RP power supply</b>	<b>3686.469</b>	<b>3686.470</b>		<b>3686.471</b>	<b>3685.306</b>	
<b>Model No. RP front panel</b>	<b>3685.304</b>	<b>3685.305</b>		<b>3686.472</b>	<b>3685.307</b>	
<b>Output sizes</b>						
<b>Output</b>	1	2	3	1	2	3
Output voltage	5 V	+12 V	-12 V	5 V	+12 V	-12 V
Output current 3 U, 10 HP/6 U, 8 HP	14 A	5 A	2 A	20 A	5 A	2 A
Output current 3 U, 12 HP/6 U, 12 HP	20 A	5 A	2 A	35 A	6 A	2 A
Maximum power output	130 W (10 HP), 160 W (12 HP)			160 W (8 HP), 270 W (12 HP)		
Setting range of output voltage	± 5 %	-		± 5 %	-	
Load compensation (load variation 0 – 100 %)	< 0.1 %	< 1 %		< 0.1 %	< 1 %	
Line regulation ( $U_{e \min.} - U_{e \max.}$ )	< 0.2 % at 99 – 138/187 – 264 V AC			< 0.2 % at 230 V AC + 15 % – 19 %		
Base load	-					
Compensation time	< 1 ms at $I_a$ 20 – 80 %					
Infeed compensation (Sense)	± 0.25 V	-		± 0.25 V	-	
Residual ripple (max.)	< 35 mV		< 20 mV	< 45 mV <sub>SS</sub>	< 30 mV <sub>SS</sub>	< 15 mV <sub>SS</sub>
Interference voltage	50 mV typ. (bandwidth 20 MHz)			< 80 mV typ. (bandwidth 20 MHz)		
Temperature coefficient	0.025 %/K					
Overvoltage protection (automatically recovery)	125 % + 5 %	125 % + 10 %		125 % ± 5 %	120 % ± 10 %	
Overload protection	typ. 110 % $I_{a \text{ rated}}$ , U/I characteristic curve acting on all outputs, outputs short circuit-resistant					
Overtemperature protection	Cuts out if the internal temperature is too high, cuts in again with hysteresis					
AC-FAIL, SYSRESET	TTL signals with 48 mA drive current, active low					
ON delay	< 0.5 s			-		
Ramp-up time	< 30 ms			50 ms		
<b>Input variables</b>						
Mains voltage $U_e$	AC 187 – 264 V, 50/60 Hz with automatic changeover to AC 90 – 138 V (in the range 90 – 94 V AC only 85 % rated load) or 264 – 347 V DC			AC 187 – 264 V, 50/60 Hz with automatic changeover to AC 99 – 138 V		
Mains frequency	47 – 63 Hz					
Efficiency (typ.)	80 %					
Startup current limitation	< 10 As typ. – in cold state < 15 As typ. – in warm state			< 25 As typ. – in cold state < 35 As typ. – in warm state		
Fuse	4 AT			8 AT		
<b>General specifications, see page 1267</b>						



**Connector assignment,**  
see page 1268.

**Detailed drawing,**  
see page 1268.

	1				2			
Height (H)	3 U				6 U			
Width (B)	8 HP				8 HP			
Depth (T) mm	170.0				170.0			
Model No. RP AC power supply	3688.534		3688.694		3688.695		3688.528	
Model No. RP DC power supply	3688.537		3688.655		3688.696		3688.530	

Output sizes	U <sub>1</sub>				U <sub>2</sub>				U <sub>3</sub>				U <sub>4</sub>			
Output	U <sub>1</sub>	U <sub>2</sub>	U <sub>3</sub>	U <sub>4</sub>	U <sub>1</sub>	U <sub>2</sub>	U <sub>3</sub>	U <sub>4</sub>	U <sub>1</sub>	U <sub>2</sub>	U <sub>3</sub>	U <sub>4</sub>	U <sub>1</sub>	U <sub>2</sub>	U <sub>3</sub>	U <sub>4</sub>
Output voltage	5 V	3.3 V	12 V	-12 V	5 V	3.3 V	12 V	-12 V	5 V	3.3 V	12 V	-12 V	5 V	3.3 V	12 V	-12 V
Output current	25 A	20 A	5 A	0.5 A	30 A	25 A	5 A	0.5 A	33 A	33 A	6 A	1.5 A	40 A	40 A	9 A	1 A
Output current U <sub>1</sub> and U <sub>2</sub>	30 A max.				38 A max.				80 A max.							
Maximum power output	175 W				200 W				250 W				350 W			
Base load (only U <sub>1</sub> )	5 %	-	-	-	5 %	-	-	-	5 %	-	-	-	10 %	-	-	-
Load compensation (dyn.)	< 3 % at 25 % load variation (1A/μs) 1 % after 300 μs															
Line regulation	< ± 1% (90 – 264 V AC)												< ± 1% (90 – 264 V AC) U <sub>1</sub> , U <sub>2</sub> , U <sub>3</sub>			
Infeed compensation (Sense)	0.25 V	0.25 V	0.25 V	-	0.25 V	0.25 V	0.25 V	-	-	-	-	-	0.25 V	0.25 V	0.25 V	-
Residual ripple (PARD)	50 mV or 1 % (bandwidth 20 MHz)															
Temperature coefficient	< ± 0.02 %/K (0° – 50°C) after 20 min. start-up time															
Overvoltage protection	125 % ± 10 %, reset by switching on again															
Overload protection	Current limiting of all outputs, automatic return at normal load															
Overtemperature protection	At overtemperature switches off all outputs, automatic return at normal temperature															
<b>Input variables</b>																
Mains voltage or DC input	90 – 264 V AC, 47 – 63 Hz, 3.2 A max.												90 – 264 V AC, 47 – 63 Hz, 7 A			
Power Factor	0.99 at V AC 115 V, full load															
Starting current	15 A (115 V AC) cold start, 30 A (230 V AC) cold start															
Fuse	3.15 A, 250 V AC or 10 A, DC												10 A, 250 V AC or 20 A, DC			
<b>Signals and control cables</b>																
Power Fail (pin 42)	In the event of a mains failure > 4 ms before output voltages exit control range. Power fail also triggered by failure or under-voltage of V <sub>1</sub> or V <sub>2</sub> (3 U) or any output (6 U)															
DEG (pin 38)	In case of overtemperature												-			
Remote enable	Use logic "0" (TTL level)															
Remote inhibit	Use logic "1" (TTL level)															
LED displays, two-colour	Green: "Power ON" and output voltages present Red: Error															
<b>General specifications, see page 1268</b>																

# Power supplies

## CPCI power supplies, uninterruptible power supply



### CPCI power supply

#### Open Frame 400 W

- Wide-range input (90 – 253 V AC)
- Power factor to EN 61 000-3-2
- Radio interference suppressed to EN 55 022 curve B
- Immunity to interference to EN 61 000-4-2/4/5 Level 3 (formerly IEC 801-2/4/5)
- Quick installation due to "Fast On" connectors (approx. 30 sec.)
- Tested to IEC 60 950, UL 1950 and CSA 22.2 No. 234

#### Technical specifications:

400 W max.  
3.3 V/25 A  
5.0 V/25 A  
12.0 V/8 A  
-12.0 V/7 A

Height mm	Width mm	Depth mm	Model No. RP
126	63	279	<b>3687.695</b>



### CPCI power supply

#### Plug-type, 180 W

- Module, 3 U, 12 HP, plug-in
- Connector M24/8/DIN 41 612
- Automatic changeover 120/230 V AC
- All outputs permanently short-circuit resistant
- SELV outputs to EN 60 950
- Overvoltage protection on the primary and secondary circuits
- Overtemperature protection
- Control inputs: ENABLE, INHIBIT
- Signal output: DERATE
- EMC standards EN 50 081-1 and EN 50 082-2
- IEC 60 950/VDE 0805-SELV, protection category I, VDE 0100

#### Technical specifications:

180 W max.  
5.1 V/20 A  
3.3 V/14 A  
12.0 V/2 A  
-12.0 V/1 A

Detailed data specification sheet available on request.

Height U	Width HP	Model No. RP	
		Power supply	Front panel for power supply
3	12	<b>3686.682</b>	<b>3685.330</b>

#### Accessories:

Female connector type M24/8, see page 547.  
Guide rails, see page 575.



### Uninterruptible power supply

- Ensures power continuity in the event of a mains failure
- Suitable for installation in a 5 1/4" drive holder
- Floating contacts (DB-9) for UPS communication: Indicates the operating states: mains ok/ mains failure/end of battery capacity/input for UPS deactivation signal
- Integral maintenance-free batteries
- CE certified, IEC 60 950 tested (LVD/EMC)

#### Note:

The UPS does not have an RS232 interface. Upon request you can obtain an adaptor cable including CD-ROM with shutdown drivers for automatic termination of program routines and shutdown of the system for Windows, Netware and Linux. Additional battery (5 1/4") to extend to 500 VA available on request.

Packs of	Model No. RP
1	<b>3659.080</b>

#### Technical specifications:

Output 300 VA/180 W  
Input/output voltage: 220, 230, 240 V AC  $\pm$  15 %  
Input frequency: 50 Hz  $\pm$  5 %  
Output frequency: 50 Hz  $\pm$  1 %  
Switch-over time: < 4 ms  
Charging time: 6 – 8 hours (to 90 % capacity)  
Operating environment: Temperature 0°C – 40°C  
Humidity 0 – 90 %  
Status displays: LED for mains operation, back-up, low battery, over-temperature  
Acoustic alarms: Mains interruption (sounds every 5 sec.), Low battery (sounds every sec.)  
Test function: Test switch on the front panel to check the UPS function  
Approvals: CE, EN 60 950 tested (LVD/EMC)  
Hold-up time: 6 min.



## AT/ATX power supplies, redundant power supplies



### ATX power supply

#### for external switches

- PS/2 model
- Built-in fan
- Short circuit-protected
- CSA-approved
- Connection cable for 5 1/4" and 3 1/2" disk drives, hard drive and motherboard
- PFC passive

#### Technical specifications:

300 W/230 V AC  
 +3.3 V, 0.2 A/16.0 A  
 +5.0 V, 30.0 A/19.5 A  
 +12.0 V, 11.0 A  
 -12.0 V, 0.8 A  
 -5.0 V, 0.3 A  
 +5.0 VSB, 2.0 A  
 +3.3 V and +5 V, total max. 150 W  
 if 3.3 V/0.2 A, target +5 V/30 A  
 if 3.3 V/16 A, target +5 V/19.5 A

Packs of	Model No. RP
1	3687.793

**Supply includes:**  
 Connection cable.

#### ⊕ Accessories:

Front panel for ATX power supply, see page 545.



### Front panel

#### for ATX power supply

Front panel with cut-outs for mounting the ATX power supply units in the subrack.

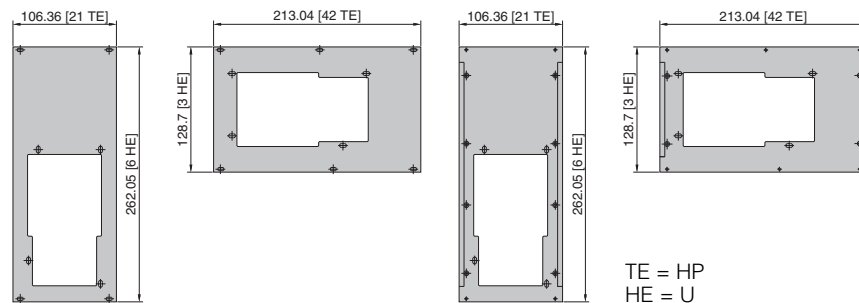
#### Material:

Aluminium, clear-chromated

#### Supply includes:

Assembly parts,  
 EMC gaskets (with EMC version).

U	HP	Model No. RP	
		EMC	Non-EMC
3	42	3685.331	3685.328
6	21	3685.332	3685.329



### AT/ATX power supply

- PS/2 model
- Built-in fan
- Short circuit-protected
- CSA-approved
- On/off switch
- PFC active/passive
- W x H x D = 86 x 150 x 140 mm
- 47 – 63 Hz

**Supply includes:**  
 Connection cable.

#### Technical specifications:

3688.118	3688.119	3688.121	3688.127	3688.129	3688.128
300 W max./ 230 V AC 5.0 V/30.0 A -5.0 V/0.5 A 12.0 V/12.0 A -12.0 V/0.5 A PFC passive	300 W/ 230 V AC 5.0 V/16.0 A -5.0 V/1.0 A 12.0 V/18.0 A -12.0 V/1.0 A PFC passive	300 W max./ 115/230 V AC 3.3 V/15.0 A 5.0 V/30.0 A -5.0 V/0.3 A 12.0 V/15.0 A -12.0 V/0.8 A +5 VSB/2.0 A 3.3 V plus 5 V total max. 200 W 3.3 V, 5 V plus 12 V total max. 280 W PFC passive	250 W max./ 100 – 240 V AC 3.3 V/20.0 A 5.0 V/25.0 A -5.0 V/0.3 A 12.0 V/13.0 A -12.0 V/0.8 A +5 VSB/2.0 A 3.3 V plus 5 V total max. 150 W 3.3 V, 5 V plus 12 V total max. 230 W PFC active	300 W max./ 110 – 240 V AC 3.3 V/28.0 A 5.0 V/30.0 A -5.0 V/0.3 A +5 VSB/2 A 3.3 V plus 5 V total max. 180 W 3.3 V, 5 V plus 12 V total max. 280 W PFC active	400 W max./ 110 – 240 V AC 3.3 V/28.0 A 5.0 V/40.0 A -5.0 V/0.3 A 12.0 V/15.0 A -12.0 V/0.8 A +5 VSB/2.0 A 3.3 V plus 5 V total max. 235 W 3.3 V, 5 V plus 12 V total max. 380 W PFC active

Design	Power	Packs of	Model No. RP
AT	300 W	1	3688.118
AT for RAID	300 W	1	3688.119
ATX	300 W	1	3688.121
ATX	250 W	1	3688.127
ATX	300 W	1	3688.129
ATX	400 W	1	3688.128

# Power supplies

## AT/ATX power supplies, redundant power supplies



### ATX power supply 1 U

- 2 built-in fans
- Short circuit-protected
- On/off switch
- PFC active
- W x H x D = 85 x 40 x 230 mm

#### Technical specifications:

200 W max./  
 100 – 240 V AC  
 47 – 63 Hz  
 3.3 V/14.0 A  
 5.0 V/20.0 A  
 –5.0 V/0.3 A  
 12.0 V/6.0 A  
 –12.0 V/0.8 A  
 +5 VSB/2 A  
 +3.3 V plus 5 V total max. 120 W  
 +3.3, 5 V, 12 V total max. 180 W

Design	Packs of	Model No. RP
ATX	1	<b>3688.130</b>

**Supply includes:**  
 Connection cable.



### Redundant power supply for ATX

- PS/2 model, 2 switches, 1 connector
- Built-in fan
- Hot-swap version
- PFC active
- Individual power pack module available (separately)
- W x H x D = 86 x 150 x 185 mm

#### Technical specifications:

2 x 300 W  
 90 – 264 V AC  
 47 – 63 Hz  
 3.3 V/20.0 A  
 5.0 V/25.0 A  
 5 VSB/1.5 V  
 12.0 V/16.0 A max. 20 A  
 –12.0 V/0.5 A  
 5 V, 3.3 V plus 12 V total max. 285 W

Design	Packs of	Model No. RP
ATX version	1	<b>3688.123</b>

**Supply includes:**  
 Connection cable.



### Redundant power supply for ATX

- PS/2 model, 2 switches, 2 connector
- Built-in fan
- Hot-swap version
- PFC active
- Individual power pack module available (separately)
- W x H x D = 86 x 160 x 220 mm

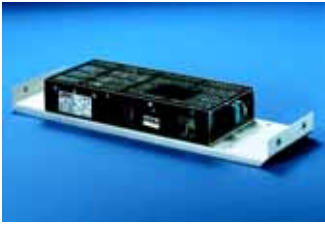
#### Technical specifications:

2 x 300 W  
 90 – 264 V AC  
 47 – 63 Hz  
 3.3 V/18.0 A  
 5.0 V/26.0 A  
 5.0 VSB/1.2 A  
 12.0 V/16.0 A max. 20 A  
 –12.0 V/1.0 A  
 +5 V, 3.3 V plus 12.0 V total max. 285 W

Design	Packs of	Model No. RP
ATX version	1	<b>3688.120</b>
Power pack module (spare)	1	<b>3688.122</b>

**Supply includes:**  
 Connection cable.

## AT/ATX power supplies, redundant power supplies



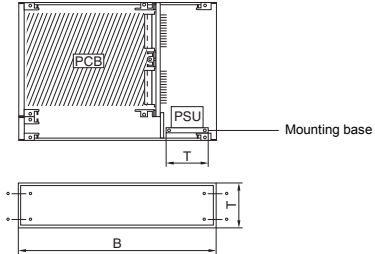
### Mounting base for power supplies

- Attaches to the subrack side panel

**Material:**  
2 mm aluminium, clear-chromated

**Supply includes:**  
Assembly parts.

Width (B) mm	Depth (T) mm	Model No. RP
431.8	100	<b>3684.323</b>
431.8	130	<b>3684.324</b>



### Female connector type M24/8

**IEC 60 603-2**

- Female connector for plug-in CPCI power supplies
- Quality level 2 to IEC 60 603-2 (DIN 41 612)
- Optional 20 A high current contacts for straight conductor connection either crimp or solder
- Volume resistance max. 1.5 mΩ
- Max. rated current: 40 A

**Supply includes:**  
5 connection sockets (crimping or soldering method)

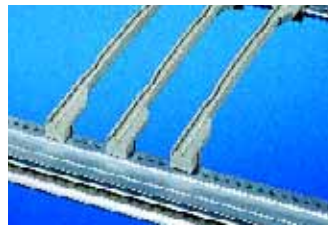
Type of connection	Packs of	Model No. RP
Soldering	1	<b>3687.665</b>
Crimping	1	<b>3687.666</b>

**!** **Also required:**

For mounting in the subrack, a Z rail is required, see page 570.



**Female connector type H15**  
**IEC 60 603-2 (DIN 41 612)**  
for plug-in power supplies.



**Plastic guide rails**  
for routing the plug-in power supply,  
see page 575.



**Keyable guide rails, plastic,**  
see page 576/577.

**Note:**  
The CompactPCI specification prescribes green guide rails with 1/2 HP offset for power supply installation (PICMG 2.11).