



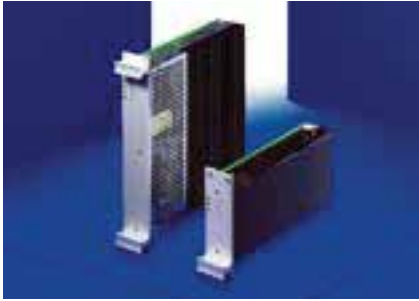
# Power Supplies

cPCI	System										Power supplies	Design	Page	
	VME	ATX	1	2	3	4	5	6	7	9				13
	■				■			■				Ripac power supplies . . . . .	plug-in . . . . .	74
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## Overview

### 3U, 6U plug-in (VME)



**130, 160, 270 watts**  
See page 74 for details

#### Applications

Plug-in power supply units for VMEbus systems with integral VMEbus signalling.

#### Design features

- 130, 160, 270 watts
- 482.6 mm (19") module to IEC 60 297-3
- Installation depth 160 mm
- 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: EN 60 950, VDE 0805 and IEC 950



### 3U, 6U plug-in (cPCI)



**175, 200, 250, 350 watts**  
See page 75 for details

#### Applications

Plug-in power supply units for cPCI systems.

#### Design features

- 175, 200, 250, 350 watts
- 482.6 mm (19") module to IEC 60 297-3
- Installation depth 160 mm
- Mounting in the subrack with the aid of guide rails
- Connection via Positronic connector 47-pole PICMG 2.9
- 4 outputs

#### User benefits

- 482.6 mm (19") compatible
- Quick exchange
- Approvals: EN 60 950 A1 – A4, CSA 22.2, UL 1950, C
- Complies with PICMG specifications





Pixus offers an extensive range of power supply units in various designs. The range includes 482.6 mm (19") compatible and open frame.

130, 160, 270 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



**Overview of benefits**

**Open Frame (VME)**

- 250, 600, 400, 1000 watts
- Minimal space requirements with a high power output
- Universal applications
- Approvals: UL 1950, IEC 60 950 and CSA 22.2 No. 234

**3U, 6U (VME), plug-in**

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

**3U, 6U (cPCI), plug-in**

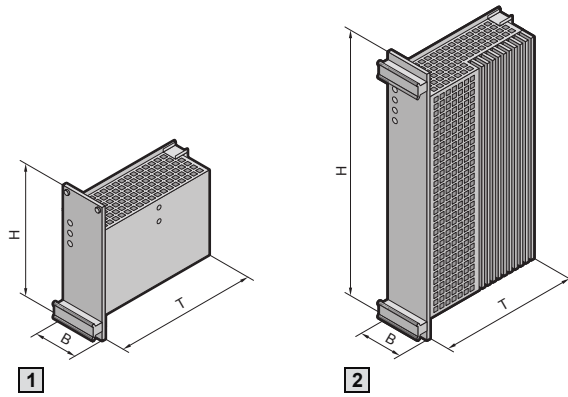
- 482.6 mm (19") compatible
- 175, 200, 250, 350 W
- Quick exchange

- Approvals: IEC 60 950 A1 – A4, CSA 22.2, UL 1950, CE
- PICMG specification

**PS/2 (AT/ATX)**

- 550W – 1000W
- Universal applications
- Approvals: CSA

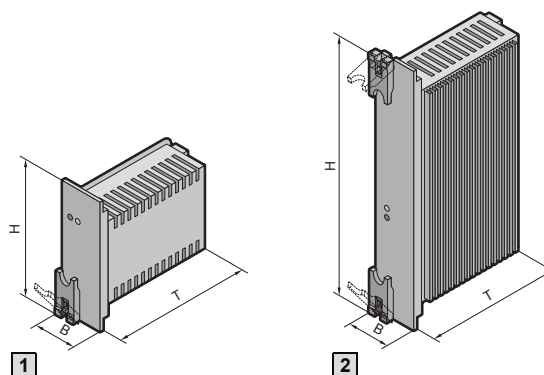
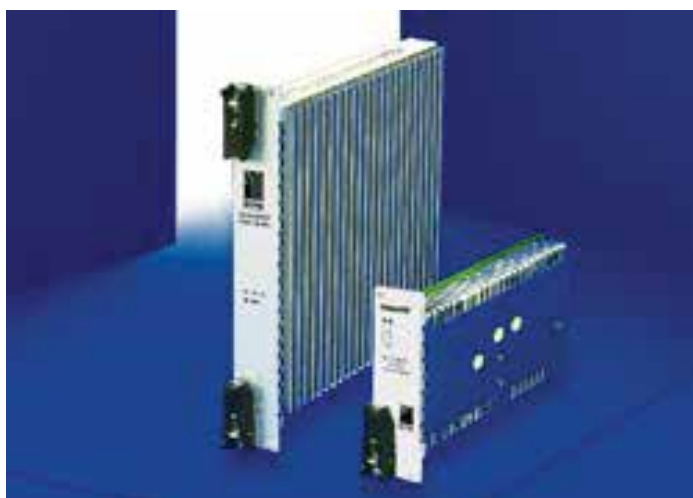
## Power supplies for VME, plug-in



Connector assignment, see page 186  
 Characteristic curve diagram, see page 186  
 Detailed drawing, see page 186

	1			2		
<b>Height (H)</b>	3U			6U		
<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
<b>Output voltage</b>	5 V	+12 V	-12 V	5 V	+12 V	-12 V
<b>Output current 3U, 10 HP/6 U, 8 HP</b>	14 A	5 A	2 A	20 A	5 A	2 A
<b>Output current 3U, 12 HP/6 U, 12 HP</b>	20 A	5 A	2 A	35 A	6 A	2 A
<b>Maximum power output</b>	130 W (10 HP), 160 W (12 HP)			160 W (8 HP), 270 W (12 HP)		
<b>Setting range of output voltage</b>	± 5 %	-		± 5 %	-	
<b>Load compensation (load variation 0 – 100 %)</b>	< 0.1 %	< 1 %		< 0.1 %	< 1 %	
<b>Line regulation (<math>U_{e \text{ min.}} - U_{e \text{ max.}}</math>)</b>	< 0.2 % at 230 V AC + 15 % – 19 %			< 0.2 % at 99 – 138/187 – 264 V AC		
<b>Base load</b>	-					
<b>Compensation time</b>	< 1 ms at $I_a$ 20 – 80 %					
<b>Infeed compensation (Sense)</b>	± 0.25 V	-		± 0.25 V	-	
<b>Residual ripple (max.)</b>	< 35 mV	< 20 mV		< 45 mV <sub>SS</sub>	< 30 mV <sub>SS</sub>	< 15 mV <sub>SS</sub>
<b>Interference voltage</b>	50 mV typ. (bandwidth 20 MHz)			< 80 mV typ. (bandwidth 20 MHz)		
<b>Temperature coefficient</b>	0.025 %/K					
<b>Overvoltage protection (automatic recovery)</b>	125 % + 5 %	125 % + 10 %		125 % ± 5 %	120 % ± 10 %	
<b>Overload protection</b>	typ. 110 % $I_a$ rated, U/I characteristic curve acting on all outputs, outputs short circuit-resistant					
<b>Overtemperature protection</b>	Cuts out if the internal temperature is too high, cuts in again with hysteresis					
<b>AC-FAIL, SYSRESET</b>	TTL signals with 48 mA drive current, active low					
<b>ON delay</b>	typ. 500 ms			< 0.5 s		
<b>Ramp-up time</b>	< 30 ms			≤ 50 ms		
<b>Input variables</b>						
<b>Mains voltage <math>U_e</math></b>	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		
<b>Mains frequency</b>	47 – 63 Hz					
<b>Efficiency (typ.)</b>	80 %					
<b>Startup current limitation</b>	< 10 As typ. – in cold state < 15 As typ. – in warm state			< 25 As typ. – in cold state < 35 As typ. – in warm state		
<b>Fuse</b>	3.15 AT			4 AT		

## Ripac Power supplies



Connector assignment, see page 185

Detailed drawing, see page 185

	[1]				[2]			
Height (H)	3U				6U			
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>	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	6 A	1 A	30 A	25 A	6 A	1 A	33 A	33 A	6 A	1 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 (1 A/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 of f all outputs, automatic return at normal temperature															

Input variables		
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	36 – 72 V DC, 7.9 A	40 – 72 V DC, 14 A
Starting current	0.99 at V AC 115 V, full load	
Fuse	15 A (115 V AC) cold start, 30 A (230 V AC) cold start	
	3.15 A, 250 V AC or 10 A, DC	10 A, 250 V AC or 20 A, DC

Signals and control cables	
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 undervoltage of V1 or V2 (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

General specifications, see page 185.

## cPCI power supplies



Plug-type, 180 W

- Module, 3 U, 12 HP, plug-in
- Connector M24/8/IEC 60 603-2
- 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>



## ATX power supplies



### for ATX power supply

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

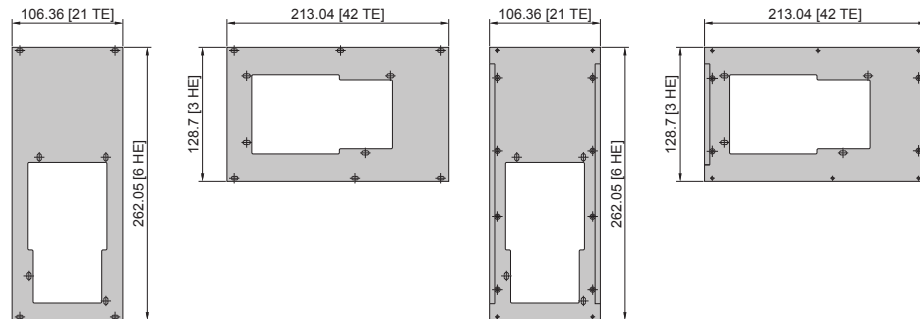
**Material:**

Aluminium, clear-chromated

**Supply includes:**

Assembly parts,  
EMC gaskets (with EMC version).

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



# Rugged Enclosures Overview



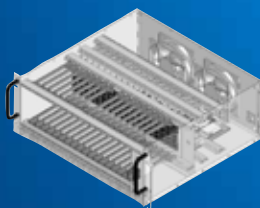
Pixus offers custom and standard ruggedized chassis in rackmount, portable, and ATR enclosure formats. Utilizing our backplane design expertise, convection and conduction cooling capabilities, and superb rugged solutions with key partners, Pixus has a solution for you.

## The enclosures can be designed to meet:

- MIL-STD-810 for shock/vibration, environmental
- MIL-STD-901D for shock/vibration
- MIL-STD-461 for EMC
- ARINC 404 and 600 requirements
- Much more, contact Pixus for details



Whether its an ITAR requirement, a standard product, or a custom design, contact our team to discuss your rugged application. Pixus can also provide various conduction-cooled boards from processors/SBCs, graphics, FPGAs, and more.





### 19” Rugged Rackmount Systems

The Pixus 19” rugged rackmount systems are based on the modular open-standard COTS (Commercial Off the Shelf) Eurocard approach. This allows us to configure virtually unlimited tailored configurations of a chassis with little to no customization. This provides standardization with the benefits of an open-standard architecture, which include:

- Multi-vendor options, more choices
- Less risk, not relying on one vendor
- Selection options of “best in class” for all modules
- Proven design in commercial, industrial, and MIL/Aero
- Less obsolescence risk with multiple vendors
- Lower prototyping/development costs and time-to-market
- Typical plug-in modules are 3U or 6U with a 160mm depth.

### Rugged 19” Rackmount

Height	Architecture Options	Slots	Ruggedization	Notes	Part Number Prefix	Part No.
1U	MicroTCA/AMC	6	MIL-810/901 for shock vibration	GPS/IEEE1588/ SyncE/NTP	PXS01R6	PSM_VTAP10
5U	OpenVPX or other Eurocard	Up to 20	MIL-810/901 for shock vibration, MIL 461 for EMI	Accepts 3U Boards	PXS05R20	PSM_VTAP40
8U	OpenVPX or other Eurocard	Up to 20	MIL-810/901 for shock vibration, MIL 461 for EMI	Accepts 6U Boards	PXS08R20	PSM_VTFC03



### ATR ENCLOSURES

Modular ATR sizes of 1/2 and 3/4 with various heights and depths. Contact Pixus to discuss your application. The HEX version is a top-of-the-line MIL qualified unit with heat exchangers for high wattage requirements.

### SMALL FORM FACTOR SOLUTIONS

From Small Form Factor solutions to application-specific conduction cooled solutions, Pixus offers a wide range of configurations. Give us a call at 916-297-0020 to discuss your SWaP requirements and performance specifications.

### Rugged ATR or Purpose-built

Size	Architecture Options	Slots	Ruggedization	Notes	Part Number Prefix	Part No.
1/2 ATR*	MicroTCA/AMC	6	MIL-810/901 for shock vibration	GPS/IEEE1588/ SyncE/NTP	ATRM12	PSM_VTAP10
1/2 ATR*	OpenVPX or other Eurocard	Up to 6	MIL-810/901 for shock vibration, MIL 461 for EMI	Accepts 3U Boards, Sealed conduction	ATR012	PSM_VTAP40
1/2 ATR*	OpenVPX or other Eurocard	Up to 6	MIL-810/901 for shock vibration, MIL 461 for EMI	Accepts 3U Boards, Sealed conduction with heat exchanger	ATR012-HEX	PSM_VTFC03

\*consult factory for other size or cooling options

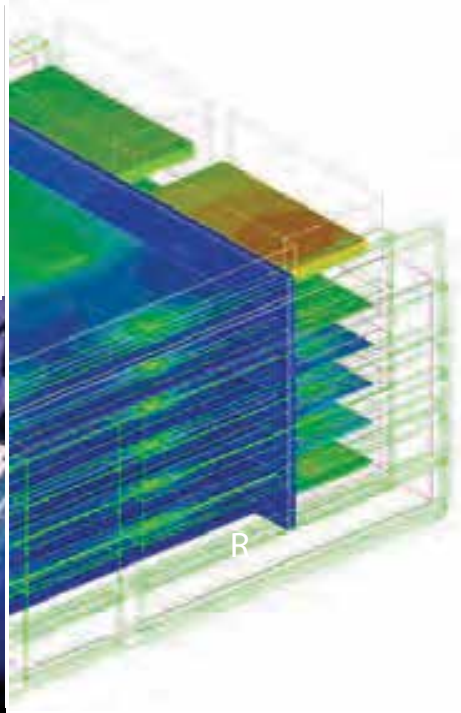
# Climate control for Subracks



Heat shortens the service life of equipment leading to failure, and also diminishes the high performance of electronics.

The problem lies in high heat losses and compact installation spaces. Effective heat dissipation is therefore essential to ensure long service life and operational reliability.

As well as the components shown below, Pixus also offers a range of other 482.6 mm (19") cooling systems and rack-mounted fans.

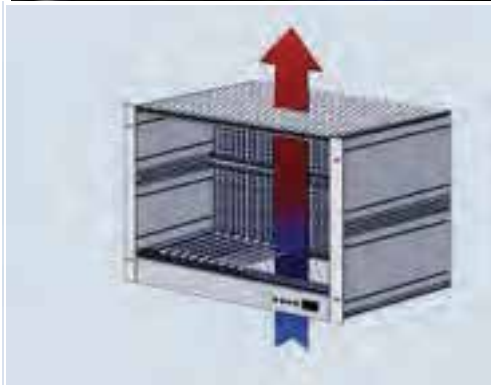


### Diagonal cooling

The air baffle plate in combination with..

... the air block panel ensures targeted air routing inside the subrack.

**RiCool high-capacity fan** for heat losses of 700 W or more.



### CFD (Computational Fluid Dynamics)

With the aid of CFD, climate control solutions may be optimised even before the first prototype has been built.

The Pixus portfolio of services includes:

- Visualisation of temperature variations
- Visualisation of air flows
- Localisation and elimination of heat accumulation and hotspots
- Targeted optimisation of climate control
- Positioning of temperature sensors and smoke alarms.



### Vertical ventilation

**Rack-mounted fans** are installed below the subrack in the enclosure. This ensures permanent air circulation to prevent the formation of hotspots.

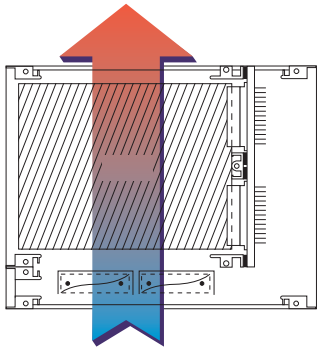
**Fans** are installed directly in the subrack, below or above the PCBs, with the aid of fan mounting plates, thereby preventing heat accumulation.

**AC and DC fans** in various output categories, can be fitted.



### Overview of benefits

- Climate control solutions for a variety of applications (vertical cooling, diagonal cooling)
- Detailed solutions for targeted air routing
- The RiCool flat-pack offers maximum performance (204 m<sup>3</sup>/h) coupled with minimal space requirements (1 U).



**Vertical cooling from bottom to top**

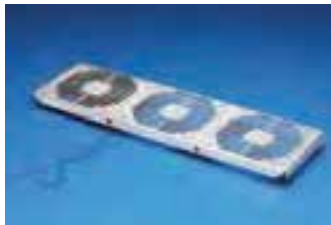
- Air flow via normal convection or forced cooling devices in the enclosure or housing outside of the subrack.

- Vertical forced air flow, supported by fans installed at the bottom of the subrack (1 U). For the cooling of enclosures and housings, rackmounted fans, see page 88 and rack-mounted cooling units are available.



**Fan mounting plate**

For the installation of 120 mm fans and filter modules in subracks. For mounting on the subrack side panels.



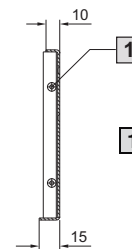
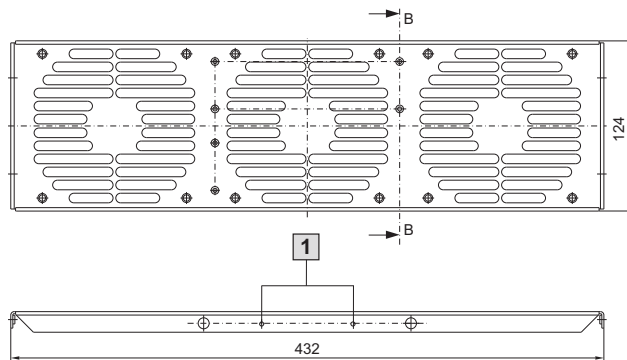
U	For PCB depth mm	No. of fan mounting plates required	HP	Model No. RP
1	160	1	84	3684.317
	220	1		
	280	2		
	340	2		
	400	3		



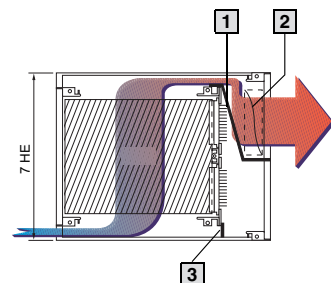
Also required:

1 terminal block is required for each subrack.

Packs of	Model No. RP
1	3686.805



**1** M3 Einpressmutter  
M3 Pem Nut



**Diagonal cooling from front to back**

Diagonal air flow from front to back allows individual cooling of PCBs in vertical installation position. An air baffle and air partition ensure controlled air flow.

- 1** Air baffle, see page 83
- 2** Fan (mounted on the rear panel), see page 85
- 3** Air partition, see page 83

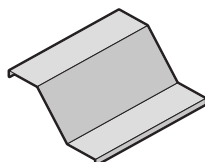
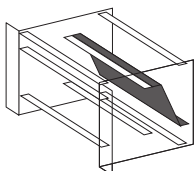


**Air baffle**

For controlled air flow in 7 U subracks.  
For mounting on subrack side panels with the aid of mounting blocks.

**Material:**  
1 mm aluminium

**Supply includes:**  
Assembly parts.



Subrack depth mm	Model No. RP
285	3685.302
345	3685.303
405	3684.320
465	3684.321
525	3684.322

Custom versions available upon request.

**! Also required:**

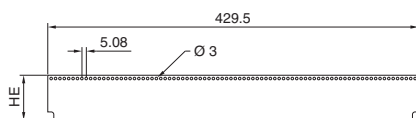
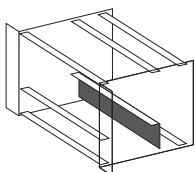
Mounting blocks, see page 125



**Air partition**

For controlled air flow in the subrack. The partitions are mounted on the horizontal rails together with the backplanes.

**Material:**  
Epoxy

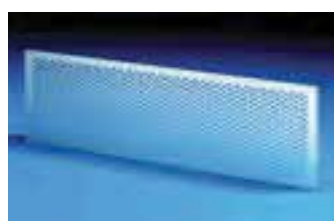


U	Model No. RP
1/2	3684.870
1	3684.871
3	3684.872

Custom versions available upon request.

**! Also required:**

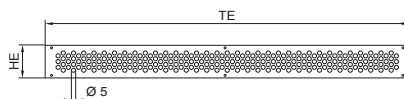
Fastening screws and washers, packs of 100, Model No. RP 3684.019, see page 159



**Front/rear panels for ventilation**

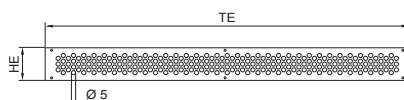
**Material:**  
2.5 mm aluminium

**Surface finish:**  
Anodised, clear-chromated (EMC version)



**EMC version supply includes:**

- 1 front panel,
- 1 contact strip,
- 1 gasket strip,
- 1 verical EMC gasket,
- assembly parts.



U (HE)	HP (TE)	Packs of	Model No. RP
1	84	1	3684.812
2	84	1	3684.813
3	84	1	3684.814

Custom versions available upon request.

**! Also required:**

Collar screws (slotted) and plastic collars, packs of 100 sets, Model No. RP 3658.160, see page 159

**EMC version:**

U (HE)	HP (TE)	Packs of	Model No. RP
1	84	1	3684.281
2	84	1	3684.282
3	84	1	3684.283

Custom versions available upon request.

**! Also required:**

Centering screws, see page 160

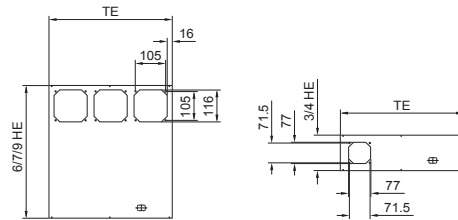
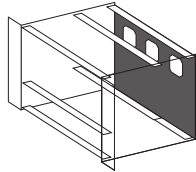


**Rear panels for fan installation**

**Material:**  
2.5 mm aluminium

**Surface finish:**  
Anodised,  
clear-chromated (EMC version)

**EMC version supply includes:**  
1 rear panel,  
1 contact strip,  
1 gasket strip,  
1 vertical EMC gasket,  
assembly parts.



U (HE)	HP (TE)	For fans mm	Packs of	Model No. RP
3	85	80	1	3684.839
4	85	80	1	3684.840
6	85	120	1	3684.841
7	85	120	1	3684.842

Custom versions available upon request.

**! Also required:**

Collar screws (slotted) and plastic collars, packs of 100 sets, Model No. RP 3658.160, see page 159

**EMC version:**

U (HE)	HP (TE)	For fans mm	Packs of	Model No. RP
3	84	80	1	3684.284
4	84	80	1	3684.285
6	84	120	1	3684.286
7	84	120	1	3684.287

Custom versions available upon request.

**! Also required:**

Centering screws, see page 160

**+ Accessories:**

Fans, see page 85



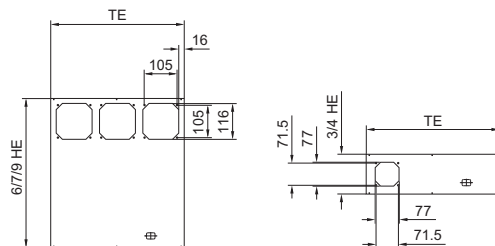
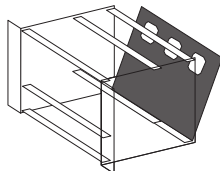
**Rear panels, horizontally hinged for fan installation**

**Material:**  
2.5 mm aluminium

**Surface finish:**  
Anodised,  
clear-chromated (EMC version)

**Supply includes:**  
1 rear panel,  
1 set of hinges,  
assembly parts.

**EMC version supply includes:**  
1 rear panel,  
1 contact strip,  
1 gasket strip,  
1 vertical EMC gasket,  
1 set of hinges,  
assembly parts.



U (HE)	HP (TE)	For fans mm	Packs of	Model No. RP
3	85	80	1	3684.304
4	85	80	1	3684.305
6	85	120	1	3684.306
7	85	120	1	3684.307

Custom versions available upon request.

**! Also required:**

Collar screws (slotted) and plastic collars, packs of 100 sets, Model No. RP 3658.160, see page 159

**EMC version:**

U (HE)	HP (TE)	For fans mm	Packs of	Model No. RP
3	84	80	1	3684.311
4	84	80	1	3684.312
6	84	120	1	3684.313
7	84	120	1	3684.314

Custom versions available upon request.

**! Also required:**

Centering screws, see page 160

**+ Accessories:**

Fans, see page 85





**AC fans**

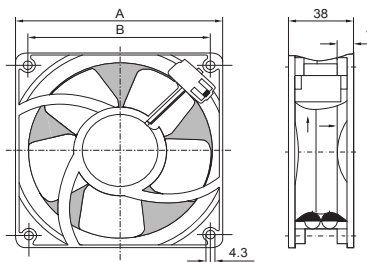
For subracks and microcomputer systems.

**Supply includes:**  
1 fan without connection cable.



**Also required:**

Assembly screws,  
packs of 1 set, Model No. RP 3685.197,  
see page 160



**AC fans**

Fan mm	Dimensions		Bearing	Rated voltage V/Hz	Power watts	Noise level dB (A)	Temperature range °C	Volume flow m³/h	Model No. RP
	A mm	B mm							
80	79.5	71.5	Ball bearing	115/60	11.0	42	-40 to +95	57	3686.645
80	79.5	71.5	Ball bearing	230/50	12.0	37	-40 to +90	48	3686.646
120	119.0	105.0	Ball bearing	115/60	18.0	51	-40 to +90	180	3686.643
120	119.0	105.0	Ball bearing	230/50	19.0	47	-40 to +85	160	3686.644

**Connection cable**

Cable length mm	Packs of	Model No. RP
610	1	3686.658
1000	1	3686.659



**DC fans**

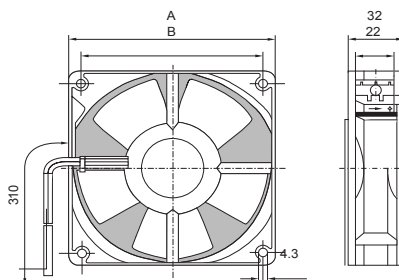
Optionally available with temperature-dependent speed control via additional temperature sensor.

**Supply includes:**  
1 fan with connection cable (310 mm).



**Also required:**

Assembly screws,  
packs of 1 set, Model No. RP 3685.197,  
see page 160  
Temperature sensor for DC fans  
with speed control,  
see page 86



**DC fan with speed control and alarm signal**

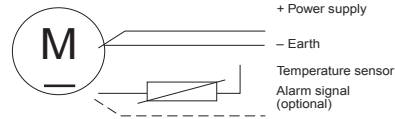
Fan mm	Dimensions		Bearing	Rated voltage V (DC)	Voltage range Volt	Power watts	Noise level dB (A)	Temperature range °C	Temperature max. °C	Volume flow m³/h	Model No. RP
	A mm	B mm									
80	79.5	71.5	Ball bearing	12	8.0 – 14.0	2.2	34	-20 to +65	65	48	3686.649
80	79.5	71.5	Ball bearing	24	21.6 – 26.4	2.4	36	-20 to +65	65	54	3686.650
120	119.0	104.8	Ball bearing	12	8.0 – 12.6	5.4	45	-20 to +65	65	170	3686.647
120	119.0	104.8	Ball bearing	24	21.0 – 27.0	5.4	45	-20 to +65	65	170	3686.648

**DC fan without speed control and without alarm signal**

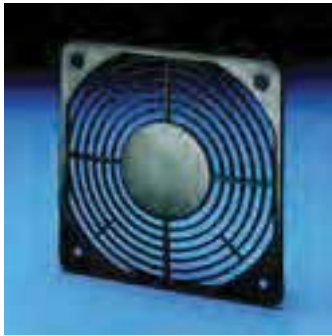
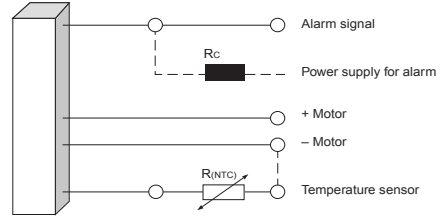
Fan mm	Dimensions		Bearing	Rated voltage V (DC)	Voltage range Volt	Power watts	Noise level dB (A)	Temperature range °C	Temperature max. °C	Volume flow m³/h	Model No. RP
	A mm	B mm									
80	79.5	71.5	Ball bearing	12	6.0 – 15.0	1.8	34	-20 to +75	75	48	3687.612
80	79.5	71.5	Ball bearing	24	12.0 – 28.0	2.1	34	-20 to +75	75	48	3687.613
120	119.0	104.8	Ball bearing	12	6.0 – 15.0	2.6	39	-20 to +75	75	140	3687.614
120	119.0	104.8	Ball bearing	24	12.0 – 28.0	2.6	39	-20 to +75	75	140	3687.615

### Temperature sensor

For DC fans 12/24 V with speed control.  
Temperature sensor:for DC fans



Voltage	Packs of	Model No. RP
12 V/24 V (DC)	1	<b>3686.657</b>



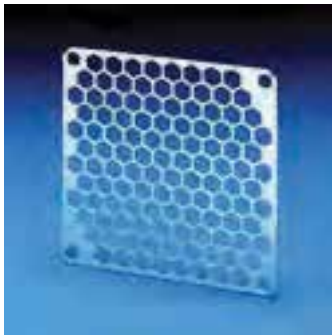
### Finger guard

For AC fans and DC fans.

**Material:**  
Polyamide, self-extinguishing to UL 94-V0

**Colour:**  
Black

For fans mm	Packs of	Model No. RP
80	1	<b>3686.656</b>
120	1	<b>3686.655</b>

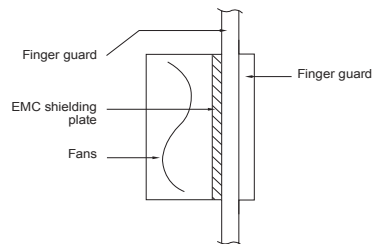


### EMC shielding plate

For AC fans and DC fans.

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

For fans mm	Packs of	Model No. RP
80	1	<b>3686.359</b>
120	1	<b>3686.329</b>



### Air block panel for unused slots see page 131



Supercool, Hot Swappable RiCool System Blowers...

# COOL SOLUTIONS.

Cool Off With Rittal RiCool.

Rittal Ripac has literally set the standard for packaging solutions. And our new RiCool Blower Assembly helps to keep the innovations coming. These supercool, hot swappable blowers deliver 220CFM system airflow at 70% efficiency (versus 20% when using typical 4.7" tubeaxial muffin fans) in only a 1U form factor. RiCool is an ideal solution for systems with PCBs exceeding 35W to 70W (average at 21 slots) heat loss and requiring a hotplug redundant blower. In addition, Rittal also offers a wide variety of conventional AC and DC fan solutions for applications which do not exceed 30W (average at 21 slots) heat dissipation. So when things heat up, cool them off with Rittal Ripac cooling solutions.



A photograph of a Rittal RiPAC server rack. The rack is open, revealing several server units. The top unit has a large, circular cooling fan with a black grille. Below it, there are more server units with various components visible. The rack is made of dark metal. The background is a gradient of blue and white.

# RITTAL RIPAC

## **RiCool Blower Assembly**

RiCool data and specifications ..... Pages 90 - 91

## **Conventional AC/DC Tubeaxial Muffin Fan Cooling**

Methods A, B, C and D ..... Pages 92

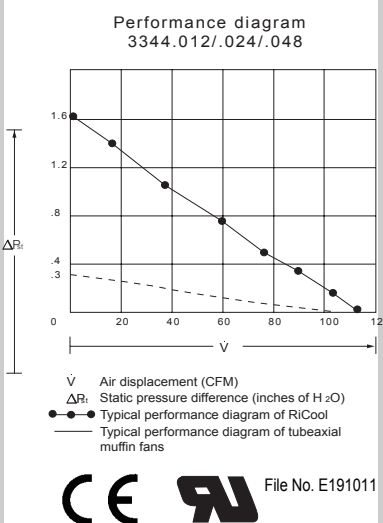
Conventional AC/DC fans ..... Pages 93



The powerful RiCool blower assembly is specially designed to provide effective cooling in densely packed systems where the average board has a heat loss of above 30 Watts at 21 slots and performs well at an average heat loss at 70W per PCB (at 21 slots). Low noise (48dBa at <sup>3</sup>/<sub>4</sub> speed and a life of approx. 60,000 hrs at 40°C) makes this blower the ideal solution for today's systems.

Air is drawn through the PCBs and then exhausted out the back of the system via a powerful curved impeller blower, while using only 1U rack space.

Especially effective for such applications as telecommunications where rack height restrictions exist. Also targeted for industrial and scientific research applications.



**Features And Benefits**

- Uses only 1U of rack height
- Available in 12V, 24V and 48V DC
- Fan alarm via fan speed sensor
- Optional speed control
- Designed to move air effectively through densely packed subracks
- Easy access
- Hot swappable for fast and easy maintenance
- No extra ducting required
- Ability to use two blowers in 19" applications
- Locked rotor protection
- Polarity protection
- Automatic restart capability

**Configuration**

**Material:**  
Clear zinc chromate steel housing

**Includes:**  
Complete fan assembly: weight 5 lbs. ready for mounting in subrack, with Molex 15-06-0061 6 pin male mini-fit connector

**Airflow Direction:**  
Exhausts outward from back of subrack

**Power Consumption:**  
48W

**Operating Temperature:**  
-10°C to +60°C / +14°F to +140°F

**RiCool Blower Performance Data**

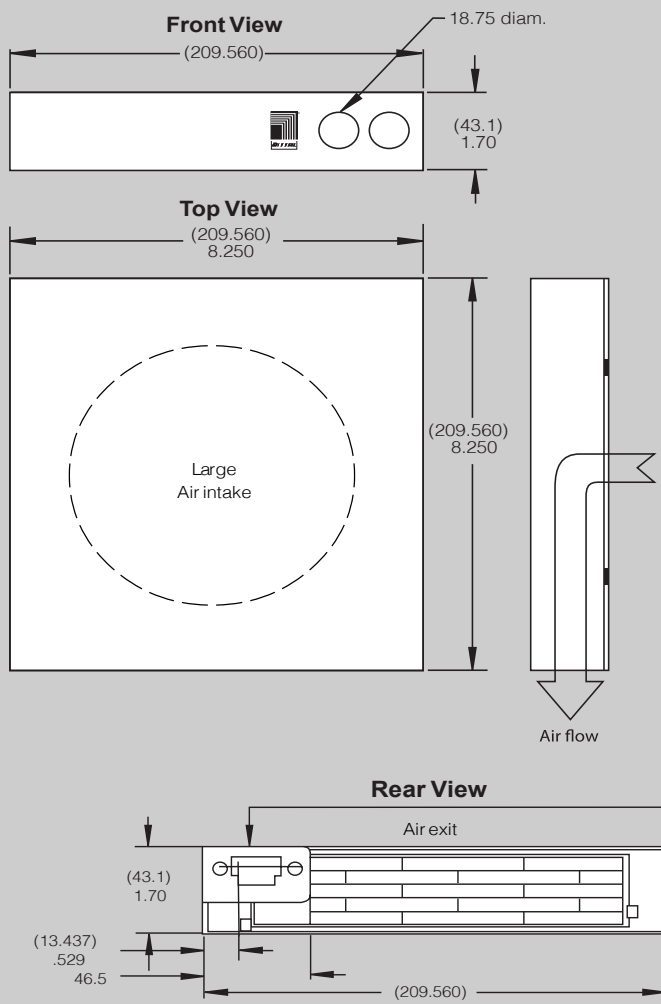
- CFM..... 110CFM (190m<sup>3</sup>/h)
- Static pressure ..... 4.07 CM (1.6 inch) of H<sub>2</sub>O
- Voltages ..... 12, 24, 48V DC
- Rated current ..... 4, 2, 1 Amps
- Noise level free blowing .. 56.2dBa
- Weight ..... 5 lbs. (2.3 Kg)

**RiCool Blower Construction**

- Housing ..... Cold rolled steel
- Impeller ..... Noryl™ 94V0
- Bearing ..... Ball bearing
- Power/alarm connector ..... Molex15-06-0061
- Alarm signal ..... rpm sensor
- Life at full speed ... 60,000 hrs @ 40°C  
50,000 hrs @ 50°C

Please inquire for separate AC/DC RiCool power supply.

RiCool is also available in 19" blower trays (see inset photo at top). Please note that the airflow, power consumption, rated current and weight are double for the 19" fan trays.



**Thermistors needed for RiCool speed control:**

PTC thermistor for 12V **Part No. 3686887**

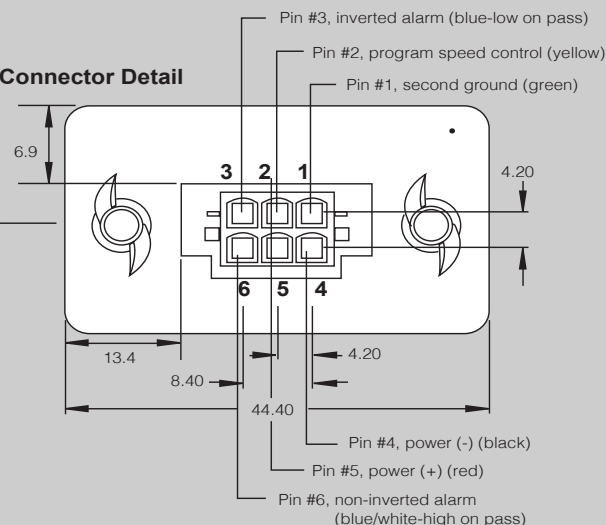
PTC thermistor for 24V **Part No. 3686888**

PTC thermistor for 48V **Part No. 3686889**

**Note:** the thermistor comes with a 600mm(2') cable.

Pin Location Description	
Pin #1, second motor ground	(green)
Pin #2, program speed control	(yellow)
Pin #3, inverted alarm	(blue-low on pass)
Pin #4, power (-)	(black)
Pin #5, power (+)	(red)
Pin #6, non-inverted alarm	(blue/white-high on pass)

**Connector Detail**



**Individual RiCool Blowers**

Part No.	3344.012	3344.024	3344.048
Voltage	12V DC(6-14V)	24V DC(16-28V)	48V DC(32-56V)
Airflow (free airdelivery)	110CFM/190m <sup>3</sup> /h	110CFM 190m <sup>3</sup> /h	110CFM190m <sup>3</sup> /h
Power consumption	48W	48W	48W
Rated current	4.0A	2.0A	1.0A
Noise level (dB <sub>A</sub> )	56dB <sub>A</sub>	56dB <sub>A</sub>	56dB <sub>A</sub>
Temperature range	-10 °C to +60°C	-10°C to +60°C	-10°C to +60°C
Weight	5 lb. (2.3 kg)	5 lb. (2.3 kg)	5 lb. (2.3 kg)
Power/alarm connector	Molex 15-06-006	Molex 15-06-006	Molex 15-06-0061
Alarm signa	rpm sensø, non-isolated, high on pas	rpm sensø, non-isolated, high on pas	rpm sensø, non-isolated, high on pass

**Alarm Characteristics**

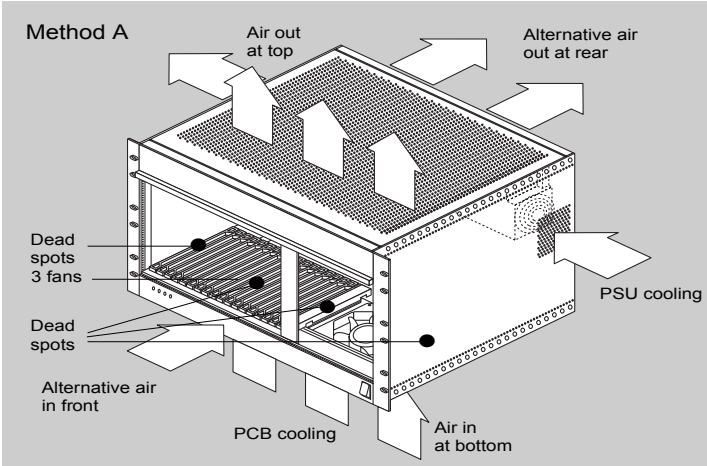
- Pin #3 inverted alarm, max load of 0.05A at 60V DC
- Pin #6 non-inverted alarm, max load of .015A at 5.5V DC
- Trigger speed at 40% of max speed
- 10 second signal delay
- Alarm condition causes +5V DC rise in supply voltage measured between pin #3 and pin #1
- Customer supplied pull-up resistor at interfacing alarm required to limit current to blower alarm circuit

**19" RiCool Blower Trays**

Part No.	3686.879	3686.880	3686.881
Voltage	12V DC(6-14V)	24V DC(16-28V)	48V DC(32-56V)
Airflow (free airdelivery)	220CFM/380m <sup>3</sup> /h	220CFM/380m <sup>3</sup> /h	220CFM/380m <sup>3</sup> /h
Power consumption	96W	96W	96W
Rated current	8.0A	4.0A	2.0A
Noise level (dB <sub>A</sub> )	56dB <sub>A</sub>	56dB <sub>A</sub>	56dB <sub>A</sub>
Temperature range	-10 °C to +60°C	-10°C to +60°C	-10°C to +60°C
Weight	10 lb. (4.6 kg)	10 lb. (4.6 kg)	10 lb. (4.6 kg)
Power/alarm connector	Molex 15-06-006	Molex 15-06-006	Molex 15-06-0061
Alarm signa	rpm sensø, non-isolated, high on pas	rpm sensø, non-isolated, high on pas	rpm sensø, non-isolated, high on pass

# Conventional AC/DC Tubeaxial Muffin Fans....

## SYSTEM COOLING

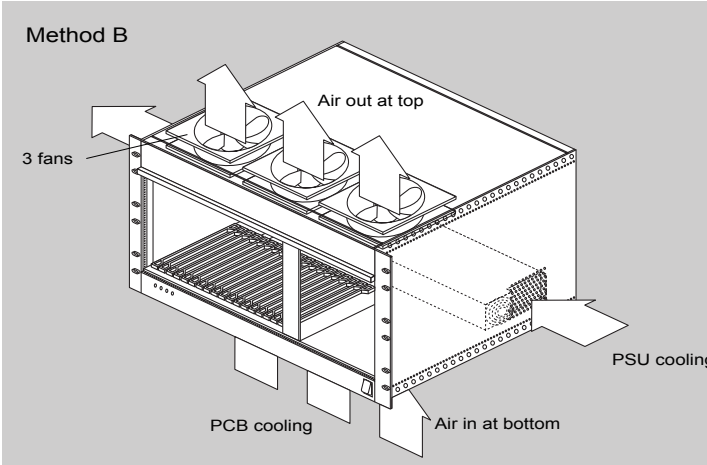


### System Cooling Method A

Method A is the most common way of system cooling and good for PCBs which do not exceed 30 Watt heat dissipation, since the fans have a “dead” spot over the center of the fan and typically “dead” spots between the fans (4 dead spots) at 21 slots. It is advisable to place the fans at least 50mm (2”) below the boards so that the air can “fan” out, thus air will reach all parts of the boards (this will add overall system height).

The efficiency of these tubeaxial muffin fans operating at maximum generated 7.62mm/0.3” of H<sub>2</sub>O of static pressure under these conditions may be as little as 20%. An additional metal fan chassis design is required making replacement of failed fans difficult and time consuming.

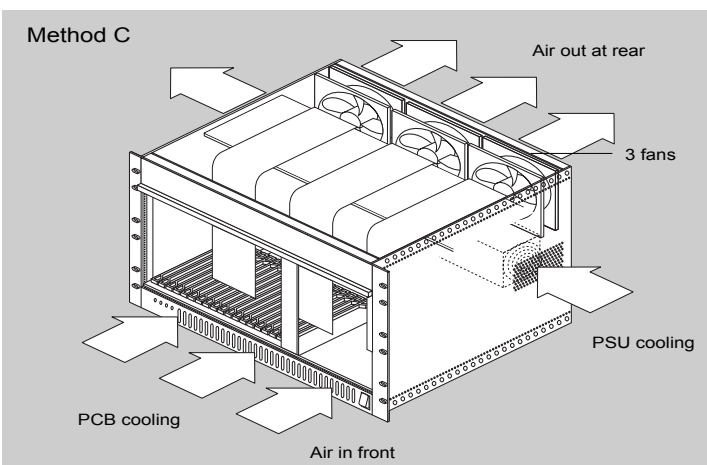
System shut down at fan replacement may be required.



### System Cooling Method B

Method B is not often used, as the fans may be in the way of top mounted drives, power supplies, etc.

However, this method is an improvement over Method A, as the efficiency of these muffin fans may be as much as 30%. The reason is there are no dead spots to deal with and less back pressure. However, the maximum generated static pressure of the tubeaxial muffin fans remains at 7.62mm/0.3” of H<sub>2</sub>O.



### System Cooling Method C

Method C is perhaps the most popular for VME solutions. However, it is not suitable when extensive rear panel I/O or CompactPCI rear mounted I/O boards are used.

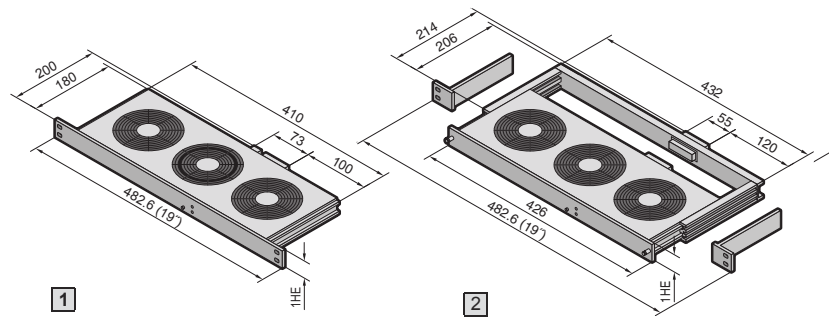
Fan efficiency is approx 30%.

### The RiCool Advantage Method D

The ability of the RiCool blower to generate 40.64mm/1.6” (H<sub>2</sub>O) of static pressure confirms that the RiCool blower is able to provide effective cooling in densely packed enclosures and subracks. By comparison, a typical 19” rackmount fan tray, consisting of (3) 4.7” x 4.7” 18W (110CFM at free delivery) fans, generates only 0.22”-0.40” (H<sub>2</sub>O) of static pressure. The estimated (operating) static pressure point of a fan assembly mounted inside a fully loaded subrack is 0.3-0.5” (H<sub>2</sub>O). Under those conditions one RiCool blower assembly provides at least 40% higher airflow than a typical 19” rackmount fan tray with 3 tubeaxial muffin fans.



## Rackmounted fan 482.6 mm (19")



**Rack-mounted fan/  
Vario rack-mounted fan**  
supply includes:  
Wired unit ready for connection,  
including terminal strip and  
assembly parts.

**Guide frame supply includes:**  
Guide frame including connector and fitted connection  
cable (3 m), bracket for  
optional attachment to the  
482.6 mm (19") system,  
assembly parts.

**! Also required:**  
Remember to order the  
appropriate guide frame for  
your chosen application.

	1] Rack-mounted fan module					2] Vario rack-mounted fan			
	Model No. SK					Model No. SK			
2 fans Distance between axes 85 mm	3340.024 <sup>1)</sup>	3340.115 <sup>1)</sup>	3340.230	–	–	3350.024 <sup>1)</sup>	3350.115 <sup>1)</sup>	3350.230	–
3 fans Distance between axes 85 mm	3341.024 <sup>1)</sup>	3341.115	3341.230	–	9769.002 <sup>1)2)</sup>	3351.024 <sup>1)</sup>	3351.115 <sup>1)</sup>	3351.230	–
3 fans Distance between axes 105 mm	3342.024	3342.115 <sup>1)</sup>	3342.230	3342.500 <sup>2)3)</sup>	–	3352.024 <sup>1)</sup>	3352.115 <sup>1)</sup>	3352.230	3352.500 <sup>1)3)</sup>
Rated operating voltage V	24 V (DC)	115 V (AC)	230 V (AC)	24 V (DC) 115 – 230 V (AC)	36 V (DC) up to 72 V (DC)	24 V (DC)	115 V (AC)	230 V (AC)	24 V (DC) 115 – 230 V (AC)
Model No. SK matching guide frame	–	–	–	–	–	3356.100 <sup>1)</sup>	3355.100	3355.100	3357.100 <sup>1)</sup>
<b>Accessories</b>	<b>Page</b>								
Temperature indicator 230 V (AC)	3114.100	3114.115	3114.100	3114.024	–	3114.100	3114.115	3114.100	3114.024
Thermostat	3110.000								
Speed control	3120.000	3120.115	3120.000	–	–	3120.000	3120.115	3120.000	–

<b>Technical specifications</b>									
Model No. SK/CS	3340.230 3350.230	3340.115 3350.115	3340.024 3350.024	3341.230 3351.230 3342.230 3352.230	3341.115 3351.115 3342.115 3352.115	3341.024 3351.024 3342.024 3352.024	3342.500 <sup>2)</sup> 3352.500 <sup>2)</sup>	9769.002	
Rated operating voltage V, Hz	AC 230 V 50/60 Hz	AC 115 V 50/60 Hz	DC 24 V	AC 230 V 50/60 Hz	AC 115 V 50/60 Hz	DC 24 V	DC 24 V AC 115 – 230 V 50/60 Hz	36 V (DC) up to 72 V (DC)	
Rated current max.	0.24 A/ 0.22 A	0.46 A/ 0.46 A	0.49 A	0.36 A/ 0.33 A	0.69 A/ 0.69 A	0.74 A	0.85 A	0.28 A	
Pre-fuse T	6.0 A								6.0 A
Number of fans	2			3				3	
Air throughput, unimpeded air flow	320 m <sup>3</sup> /h			480 m <sup>3</sup> /h				250 m <sup>3</sup> /h	
Temperature range	–10°C to +55°C								–33°C to +55°C
Noise level	51 dB (A)	52 dB (A)	51 dB (A)	51 dB (A)	52 dB (A)	51 dB (A)		52 dB (A)	

<sup>1)</sup> Delivery times available on request.

<sup>2)</sup> Rack-mounted fan for metric mounting angles available on request.

<sup>3)</sup> Version with monitoring.





## Cases, Subracks, & Rittal Brand Components



### Instrumentation Cases

Pixus provides modular cases, sold as kits or assembled, for the electronics packaging of your instrumentation solution and specialty electronics. There are rackmount and desktop versions with a wide selection of configurations, sizes, and accessories utilizing Rittal brand enclosure components (including Vario, Kaparel, RiPac, and RiCase brands). Accessories include mounting kits, earthing kits, flanges for rackmount, feet, front handles, EMC gasketing, and panels.



Heat shortens the service life of equipment leading to failure, and also diminishes the high performance of electronics. The problem lies in high heat losses and compact installation spaces. Effective heat dissipation is therefore essential to ensure long service life and operational reliability.

As well as the components shown below, Pixus also offers a range of other 482.6 mm (19") cooling systems and rack mounted fans.

### Rittal Brand Components – Subracks & Components

Pixus offers the Rittal brand components for standard embedded boards, subracks, enclosures, cases, etc in individual piece parts. This includes rails, card guides, panels/handles, fillers, and much more.

# Pixus Technologies Subrack Systems

EMC	U									Subracks	Design	Page
	1	2	3	4	5	6	7	9				
			■			■				Ripac Easy	aluminium	101
			■			■		■		Ripac Vario	aluminium	102
				■				■		Ripac Vario	aluminium	103
■			■			■		■		Ripac Vario EMC	aluminium	104
■				■				■		Ripac Vario EMC	aluminium	105
			■			■				Ripac Compact	aluminium	106
			■			■				Ripac Vario Mobil	aluminium	107

EMC	U									Subracks, individual components	Page
	1	2	3	4	5	6	7	9			
										Table of horizontal rails	108
			■	■		■	■	■		Side panels and flanges	110
										Horizontal rails	113

EMC	U									Subrack accessories	Page
	1	2	3	4	5	6	7	9			
	■	■	■	■		■	■	■		Components for EMC installation	124
						■		■		Mounting kits	126
										Guide rails	127
										Keying/PCB ejectors	132
										Covers	133
										Subrack climate control	88
										Front panels, handles	139
			■			■				Ripac box type plug-in units	156
										Assembly parts	159

# Overview

## Ripac EASY



**For standard applications or demanding mechanical requirements**  
see page 101

### Applications

Subrack system for standard applications or for high mechanical loads. Also suitable for applications requiring simple handling and fast assembly. Suitable for the installation of standardised PCBs or board type plug-in units up to 400 mm deep.

### Design features

- 482.6 mm (19") to IEC 60 297-3
- Height: 3 and 6U
- For board depth: 160 mm, 220 mm, 280 mm, 340 mm, 400 mm
- Fast, simple assembly thanks to pre-assembled screws and slots in the side panels
- Cover plates simply slide into place
- Horizontal rails with double screw-fastening
- Material: Aluminium, corrosion-resistant
- Mounting positions for horizontal rails on a 60 mm pitch pattern
- Horizontal rails at the rear with integral contact surface
- Installation of backplanes/midplanes or connectors
- Separate 482.6 mm (19") gland plate

### User benefits

- Simple, fast assembly thanks to pre-assembled screws
- Slide-in cover plates
- Horizontal rails with integral contact surface (no insulating strips required)
- Double screw-fastening of the horizontal rails ensures stability even under heavy loads



## Ripac Vario



**For standard applications or complex configurations**  
see pages 102-103

### Applications

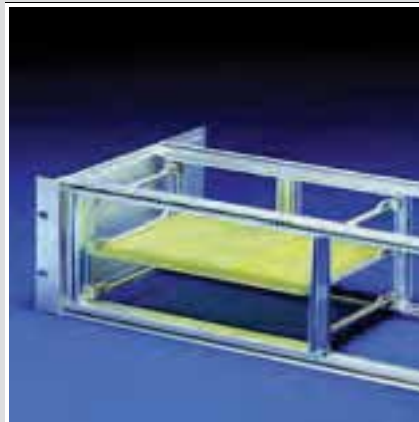
Subrack system for standard applications or complex configurations. Suitable for the installation of standardised PCBs or board type plug-in units up to 400 mm deep.

### Design features

- 482.6 mm (19") rack-mount system to IEC 60 297-3
- 3, 4, 6, 7 and 9U
- For board formats up to 400 mm deep
- Side panels of aluminium, clear-chromated
- Mounting positions for horizontal rails on a 10 mm pitch pattern
- Installation of backplanes/midplanes or connectors
- Separate 482.6 mm (19") gland plate

### User benefits

- Side panels with 10 mm pitch pattern of holes for variable system installation
- EMC upgradable
- 482.6 mm (19) gland plate may optionally be mounted on the front or rear
- Many size variants available as standard
- For backplane or connector mounting
- Extensive range of accessories



## Ripac Vario EMC



**For EMC applications and complex configurations**  
see pages 104-105

### Applications

Subrack system for EMC applications or complex configurations. Suitable for the installation of standardised PCBs or board type plug-in units up to 400 mm deep.

### Design features

- 482.6 mm (19") EMC rack-mount system to IEC 60 297-3
- 3, 4, 6, 7 and 9U
- For board formats up to 400 mm deep
- Side panels of aluminium, clear-chromated
- Mounting positions for horizontal rails on a 10 mm pitch pattern
- Installation of backplanes/midplanes or connectors
- Separate 482.6 mm (19") gland plate
- Including EMC springs

### User benefits

- EMC version
- Side panels with 10 mm pitch pattern of holes for variable system installation
- 482.6 mm (19) gland plate may optionally be mounted on the front or rear
- Many size variants available as standard
- For backplane or connector mounting
- Extensive range of accessories



## Overview

### Ripac Compact



For mounting plates or top hat rails  
see page 106

#### Applications

Subrack system for direct mounting in the enclosure. May optionally be mounted on a top hat rail or mounting plate. Suitable for the installation of standardised PCBs or board type plug-in units.

#### Design features

- Rack-mount system to IEC 60 297-3
- Prepared for mounting on top hat rails or directly on the mounting plate
- 3 and 6U
- For board formats up to 160 mm deep
- Installation width: 21 and 42 HP
- Side panels of aluminium, clear-chromated
- Installation of backplanes/midplanes

#### User benefits

- Direct mounting on mounting plates or rails
- Variable cable entry from below or above
- Side panels with 10 mm pitch pattern of holes for variable system installation
- For backplane mounting
- EMC version optional



### Ripac Vario Mobil



For mobile applications  
see page 107

#### Applications

Subrack system for use in rail vehicles. Suitable for the installation of standardised PCBs or board type plug-in units.

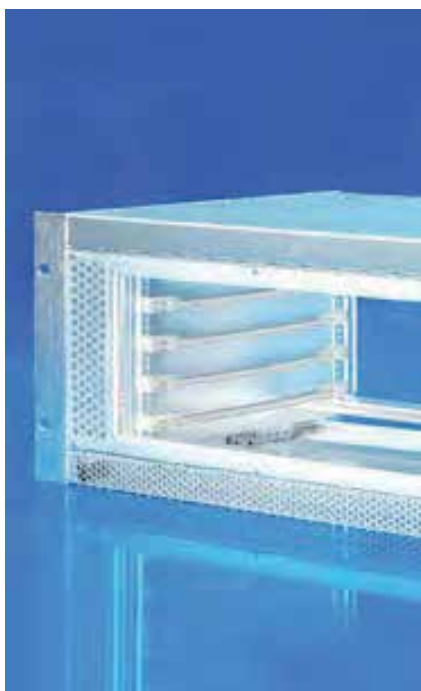
#### Design features

- 482.6 mm (19") rack-mount system to IEC 60 297-3
- Tested to EN 50 155, 1996 (electronic equipment for rail vehicles)
- 3 and 6U
- For board formats up to 220 mm deep
- Side panels of aluminium, clear-chromated
- Installation of backplanes/midplanes or connectors
- Fully assembled

#### User benefits

- Suitable for use in rail vehicles
- EMC versions available
- Side panels with 10 mm pitch pattern of holes for variable system installation
- Fully assembled
- For backplane or connector mounting





### Ripac Vario/Vario EMC

Complex applications thanks to numerous size variants and system accessories.

**Depth-variable system installation** is supported by the 10 mm pitch pattern of holes in the side panels.

**EMC shielding** via horizontal and vertical EMC gaskets. Also suitable for retrofitting (with Ripac Vario).

### Ripac Vario Mobil

- The subracks have been tested for use in the German national railway. Testing was conducted in accordance with standard EN 50 155, 1996 (electronic equipment in rail vehicles). The construction of the subracks tested conforms to IEC 48D.
- Vibration and shock-tested to: IEC 600-68-2-6, test Fc  
IEC 600-68-2-27, test Ea
- Supply includes:  
Subrack, fully assembled.

### Ripac Compact

Subracks for mounting on mounting plates or top hat rails.



### Ripac EASY

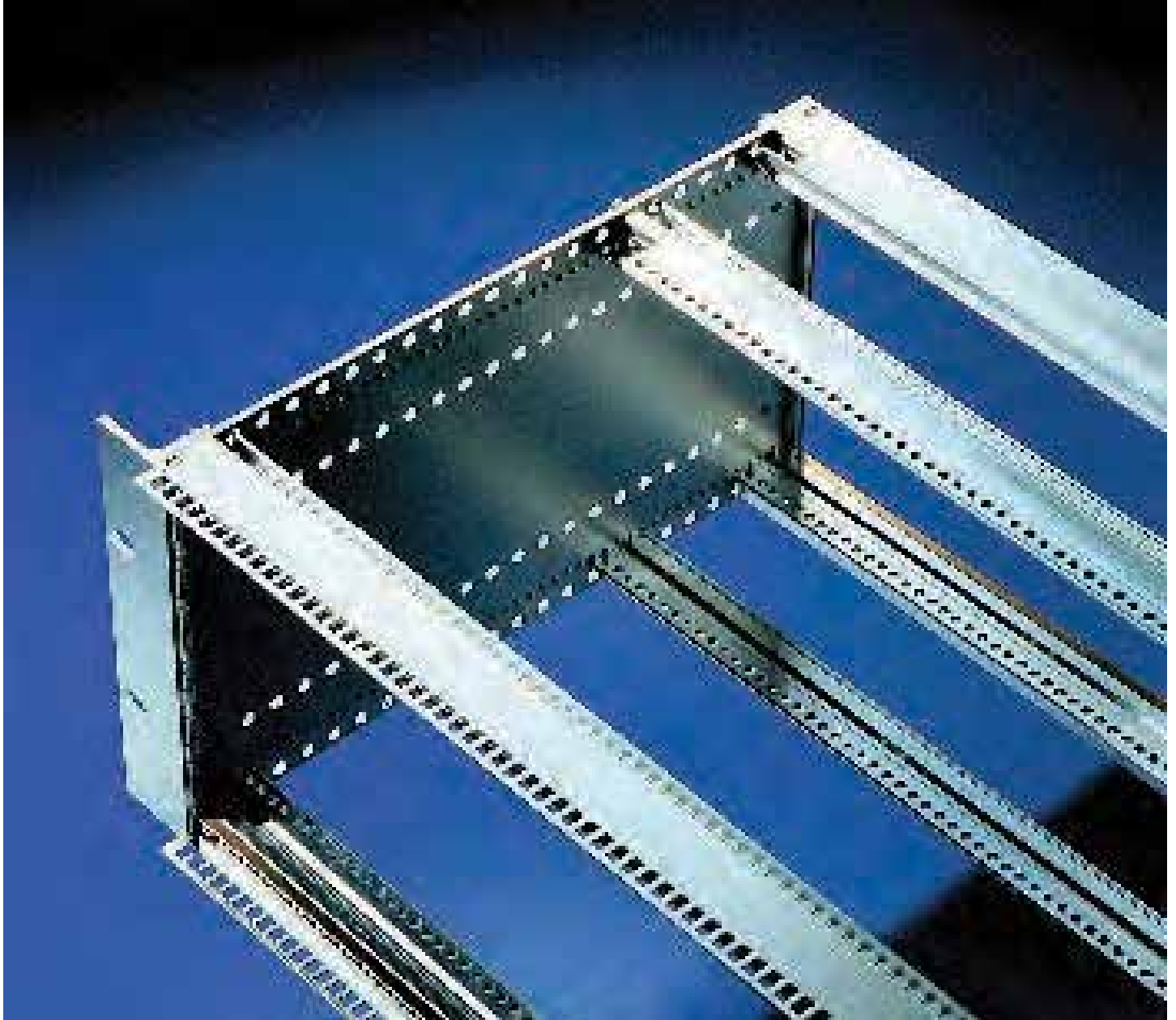
Simple handling thanks to pre-assembled screws. Double screw-fastening of the rails ensures safety even under heavy loads



### Overview of benefits

- Modular subrack systems for individual configuration
- 5 basic versions for a variety of application areas
- Horizontal rails and accessories to fit all variants
- Prepared for or upgradable to EMC
- Fully assembled and wired on request
- Vibration and shock-tested

# Ripac EASY



The modular concept of Ripac subracks facilitates a wide range of application options with a minimum of components.

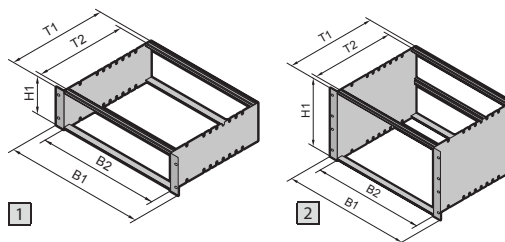
All Ripac subracks are based on the same horizontal rails and system components.

The difference lies in the design of the side panels and installation options.

The subracks are shock and vibration-tested and comply with IEC 60 297-3-101, -102, -103.



# Ripac EASY 3U, 6U



**Material/Surface finish:**

Side panels:  
2 mm aluminium, corrosion-resistant

Horizontal rails:  
Extruded aluminium section, corrosion-resistant  
Flanges: Pre-anodised

**Supply includes:**

Side panels, flanges, horizontal rails, threaded inserts, assembly screws.  
Rear horizontal rails (C4, C5) including prefitted assembly screws,  
front horizontal rails (A2) including prefitted assembly screws and threaded inserts.

**Tests:**

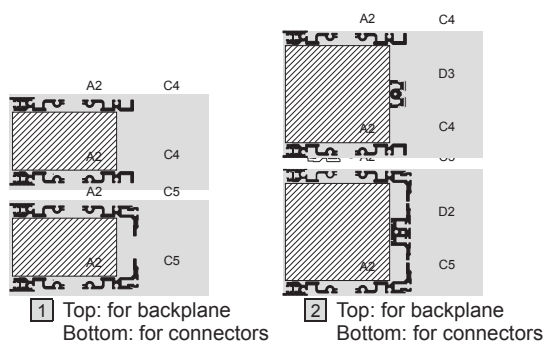
Vibration and shock-tested to:  
IEC 600-68-2-6 test Fc  
IEC 600-68-2-27 test Ea

**Standards:**

Sub racks are based on the system dimensions of IEC 60 297-3.

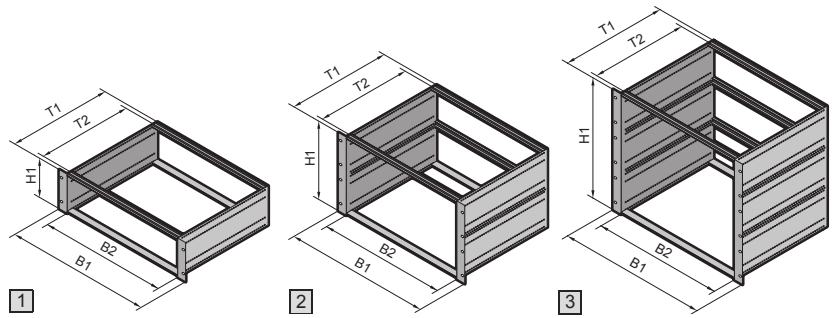
**Note:**

The backplanes may be fitted in direct contact with the rear horizontal rails.  
No additional insulating strips are required.



Custom configuration available upon request.

					Model No. RP				Page	
					1			2		
U (H1)					3			6		
B1 mm	B2 HP	Side panel (T1) mm	T2 mm	Max. PCB depth mm	For backplane	For connector IEC 60 603-2	For backplane	For connector IEC 60 603-2		
482.6 (19")	84	175	160	160	3634.100	3634.150	3634.180	3634.230		
		235	220	220	3634.110	3634.160	3634.190	3634.240		
		295	280	280	3634.120	3634.170	3634.200	3634.250		
		355	340	340	3634.130	-	3634.210	-		
		415	400	400	3634.140	-	3634.220	-		
<b>Accessories</b>										
Covers									135	
Horizontal rails									113	
Guide rails									127	



**EMC** upgradable

B = Width  
H = Height  
T = Depth

**Material/Surface finish:**

Side panels:  
2.5 mm aluminium,  
clear-chromated  
482.6 mm (19") flanges and  
horizontal rails:  
Extruded aluminium section,  
clear-chromated

**Supply includes:**

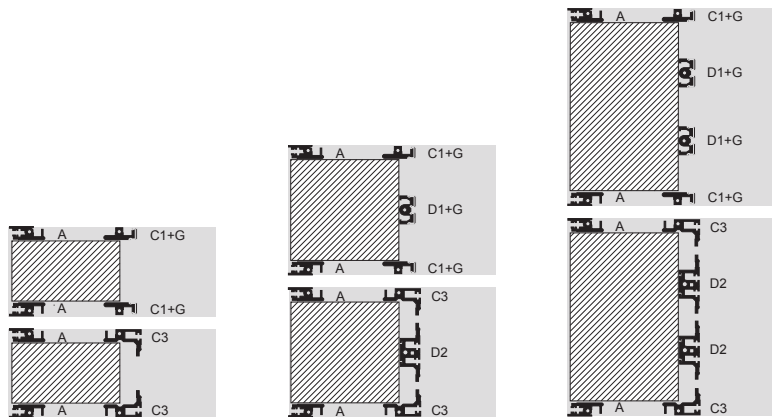
Flanges, side panels, horizontal  
rails, threaded inserts,  
insulating strips or Z rails.

**Tests:**

Vibration and shock-tested to:  
IEC 600-68-2-6 test Fc  
IEC 600-68-2-27 test Ea

**Standards:**

Ripac subracks are based  
on the system dimensions  
of IEC 60 297-3.



**1** Top: for backplane  
Bottom: for connectors

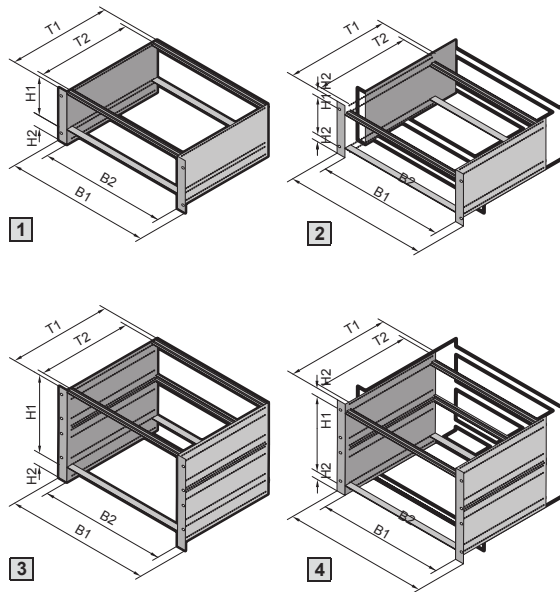
**2** Top: for backplane  
Bottom: for connectors

**3** Top: for backplane  
Bottom: for connectors

Custom configuration available upon request.

					Model No. RP					
					1		2		3	
U					3	3	6	6	9	9
Height (H1) mm					132		265.35		398.70	
B1 mm	B2 HP	Side panel (T1) mm	T2 mm	Max. PCB depth mm	For backplane	For connector IEC 60 603-2	For backplane	For connector IEC 60 603-2	For backplane	For connector IEC 60 603-2
482.6 (19")	84	185	160	160	3684.020	3684.034	3684.043	3684.056	-	-
		225	200	160	3684.021	3684.035	3684.044	3684.057	-	-
		245	220	220	3684.022	3684.036	3684.045	3684.058	-	-
		285	260	220	3684.023	3685.281	3684.046	-	-	-
		305	280	280	3685.231	3685.233	3685.238	3685.240	-	-
		345	320	280	3684.024	-	3684.047	-	3684.051	3684.059
		365	340	340	3685.232	3685.234	3685.239	-	-	-
		405	380	340	3684.025	-	3684.048	-	3684.052	3684.060
		465	440	400	3684.026	-	3684.049	-	3684.053	3684.061
		525	500	400	3684.027	-	3684.050	-	3684.054	-
585	560	400	-	-	-	-	-	3684.055	-	

# Ripac Vario 4U, 7U



B = Width  
H = Height  
T = Depth

**Material/Surface finish:**

Side panels:  
2.5 mm aluminium,  
clear-chromated  
482.6 mm (19") flanges and  
horizontal rails:  
Extruded aluminium section,  
clear-chromated

**Supply includes:**

Flanges, side panels, horizontal  
rails, threaded inserts,  
insulating strips or Z rails.

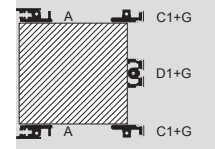
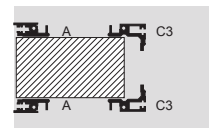
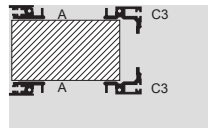
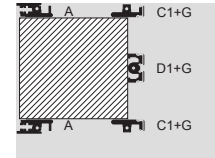
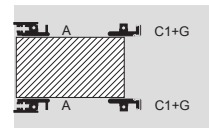
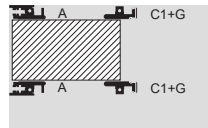
**Tests:**

Vibration and shock-tested to:  
IEC 600-68-2-6 test Fc  
IEC 600-68-2-27 test Ea

**Standards:**

Ripac subracks are based  
on the system dimensions  
of IEC 60 297-3.

**EMC** upgradable



**1** Top: for backplane  
Bottom: for connectors

**2** Top: for backplane  
Bottom: for connectors

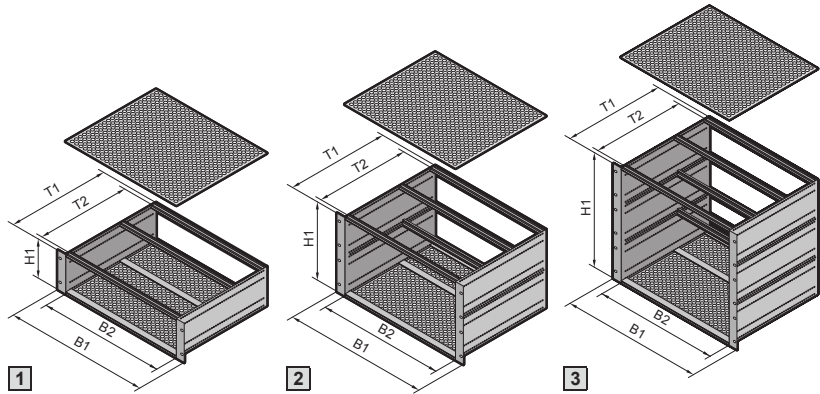
**3** Top: for backplane  
(6U + 1U)

**4** Bottom: for backplane  
(6U + 2 x 1/2U)

Custom configuration available upon request.

					Model No. RP					
					<b>1</b>		<b>2</b>		<b>3</b>	<b>4</b>
U (H1 + H2)					4 (3 + 1)	4 (3 + 1)	4 (3 + 2 x 1/2)	4 (3 + 2 x 1/2)	7 (6 + 1)	7 (6 + 2 x 1/2)
B1 mm	B2 HP	Side panel (T1) mm	T2 mm	Max. PCB depth mm	For backplane	For connector IEC 60 603-2	For backplane	For connector IEC 60 603-2	For backplane	For backplane
482.6 (19")	84	245	220	220	<b>3685.235</b>	—	—	—	—	—
		285	260	220	<b>3684.028</b>	<b>3684.037</b>	<b>3684.031</b>	<b>3684.040</b>	—	—
		305	280	280	<b>3685.236</b>	—	—	—	—	—
		345	320	280	<b>3684.029</b>	<b>3684.038</b>	<b>3684.032</b>	<b>3684.041</b>	—	—
		365	340	340	<b>3685.237</b>	—	—	—	—	—
		405	380	340	<b>3684.030</b>	<b>3684.039</b>	<b>3684.033</b>	<b>3684.042</b>	<b>3684.064</b>	<b>3684.062</b>
		465	440	400	—	—	—	—	<b>3684.065</b>	<b>3684.063</b>

# Ripac Vario EMC 3U, 6U, 9U



B = Width  
H = Height  
T = Depth

**Material/Surface finish:**

Side panels:  
2.5 mm aluminium,  
clear-chromated  
Flanges and horizontal rails:  
Extruded aluminium section,  
clear-chromated  
Covers: Aluminium, unplated

**Supply includes:**

Flanges, rear trim, side panels,  
EMC gaskets, covers, mounting  
blocks, horizontal rails,  
insulating strips.

**Tests:**

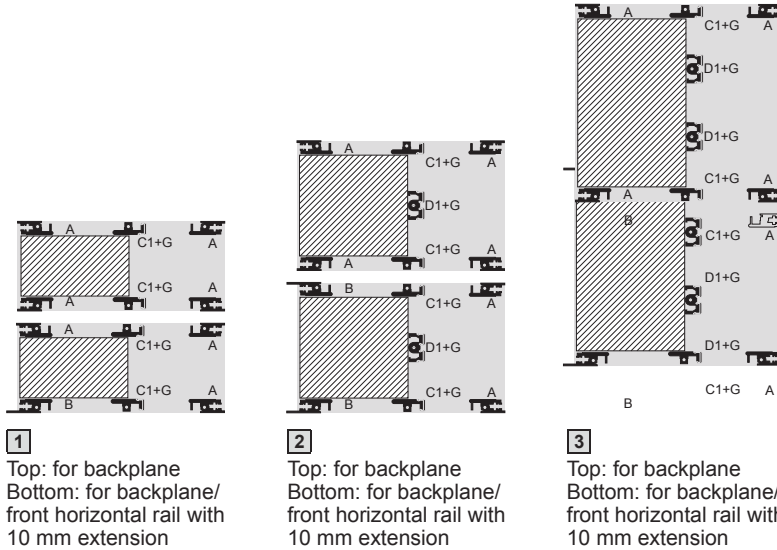
Vibration and shock-tested to:  
IEC 600-68-2-6 test Fc  
IEC 600-68-2-27 test Ea

**Standards:**

Ripac sub racks are based  
on the system dimensions  
of IEC 60 297-3.

**Detailed drawing,**  
see page 182.

**EMC diagram,**  
see page 194.



**1**  
Top: for backplane  
Bottom: for backplane/  
front horizontal rail with  
10 mm extension

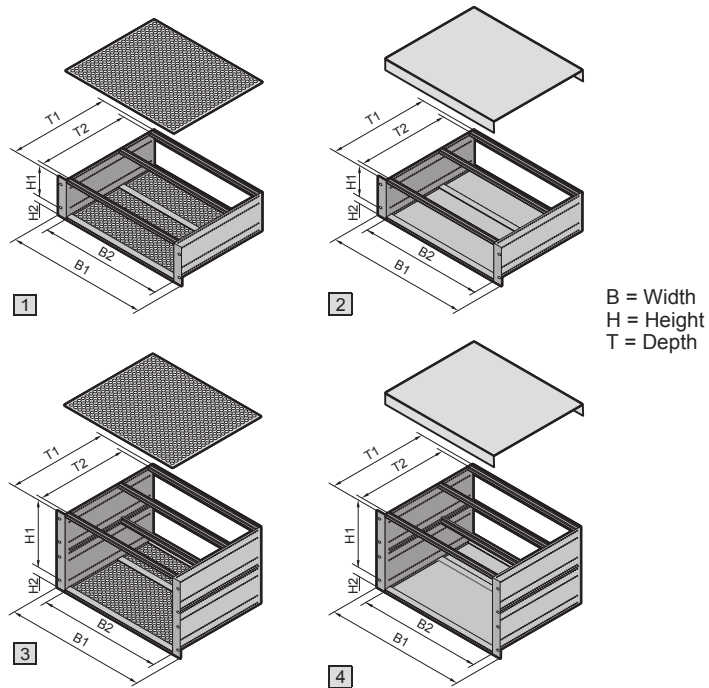
**2**  
Top: for backplane  
Bottom: for backplane/  
front horizontal rail with  
10 mm extension

**3**  
Top: for backplane  
Bottom: for backplane/  
front horizontal rail with  
10 mm extension

					Model No. RP					
					<b>1</b>		<b>2</b>		<b>3</b>	
<b>U</b>					<b>3</b>		<b>6</b>		<b>9</b>	
<b>Height (H1) mm</b>					132		265.35		398.70	
B1 mm	B2 HP	Side panel (T1) mm	T2 mm	Max. PCB depth mm	For backplane	For backplane <sup>1)</sup>	For backplane	For backplane <sup>1)</sup>	For backplane	For backplane <sup>1)</sup>
482.6 (19")	84	245	220	180	3684.128	3684.142	3684.156	3684.169	-	-
		285	280	220	3684.129	3684.143	3684.157	3684.170	-	-
		305	280	220	3685.241	3685.243	3685.242	3685.244	-	-
		345	320	280	3684.130	3684.144	3684.158	3684.171	3684.162	3684.175
		405	380	340	3684.131	3684.145	3684.159	3684.172	3684.163	3684.176
		465	440	400	3684.132	3684.146	3684.160	3684.173	3684.164	3684.177
		525	500	400	3684.133	3684.147	3684.161	3684.174	3684.165	3684.178
		585	560	400	-	-	-	-	3684.166	3684.179

<sup>1)</sup> Front horizontal rails with 10mm extension for injector/extractor handles (B)

# Ripac Vario EMC 4U, 7U



**Material/Surface finish:**

Side panels:  
2.5 mm aluminium,  
clear-chromated  
Flanges and horizontal rails:  
Extruded aluminium section,  
clear-chromated  
Covers: Aluminium, unplated

**Supply Includes:**

Flanges, rear trims, side panels,  
EMC gaskets, covers, mounting  
blocks, horizontal rails, threaded  
inserts, insulating strips.

**Detailed parts lists,**  
see page 183.

**Tests:**

Vibration and shock-tested to:  
IEC 600-68-2-6 test Fc  
IEC 600-68-2-27 test Ea

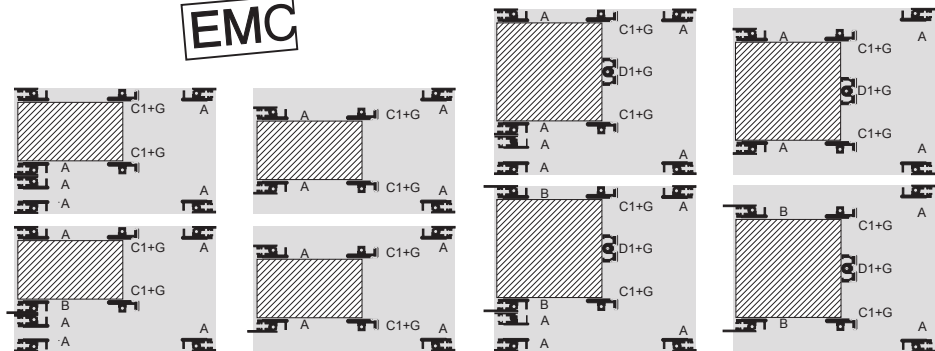
**Standards:**

Ripac subracks are based  
on the system dimensions  
of IEC 60 279-3.

**Detailed drawing,**  
see page 182.

**EMC diagram,**  
see page 194.

**EMC**



**1** Top: for backplane  
Bottom: for backplane/  
front horizontal rail with  
10 mm extension

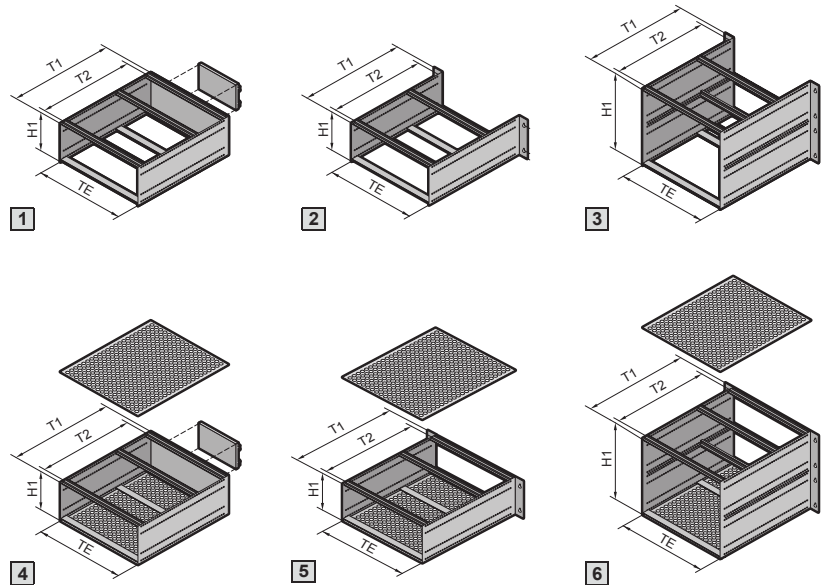
**2** Top: for backplane  
Bottom: for backplane/  
front horizontal rail with  
10 mm extension

**3** Top: for backplane  
Bottom: for backplane/  
front horizontal rail with  
10 mm extension

**4** Top: for backplane  
Bottom: for backplane/  
front horizontal rail with  
10 mm extension

					Model No. RP							
					1		2		3		4	
U (H1 + H2)					4 (3 + 1)	4 (3 + 1)	4 (3 + 2 x 1/2)	4 (3 + 2 x 1/2)	7 (6 + 1)	7 (6 + 1)	7 (6 + 2 x 1/2)	7 (6 + 2 x 1/2)
B1 mm	B2 HP	Side panel (T1) mm	T2 mm	Max. PCB depth mm	For backplane	For backplan <sup>1)</sup>	For backplane	For backplan <sup>1)</sup>	For backplane	For backplan <sup>1)</sup>	For backplane	For backplan <sup>1)</sup>
482.6 (19")	84	285	260	220	3684.134	3684.148	3684.137	3684.151	3684.187	3684.192	—	—
		345	320	280	3684.135	3684.149	3684.138	3684.152	3684.188	3684.193	3684.189	3684.196
		405	380	340	3684.136	3684.150	3684.139	3684.153	3684.180	3684.194	3684.190	3684.197
		465	440	400	—	—	—	—	3684.181	3684.195	3684.191	3684.198

<sup>1)</sup> Front horizontal rails with 10mm extension for injector/extractor handles (B)



B = Width  
H = Height  
T = Depth

**1 4**  
Ripac Compact 3 U  
for top-hat rail

**2 3 5 6**  
Ripac Compact 3 U  
for mounting plate

**Material/Surface finish:**

Side panels:  
2.5 mm aluminium,  
clear-chromated  
Flanges and horizontal rails:  
Extruded aluminium section,  
clear-chromated

**Supply includes:**

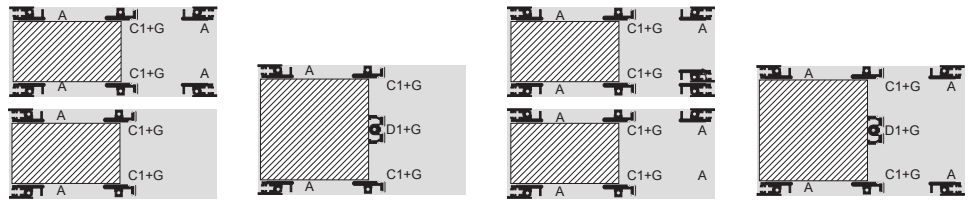
Side panels, rear trims, flanges  
for mounting plates or top-hat  
rail adaptors, EMC front/rear  
panels, EMC gaskets, covers,  
horizontal rails, threaded  
inserts, insulating strips.

**Tests:**

Vibration and shock-tested to:  
IEC 600-68-2-6 test Fc  
IEC 600-68-2-27 test Ea

**Standards:**

Ripac subracks are based  
on the system dimensions  
of IEC 60 297-3.



**1** Top:  
for top-hat rail  
**2** Bottom:  
for mounting plate

**3** For mounting plate

**4** Top: EMC for  
top-hat rail  
**5** Bottom: EMC for  
mounting plate

**6** EMC for  
mounting plate

Custom configuration available upon request.

			Model No. RP					Model No. RP EMC				
			1	2	1	2	3	4	5	4	5	6
<b>U</b>			3	3	3	3	6	3	3	3	3	6
<b>Height (H1) mm</b>			132				265.35	132				265.35
<b>HP</b>			21	21	42	42	42	21	21	42	42	42
<b>Attachment</b>			Top-hat rail	Mounting plate	Top-hat rail	Mounting plate	Mounting plate	Top-hat rail	Mounting plate	Top-hat rail	Mounting plate	Mounting plate
Side panel (T1) mm	T2 mm	Max. PCB depth mm	For backplane									
225	200	160	3687.667	3687.669	3687.671	3687.673	3687.680	3687.682	3687.684	3687.686	3687.688	3687.690
285	260	220	3687.668	3687.670	3687.672	3687.674	3687.681	3687.683	3687.685	3687.687	3687.689	3687.691

# Ripac Vario Mobil 3U, 6U



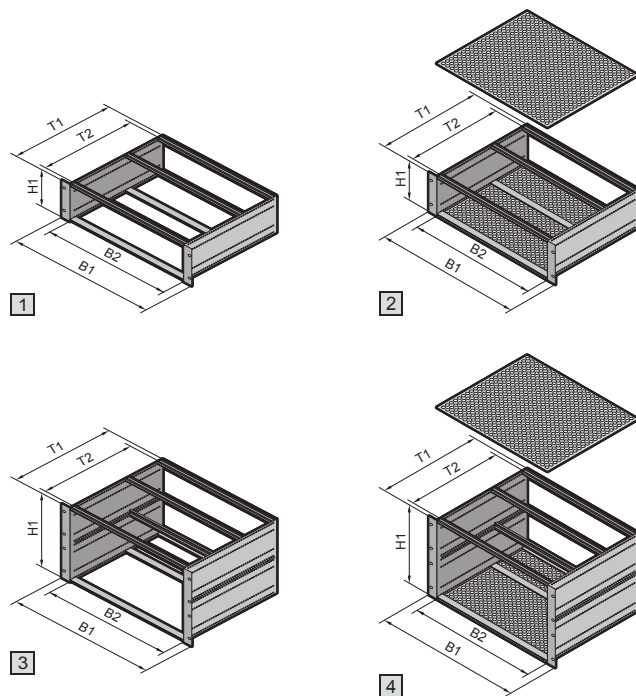
**Material/Surface finish:**  
 Side panels:  
 2.5 mm aluminium,  
 clear-chromated  
 482.6 mm (19") flanges and  
 horizontal rails:  
 Extruded aluminium section,  
 clear-chromated  
 Covers: Aluminium, unplated

**Supply includes:**  
 Flanges, rear trims, side panels,  
 EMC gaskets, covers, mounting  
 blocks, horizontal rails, threaded  
 inserts, insulating strips,  
 fully assembled.

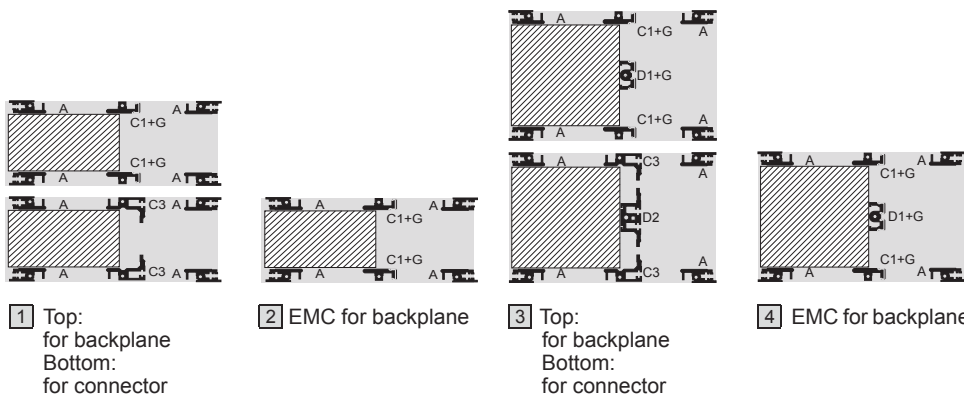
**Tests:**  
 Vibration and shock-tested to:  
 IEC 600-68-2-6 test Fc  
 IEC 600-68-2-27 test Ea  
 The subracks have been tested  
 for use in the German national  
 railway. Testing was conducted  
 in accordance with standard  
 EN 50 155, 1996 (Electronic  
 Equipment in Rail Vehicles).  
 The configuration of the tested  
 subracks conforms to IEC 48 D.

**Standards:**  
 Ripac subracks are based  
 on the system dimensions  
 of IEC 60 297-3.

**Note:**  
 The subracks are supplied  
 fully assembled.



B = Width  
 H = Height  
 T = Depth



1 Top:  
for backplane  
Bottom:  
for connector

2 EMC for backplane

3 Top:  
for backplane  
Bottom:  
for connector

4 EMC for backplane

Custom configuration available upon request.

					Model No. RP		Model No. RP EMC		Model No. RP EMC			
					1		2		3			
					3	3	3	6	6	6		
Height (H1) mm					132						265,35	
B1 mm	B2 HP	Side panel (T1) mm	T2 mm	Max. PCB depth mm	For backplane	For connector IEC 60 603-2	For backplane	For backplane	For connector IEC 60 603-2	For backplane		
482.6 (19")	84	245	220	220	3687.782	3687.780	3687.784	3687.783	3687.781	3687.785		

## Table of Horizontal Rails

### Ripac extrusion system: Complete, simple and easy to manage

To fit all subrack systems as well as the Ripac Vario-Module instrument case/system enclosure range

Main sections	A Front horizontal rail	A1 Front horizontal rail, double screw-fastening	A2 Front horizontal rail, double screw-fastening (Ripac EASY)	W (B) Front horizontal rail, with 10 mm extension, for extractor handle type IV or VII	B1 Double front horizontal rail, with 10 mm extension	B2 Front horizontal rail, with 10 mm extension, double screw-fastening	C1 Rear horizontal rail
Additional sections							
E Rear adaptor rail, centre, to accommodate guide rails	-	-	-	-	-	-	-
F Z rail for connector	-	-	-	-	-	-	
G Insulating strips <sup>1)</sup>	-	-	-	-	-	-	
H Conductive strips <sup>1)</sup>	-	-	-	-	-	-	
I Threaded insert							-
J Identification strips			-				
K EMC gaskets, horizontal			-				-

<sup>1)</sup> For conductive or insulated attachment of backplanes.

All system requirements may be covered with just a few basic types of horizontal rail. A cost-effective, easy-to-manage range.

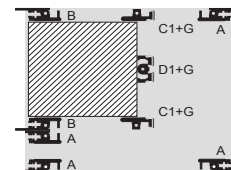
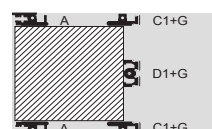
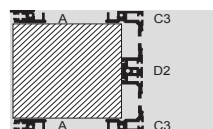




























Table of Horizontal Rails

**Ripac extrusion system: Complete, simple and easy to manage**

To fit all subrack systems as well as the Ripac Vario-Module instrument case/system enclosure range

Main sections	C3 Rear horizontal rail, with integral Z-rail	C4 Rear horizontal rail, double screw-fastening, for backplane mounting (Ripac EASY)	C5 Rear horizontal rail, with integral Z-rail, double screw-fastening (Ripac EASY)	C6 Rear horizontal rail, double screw-fastening	D1 Rear horizontal rail, centre	D2 Rear horizontal rail, centre, with integral Z-rail (also for Ripac EASY)	D3 Rear horizontal rail, centre, with integral contact surface (Ripac EASY)	D4 Rear horizontal rail, for backplane mounting, double screw-fastening (Ripac EASY)
Additional sections								
E Rear adaptor rail, centre, to accommodate guide rails	-	-	-	-				-
F Z rail for connector	-	-	-			-	-	-
G Insulating strips <sup>1)</sup>	-	-	-			-	-	-
H Conductive strips <sup>1)</sup>	-	-	-			-	-	-
I Threaded insert		-			-		-	
J Identification strips		-	-		-	-	-	-
K EMC gaskets, horizontal	-	-	-	-	-	-	-	-

<sup>1)</sup> For conductive or insulated attachment of backplanes.

# Side Panels and Flanges



## Side Panels

For Ripac Vario, Ripac Vario EMC, Ripac Compact, Ripac Vario Mobil  
Mounting holes and anti-twist half-shears on a 10 mm pitch pattern.

### Material:

2.5 mm aluminium, clear-chromated

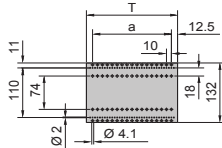


Custom versions available upon request.

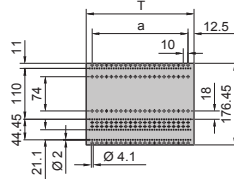
			Model No. RP								
U			3	4 (3 + 1)	4 (3 + 2 x 1/2)	6	7 (6 + 1)	7 (6 + 2 x 1/2)	9	10	11
D mm	a <sup>1)</sup> mm	Packs of									
185	160	1	3684.511	-	-	3684.529	-	-	-	-	-
225	200	1	3684.512	3685.793	3685.890	3684.530	3685.896	3685.893	3685.797	-	-
245	220	1	3684.513	3685.850	3685.891	3684.531	3685.897	3685.894	-	-	-
285	260	1	3684.514	3684.523	3684.526	3684.532	3685.743	3685.895	-	-	-
305	280	1	3684.515	3685.794	-	3684.533	-	-	3685.798	-	-
345	320	1	3684.516	3684.524	3684.527	3684.534	3685.744	3685.745	3684.547	-	-
365	340	1	3684.517	3685.795	-	3684.535	-	-	3685.799	-	-
405	380	1	3684.518	3684.525	3684.528	3684.536	3684.541	3684.543	3684.548	3684.545	-
425	400	1	3684.519	-	-	3684.537	-	-	-	-	-
465	440	1	3684.520	3685.796	3685.892	3684.538	3684.542	3684.544	3684.549	3684.546	3684.552
525	500	1	3684.521	-	-	3684.539	3685.898	3685.959	3684.550	3685.899	3684.553
585	560	1	3684.522	-	-	3684.540	-	-	3684.551	-	3684.554

<sup>1)</sup> a = Distance between the first and last mounting hole

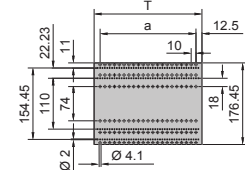
3U



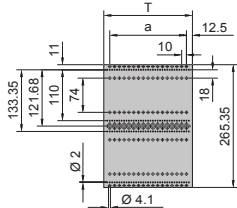
4U (3U + 1U)



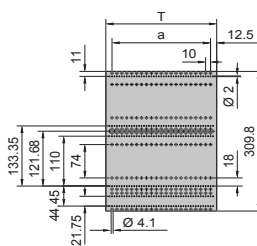
4U (3U + 2 x 1/2U)



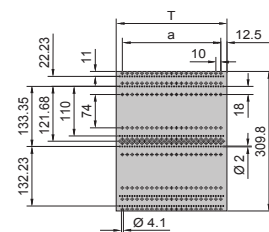
6U



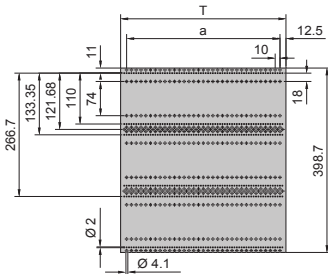
7U (6U + 1U)



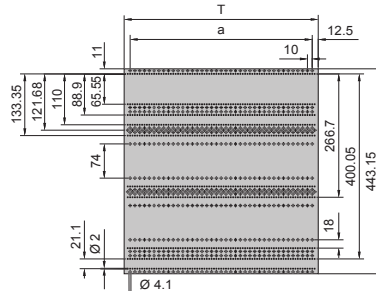
7U (6U + 2 x 1/2U)



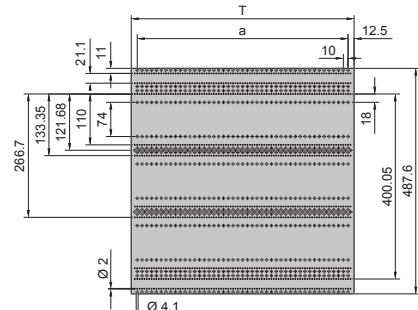
9U



10U



11U



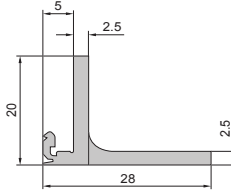
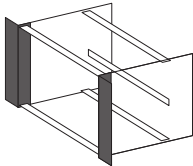
## Side Panels and Flanges



### Flange 482.6 mm (19") flange

To fit all Ripac Vario, Ripac Vario EMC, Ripac Compact and Ripac Vario Mobil subracks. With integral channel to accommodate EMC gaskets.

Material:  
Extruded aluminium section  
Surface finish:  
Clear-chromated



U	Packs of	Model No. RP	
		with handle holes	without handle holes
2	1	–	3684.614
3	1	<b>3684.622</b>	<b>3684.615</b>
4	1	<b>3684.623</b>	<b>3684.616</b>
6	1	<b>3684.624</b>	<b>3684.617</b>
7	1	<b>3684.625</b>	<b>3684.618</b>
9	1	–	<b>3684.619</b>
10	1	–	<b>3684.620</b>
11	1	–	<b>3684.621</b>

Custom versions available upon request.

#### Accessories:

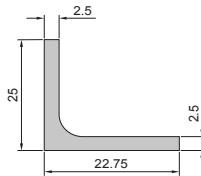
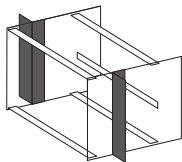
EMC gaskets, vertical, see page 124.  
Handles for subracks, see page 112.



### Flange 482.6 mm (19") flange

Recessed  
To fit all Ripac Vario, Ripac Vario EMC and Ripac Vario Mobil subracks.

Material:  
Extruded aluminium section  
Surface finish:  
Clear-chromated



U	Packs of	Model No.	RP
3	1	<b>3684.62</b>	<b>6</b>
4	1	<b>3684.62</b>	<b>7</b>
6	1	<b>3684.62</b>	<b>8</b>
7	1	<b>3684.62</b>	<b>9</b>
9	1	<b>3684.63</b>	<b>0</b>
10	1	<b>3684.63</b>	<b>1</b>
11	1	<b>3684.63</b>	<b>2</b>

Custom versions available upon request.

#### Also required:required:

Assembly screws, nuts and washers.  
Packs of 4 sets, Model No. RP 3687.015.  
see page 160.



### Side Panels for Ripac EASY

- Mounting holes spaced 60 mm apart as slots
- Holes for telescopic slide mounting

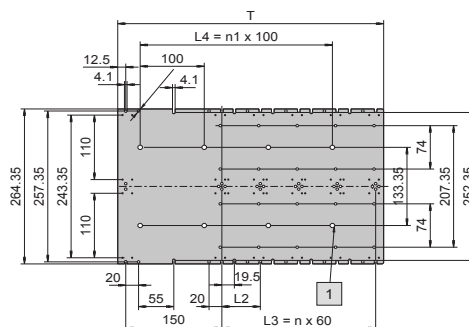
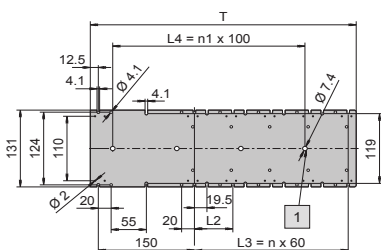
Material:  
1.5 mm aluminium, corrosion-resistant

D mm	L2	n	n1	Packs of	Max. PCB depth mm	Model No. RP	
						3U	6U
175	–	–	–	2	160	<b>3634.695</b>	<b>3634.720</b>
235	60	–	–	2	220	<b>3634.700</b>	<b>3634.725</b>
295	60	2	2	2	280	<b>3634.705</b>	<b>3634.730</b>
355	60	3	3	2	340	<b>3634.710</b>	<b>3634.735</b>
415	60	4	3	2	400	<b>3634.715</b>	<b>3634.740</b>

Custom versions available upon request.

#### Accessories:

Flange for Ripac EASY.  
see page 112.



**1**

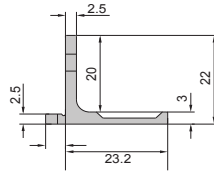
# Side Panels and Flanges



**Flange**  
**482.6 mm(19")**  
 for Ripac EASY  
 Integral holes for mounting handles.

**Material:**  
 Extruded aluminium section

**Surface finish:**  
 Anodised



U	Packs of	Model No. RP
3	2	3634.745
6	2	3634.750

Custom versions available upon request.

**Accessories:**

Handles for subracks.  
 see page 112.



## Handles

To fit all subracks and component shelves  
 For fitting on the subrack flange with handle holes  
 and on all component shelves.

**Material:**  
 Die-cast zinc

**Surface finish:**  
 Spray-finished, silver-grey

**Supply includes:**  
 Assembly parts.

U	Packs of	Model No. RP
Subracks 3U and 4U	2	3636.010
Component shelves		
Subracks 6U and 7U	2	3666.010

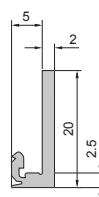
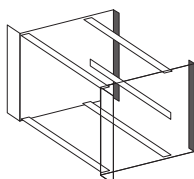


## Trim section, rear

To fit all Ripac Vario, Ripac Vario EMC,  
 Ripac Compact and Ripac Vario Mobil subracks.  
 Ensures 84 HP fit at the rear of the subrack.  
 With integral channel to accommodate  
 EMC gaskets.

**Material:**  
 Extruded aluminium section

**Surface finish:**  
 Clear-chromated



U	Model No. RP	
	Packs of 1	Packs of 2
2	3684.633	–
3	3684.634	3685.276
4	3684.635	–
6	3684.636	3685.277
7	3684.637	–
9	3684.638	–
10	3684.639	–
11	3684.640	–

Custom versions available upon request.

**Accessories:**

EMC gaskets, vertical.  
 see page 124.

## Horizontal Rails



### Front horizontal rail, double screw-fastening (A2)

To accommodate guide rails and for the attachment of front panels.

- Pre-assembled screws M4 x 12 for fast mounting on the subrack side panel
- Front projection 2.5 mm corresponding to IEC 60 297-3
- Optional double screw-fastening ensures a high level of stability
- HP pitch pattern of holes for the precise installation of guide rails
- 1 x M4 thread on end face
- Straight-through core hole for optional second screw-fastening

**Material:**

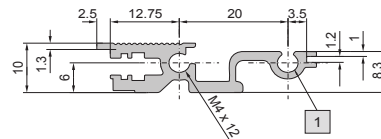
Extruded aluminium section

**Surface finish:**

Corrosion-resistant

**Supply includes:**

2 horizontal rails with pre-assembled threaded inserts and screws M4 x 12.



1 Core hole M4

Usable width (HP)	Packs of	Model No. RP
84	2	3634.600

Custom lengths available upon request.

**+ Accessories:**

Assembly screws M4 x 12,  
Model No. RP 3634.430 (packs of 100).

**Note:**

Additional assembly screws are required for double screw-fastening, Model No. RP 3634.430 (packs of 100).



### Rear horizontal rail for backplane mounting, double screw-fastening (C4)

To accommodate guide rails and for direct mounting of backplanes.

- Pre-assembled screws M4 x 12 for fast mounting on the subrack side panel
- The mounting of insulating strips is not necessary, thanks to the integral contact surface
- Tapped holes M2.5 on a 1 HP pitch pattern for mounting backplanes
- HP pitch pattern of holes for the precise installation of guide rails
- Optional double screw-fastening ensures a high level of stability
- 1 x M4 thread on end face
- Straight-through core hole for optional second screw-fastening
- The height of the extrusion allows top-mounting with cover plates

**Material:**

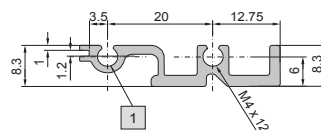
Extruded aluminium section

**Surface finish:**

Corrosion-resistant

**Supply includes:**

1 horizontal rail with pre-assembled crews M4 x 12.



1 Core hole M4

Usable width (HP)	Packs of	Model No. RP
84	2	3634.615

Custom lengths available upon request.

**Note:**

Additional assembly screws are required for double screw-fastening, Model No. RP 3634.430 (packs of 100.).

## Horizontal Rails for Ripac EASY



### Rear horizontal rail, with integral Z-rail, double screw-fastening (C5)

To accommodate guide rails, integral Z rail for mounting connectors.

- Pre-assembled screws M4 x 12 for fast mounting on the subrack side panel
- HP pitch pattern of holes for the precise installation of guide rails
- Optional double screw-fastening ensures a high level of stability
- 1 x M4 thread on end face
- Straight-through core hole for optional second screw-fastening
- The height of the extrusion allows top-mounting with cover plates

**Material:**

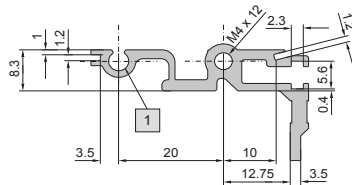
Extruded aluminium section

**Surface finish:**

Corrosion-resistant

**Supply includes:**

2 horizontal rail with pre-assembled screws M4 x 12.



1 Core hole M4

Usable width (HP)	Packs of	Model No. RP
84	2	3634.620

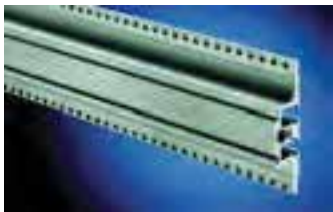
Custom lengths available upon request.

**+** Accessories:

Threaded inserts, Model No. RP 9901.816 (packs of 1). see page 122.

**Note:**

Additional assembly screws are required for double screw-fastening, Model No. RP 3634.430 (packs of 100).



### Rear horizontal rail, centre, with integral Z-rail (D2)

When using 6 U PCBs or box-type plug-in units. Integral Z rail for mounting connectors to IEC 60 603-2.

- 84 tapped holes M2.5
- M4 thread on end face
- Straight-through core hole

**Material:**

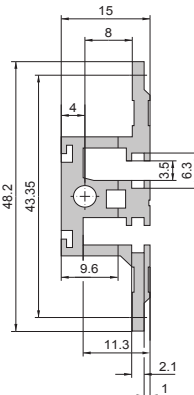
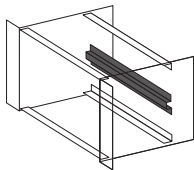
Extruded aluminium section

**Surface finish:**

Corrosion-resistant

**Supply includes:**

1 horizontal rail, 2 assembly screws.



Usable width (HP)	Packs of	Model No. RP
84	1	3634.085

Custom lengths available upon request.

## Horizontal Rails for Ripac EASY



### Rear horizontal rail, centre (D3) for backplane mounting

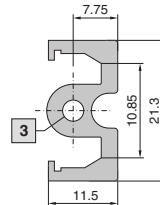
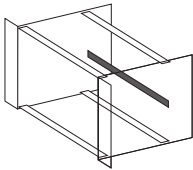
When using 6U PCBs or box-type plug-in units. For mounting backplanes.

- 84 tapped holes M2.5
- M4 thread on end face
- Straight-through core hole
- The mounting of insulating strips is not necessary, thanks to the integral contact surface

**Material:**  
Extruded aluminium section

**Surface finish:**  
Corrosion-resistant

**Supply includes:**  
1 horizontal rail,  
2 assembly screws.



Usable width (HP)	Packs of	Model No. RP
84	1	3634.045

Custom lengths available upon request.



### Rear horizontal rail, for rear panel mounting

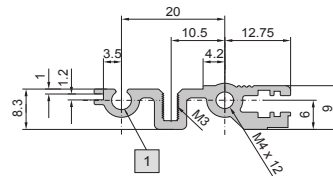
For the attachment of rear front panels.

- Optional double screw-fastening ensures a high level of stability
- With screw channel for roof plate attachment
- 1 x M4 thread on end face
- Straight-through core hole for optional second screw-fastening
- Pre-assembled screws M4x12 for fast mounting on the subrack side panel

**Material:**  
Extruded aluminium section

**Surface finish:**  
Corrosion-resistant

**Supply includes:**  
2 horizontal rails with pre-assembled threaded inserts and screws.



**1** Core hole M4

Usable width (HP)	Packs of	Model No. RP
84	1	3634.510

Custom lengths available upon request.

**+** **Accessories:**

Assembly screws M4 x 12,  
Model No. RP 3634.430 (packs of 100).

**Note:**  
Additional assembly screws are required for double screw-fastening,  
Model No. RP 3634.430 (packs of 100).



### Threaded inserts for Ripac EASY

With M2.5 threaded holes on an HP pitch pattern.

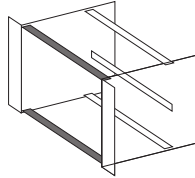
- For sliding into the front horizontal rails (A2) and rear horizontal rails (D4, C5)
- Size: 5 x 2 mm

**Material:**  
Sheet steel, zinc-plated

Usable width (HP)	Packs of	Model No. RP
84	1	9901.816

Custom lengths available upon request.

## Horizontal Rails



### Front horizontal rail (A)

To accommodate guide rails and for the attachment of front panels.

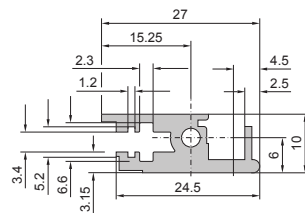
- Front projection 2.5 mm corresponding to IEC 60 297-3
- HP pitch pattern of holes for the precise installation of guide rails
- M4 thread on end face
- Straight-through core hole
- Horizontal rail 192 HP without machining on the end faces. Suitable for cutting to length

**Material:**

Extruded aluminium section

**Surface finish:**

Clear-chromated or anodised



Usable width (HP)	Packs of	Model No. RP
4 (left)	1	3684.592
4 (right)	1	3684.955
8 (left)	1	3684.593
8 (right)	1	3684.956
12	1	3684.594
16	1	3684.595
20	1	3684.596
21	1	3685.985
40	1	3684.960
42	1	3684.560
63	1	3684.561
84	1	3684.562
84	2	3685.267 <sup>1)</sup>
192	1	3688.000 <sup>2)</sup>

<sup>1)</sup>Including 4 assembly screws

<sup>2)</sup>Anodised

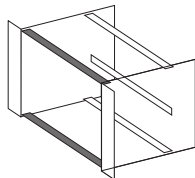
Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12  
packs of 100, Model No. RP 3654.300.  
see page 159.

**+ Accessories:**

Threaded inserts (packs of 1).  
see page 122.



### Front horizontal rail, with double screw-fastening (A1)

To accommodate guide rails and for the attachment of front panels. The double screw-fastening ensures a high level of stability even under extreme loads.

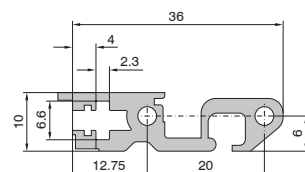
- Load test to DIN EN/IEC 61 587-1, requirement level SL1
- Shock and vibration tests undertaken as per IEC 61 373 (DIN EN 50 155), Category 1, Class B
- Front projection 2.5 mm corresponding to IEC 60 297-3-101
- HP pitch pattern of holes for the precise installation of guide rails
- M4 thread on end face
- Straight-through core hole

**Material:**

Extruded aluminium section

**Surface finish:**

Clear-chromated



Usable width (HP)	Packs of	Model No. RP
84	1	9908.721

Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12,  
packs of 100, Model No. RP 3654.300.  
see page 159.

**+ Accessories:**

Threaded inserts, Model No. RP 3684.610.  
see page 122.



## Horizontal Rails



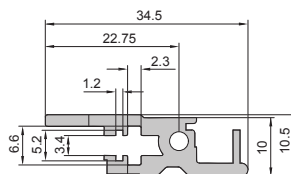
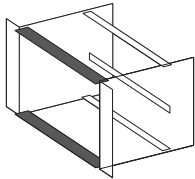
### Front horizontal rail, with 10 mm extension (B)

for type IV, IVs and VII injector/extractor handle  
To accommodate guide rails and for the attachment of front panels.

- Front projection and pitch pattern of holes based on IEEE 1101.10 and IEC 60 297-3-101, for the use of injector/extractor handles type IV and VII
- HP pitch pattern of holes for the precise installation of guide rails
- M4 thread on end face
- Straight-through core hole
- Horizontal rail 192 HP without machining on the end faces. Suitable for cutting to length

**Material:**  
Extruded aluminium section

**Surface finish:**  
Clear-chromated or anodised



Usable width (HP)	Packs of	Model No. RP
40	1	3684.961
42	1	3684.565
63	1	3684.566
84	1	3684.567
84	2	3685.269 <sup>1)</sup>
192	1	3688.001 <sup>2)</sup>

<sup>1)</sup> Including 4 assembly screws

<sup>2)</sup> Anodised

Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.

**+ Accessories:**

Threaded inserts (packs of 1). see page 122.



### Double front horizontal rail, with 10 mm extension (B1) - Version 1

To accommodate guide rails and for the attachment of front panels.

- Front projection and pitch pattern of holes based on IEEE 1101.10 and IEC 60 297-3-101, for the use of injector/extractor handles type IV and VII
- HP pitch pattern of holes for the precise installation of guide rails
- M4 thread on end face
- Straight-through core hole

**Material:**  
Extruded aluminium section

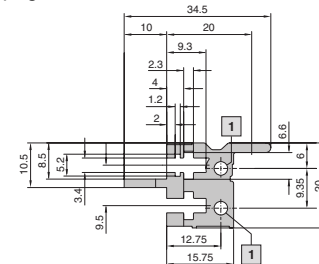
**Surface finish:**  
Clear-chromated

Usable width (HP)	Packs of	Model No. RP
84	1	3687.724

Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.



### Double front horizontal rail, with 10 mm extension (B1) - Version 2

To accommodate guide rails and for the attachment of front panels.

- Front projection and pitch pattern of holes based on IEEE 1101.10 and IEC 60 297-3-101, for the use of injector/extractor handles type IV and VII
- HP pitch pattern of holes for the precise installation of guide rails
- M4 thread on end face
- Straight-through core hole

**Material:**  
Extruded aluminium section

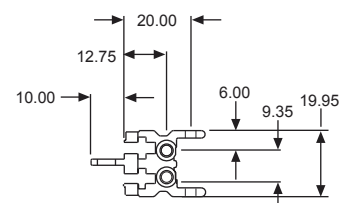
**Surface finish:**  
Clear-chromated

Usable width (HP)	Packs of	Model No. RP
84	1	3687.704

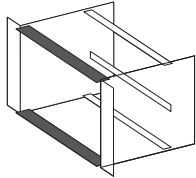
Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.



# Horizontal Rails



## Front horizontal rail, with 10 mm extension (B2), with double screw-fastening

for type IV, IVs and VII injector/extractor handle To accommodate guide rails and for the attachment of front panels. The double screw-fastening ensures a high level of stability even under extreme loads.

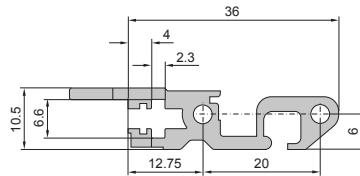
- Load test to DIN EN/IEC 61 587-1, requirement level SL1
- Shock and vibration tests undertaken as per IEC 61 373 (DIN EN 50 155), Category 1, Class B
- Front projection and pitch pattern of holes based on IEC 60 297-3-101, for the use of injector/extractor handles type IV and VII
- HP pitch pattern of holes for the precise installation of guide rails
- M4 thread on end face
- Straight-through core hole

**Material:**

Extruded aluminium section

**Surface finish:**

Clear-chromated



Usable width (HP)	Packs of	Model No. RP
84	1	9908.722

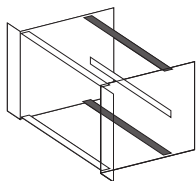
Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.

**+ Accessories:**

Threaded inserts, Model No. RP 3684.610 (packs of 1). see page 122.



## Rear horizontal rail (C1)

To accommodate guide rails and for the attachment of Z rails, insulating strips or conductive strips and backplanes.

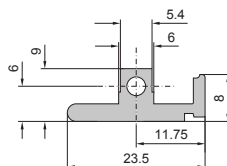
- Tapped holes M2.5 on a 1 HP pitch pattern
- HP pitch pattern of holes for the precise installation of guide rails
- M2.5 thread for the installation of Z rails or backplanes
- M4 thread on end face
- Straight-through core hole
- Horizontal rail 192 HP without machining on the end faces. Suitable for cutting to length

**Material:**

Extruded aluminium section

**Surface finish:**

Clear-chromated or anodised



Usable width (HP)	Packs of	Model No. RP
21	1	3685.991
40	1	3684.962
42	1	3684.570
63	1	3684.571
84	1	3684.572
84	2	3685.268 <sup>1)</sup>
192	1	3688.002 <sup>2)</sup>

<sup>1)</sup> Including 4 assembly screws

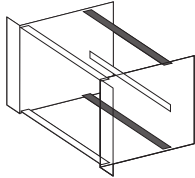
<sup>2)</sup> Anodised

Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.

## Horizontal Rails



### Rear horizontal rail, with double screw-fastening (C6)

To accommodate guide rails and for the attachment of Z rails, insulating strips or conductive strips and backplanes. The double screw-fastening ensures a high level of stability even under extreme loads.

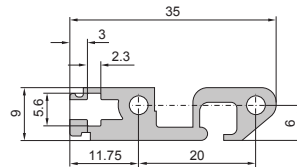
- Load test to DIN EN/IEC 61 587-1, requirement level SL1
- Shock and vibration tests undertaken as per IEC 61 373 (DIN EN 60,155), Category 1, Class B
- Tapped holes M2.5 on an HP pitch pattern
- HP pitch pattern of holes for the precise installation of guide rails
- M2.5 thread for the installation of Z rails or backplanes
- M4 thread on end face
- Straight-through core hole

#### Material:

Extruded aluminium section

#### Surface finish:

Clear-chromated or anodised



Usable width (HP)	Packs of	Model No. RP
84	1	9908.723

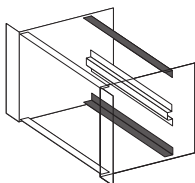
Custom lengths available upon request.

#### ! Also required:

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.

#### + Accessories:

Threaded inserts, Model No. RP 9901.816 (packs of 2). see page 122.



### Rear horizontal rail, with integral Z rail (C3)

To accommodate guide rails. Integral Z rail for mounting connectors to IEC 60 603-2.

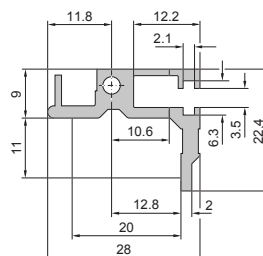
- HP pitch pattern of holes for the precise installation of guide rails
- 84 tapped holes M2.5 for connector mounting
- M4 thread on end face
- Straight-through core hole

#### Material:

Extruded aluminium section

#### Surface finish:

Clear-chromated



Usable width (HP)	Packs of	Model No. RP
42	1	3686.191
63	1	3686.919
84	1	3686.159

Custom lengths available upon request.

#### ! Also required:

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300, see page 159.

## Horizontal Rails



### Rear horizontal rail, centre (D1)

When using 6U PCBs or box-type plug-in units. Facility for the attachment of Z rails, insulating strips or conductive strips.

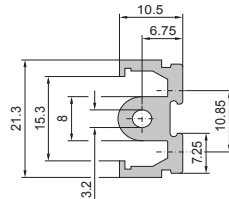
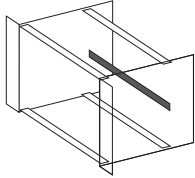
- 84 tapped holes M2.5
- M4 thread on end face
- Straight-through core hole
- Horizontal rail 192 HP for cutting to the required length

**Material:**

Extruded aluminium section

**Surface finish:**

Clear-chromated or anodised



Usable width (HP)	Packs of	Model No. RP
40	1	3684.963
42	1	3684.580
63	1	3684.581
84	1	3684.582
84	1	3685.270 <sup>1)</sup>
858.5 mm	1	3684.579
192	1	3688.003 <sup>2)</sup>

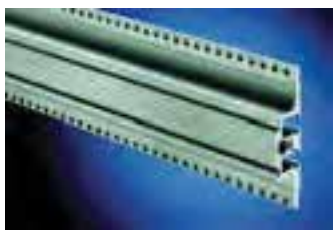
<sup>1)</sup> Including 2 assembly screws

<sup>2)</sup> Anodised

Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.



### Rear horizontal rail, centre, with integral Z rail (D2)

When using 6U PCBs or box-type plug-in units. Integral Z rail for mounting connectors to IEC 60 603-2.

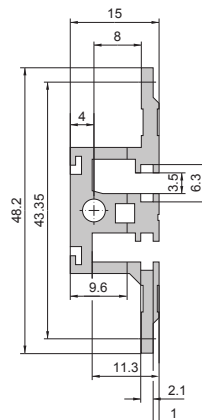
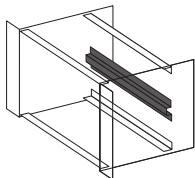
- 84 tapped holes M2.5
- M4 thread on end face
- Straight-through core hole

**Material:**

Extruded aluminium section

**Surface finish:**

Clear-chromated



Usable width (HP)	Packs of	Model No. RP
42	1	3687.600
63	1	3687.601
84	1	3687.602
858.5 mm	1	3687.603

Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.

## Horizontal Rails



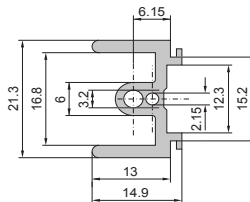
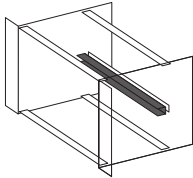
### Rear horizontal rail, centre (E)

When subdividing 6U into 2 x 3U, the adaptor rail accommodates the guide rails when fastened to the centre horizontal rail.

- HP pitch pattern of holes for the precise installation of guide rails
- M4 and M2.5 thread on the end face
- Straight-through core hole
- Horizontal rail 192 HP without machining on the end faces. Suitable for cutting to length

**Material:**  
Extruded aluminium section

**Surface finish:**  
Clear-chromated or anodised



Usable width (HP)	Packs of	Model No. RP
12	1	3684.587
16	1	3684.588
20	1	3684.589
40	1	3684.964
42	1	3684.590
63	1	3686.005
84	1	3684.591
84	1	3685.272 <sup>1)</sup>
858.5 mm	1	3684.584
192	1	3688.004 <sup>2)</sup>

<sup>1)</sup> Including 2 assembly screws

<sup>2)</sup> Anodised

Custom lengths available upon request.

**! Also required:**

Assembly screws M4 x 12, packs of 100, Model No. RP 3654.300. see page 159.

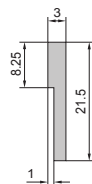


### Z rail for connector IEC 60 603-2 (F)

With 84 x M2.5 threaded holes.

**Material:**  
Extruded aluminium section

**Surface finish:**  
Clear-chromated



Usable width (HP)	Packs of	Model No. RP
4	1	3684.597
8	1	3684.598
20	1	3684.599
40	1	3684.965
42	1	3684.600
63	1	3684.601
84	1	3684.602
84	2	3685.271

Custom lengths available upon request.

**! Also required:**

Assembly screws M2.5 x 6, packs of 100, Model No. RP 3654.340. see page 159.

## Horizontal Rails



### Threaded insert (I)

With M2.5 threaded holes on an HP pitch pattern. For sliding into the horizontal rail. There are two threaded insert versions, which are distinguished by their height.

**Material:**  
Sheet steel, zinc-plated

Usable width (HP)	Packs of	Model No. RP	
		6 x 2 mm	5 x 2 mm
		for horizontal rails	
		Type A, A1, B, B1, B2, C3	Type A2, C5, C6, D4
4	1	3684.603	-
8	1	3684.604	-
12	1	3684.605	-
16	1	3684.606	-
20	1	3684.607	-
21	1	3686.149	-
40	1	3684.966	-
42	1	3684.608	-
63	1	3684.609	-
84	1	3684.610	9901.816

Custom lengths available upon request.



### Identificationstrip (J)

To identify the slots on the subrack, self-adhesive. The following versions are available.

- 4 mm wide:
- for horizontal rails
  - for rear horizontal rails
- 2 mm wide:
- for front horizontal rails (channel on front face)

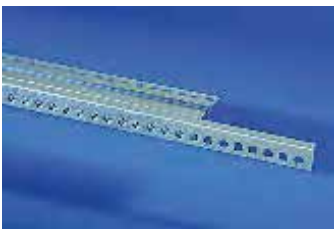
For horizontal rail	Width mm	Label	Packs of	Model No. RP
Front	4	1 ... 84	1	3687.575
Rear	4	1 ... 168	1	3687.577
Front	4	84 ... 1	1	3687.574
Front	2	1 ... 84	1	3687.576

Custom lengths available upon request.



### EMC gaskets, horizontal (K)

see page 125.



### Conductive strip (H)

For conductive mounting of backplanes.

- 84 HP
- Slides onto the rear horizontal rail

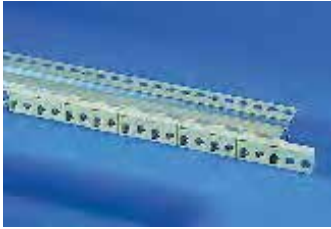
**Material:**  
Aluminium

Usable width (HP)	Packs of	Model No. RP
84	1	3684.612
84	2	3685.273

Custom lengths available upon request.



## Horizontal Rails



### Insulating strip (G)

For insulated mounting of backplanes.

- 21 HP
- Can be shortened (4 x 4HP segments 1 x 5HP segment).
- Slides onto the rear horizontal rail

**Material:**

Plastic, self-extinguishing to UL 94-V0



Rear horizontal rail, centre, fitted with insulating strips (top) and conductive strips (bottom).



Usable width (HP)	Packs of	Model No. RP
21	1	3684.611
21	8	3685.274



### Punched strip

**Material:**

Aluminium

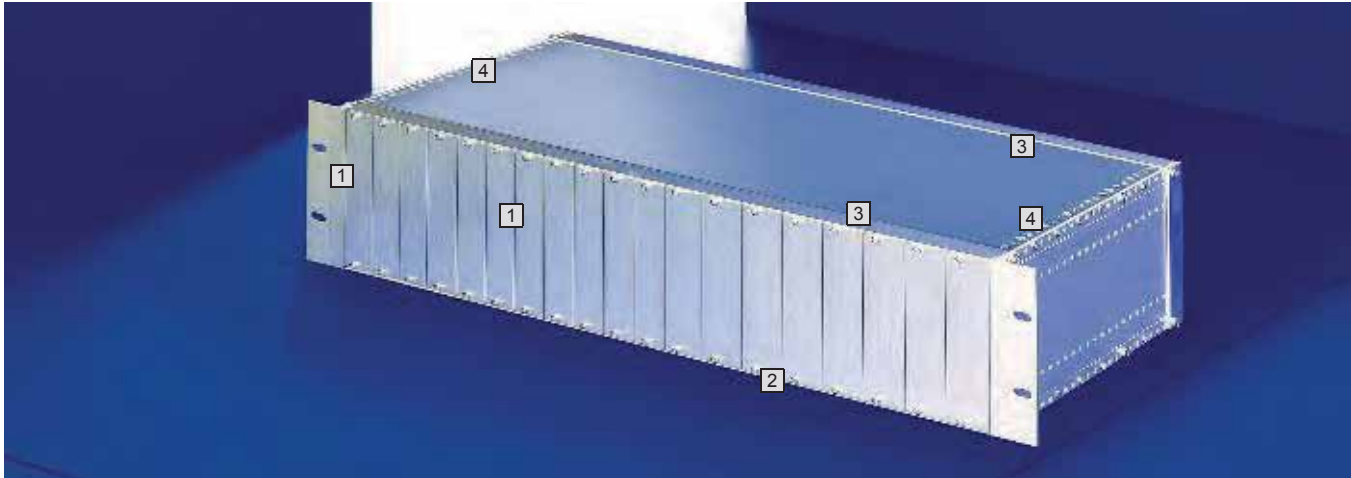


Usable width (HP)	Packs of	Model No. RP
84	2	3685.275



Custom lengths available upon request.

# Components for EMC Installation

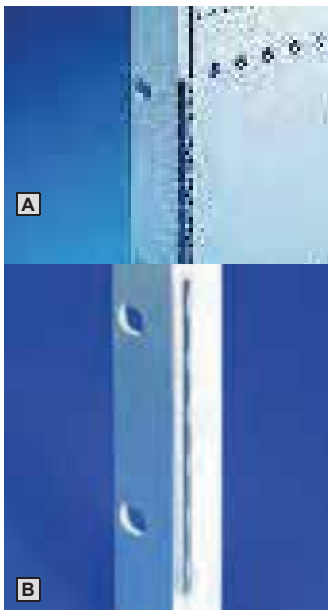


EMC (electromagnetic compatibility) refers to the ability of an electrical device to function satisfactorily in its electromagnetic environment without influencing or being influenced by this environment more than is admissible.

These requirements were taken into account when developing the Rittal subracks. They are made entirely from metal and coated with a conductive surface finish.

Stainless steel EMC gaskets ensure conductive connection of the separate parts.

- 1 EMC gaskets, vertical
- 2 EMC gaskets, horizontal
- 3 EMC gaskets for covers
- 4 Mounting blocks



### EMC gaskets, vertical

To ensure EMC protection between the subrack side panel and the front/rear panels. There are two versions available.

#### Suitable for mounting on:

- 482.6 mm (19") flanges for subracks
- Corner trims, rear
- EMC contact strip
- U-channel front panels
- Trim panels for Ripac Vario-Module
- Flanges for Ripac Vario-Module

#### Material:

Stainless steel

German patent no. 101 15 525 and no. 198 46 627  
 US patent no. 6,500,012  
 US patent no. 7,044,753



#### A Version 1: Segmented

U	Model No. RP Packs of 1	Model No. RP Packs of 10
1	3686.973	3684.236
2	3686.974	3684.237
3	3686.975	3684.238
4	3686.976	3684.239
6	3686.977	3684.240
7	3686.978	3684.241
9	3686.979	3684.242
10	3686.980	3684.243
11	3686.981	3684.244

Custom lengths available upon request.

#### B Version 2: One-piece

U	Model No. RP Packs of 1
2	3688.610
3	3688.611
4	3688.612
5	3688.613
6	3688.614
7	3688.615
8	3688.634
9	3688.616
10	3688.609
11	3688.633
12	3688.606



## Components for EMC Installation

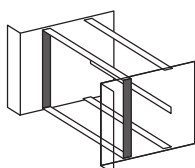


### EMC contact strip

To ensure EMC protection when horizontal rails are set-back. Integral channel to accommodate EMC gaskets.

**Material:**  
Extruded aluminium section, clear-chromated

**Note:**  
2 sections are required for each subrack.

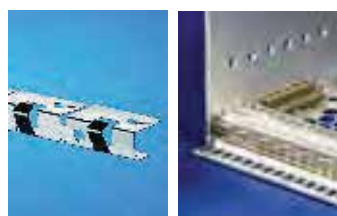


U	Packs of	Model No. RP
3	1	3684.643
6	1	3684.644
9	1	3684.645

Custom lengths available upon request.

**! Also required:**

EMC gaskets, vertical.  
Assembly screws M3 x 6, packs of 100.  
Model No. RP 3684.233.  
see page 159.



### EMC gaskets, horizontal (K)

For horizontal EMC protection. For snap-fastening onto the front horizontal rails.

**Material:**  
Stainless steel

**European patent no. 0 937 375  
with validity for DE  
US patent no. 6,137,052  
Chinese patent  
no. ZL 97 1 98582.0**



Usable width (HP)	Packs of	Model No. RP
For top/bottom horizontal rail		
40	1	3684.974
84	1	3684.808
84	10	3684.246
For sub-division of 6 U into 2 x 3 U, between 2 horizontal rails		
84	1	3685.789
84	10	3685.229

Custom lengths available upon request.



### EMCgaskets

for covers  
For EMC shielding between the horizontal rails and covers.

**Material:**  
Stainless steel



HP	Packs of	Model No. RP
84	10	3684.245

Custom lengths available upon request.

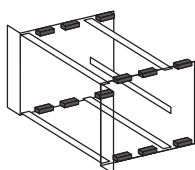


### Mounting blocks

For mounting covers, versions 1 – 4,  
on the subrack side panel.

**Material:**  
Die-cast zinc, nickel-plated

**Note:**  
For EMC applications, mounting blocks must be fitted across the entire subrack depth. The table here shows the number of mounting blocks required to install 1 cover plate with EMC shielding.



	Packs of	Model No. RP
Mounting blocks 28.5 mm long	10	3684.234

**! Also required:**

Assembly screws M3 x 6, packs of 100.  
Model No. RP 3684.233.  
see page 159.

Number of mounting blocks for max. EMC protection	Cover plate depth mm
4	142
8	192
10	212
12	252
14	272
16	312
18	332
20	372
24	432
28	492
32	552

## Mounting kits



### Vertical mounting kit

For the combined installation of single and double Euroboards in 6U and 9U subracks.

**Material:**  
Aluminium, clear-chromated

**Supply includes:**  
2 front horizontal rails,  
1 adaptor rail,  
2 threaded inserts,  
1 vertical support (from 12 HP),  
assembly parts.

**+ Accessories:**

Front panel, see page 126.  
EMC gaskets, horizontal, see page 125.

6U (2 x 3U)

HP	HP	Model No. RP
<b>1</b> (2 x 3U)	<b>2</b> (6U)	
14	68	3684.220
21	61	3684.221
28	54	3684.222
40	42	3684.223
42	40	3684.224

9U (1 x 6U + 1 x 3U)

HP	HP	Model No. RP
(9U)	(1 x 6 + 1 x 3U)	
80	4	3684.225
76	8	3684.226
70	12	3684.227
66	16	3684.228
62	20	3684.229

Custom versions available upon request.



### Vertical support

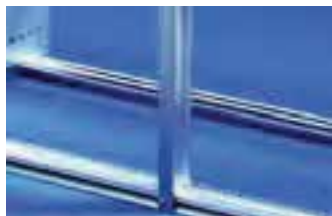
Required for the combined installation of single, double and triple Euroboards in one subrack.

**Material:**  
Aluminium, extruded

**Surface finish:**  
Clear-chromated

U	Packs of	Model No. RP
6	1	3684.678
9	1	3684.679

Custom versions available upon request.



### Front panel

To conceal the vertical support of the vertical divider kit.

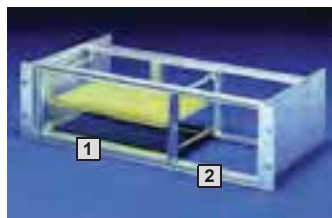
**Material:**  
Aluminium, anodised

**Supply includes:**  
Assembly parts.

U	HP	Packs of	Model No. RP
6	2	1	3685.176
9	2	1	3685.286

Custom versions available upon request.

**EMC version.**  
see page 152.



### Horizontal mounting kit

For the horizontal installation of 6U/9U PCBs in 3U/4U subracks.

**1** Horizontal installation space:  
3U subrack: 20 HP (5 slots)  
4U subrack: 28 HP (7 slots)

**2** Vertical installation space:  
(when installing double Euroboards)  
31 HP (without trim frame)  
28 HP (with trim frame)

**Material:**  
Aluminium, clear-chromated

**Supply includes:**  
2 horizontal rails, front,  
2 horizontal rails, rear,  
1 or 2 horizontal rails, rear, centre,  
2 threaded inserts,  
4 or 6 insulating strips,  
4 connecting parts,  
assembly parts.

For backplane assembly  
with standard horizontal rail, front

U horizontal	Model No. RP	
	for 3U subrack	for 4U subrack
6	3684.206	3684.208
9	3684.207	3684.209

For backplane assembly,  
front horizontal rail with 10 mm extension

U horizontal	Model No. RP	
	for 3U subrack	for 4U subrack
6	3684.210	3684.212
9	3684.211	3684.213

Custom versions available upon request.

**+ Accessories:**

Trim frame.  
see page 127.

## Mounting kits/guide Rails



### Trim frame

for horizontal mounting kit  
To conceal the front sections of the horizontal mounting kit.

**Material:**  
Aluminium, anodised

U horizontal	HP	Model No. RP	
		for 3U subrack	for 4U subrack
6	56	<b>3685.783</b>	<b>3685.785</b>
9	84	<b>3685.784</b>	<b>3685.786</b>

Custom versions available upon request.

**!** Also required:

Collar screws and plastic collars, packs of 100 sets, Model No. RP 3658.160. see page 159.



### Trim frame, vented

for horizontal mounting kit  
To conceal the front sections of the horizontal mounting kit.

**Material:**  
Aluminium

**Surface finish:**  
Anodised, clear-chromated (EMC version)

**Supply includes:**  
EMC accessories (with EMC version).

**EMC**

U horizontal	HP	Model No. RP	
		for 3U subrack	for 4U subrack
6	63	<b>3685.787</b>	<b>3685.788</b>

**!** Also required:

Collar screws and plastic collars, packs of 100 sets, Model No. RP 3658.160. see page 160.

#### EMC version

U horizontal	HP	Model No. RP	
		for 3U subrack	for 4U subrack
6	63	<b>3685.291</b>	<b>3685.292</b>

Custom versions available upon request.

**!** Also required:

Centering screws, packs of 100, Model No. RP 3687.050. see page 160 .



### Plastic guide rails

For 160, 220 and 280 mm PCBs up to 2 mm nominal thickness.

2 versions are available:

- Snap-in-fastening and screw-fastening
- Snap-in-fastening

**Material:**  
Polycarbonate, base material to UL 94-V0

PCB depth mm	Packs of	Model No. RP	
		Snap-in-fastening/ screw-fastening <sup>1)</sup>	Snap-in-fastening
100	1	–	<b>3688.005</b>
160	10	<b>3688.048</b>	<b>3688.045</b>
220	10	<b>3688.049</b>	<b>3688.046</b>
280	10	<b>3688.052</b>	<b>3688.047</b>

**!** Also required:

<sup>1)</sup> Assembly screws, packs of 100, Model No. RP 3654.360. see page 159.



### Plastic guide rails

For contact spring fitting  
For 160, 220 and 280 mm PCBs up to 2 mm nominal thickness. By installing contact springs, an electrical connection can be made between the PCB and the assembly.

**Material:**  
Polycarbonate, base material to UL 94-V0

PCB depth mm	Packs of	Model No. RP
160	10	<b>3688.053</b>
220	10	<b>3688.054</b>
280	10	<b>3688.056</b>

**+** Accessories:

Contact springs. see page 128.

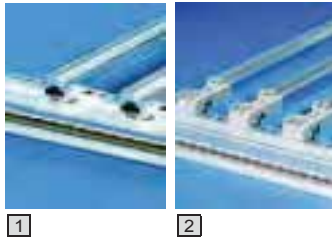
## Guide Rails



### Contact springs

For electrical connection between the PCB and the subrack, or to discharge static charges from the PCB.  
Suitable for installation in "guide rails for contact spring fitting" and "end pieces for guide rails".

Packs of	Model No. RP
10	3687.726



### Guide rails, aluminium

For high loads. Suitable for a nominal PCB thicknesses of 1.6 mm. A distinction is made between guide rails for and without end pieces. The guide rails without end pieces are screw-fastened directly into the horizontal rail.

**Material:**  
Aluminium

PCB depth mm	Packs of	Model No. RP	
		1 Without end piece <sup>1)</sup>	2 For end pieces
160	1	3687.526	3684.663
220	1	3687.527	3684.664
280	1	3687.528	3684.665
160	10	3688.064	3688.057
220	10	3688.065	3688.058
280	10	3688.066	3688.059
1000	1	3684.666	-

**! Also required:**

- <sup>1)</sup> Screw M2.5 x 6, packs of 100. Model No. RP 3654.340, see page 159.
- <sup>1)</sup> Nut M2.5, packs of 100. Model No. RP 3654.370, see page 159.
- <sup>1)</sup> Retaining cage M2.5, packs of 100.



### End pieces

for guide rails, aluminium  
To discharge static charges, contact springs RP 3687.726 may be used.

**Material:**  
Polycarbonate, base material to UL 94-V1

	Packs of	Model No. RP
End piece, front	1	3684.759
End piece, rear	1	3685.668
End pieces, pairs	10	3688.028

**+ Accessories:**

Contact springs.  
see page 128.



### Keyable guide rails, plastic

Guide rails 4 HP, keyable, to IEEE 1101.10.

- For 1.6 – 2.0 mm nominal thickness
- Chambers for the installation of keys
- Option of installing ESD contacts to discharge static charges
- Narrow design for maximum air flow
- Various colour variants to identify the slots:
  - Red for system slot
  - Green for power supply
  - Yellow and grey for board-type plug-in units

**Material:**  
Polycarbonate, base material to UL 94-V0

**Note:**  
Only for use in conjunction with type IV, IVs, VII injector/extractor handles.

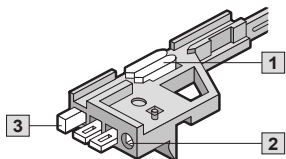
**+ Accessories:**

Keys, see page 132.  
ESD contact, see page 131.  
Extractor handles type IV, IVs, VII, see pages 142 - 149.



- 1 ESD contact for guide rails
- 2 ESD contact for front panel
- 3 Keys

For PCB depth mm	Packs of	Model No. RP			
		Grey	Red	Green	Yellow
160	10	3685.257	-	-	-
220	10	3685.258	-	-	-
280	10	3685.259	-	-	-
160	1	3684.669	3686.063	3688.055	3689.089
220	1	3684.953	9902.240	-	3689.091
280	1	3684.954	-	-	3689.093



## Guide Rails



### Keyable guide rails

with 1/2 HP offset  
 Guide rails with 1/2 HP offset for use e.g. in telecom applications. This allows PCBs to be populated on both sides. Green guide rails with offset are prescribed in the specification (PICMG 2.11) for the installation of power supply units.

- For 1.6 – 2.0 mm PCB thickness
- 4 HP x 160/220 mm
- Narrow design for maximum air flow
- Chambers for the installation of keys
- Option of installing ESD contacts to discharge static charges

**Material:**

Polycarbonate, base material to UL 94-V0

**Note:**

Only suitable for use in conjunction with extractor handles type IV, IVs, VII with 1/2 HP offset.

For PCB depth mm	Packs of	Colour	Model No. RP
160	10	Grey	<b>3688.062</b>
		Grey	<b>3686.137</b>
	1	Yellow	<b>3689.090</b>
		Green	<b>3687.832</b>
20	10	Grey	<b>3688.060</b>
		Grey	<b>3686.136</b>
	1	Yellow	<b>3689.092</b>
		Yellow	<b>3689.092</b>



**Accessories:**

Keys, see page 132.  
 ESD contact, see page 131.  
 Extractor handles type IVs, VII with 1/2 HP offset, see pages 143 - 144.



### Keyable guide rails

For I/O assemblies  
 Guide rails 4 HP, keyable, to IEEE 1101.10. Prepared to accommodate a ground contact for assembly of a plug-type connection.

- For 1.6 – 2.0 mm nominal thickness
- For 80 mm deep PCBs
- Chambers for the installation of keys
- Option of installing ESD contacts to discharge static charges
- Narrow design for maximum air flow

**Material:**

Polycarbonate, base material to UL 94-V0

**Note:**

Only for use in conjunction with type IV, IVs, VII injector/extractor handles.

Colour	For PCB depth mm	Packs of	Model No. RP	
			Guide rails	
			Top	Bottom
Grey	80	1	<b>3687.936</b>	<b>3687.937</b>
Yellow	80	1	<b>3689.097</b>	<b>3689.098</b>



**Accessories:**

Keys, see page 132.  
 ESD contact, see page 131.  
 Ground contact, see page 129.  
 Extractor handles type IV, IVs, VII, see pages 142 - 149.



### Ground contact

Ensures a plug-in ground connection. UL-approved.

**Material:**

Die-cast zinc

Supply includes:  
 Grounding bush, contact spring.

**Note:**

Only suitable for use in conjunction with keyable guide rails for rear I/O assemblies.



	Model No. RP	
	1 set	50 sets
Grounding bush and contact spring	<b>3689.036</b>	<b>3687.951</b>



**Also required:**

Assembly screws 3.5 x 12 mm, packs of 50, Model No. RP 3684.109. see page 160.

## Guide Rails



### Keyable guide rails, aluminium, three-part

Keyable guide rails with aluminium centre part, for high mechanical loads. Suitable for 1.6 – 2.0 mm PCB thickness.

The guide rails are compiled from the following individual components:

- 1 2 end pieces
- 2 1 aluminium centre part
- 3 Insulating centre part(s)



### 1 End Pieces

#### for three-part guide rails

For 1.6 – 2.0 mm PCB thickness.

#### Material:

Polycarbonate, base material to UL 94-V0

	Packs of	Model No. RP
	10 pairs	3685.265
front end piece	1	3685.790
rear end piece	1	3684.670

#### Note:

A front and a rear end piece is required for each guide rail.



### 2 Aluminium centre part

#### for three-part guide rails

For 1.6 – 2.0 mm PCB thickness.

#### Material:

Aluminium, unplated

For PCB depth mm	Model No. RP	
	Packs of = 1	Packs of = 10
220	3684.673	3685.260
280	3684.674	3685.261
340	3684.675	3685.262
400	3684.676	3685.263
1000	3684.672	–



### 3 Insulated centre part for three-part guide rails

The insulated centre part is pushed onto the aluminium centre part. length: 60 mm.

#### Material:

Plastic, self-extinguishing to UL 94-V0

Packs of	Model No. RP
1	3684.677
10	3685.264

For PCB depth mm	Number of insulating strips required
160	1
220	2
280	3
340	4
400	5



### Guide rails for 4.4"

Snap-fastening guide rails to accommodate PCBs and assemblies with a height of 4.4".

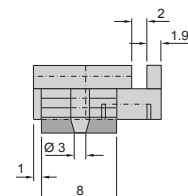
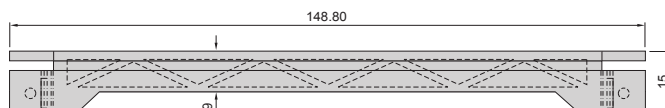
#### Material:

Macrolon

#### Colour:

Dark grey

For PCB depth mm	Packs of	Model No. RP
160	1	3686.990



## Guide Rails



### Guide rails

for box type plug-in units  
 For PCB depth 1.6 mm.  
 For insertion into covers with vent slots  
 (from 12 HP).

**Material:**  
 Noryl

For PCB depth mm	Packs of	Model No. RP
160	10	3606.140
220	10	3606.200



### Air block panel

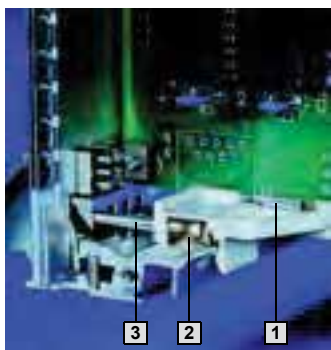
for unused slots  
 To conceal unused slots and prevent unwanted airflow. The air block panel simply snaps into position on the guide rails.

**Material:**  
 Polycarbonate, self-extinguishing to UL 94-V0

**Colour:**  
 Blue

**Note:**  
 Not suitable for use in conjunction with guide rails with 1/2 HP offset.

For keyable guide rails	Packs of	Model No. RP
160 mm	1	3687.924



### ESD contacts

for installation in keyable guide rails.  
 To discharge static charges.

**1 ESD contact for guide rail**  
 For permanent direct discharge via the PCB.

**2 ESD contact for front panel**  
 To discharge static charges in conjunction with the ESD pin. For insertion into the end piece of the guide rail.

**3 ESD pin**

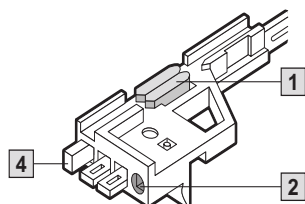
**4 Keys**

**Material:**

- 1** Stainless steel
- 2** Tin bronze, tin-plated

ESD contact for	Packs of	Model No. RP
Guide rail	50	3684.204
Front panel	50	3684.205

**Note:**  
 Only for use in conjunction with extractor handle with ESD pin (type IV, IVs, VII), see pages 142 - 149.



## Keying/PCB ejectors

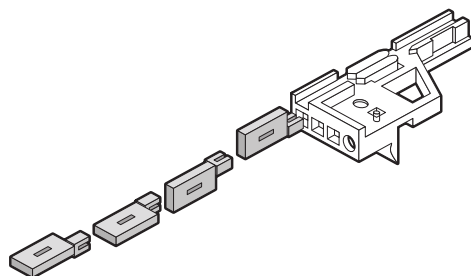


### Keys

Keys are used for coding of board-type plug-in units and prevent the use of assemblies in incorrect slots. The keys are inserted into the chambers of the keyable guide rails and the injector/extractor handles, types IV, IVs and VII (4 positions are possible). This produces 64 keying combinations per guide rail. When keying the top and bottom guide rail, 4096 potential combinations are possible.

**Standards:**  
IEEE 1101.10, IEC 60 297-5-104

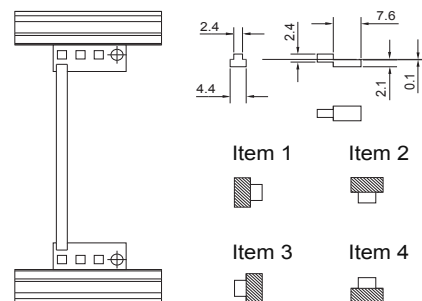
**Material:**  
Plastic, PBTP, basic material to UL 94-V0



Colour	Packs of	Model No. RP
Grey	100	3684.325
Red	100	3684.326

### + Accessories:

Keying tool,  
see page 132.



### Keying tool

For simple assembly of keys. Up to 3 coding keys may be fitted simultaneously. An integral alignment pin makes positioning easier.

**Material:**  
Polycarbonate, base material to UL 94-V0

Packs of	Model No. RP
1	3687.956



### PCB ejector/retainer

The two-piece PCB ejector is used for securing and extracting PCBs without front panels. The base section may also be used separately for board retention only.

**Material:**  
Polycarbonate, base material to UL 94-V0

	Packs of	Model No. RP
1 PCB ejector/retainer	10	3687.014
2 PCB retainer	10	3687.052





## Covers for subracks



### Cover

For subrack Ripac EASY

- Perforated or solid
- Optional screw-fastening to the side panels with mounting clips for additional support

#### Cover plates, version 1, slide-in:

The cover plates simply slide into the front horizontal and rear horizontal rails for backplane/connector mounting.



#### Cover plates, version 2, slide-in/screw-fastened:

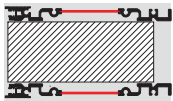
In this application example, additional horizontal rails for backplane mounting are fitted at the rear. The horizontal rails for backplane/connector mounting are available for top-mounting.

The cover plates simply slide into the front and rear horizontal rails for backplane mounting.

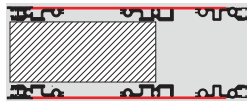
**Material:**  
Aluminium

**Supply includes:**  
2 covers

Version 1



Version 2



### Version 1

HP	For side panel depth mm	Model No. RP	
		Perforated	Solid
84	175	3634.685	3634.675
84	235	3634.690	3634.680

### Version 2

HP	For side panel depth mm	Model No. RP	
		Perforated <sup>1)</sup>	Solid <sup>1)</sup>
84	175	3634.650	3634.625
84	235	3634.655	3634.630
84	295	3634.660	3634.635
84	355	3634.665	3634.640
84	415	3634.670	3634.645

Custom versions available upon request.

**Also required:**

<sup>1)</sup> Assembly screws, packs of 100, Model No. RP 3634.233, see page 159.

**Accessories:**

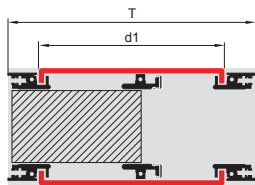
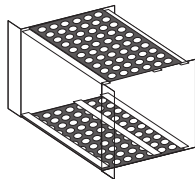
Mounting clips

Packs of	Model No. RP
50	3634.450

Assembly screws for mounting clips

Packs of	Model No. RP
100	3634.420

## Covers for subracks



### Covers version 1

For all Ripac Vario, Ripac Vario EMC, Ripac Compact and Ripac Vario Mobil subracks.

**To cover the overall subrack depth** (EMC application) or as connector protection.

- Flat design for top and bottom
- Optionally solid or perforated
- For mounting on the subrack side panel with the aid of mounting blocks.

### Material:

1.0 mm aluminium, unplated, hole diameter 4 mm in perforated version

### Each set includes:

2 covers,  
8 mounting blocks @ 28.5 mm,  
24 assembly screws

### Each individual unit includes:

1 cover

### Note:

For EMC applications, additional mounting blocks must be fitted across the entire subrack depth.

HP	For side panel depth (T) mm	Cover depth (d1) mm	Model No. RP			
			Individual unit <sup>1)</sup>		Set	
			perforated	solid	perforated	solid
21	225	192	3687.618	3687.620	-	-
21	285	252	3687.619	3687.621	-	-
42	175	142	3684.957	3687.626	-	-
42	225	192	3687.623	3687.627	-	-
42	245	212	3684.958	3687.628	-	-
42	285	252	3685.642	3687.629	-	-
84	175	142	3684.681	3684.680	3685.245	3685.250
84	225	192	3684.694	3684.683	-	-
84	235	202	3685.851	3685.813	-	-
84	245	212	3684.695	3684.684	3685.246	3685.251
84	285	252	3684.696	3684.685	-	-
84	295	262	3685.855	3685.814	-	-
84	305	272	3685.852	3684.686	3685.247	3685.252
84	345	312	3684.698	3684.687	-	-
84	365	332	3685.853	3684.688	3685.248	3685.253
84	405	372	3684.700	3684.689	3685.249	3685.254
84	465	432	3684.701	3684.691	-	-
84	525	492	3684.702	3684.692	-	-
84	585	552	3684.703	3684.693	-	-

Custom versions available upon request.

### Also required:

<sup>1)</sup> Mounting blocks, see page 127.

<sup>1)</sup> EMC gaskets for cover plates, see page 127.

<sup>1)</sup> Assembly screws, packs of 100, Model No. RP 3684.233, see page 159.

## Covers for subracks

**Covers version 2**

For all Ripac Vario, Ripac Vario EMC, Ripac Compact and Ripac Vario Mobil subracks.

**To cover the PCB depth.**

- Flat design for top and bottom
- Optionally solid or perforated
- For mounting on the subrack side panel with the aid of mounting blocks.

**Material:**

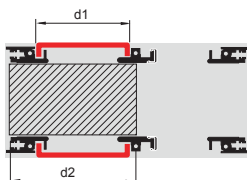
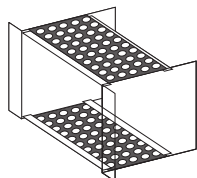
1.0 mm aluminium, unplated, hole diameter 4 mm in perforated version

**Each set includes:**

2 covers,  
8 mounting blocks @ 28.5 mm,  
24 assembly screws

**Each individual unit includes:**

1 cover.



HP	For PCB depth (d2) mm	Cover depth (d1) mm	Model No. RP			
			Individual unit <sup>1)</sup>		Set	
			perforated	solid	perforated	solid
21	160	142	<b>3687.630</b>	<b>3687.634</b>	-	-
21	220	202	<b>3687.631</b>	<b>3687.635</b>	-	-
42	160	142	<b>3684.957</b>	<b>3687.626</b>	-	-
42	220	202	<b>3687.633</b>	<b>3687.637</b>	-	-
42	280	262	<b>3687.638</b>	<b>3687.639</b>	-	-
84	160	142	<b>3684.681</b>	<b>3684.680</b>	<b>3685.245</b>	<b>3685.250</b>
84	220	202	<b>3685.851</b>	<b>3685.813</b>	-	-
84	280	262	<b>3685.855</b>	<b>3685.814</b>	-	-
84	340	322	<b>3685.856</b>	-	-	-
84	400	382	<b>3685.857</b>	-	-	-



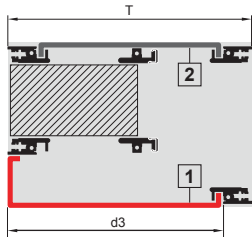
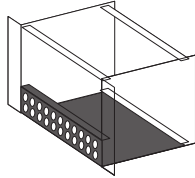
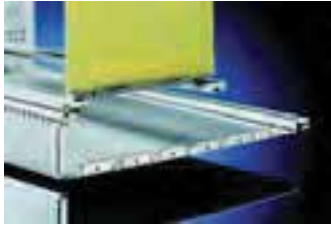
Custom versions available upon request.

**Also required:**

<sup>1)</sup> Mounting blocks, see page 127.

<sup>1)</sup> Assembly screws, packs of 100, Model No. RP 3684.233, see page 159.

## Covers



### Covers version 3

For all Ripac Vario, Ripac Vario EMC and Ripac Vario Mobil subracks.

**To cover the overall subrack depth** (EMC application).

- Cover with 1U edge fold (item 1), to conceal the 1U area in the subrack
- A version 1 flat cover (item 2) is additionally required
- Optionally perforated or solid front
- Suitable for subracks 4U (3 + 1), 7U (6 + 1)
- For mounting on the subrack side panel with the aid of mounting blocks.

**Material:**

1.0 mm aluminium, unplated, hole diameter 4 mm in perforated version

**Note:**

For EMC applications, mounting blocks must be fitted across the entire subrack depth.

HP	For side panel depth (T) mm	Cover depth (d3) mm	Model No. RP	
			perforated	solid
84	285	270	<b>3684.720</b>	<b>3684.714</b>
84	345	330	<b>3684.721</b>	<b>3684.715</b>
84	405	390	<b>3684.722</b>	<b>3684.716</b>
84	465	450	<b>3684.723</b>	<b>3684.717</b>
84	525	510	<b>3684.724</b>	<b>3684.718</b>
84	585	570	<b>3684.725</b>	<b>3684.719</b>

Custom versions available upon request.

**! Also required:**

- Mounting blocks, see page 127.
- EMC gaskets for covers, see page 127.
- Assembly screws, packs of 100, Model No. RP 3684.233, see page 159.
- Cover, version 1, see page 134.

Covers

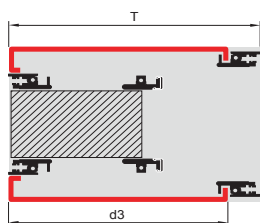
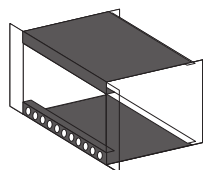


**Covers version 4**

For all Ripac Vario, Ripac Vario EMC and Ripac Vario Mobil subracks.

**To cover the overall subrack depth (EMC application).**

- Cover top/bottom with 1/2 U edge fold to cover the 1/2 U section in the subrack
- Optionally perforated or solid front
- Suitable for subracks 4U (3 + 2 x 1/2), 7U (6 + 2 x 1/2)
- For mounting on the subrack side panel with the aid of mounting blocks.



**Material:**

1.0 mm aluminium, unplated, hole diameter 4 mm in perforated version.

**Note:**

For EMC applications, mounting blocks must be fitted across the entire subrack depth.

HP	For side panel depth (T) mm	Cover depth (d3) mm	Model No. RP	
			perforated	solid
84	285	270	<b>3684.732</b>	<b>3684.726</b>
84	345	330	<b>3684.733</b>	<b>3684.727</b>
84	405	390	<b>3684.734</b>	<b>3684.728</b>
84	465	450	<b>3684.735</b>	<b>3684.729</b>
84	525	510	<b>3684.736</b>	<b>3684.730</b>
84	585	570	<b>3684.737</b>	<b>3684.731</b>

Custom versions available upon request.

**! Also required:**

Mounting blocks, see page 127.

EMC gaskets for covers, see page 127.

Assembly screws.

packs of 100, Model No. RP 3684.233, see page 159.



**Covers version 5**

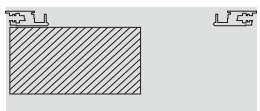
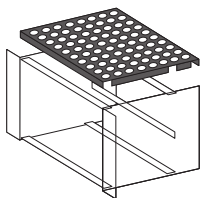
(snap-fastening)

For all Ripac Vario, Ripac Vario EMC and Ripac Vario Mobil subracks.

**To cover the overall subrack depth or PCB depth.**

Simple assembly:

- Side edge fold with half shears facilitates fast assembly (without mounting blocks) by simply snap-fastening
- Side notches for fitting horizontal rails in 160, 220 or 280 mm depth
- Optionally solid or perforated.



**Material:**

1.0 mm aluminium, unplated, hole diameter 4 mm in perforated version.

**Supply includes:**

2 gaskets.

HP	Position of side notches for horizontal rails mm	For side panel depth mm	Model No. RP	
			perforated	solid
21	160	175/185	<b>3687.624</b>	-
21	160/220	235	<b>3687.692</b>	-
42	160	175/185	<b>3687.625</b>	-
42	160/220	235	<b>3687.677</b>	-
42	160	245	<b>3687.640</b>	-
84	160	175/185	<b>3687.641</b>	<b>3687.647</b>
84	160	245	<b>3687.642</b>	<b>3687.648</b>
84	160/220	235	<b>3687.643</b>	<b>3687.649</b>
84	160/220	285	<b>3687.644</b>	<b>3687.650</b>
84	160/220	305	<b>3687.645</b>	<b>3687.651</b>
84	160/220/280	345	<b>3687.646</b>	<b>3687.652</b>

Custom versions available upon request.