

# Industrial-Automation Cabinets and Power Supplies

## Catalog



HIMA Paul Hildebrandt GmbH  
Industrial Automation

**HI 800 055 BEA**

## **Important Notes**

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# 1 HIMA Standard Cabinet

## 1.1 Construction

The HIMA standard cabinet is based on the RITTAL TS 8 cabinet series. HIMA tailors the cabinets to the requirements for the installation of HIMA modules and equipment.

### Available sizes:

Dimensions (W x H x D)	HIMA designation	RITTAL designation
800 x 2000 x 600 mm	M 1511	TS8806
800 x 2200 x 600 mm	M 1512	TS8826
800 x 2000 x 800 mm	M 1513	TS8808
800 x 2000 x 500 mm (reduced depth)	M 1514	TS8805
Further types on demand		

Table 1: Cabinets - available sizes

### Material:

The cabinets are made of sheet steel. The rack has a sixteen-fold profile. The thickness of the material is

- 2.0 mm for the door,
- 1.5 mm for the rear panel and the side panels.

### Surface:

- RAL 7035 anodic dipping priming,
- Structured powder coating.

### Construction of the cabinet (Standard design):

- Two top-cover cutouts with air outlet grills, prepared for the installation of the K 9202 cabinet fan
- Door with 180° hinges on the left side (two doors for M 1515), locking with pushbutton safety locking device  
**Note:** Doors are also available in plexiglas design
- A 3 format compartment for circuit diagrams at the inside of the door
- Two bus bars M 2500
- Cable ducts and mounting rails mounted on four frame supports at the rear side of the cabinet and mounted on four installation rails on the right side panel
- Vertical installation rail on the left side of the cabinet frame with cable shackles
- Air inlet filter in the lower part of the door
- Swing frame to install 19-inches equipment according to EN 60297, fixed on the left side, twin-bit lock. Mounting frame 40 units high for a cabinet height of 2000 mm or 45 units high for a cabinet height of 2200 mm

**Note:** When installing parts with front side extensions (e.g. subracks of the HIMA Automation System), the maximum opening angle of the swing frame is reduced.

- Cable duct mounted on the side of the swing frame for internal wiring of the 19-inches equipment
- Also mounted on the side of the swing frame is a mounting rail to install terminals or relays
- Side panels are included in the scope of delivery

## 1.2 Assembly Requirements

Degree of protection: The HIMA standard cabinets meet the requirements of protection IP 40 according to EN 60529.

Concerning the ambient conditions it must be regarded that the operating temperature inside the cabinet does not exceed 60 °C. A reduction of the internal temperature of the cabinet can also be achieved by design, cf. therefore chapter 2.

## 1.3 Regulations Regarding Loads and Transport

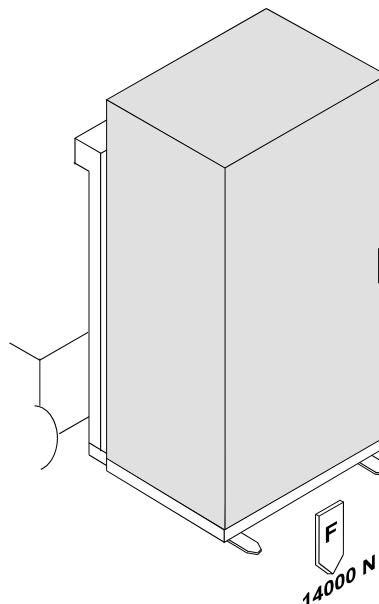
The cabinets may only be transported when closed. The transportation may only be made in the upright position of the cabinet, otherwise mechanical damage may occur by overstressing of the bearings of the swing frame.

For reasons of stability the standard cabinet is delivered with two side panels.

*Maximum load for transportation of  
the cabinet by a fork lifter:  
14 000 N (1400 kg)*

**Safety note:**

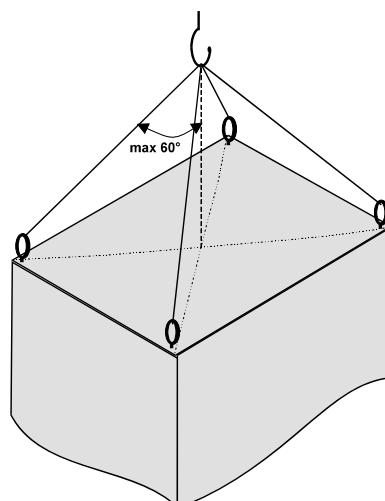
Position the lifter forks below the side panels of the cabinet. The cabinet must be transported on a palette.



*Transportation by crane*

**Safety notes:**

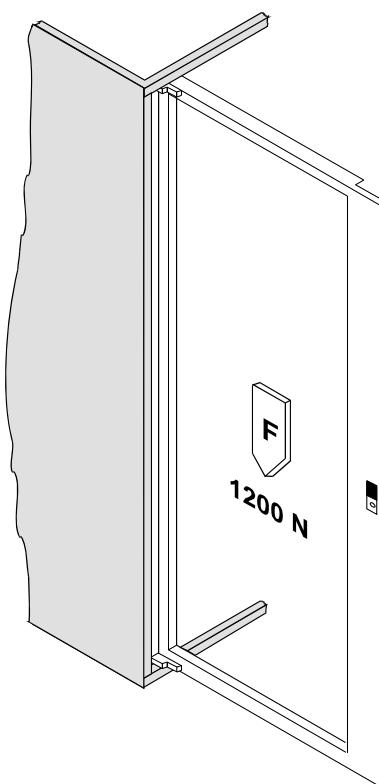
- When transporting by crane the gear must always be fastened to all four ring bolts.
- Individual cabinets may have a maximum load of 1000 kg.
- Exceptionally heavy equipment like e.g. transformers have to be removed before transport (not required for HIMA products).



*Maximum load for equipment in the swing frame:  
1200 N (120 kg)*

**Safety note:**

In general the cabinet with swing frame must be secured against turn over before opening the swing frame.



## 1.4 Accessories for the Standard Cabinet

For the completion of the equipment of the standard cabinet the following accessories can be supplied:

Designation	Order designation
Temperature controller SK 3112 *	54 2118011
Position switch for swing frame *	88 0003331
Alternative: Motion detector with lamp	88 0004793
Cabinet lamp * 140 mm	55 7100360
180 mm	55 7100361
Bus bar M 2500 (2 per cabinet already assembled)	99 0000118 99 0000135
Plinth, height 100 mm 800 x 500 mm, for M 1514 * 800 x 600 mm, for M 1511, M 1512 * 800 x 800 mm, for M 1513 *	88 0005605 88 0005606 88 0005607
Plinth, height 200 mm 800 x 500 mm, for M 1514 * 800 x 600 mm, for M 1511, M 1512 * 800 x 800 mm, for M 1513 *	88 0005609 88 0005610 88 0005611
Cabinet fan K 9202	99 6920202
Other accessories available on request	

Table 2: Accessories for the standard cabinet

\* for details refer to the RITTAL product catalog

## 1.5 Wiring of the Cabinets

The connecting lines to the external are normally entered into the cabinet from below. The signal transfer is made via terminal blocks on mounting rails at the rear of the cabinet. The connecting lines are taken to the terminals via vertically mounted cable ducts. The horizontal wiring between the cable ducts is always made via three cable-leading shackles mounted on the frame.

On the left side of the cabinet a vertical mounting rail with six cable shackles (seven, if the cabinet is 2200 mm high) is installed to support the connecting lines from the cable duct to the swing frame. The lines for one subrack are bundled together at the corresponding 19-inches field level fields (e.g. subrack). The wiring within the 19-inches field is made via horizontally cable ducts mounted at the subracks. For the wiring between the subracks of the swing frame a vertical cable duct is mounted at the end face of the swing frame.

## 1.6 Terminals on Mounting Rails

Effective length of the mounting rail TS 35/15:

Cabinet type	Cabinet height	Effective length
M 1511	2000 mm	1650 mm
M 1512	2200 mm	1850 mm
M 1513	2000 mm	1650 mm
M 1514	2000 mm	1650 mm

Table 3: Mounting rails

For the equipment of the mounting rail the effective length must be reduced for 10 mm each for the end bracket and the label.

### Mounting examples

Terminal width	Max. quantity at a rail length of		Type	Manufacturer
	1630 mm	1830 mm		
5 mm	326	366	280-601	WAGO
5.2 mm	313	351	UK3 UK3 blue UKK3 UKK3 blue	Phoenix
6 mm	271	305	281-601 SAK 2,5/35 SAK 2,5/35 blue	WAGO Weidmüller
6.2 mm	262	295	UK5 UK5 blue UKK5 UKK5 blue	Phoenix

Table 4: Mounting examples

## 2 Cabinet Ventilation

The increasing integration level of electronic modules causes high heat dissipation. Therefore appropriate measures are required so that the lifetime and reliability of the components assembled in the HIMA standard cabinet will not be reduced by the increase of the internal temperature of the cabinet. Therefore it is necessary that the power dissipation of the installed components is calculated. For this you can use the calculation tool "Power" available in the internet and on the HIMA ELOP II CD.

### 2.1 Measures for Temperature Reduction

The following ventilation components are used by HIMA to counteract temperature problems inside the standard cabinet:

For the air cooling of the cabinet these are

- SK 3162 S air supply filter for the air supply of the cabinet via the door and air exit via top-cover cutouts,
- HIMA K 9202 cabinet fan to be assembled on the internal side of the top cover.

For the air cooling of the subracks these are

- HIMA M 7200 air duct for the air-flow,
- HIMA K 9203 circulating fan for the forced circulation of the air.

### 2.2 Project Planning Aid

For the determination of the ventilation components, the heat dissipation and built-in components are relevant. A uniformly distributed thermal load is assumed, the maximum temperature rise is 25 °C.

The average heat discharge of a HIMA standard cabinet only with convection, i.e. without auxiliary devices is 300 W. Basis of this consideration is several cabinets to be installed side by side directly on a wall, so that heat discharge is only possible via the top.

The use of the cabinet fan K 9202 enables an air flow of 200 m<sup>3</sup> per hour with use of the chimney effect. With this the following amount of heat must be dissipated:

Type of standard cabinet	Power dissipation
M 1511	1000 W
M 1512	1000 W
M 1513	1000 W
M 1514	800 W

Table 5: Power dissipation of standard cabinets

The air supply into the cabinet is via the filter in the door. To produce the air stream by using the chimney effect, in the swing frame two height units at the bottom have to remain free. With installation of a circulating fan K 9203 as lowest part of the equipment, one height unit has to remain free.

## 2.2.1 I/O Subracks of the HIMA Automation System

The I/O subracks (4 units high) of the HIMA Automation System H41q/H51q are fundamentally mounted in blocks of two subracks. Between these double blocks one height unit has to remain free to install a circulating fan K 9203. The central rack has its own circulating fans.

The following figure shows the side view of a cabinet with installed devices and subracks of the HIMA Automation System to demonstrate the way of the air flow within the cabinet.

The figure shows also the correlation between the total power dissipation of the cabinet and the ventilation components to be used.

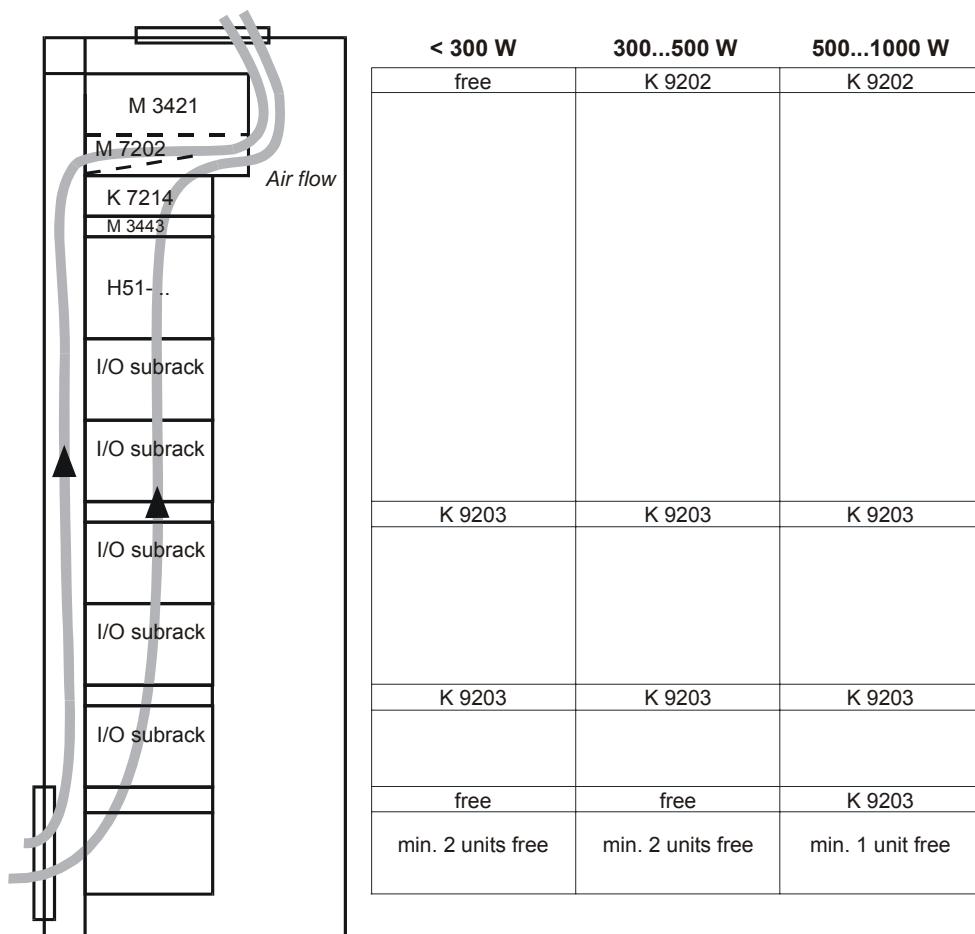


Figure 1: Principle of cooling I/O subracks

At total power dissipations > 300 W a cabinet fan has to be installed within the cabinet.

The same assignment with additional consideration of the power dissipation of the different I/O modules is also shown in the table below:

Total power dissipation	max. power dissipation per I/O subrack	Air fan
< 300 W	< 50 W	2 x K 9203
300...500 W	< 50 W	K 9202, 2 x K 9203
500...1000 W	< 100 W	K 9202, 3 x K 9203

Table 6: Cooling of I/O subracks related to Figure 1

**Note** At installation of I/O modules regard the special notes in the corresponding data sheets. Depending on the module additional fans can be necessary for cooling.

## 2.2.2 Subracks of the HIMA Planar System

The same features as in 2.2.1 are also valid.

The construction of the subracks in double blocks is not absolutely necessary but should be considered in the planning phase to enable the installation of a circulating fan in case of possibly appearing higher power dissipations (> 50 W per subrack).

## 2.2.3 Installation of HIMatrix Devices

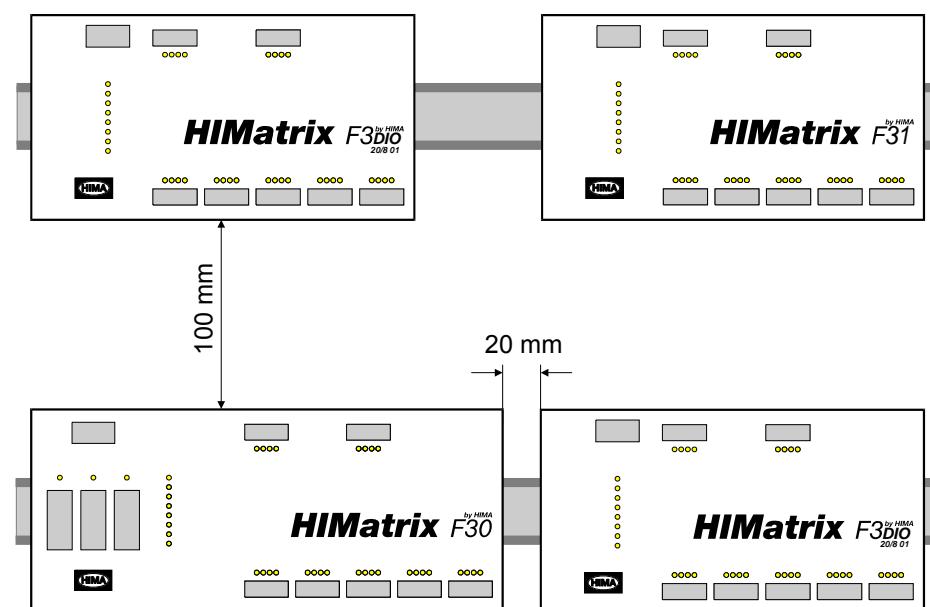
All devices must be mounted in a horizontal position (with reference to the inscription on the front plate) to ensure sufficient ventilation. Mounting in a vertical position requires additional measures to ensure sufficient ventilation.

See the relevant manuals for the dimensions of the various devices.

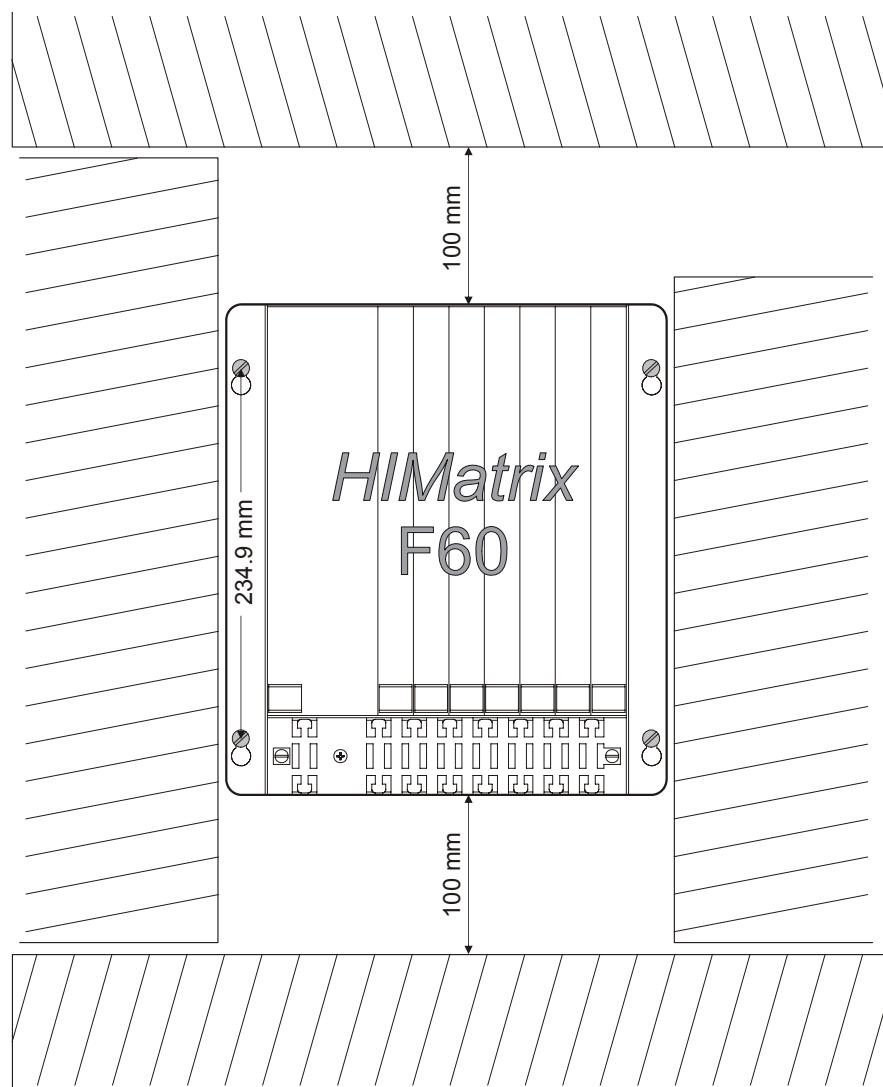
The minimum distances between HIMatrix devices, to devices from other manufacturers also as to cabinet walls are as follows

- **vertical** minimum **100 mm**,
- **horizontal** approx. **20 mm** (set by the fastening straps with the F60).

The installation space (rack heights) must also be considered for attaching connectors for the inputs and outputs and for communication (see Chapter 2.2.5 Assembly heights).



**Minimum clearances for HIMatrix Fxx and Remote I/O (Compact devices)**



**Minimum clearances for HIMatrix F60**

**Figure 2: Minimum clearances at installation**

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**Notes** The following installation is required so that

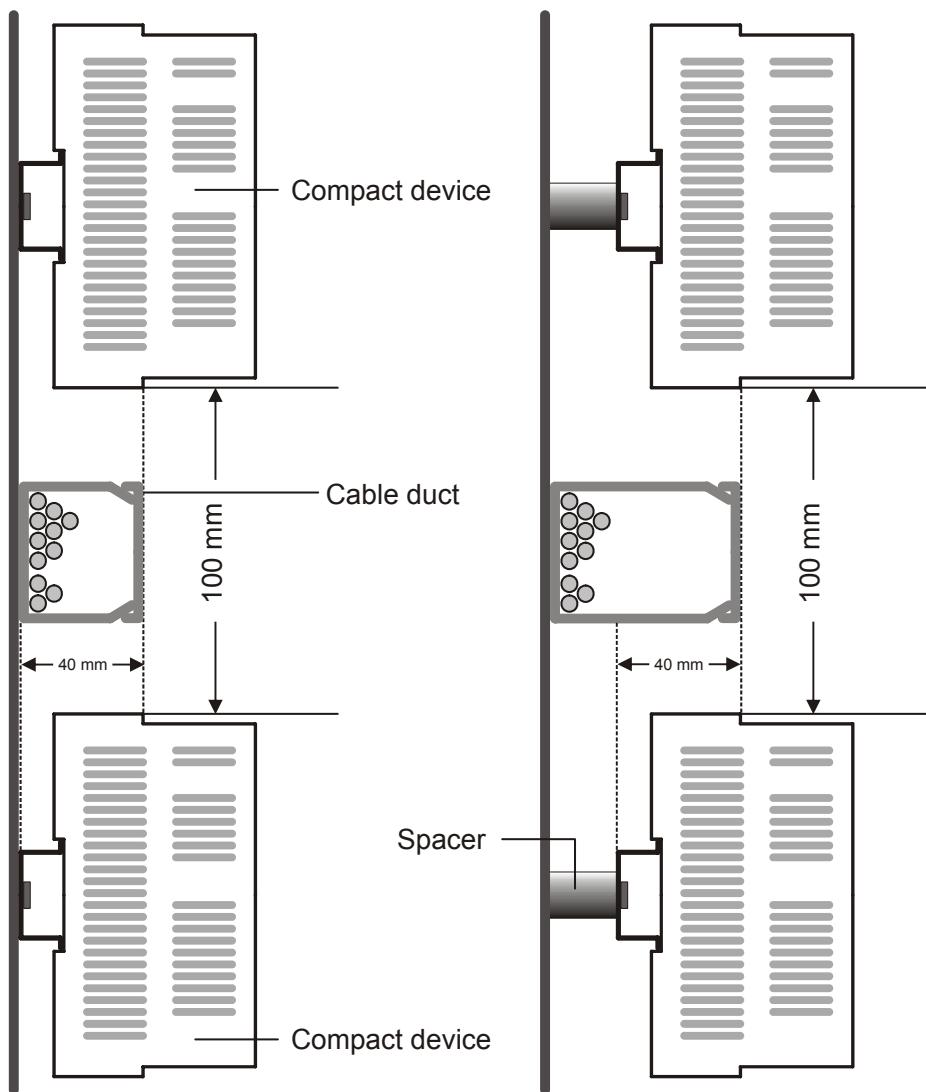
- HIMatrix devices are not subject to heat from other equipment with high heat dissipation,
- devices with high EMC interference do not interfere with HIMatrix devices.

Note the information provided by the manufacturer.

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## 2.2.4 Air Circulation

The ventilation slots in the case may not be obstructed. When mounting compact devices and cable ducts at the same level the height of the cable ducts must be no more than 40 mm. If the cable ducts are higher, the mounting rails must be placed on spacers:



**Use of cable ducts  
with horizontal mounting of compact devices on rails**

**Figure 3: Use of cable ducts and spacers**

The length  $l$  of the required spacer is calculated as follows:

$$l = \text{height of the cable duct} - 40 \text{ mm}$$

If **more** than two HIMatrix devices (even when the minimum vertical clearance of 100 mm is retained) are installed one above the other, additional measures for ventilation are required to ensure even temperature distribution.

The illustration below left shows the minimum clearances if no spacers are used for the rails:



**Clearances for mounting without spacers**

**Vertical mounting of HIMatrix devices**

**Figure 4: Mounting without spacers and vertical mounting**

On open mounting surfaces there are no problems with maintaining the maximum operating temperature if the minimum clearances are retained and the air can circulate without obstruction.

## 2.2.5 Assembly Heights

Because of the connectors for communication and I/O level the HIMatrix devices require the assembly heights shown in the table below. With compact devices they apply from the fixing rail:

HIMatrix device	Assembly height
F60	270 mm
F1 DI 16 01	100 mm
F2 DO 4 01	100 mm
F2 DO 8 01	120 mm
F2 DO 16 01	100 mm
F2 DO 16 02	120 mm
F3 DIO 8/8 01	100 mm
F3 DIO 16/8 01	100 mm
F3 DIO 20/8 01	100 mm
F3 DIO 20/8 02	100 mm
F3 AIO 8/4 01	100 mm
F20	with Profibus connector* without Profibus connector
F30	with Profibus connector* without Profibus connector
F31	100 mm
F35	with Profibus connector* without Profibus connector

Table 7: Assembly heights

\*Assembly height = height HIMatrix + height of Profibus connector

Right connector: 100 mm + 50 mm

45° connector : 100 mm + 40 mm

90° connector : 100 mm + 35 mm

## 2.2.6 Other Products

With using products of other companies in the 19-inches level a good thoroughly air flow rate has to be regarded.

If this is not possible, the air stream has to be conveyed via cable ducts M 7202.

The instructions of the concerning manufacturers have to be observed!

## 3 Earthing Concept

### 3.1 Earthing Cable Run

Reliable earthing and thus the fulfillment of the valid EMC regulations in HIMA systems is achieved by the measures described below.

All touchable plates of the 19-inches HIMA components (e. g. blind plates and subracks) are electrically conductive passivated (ESD protection).

The safe electrical connection between built-in components such as subracks and the switchgear cabinet is made via captive nuts with claws. The claws penetrate the surface of the swing frame (1) and thus guarantee a safe electrical contact. The screws and washers used therefore are made of high-grade steel to avoid electrical corrosion (2).

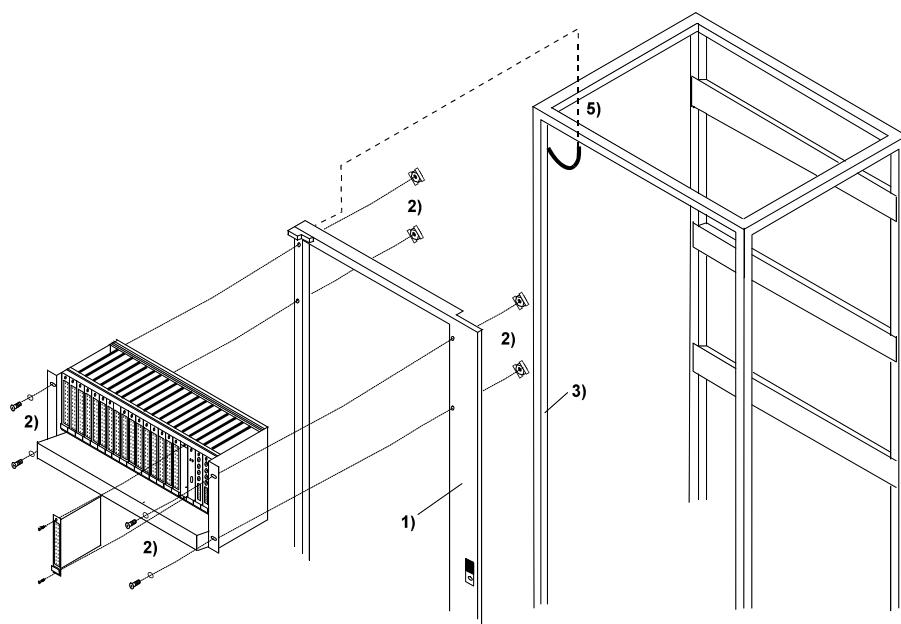


Figure 5: Cabinet framework

The parts of the cabinet framework (3) are welded together and therefore they make up an electrically conductive constructional element. Swing frame, door, mounting rails and mounting plates (if existing) are conductively connected to the cabinet framework via short earthing straps with a cross section of  $16 \text{ mm}^2$  or  $25 \text{ mm}^2$ . The earthing straps are covered with a yellow/green identifying sheath (5).

The top plate is screwed to the cabinet framework via four lifting eyes. Side panels and rear panel are conductively connected via earthing clamps (7) (see Figure 6) to the cabinet framework as well as the bottom plate via screws.

As a standard, two M 2500 (4) bus bars are already installed in the cabinet and are connected to the cabinet framework via  $25 \text{ mm}^2$  earthing straps (5). Additionally, the bus bars (4) can be used for potentials separated from the earth just by removing the earthing straps (e.g. for the screens of field cables).

For the connection of the customers earthing an M 8 screw bolt is provided at the cabinet framework (6).

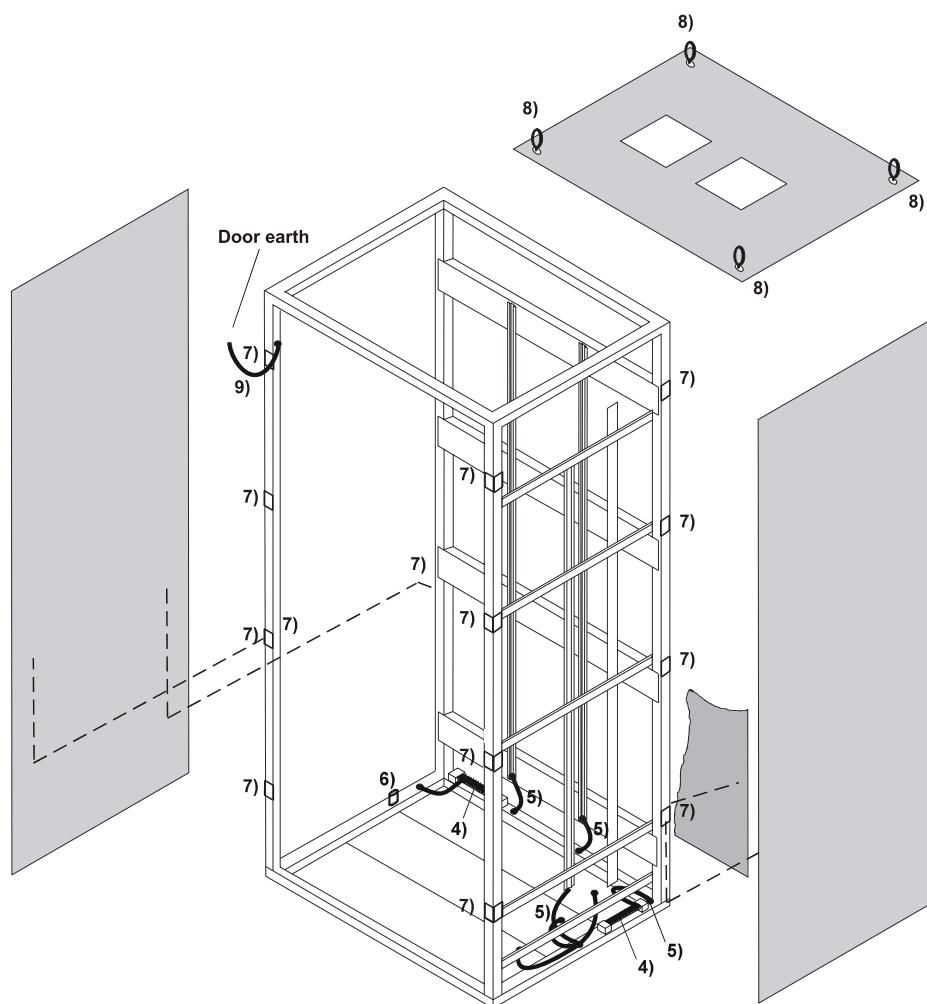


Figure 6: Earthing cable run

### 3.2 Earthing Straps / Earthing Cables

Location of installation	Position in Figure 6	Cross section	Length
Mounting rails (connector sleeve at one end)	5)	16 mm <sup>2</sup>	300 mm
Door	9)	16 mm <sup>2</sup>	300 mm
Swing frame		25 mm <sup>2</sup>	300 mm
M 2500 bus bar (connector sleeve at one end)	4)	25 mm <sup>2</sup>	300 mm

Table 8: Earthing straps / earthing cables

**Earthing clamps** (Position 7 in Figure 6)

- Side panel, rear panel, bottom plate

**Customers earthing** (Position 6 in Figure 6)

**Lifting eyes** (Position 8 in Figure 6)

- Top plate connected via four lifting eyes to the cabinet framework

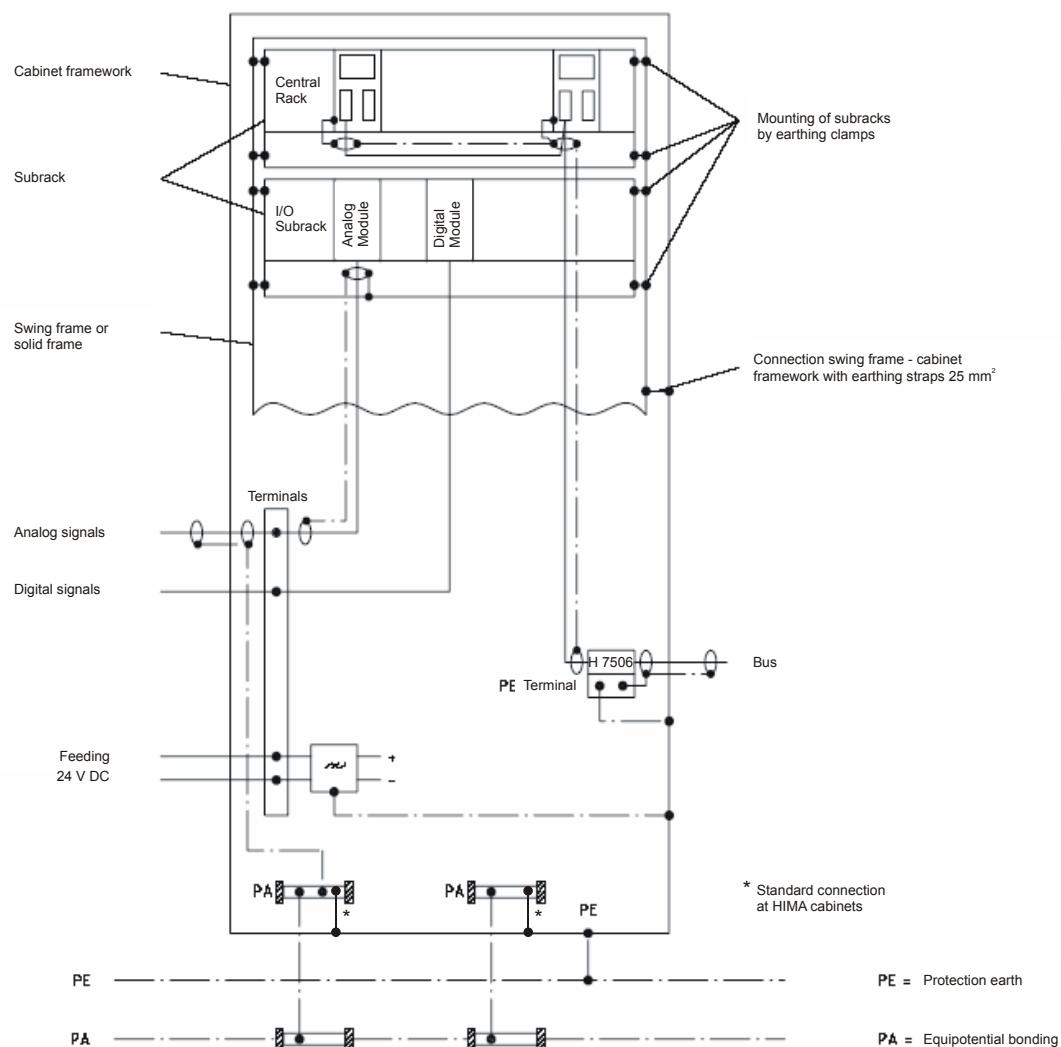


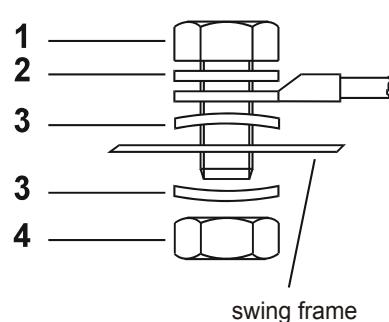
Figure 7: Earthing and screening concept of system cabinet

### 3.3 Fastening of the Earthing Straps / Earthing Cables

Used fastening elements:  
(Central earthing RITTAL DK 7829.200)

- 1 M 8 x 16 hexagon bolt
- 2 M 8 x 4 washer
- 3 8.4 mm contact washer
- 4 M 8 hexagon nut

Earth strap to the swing frame



Earth strap to the framework /Connection of the protective conductor

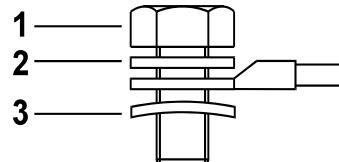
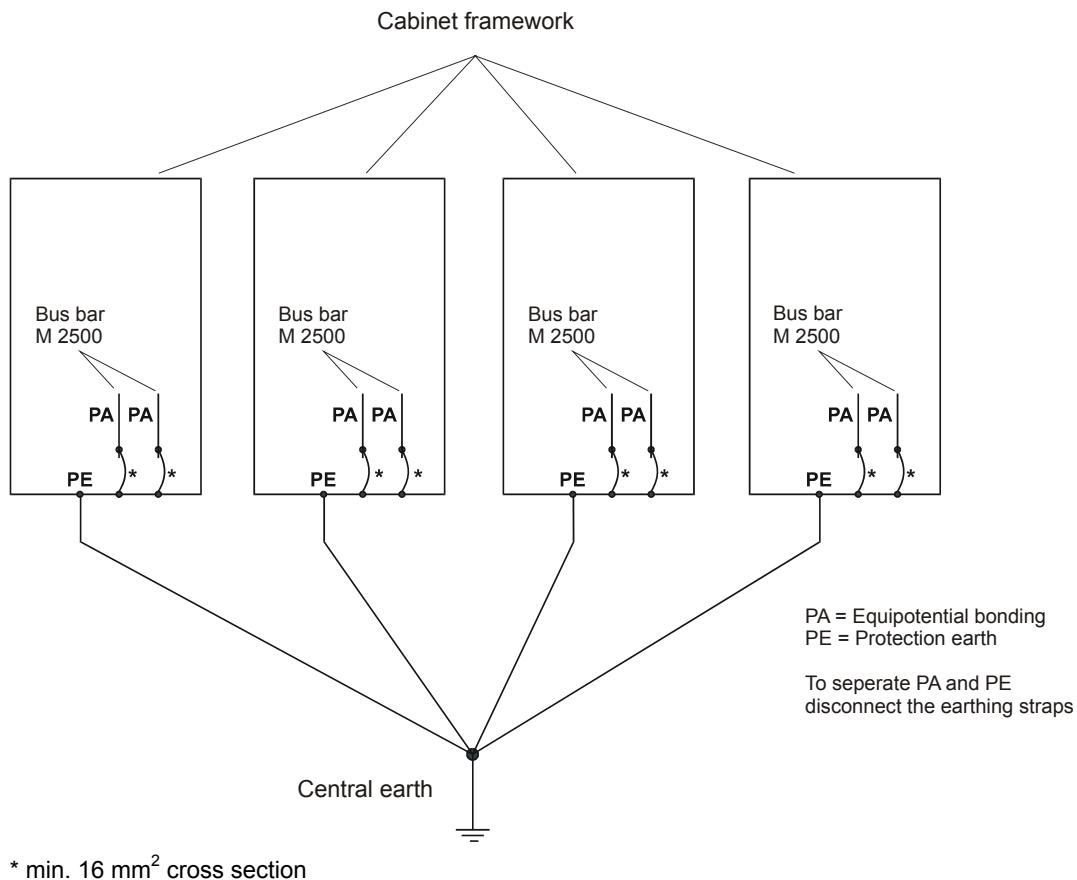


Figure 8: Fastening of the earthing straps / earthing cables

### 3.4 Linking the Earth Connections of Multiple Switchgear Cabinets



**Figure 9: Earth connections of multiple switchgear cabinets**

### 3.5 Shielding of Data Lines in the HIMA Communication Systems

Reliable shielding of data lines in HIMA communication systems is achieved by the following measures:

The connection <sup>1)</sup> of the cable shield from the bus subscriber's (H41q, H51q) to the bus terminals (H 7506) is established on the bus subscriber's side. Via the plug case and the metal front plate a connection is established via the PCB layout to the PE cabinet earth. The other side of the cable shield is not connected.

The connection <sup>2)</sup> of the H 7505 interface converter is also established on one side via the plug case. The connection to the top hat rail is established via the X2/1 <sup>5)</sup> connection. According to HIMA earthing principles the top hat rail itself is connected to the cabinet earth or optionally, to an instrument earth <sup>6)</sup>.

The connection <sup>4)</sup> of the cable shield between the individual H 7506 bus terminals is established on one side via a terminal. The terminal is located on a top hat rail to which it is also conductively connected.

The shield of the BV 7044 cable for the connection <sup>3)</sup> of the H 7505 interface converter is earthed on the PC (PAPT) side.

The measures <sup>1), 2), 3)</sup> are standardized already finished in HIMA. The connections <sup>4), 5), 6)</sup> have to be performed during the installation on site. The shielding connection using a special cable <sup>7)</sup> does already exist or has to be performed depending on the special cable.

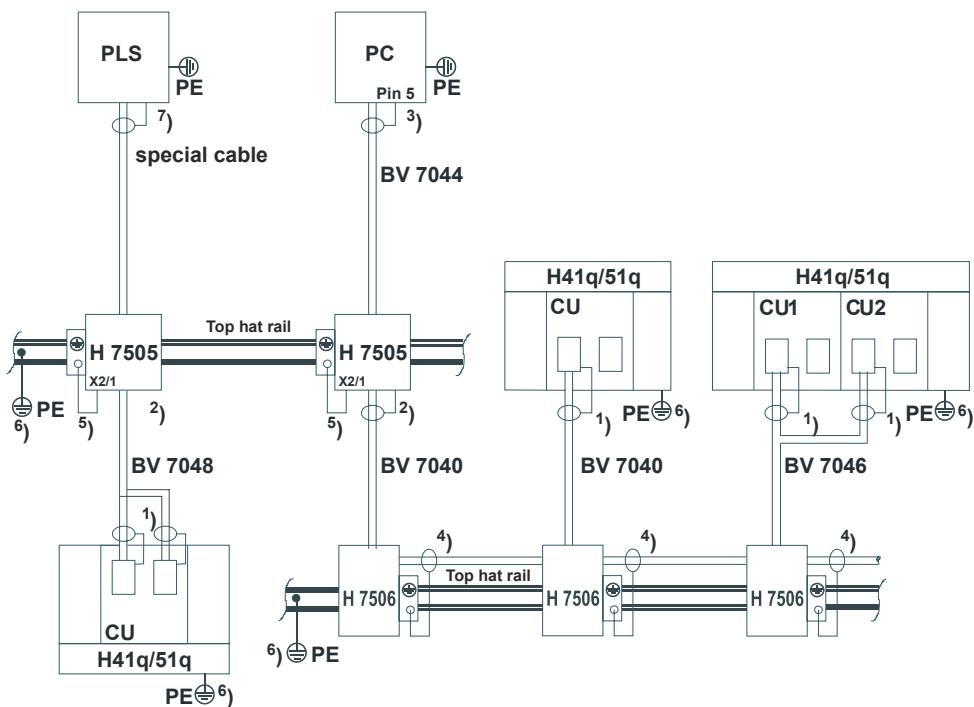


Figure 10: Connection of the cable shields

### 3.6 Shielding in the Input/Output Area

At installation of the field cables pay attention to the fact, that the cables to sensors and actuators are separated from power supply cables and in a sufficient distance from electromagnetic active devices (motors, transformers).

Cables to the input modules of the H41q/H51q systems have to be installed interference-free as possible e. g. as shielded cables.

This applies especially to cables with analog signals and for proximity switches.

With cable connectors having a shield termination line this has to be connected to the bus bar of the I/O rack below the slot of the module.

Further information on the requirements of shielding and earthing you will find in the data sheets of the modules.

### 3.7 Lightning Protection in HIMA Communication Systems

System earthing problems caused by a flash of lightning could be minimized due to the following methods:

- complete shielding of the field wiring of HIMA communication systems
- correct installation of the system earthing.

In especially exposed environments outside of buildings it could be advisable to provide lightning protection by using special lightning protection modules. For this the module of type MTRS 485 "DATA-MODUTRAB" from Phoenix company is used. The module is provided for coarse protection (influences up to 10 kA) and fine protection (influences up to 400 A).

The connection of the lightning protection modules is according to the sketch below:

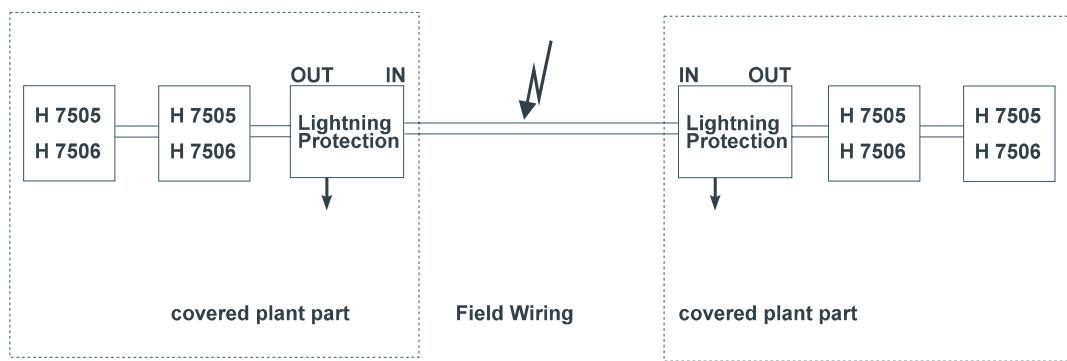


Figure 11: Connection of lightning protection tools

**Planning notes:**

The using of this lightning protection module reduces the max. possible transmission length because of its series resistance of  $4.4 \Omega$ . Two modules are necessary per channel.

For HIBUS-2 the max. transmission length is 1200 m with  $0.25 \text{ mm}^2$  wiring cross section. The loop resistance is  $180 \Omega$  in this case (with regard of the specific line resistance of copper and the double transmission length). The calculation of the remaining length of the bus refers on a continuous wiring with the same cross-section according to the formula:

$$L_R = ((180 \Omega - n * 4.4 \Omega) / (2 * R_L)) * 1000$$

$L_R$  = remaining length in m

n = number of line protection modules per channel

$R_L$  = line resistance in  $\Omega/\text{km}$

The result is a remaining length of 1141 m (2 modules,  $R_L = 75 \Omega/\text{km}$ ) for  $0.25 \text{ mm}^2$  cross section.

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**Note** The line protection modules should not be installed in the same cabinet as the PES.

The use of fiber optics cable is advisable at large distances for lightning protection and protection of EMC influences.

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## 4 Wiring

Any equipment terminal having voltage in excess of 50 V are covered with a plexiglas cover and marked with a symbol.

All equipment and termination are arranged so as to be readily accessible for faultfinding and maintenance.

All cables shall be adequately supported and secured to prevent from unseating by the connectors.

**The system wiring is color coded as follows (HIMA Standard):**

Power	: 24 VDC	Red (L+) / Black (L-)
	: 5 VDC	Yellow (5V) / Green (GND)
	: 48 VDC	Brown (L+) / Brown (L-)
	: 115/230 VAC	White (Cable L, N, PE)
Safety Earth (PE)	: Green / Yellow	
Shield Earth (PA)	: Green	
Internal signal lines	: Gray	

### 4.1 Fusing the System Wiring

Cross section in mm <sup>2</sup>	Terminal	Fuse
1,0	4 mm <sup>2</sup>	4 A gL or slow blow
1.5	4 mm <sup>2</sup>	10 A gL
2.5	4 mm <sup>2</sup>	16 A gL
4	10 mm <sup>2</sup>	25 A gL
6	10 mm <sup>2</sup>	35 (32) A gL
10	35 mm <sup>2</sup>	50 A gL
16	35 mm <sup>2</sup>	63 A gL

Table 9: Fusing the system wiring

## 5 The HIMA Power Supply and Current Distribution

This documentation describes the possibilities to set up the feeding and current distribution of HIMA systems and components.

Further information to set up the feeding and current distribution of the used HIMA system families can be found in the individual system manuals.

The catalog is structured in

- The listing of different typical feedings and distributions with examples of wiring diagrams,
- Data sheets of the devices for current distributions and power supplies.

To calculate power and space requirements you can use an Excel program named "Power", which can be found on each HIMA ELOP II CD and in the internet.

### 5.1 Construction of the Power Supply and Current Distribution

The modules and drawers used for the feeding and current distribution are usable in a modular form, i.e. they can be adapted to different applications.

For the qualified setup of the feeding and current distribution the respective local specifications have to be regarded.

In the tables of the following pages frequent used applications for power supply and current distribution are listed together with the required drawers and devices. After that the wiring diagrams for some typical applications follow. In any case please regard the hints in the data sheets of the used drawers and devices additionally.

Other types of applications can easily be combined according to the information in the tables.

<b>Primary feeding single: 24 V secondary</b>	115/230 VAC single $\leq 10 \text{ A}$	115/230 VAC single $\leq 40 \text{ A}$	115/230 VAC single $\leq 80 \text{ A}$	115/230 VAC single $\leq 120 \text{ A}$
<b>Power supplies</b>	PS 1000 115/230 01	PS 1000 115/230 01	2 x PS 1000 115/230 01	3 x PS 1000 115/230 01
<b>Current distribution up to 12 circuits</b>	K 7213	K 7214	K 7214	K 7214
<b>Current distribution up to 18 circuits</b>	K 7214	K 7214	K 7214	K 7214
<b>Current distribution up to 18 circuits with current and voltage measuring</b>	K 7215	K 7215	K 7215	K 7215
<b>Current distribution &gt; 18 circuits</b>	Further K 7214 /K 7215 if required			

<b>Primary feeding redundant: 24 V secondary</b>	115/230 VAC redundant $\leq 10 \text{ A}$	115/230 VAC redundant $\leq 40 \text{ A}$	115/230 VAC redundant $\leq 80 \text{ A}$	115/230 VAC redundant $\leq 120 \text{ A}$
<b>Power supplies</b>	2 x PS 1000 115/230 01	2 x PS 1000 115/230 01	4 x PS 1000 115/230 01	6 x PS 1000 115/230 01
<b>Current distribution up to 12 circuits</b>	K 7213	K 7214	K 7214	2 x K 7214
<b>Current distribution up to 18 circuits</b>	K 7214	K 7214	K 7214	2 x K 7214
<b>Current distribution up to 18 circuits with current and voltage measuring</b>	K 7215	K 7215	K 7215	2 x K 7215
<b>Current distribution &gt; 18 circuits</b>	Further K 7214 / K 7215 if required			

<b>Feeding 24 V</b>	24 VDC single $\leq 35 \text{ A}$	24 VDC redundant $\leq 35 \text{ A}$	24 VDC single $\leq 63 \text{ A}$
<b>Filter</b>	H 7013*)	K 7208	H 7013*)
<b>Current distribution up to 12 circuits</b>	K 7212	K 7212	-
<b>Current distribution up to 18 circuits</b>	K 7214	K 7214	K 7214
<b>Current distribution up to 18 circuits with current and voltage measuring</b>	K 7215	K 7215	K 7215
<b>Current distribution &gt; 18 circuits</b>	Further K 7214 resp. K 7215 if required		
<b>Mains buffering module acc. to NE21 if required</b>	EL+ decoupling via Z 6016 (2A)		

\*) It is possible to install the power supply filter Z 6015 on the mounting rail of the K 7209 or the terminal block in the cabinet instead of the filter H 7013

<b>Feeding 24 V</b>	24 VDC redundant ≤ 63 A	115/230 VAC 24 VDC ≤ 25 A	115/230 VAC 24 VDC ≤ 63 A
<b>Power supplies</b>	-	PS 1000 115/230 01	2 x PS 1000 115/ 230 01
<b>Decoupling and Filter</b>	K 7206	-	-
<b>Decoupling</b>	-	K 7207	Diode 63 A
<b>Filter</b>	-	H 7013*)	H 7013*)
<b>Current distribution up to 18 circuits</b>	K 7214	K 7214	K 7214
<b>Current distribution up to 18 circuits with current and voltage measuring</b>	K 7215	K 7215	K 7215
<b>Current distribution &gt; 18 circuits</b>	Further K 7214 resp. K 7215 if required		
<b>Mains buffering module acc. to NE21 if required</b>	EL+ decoupling via Z 6016 (2A)		

\*) It is possible to install the power supply filter Z 6015 on the mounting rail of the K 7209 or the terminal block in the cabinet instead of the filter H 7013

<b>Primary feeding redundant: 48 V secondary</b>	115/230 V~ redundant ≤ 40 A	115/230 V~ redundant ≤ 80 A
<b>Power supplies</b>	2 x PS 1000 115/230 02	4 x PS 1000 115/230 02
<b>Current distribution up to 32 circuits</b>	K 7216	2 x K 7216
<b>Current distribution &gt; 32 circuits</b>	Further K 7216 if required	

## 5.2 Feeding Schemes

### 5.2.1 Feeding 115/230 VAC, Single Channel up to 40 A Secondary

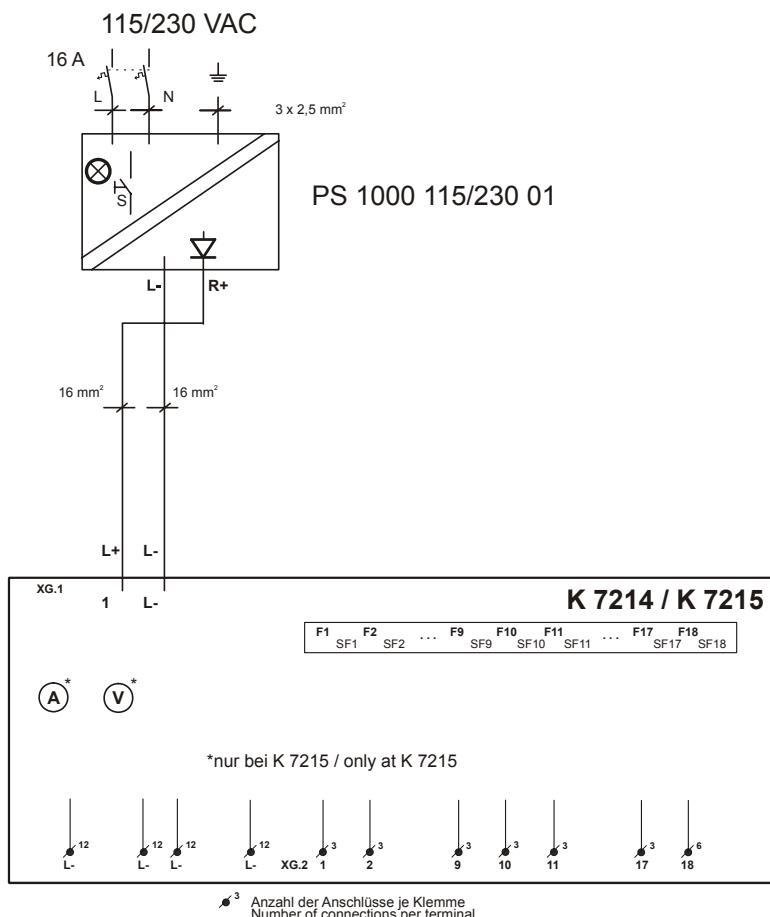


Figure 12: Feeding 115/230 VAC, single channel up to 40 A secondary

The given cross sections are based on the wiring within the cabinet and under the consideration of the maximum admissible current.

## 5.2.2 Feeding 115/230 VAC, Redundant up to 40 A / Single Channel up to 80 A Secondary

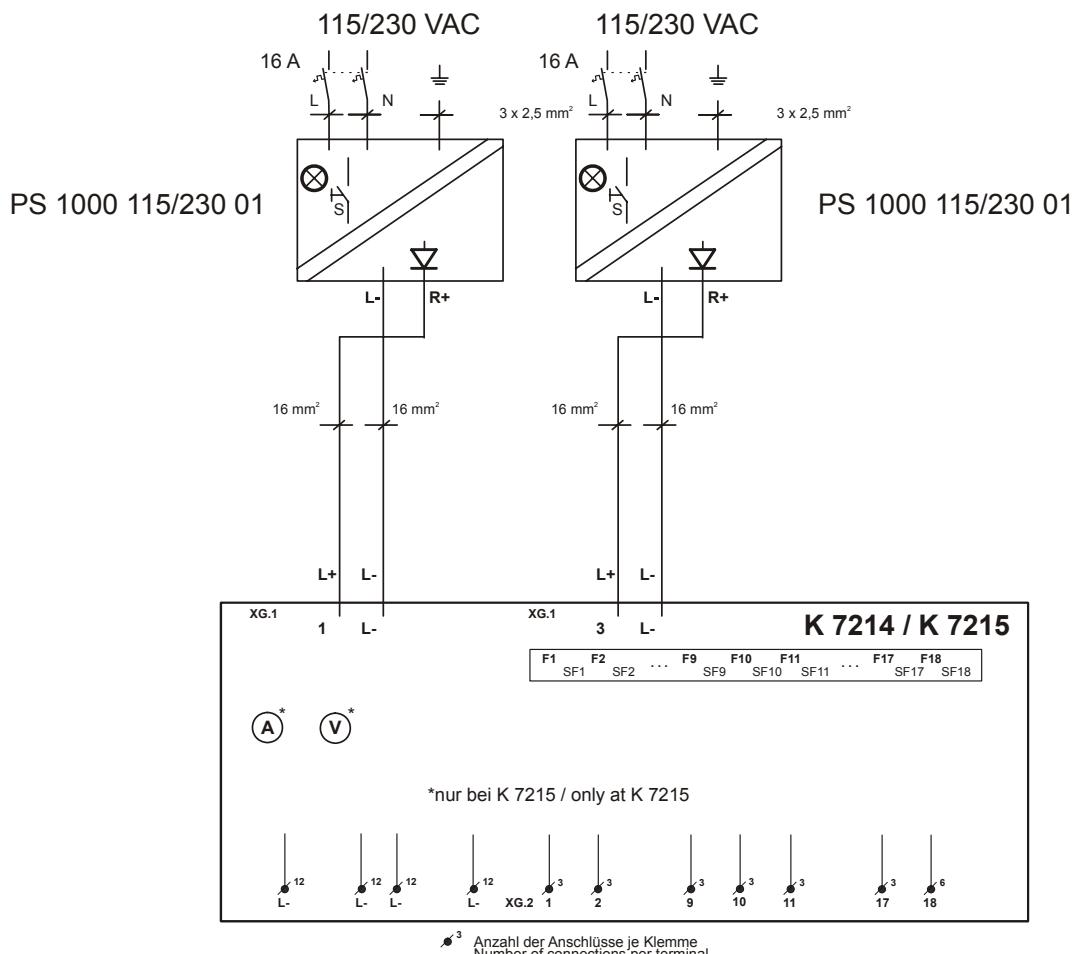


Figure 13: Feeding 115/230 VAC, redundant up to 40 A / single up to 80 A secondary

### Notes:

- Maximum total current of the connected circuits: 80 A
- The given cross sections are based on the wiring within the cabinet and under the consideration of the maximum admissible current

### 5.2.3 Feeding 24 VDC, Redundant up to 35 A Secondary (up to 12 Circuits), Example H41q

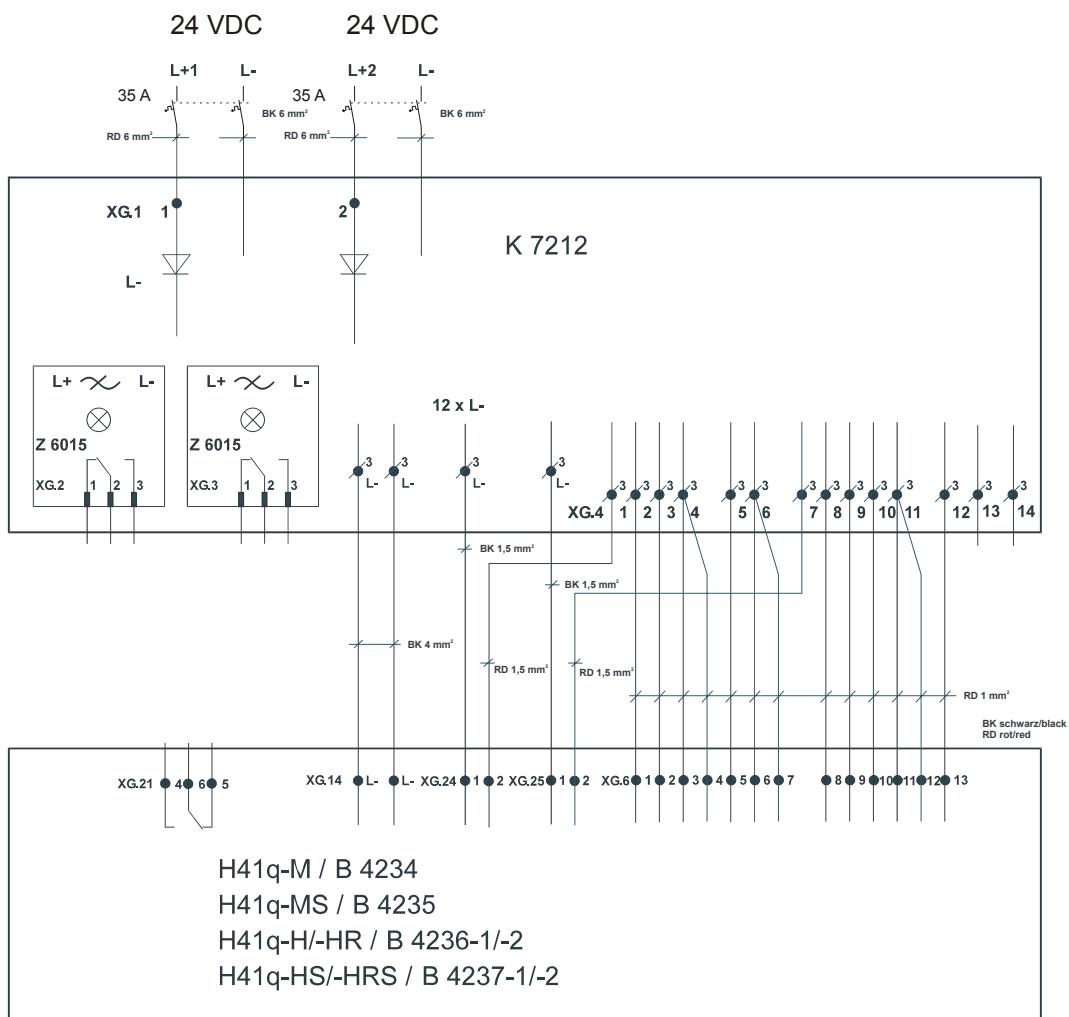
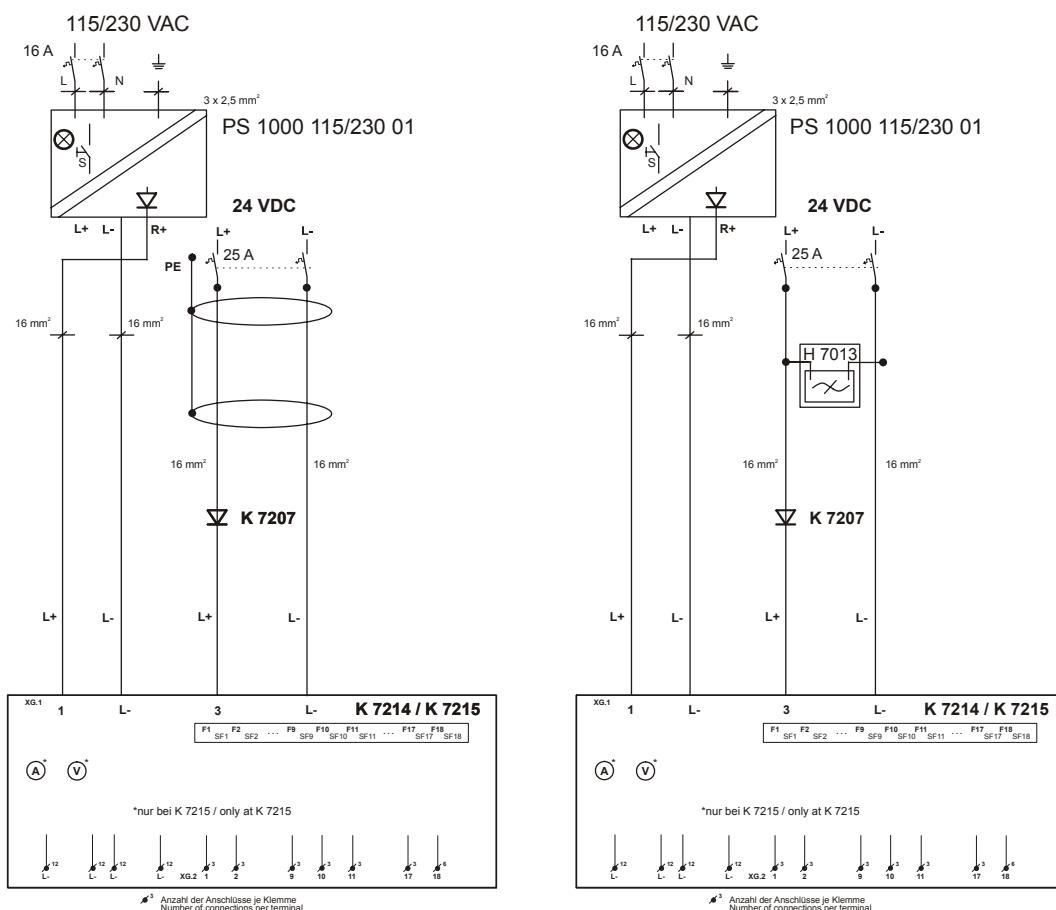


Figure 14: Feeding 24 VDC, redundant up to 35 A secondary (up to 12 circuits), example H41q

#### Notes:

- Fusing jobsite: 35 A
- The given cross sections are based on the wiring within the cabinet and under the consideration of the maximum admissible current
- Install K 7212 as near as possible to the cable inlet in to the cabinet because of the network filter.
- With feeding lines > 0.5 m within the cabinet a screened feeding line 2 x 6 mm<sup>2</sup> (HIMA part no. 904100001) has to be used.

## 5.2.4 Feeding 1 x 24 VDC, 1 x 115/230 VAC Redundant up to 25 A Secondary



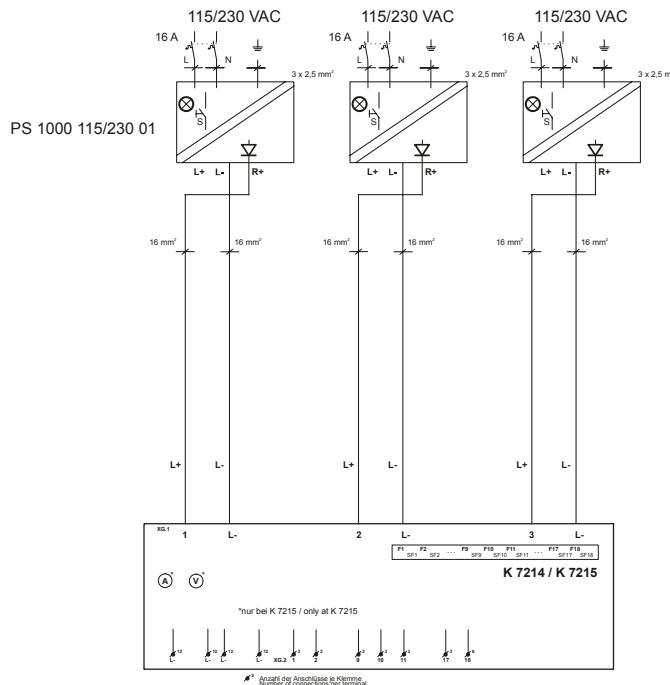
**Figure 15: Feeding 1 x 24 VDC, 1 x 115/230 VAC redundant up to 25 A secondary**  
left: with screening of the 24 V line, right: with power supply filter H7013

### Notes:

- Fusing jobsite of the 24 V supply: 25 A max.
- If the 24 VDC feeding is made from a UPS unit with battery backup please regard that the output voltage of the power supply module is not less than the UPS unit, otherwise adjust the power supply module
- Maximum total current of the connected circuits: 25 A
- The given cross sections are based on the wiring within the cabinet and under the consideration of the maximum admissible current
- Install H 7013 as near as possible to the cable inlet into the cabinet.
- With feeding lines > 0.5 m within the cabinet a screened feeding line 2 x 6 mm<sup>2</sup> (HIMA part no. 904100001) has to be used.

## 5.2.5 Feeding 6 x 115/230 VAC Redundant up to 120 A Secondary

### Netz 1/Supply 1



### Netz 2/Supply 2

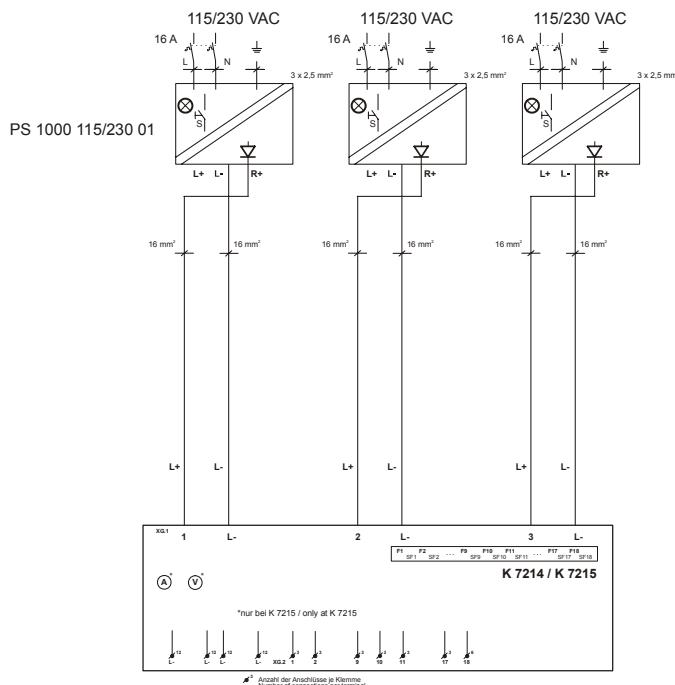


Figure 16: Feeding 6 x 115/230 VAC redundant up to 120 A secondary

### 5.2.6 Feeding 48 VDC, Redundant up to 35 A Secondary

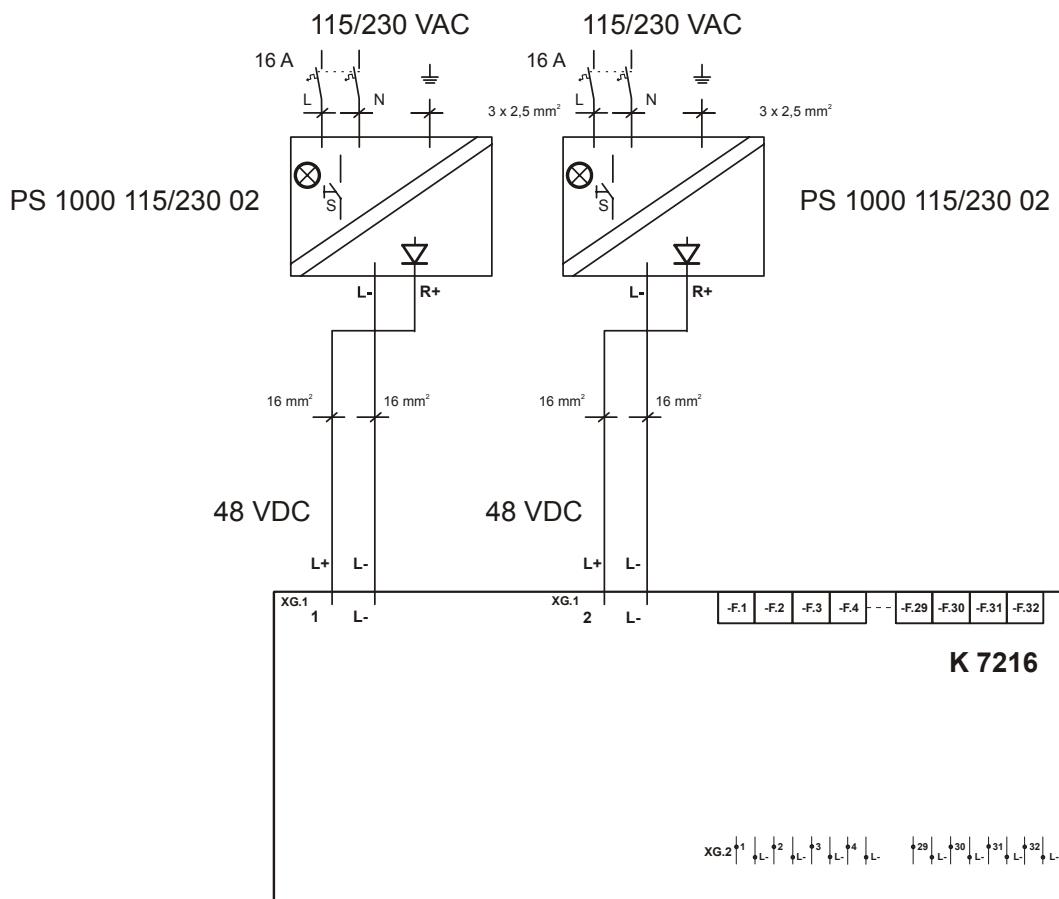


Figure 17: Feeding 48 VDC, redundant up to 35 A secondary

## 6 Mounting Example Threecold System Cabinet

The system cabinets are 800mm x 800mm x 2000mm (w x d x h), type M 1513 HIMA, for wiring, side walls, front and rear door and a fixed frame 19 inch, 40 units high (cabinet access from front and rear). The cabinet is standing on a 100 mm plinth. The degree of protection is IP 42. The color of the cabinet outside and inside is gray, structured (RAL 7035), the color of the plinth is gray (RAL 7035). The cabinet is equipped with fan units (HIMA K 9203) for forced air ventilation. HIMA K 9202 cabinet fans with monitoring are assembled on the internal side of the top cabinet cover. Air filters for the air supply of the cabinet via the front door are supplied. The cabinet is equipped with a thermostat that will be used for temperature alarm purposes. For illumination a cabinet lighting with door switch is installed.

The internal system and I/O fuse distribution for the 24 VDC is done with the 19-inch module K 7214 or K 7216 at 48 VDC supply. Up to 18 circuit breakers each max. 16 A with common fuse monitoring are provided and distributed accordingly.

The central rack B 5233-1 will then follow comprising of 2 x F 8650X central modules and an F 8621A coprocessor module (optional) for redundant serial communication with external devices. The 5 VDC power supply monitoring module F 7131 and 3 x F 7126 5 VDC power supply modules will complete the hardware in the central rack.

Several I/O racks B 9302 and an additional 5 V power supply rack B 9361, all mounted below the central rack, will complete the hardware in the cabinet.

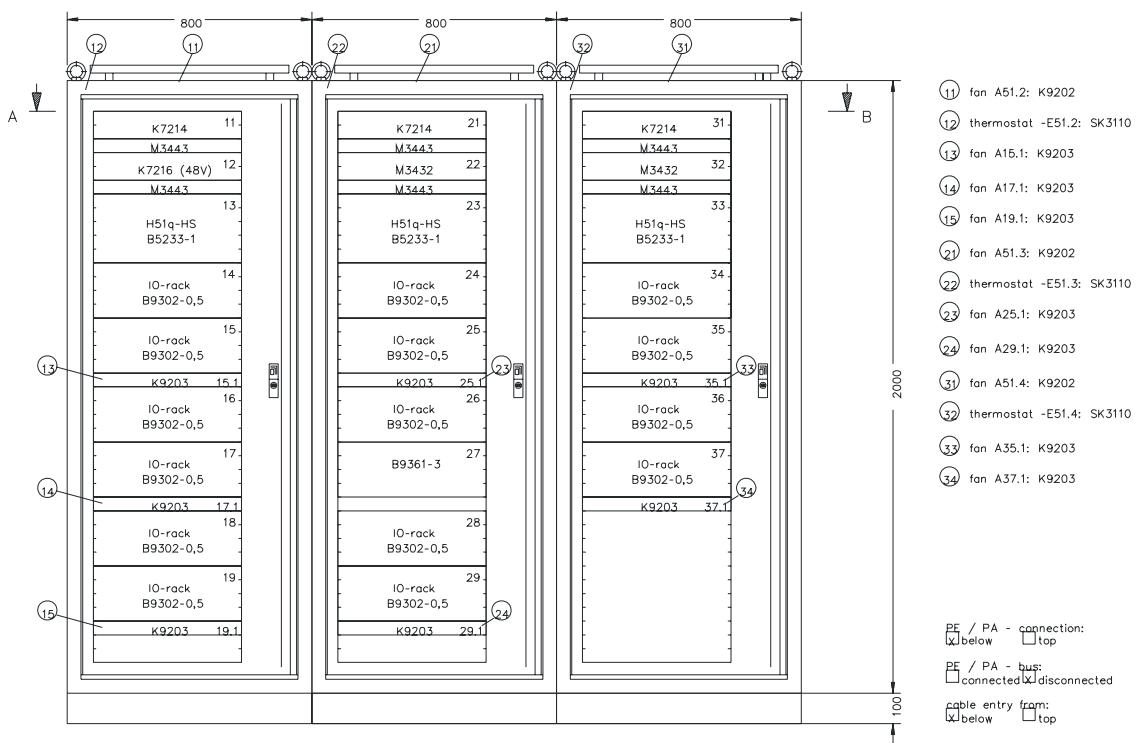


Figure 18: Layout of the system cabinets



Figure 19: Front view of the system cabinets

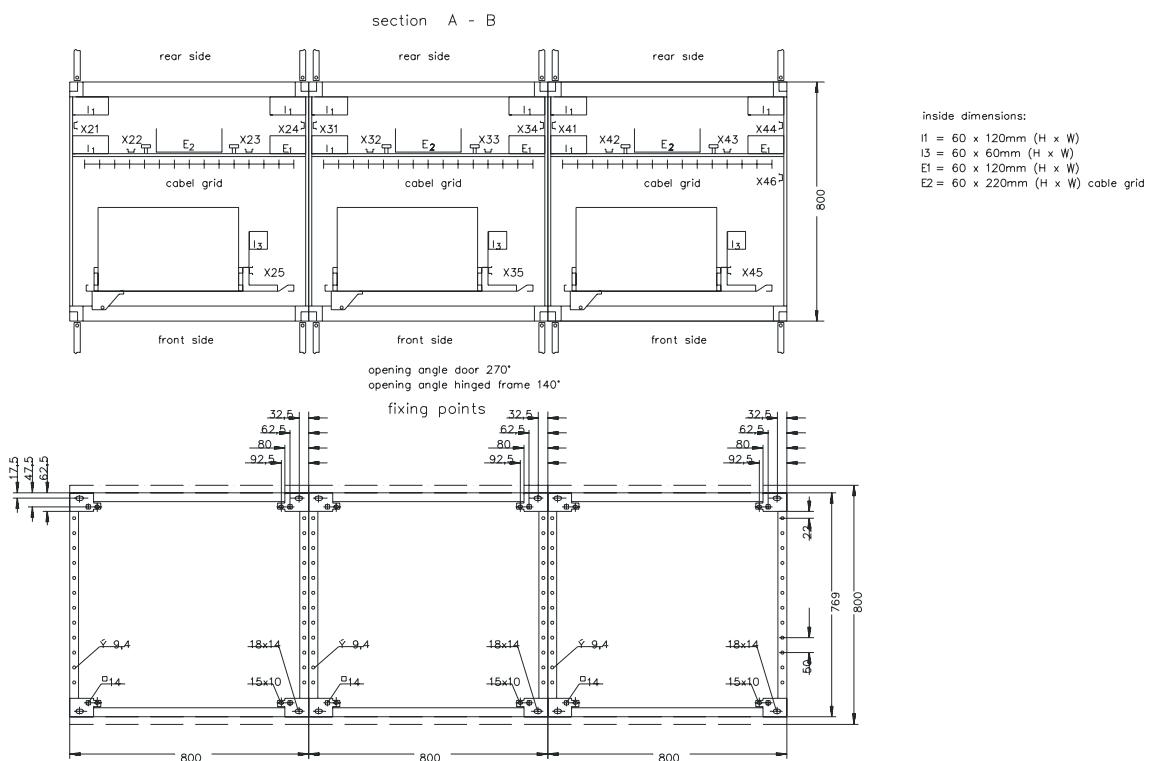


Figure 20: Top view of inner layout and frame of the system cabinets

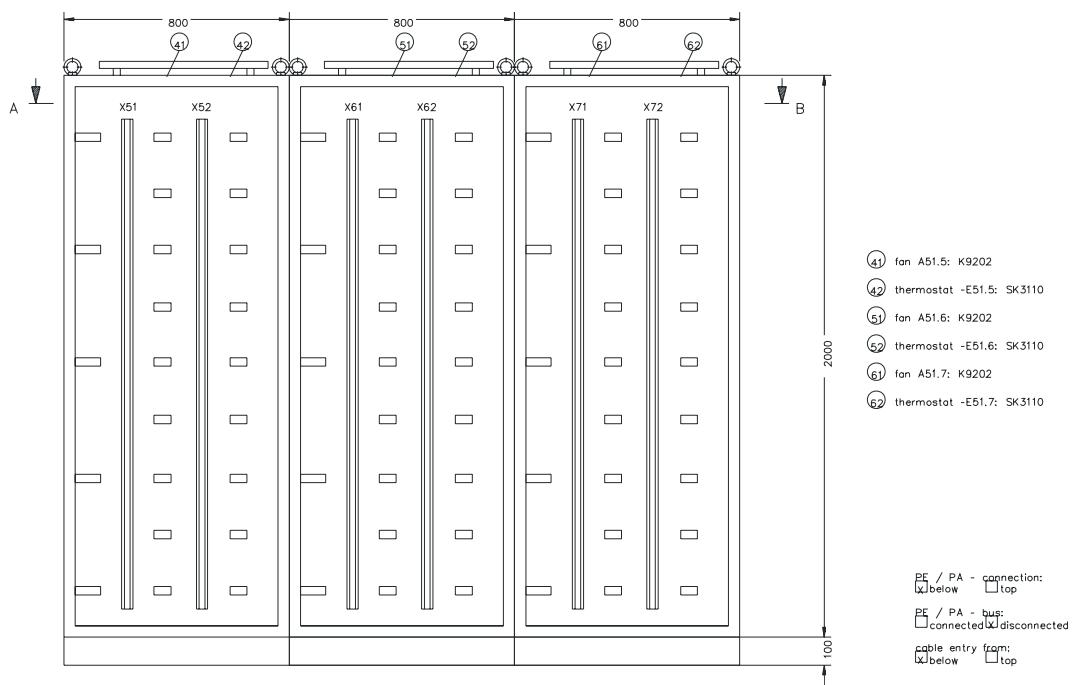


Figure 21: Front view of inner layout of the system cabinets

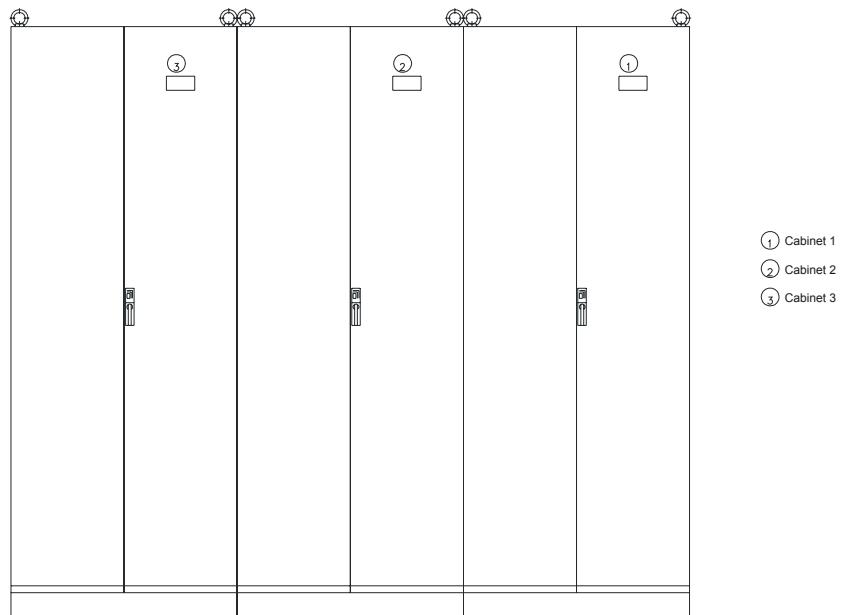


Figure 22: Rear view of the system cabinets

## 7 Data Sheets

After a structural overview of the data sheets the single data sheets will follow in alphabetical order.

### 7.1 Fans

<b>K 9202</b>	Cabinet fan	HI 800 067
<b>K 9203</b>	Circulating fan	HI 800 069
<b>K 9212</b>	Module fan for H41q/H51q	HI 800 071
<b>IP 42</b>	Mounting Kit IP 42 for Cabinet Fan K 9202	HI 800 321

### 7.2 Cabinets

<b>M 1511</b>	Standard cabinet (W x H x D) 800 x 2000 x 600 mm	HI 800 057
<b>M 1512</b>	Standard cabinet (W x H x D) 800 x 2200 x 600 mm	HI 800 059
<b>M 1513</b>	Standard cabinet (W x H x D) 800 x 2000 x 800 mm	HI 800 061
<b>M 1514</b>	Standard cabinet (W x H x D) 800 x 2000 x 500 mm	HI 800 063

### 7.3 Cabinet Accessories

<b>M 2215</b>	Cover plate for H41q/H51q and PlanarF in 19-inches system according to EN 60297-3	HI 800 239
<b>M 2218</b>	Distributor 10-pole with socket for Planar4	HI 800 235
<b>M 2225</b>	Cover plate for Planar4 in 19-inches system according to EN 60297-3	HI 800 233
<b>M 2500</b>	Bus bar	HI 800 073

### 7.4 Components 19 inches

<b>M 3410</b>	Subrack, 19 inches, 4 units high 32-pole socket connector, solder termination	HI 800 075
<b>M 3411</b>	Subrack, 19 inches, 4 units high 28-pole socket connector, solder termination (Ex)i	HI 800 075
<b>M 3412</b>	Subrack, 19 inches, 4 units high 32-pole socket connector, termi-point / wire-wrap	HI 800 075
<b>M 3413</b>	Subrack, 19 inches, 4 units high 26-pole socket connector, termi-point / wire-wrap (Ex)i	HI 800 075
<b>M 3414</b>	Subrack, 19 inches, 4 units high 32-pole socket connector, wire-wrap	HI 800 075
<b>M 3415</b>	Subrack, 19 inches, 4 units high 28-pole socket connector, wire-wrap (Ex)i	HI 800 075

<b>M 3419</b>	Subrack, 19 inches, 4 units high, not equipped, for connectors according to EN 60303-2	HI 800 075
<b>M 3431</b>	Front plate, 19 inches, 1 unit high	HI 800 077
<b>M 3432</b>	Front plate, 19 inches, 2 units high	HI 800 077
<b>M 3434</b>	Front plate, 19 inches, 4 units high	HI 800 077
<b>M 3439</b>	Partition plate for subrack	HI 800 079
<b>M 3443</b>	Labeling field with cable duct support, 19 inches, 1 unit high (with 1 cable duct)	HI 800 081
<b>M 3444</b>	Labeling field, 19 inches, 1 unit high	HI 800 083
<b>M 3445</b>	Labeling field with cable duct support, 19 inches, 1 unit high (with 2 cable ducts)	HI 800 081
<b>M 3446</b>	Cable duct for cable routing, 19 inches, 1 unit high	HI 800 085
<b>M 3447</b>	Labeling field with three guiding rings 19 inches, according to DIN EN 60297-3	HI 800 237
<b>M 4410</b>	Cover plate for subrack, 19 inches	HI 800 087
<b>M 4411</b>	Perforated plate for subrack, 19 inches	HI 800 089
<b>M 4412</b>	Cable mount for subracks M 3420 and M 3421	HI 800 229
<b>M 4413</b>	Cover plate for subracks M 3420 and M 3421	HI 800 227
<b>M 7200</b>	Air duct, 19 inches, 2 units high	HI 800 091
<b>M 7201</b>	Air duct, 19 inches, 1 unit high	HI 800 093
<b>M 7202</b>	Air duct, 19 inches, 1 unit high, with labeling field	HI 800 095

## 7.5 Power Supplies

<b>PS 1000 115 01</b>	Power Supply Unit 120 VAC / 24 VDC, Continuous load 40 A Electronically controlled power supply unit for 19-inches subracks	HI 800 123
<b>PS 1000 115 02</b>	Power Supply Unit 120 VAC / 48 VDC, Continuous load 20 A Electronically controlled power supply unit for 19-inches subracks	HI 800 127
<b>PS 1000 230 01</b>	Power Supply Unit 240 VAC / 24 VDC, Continuous load 40 A Electronically controlled power supply unit for 19-inches subracks	HI 800 053
<b>PS 1000 230 02</b>	Power Supply Unit 240 VAC / 48 VDC, Continuous load 20 A Electronically controlled power supply unit for 19-inches subracks	HI 800 125
<b>M 3420</b>	Subrack M 3420 Subrack for the 19-inches system according to EN 60297-3, 4 units high, for up to three power supply units PS 1000 (24V)	HI 800 097

<b>M 3421</b>	Subrack M 3421 Subrack for the 19-inches system according to EN 60297-3, 4 units high, for up to three power supply units PS 1000 (24V or 48V)	HI 800 137
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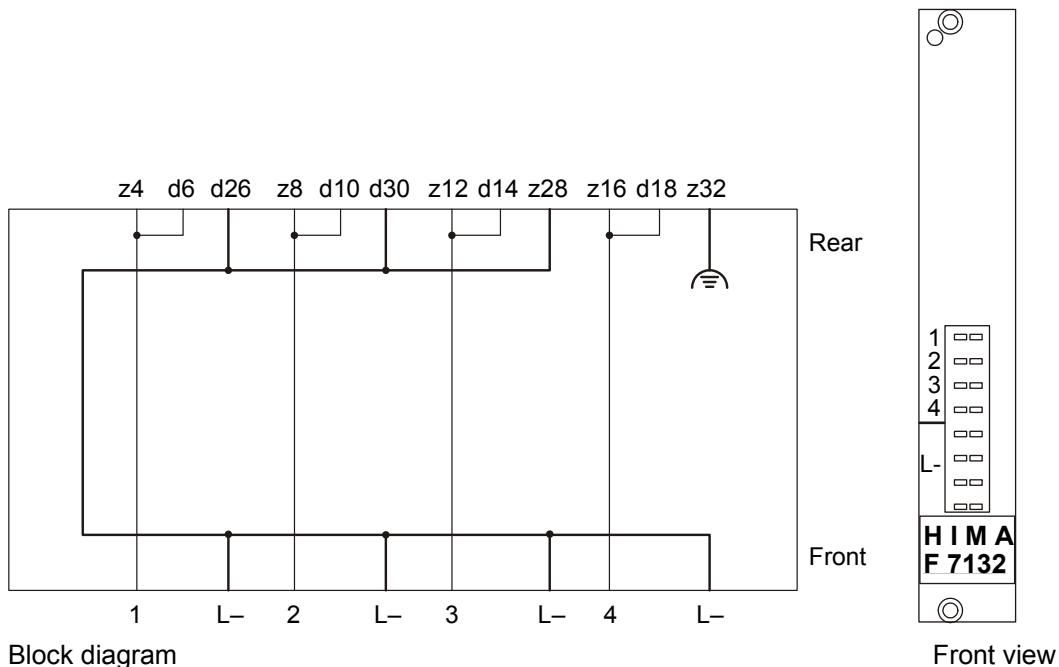
## 7.6 Feeding and Current Distribution

<b>F 7132</b>	4-channel power distribution L+ or EL+ and L-	HI 800 301
<b>F 7133</b>	4-channel power distribution with fuse monitoring	HI 800 303
<b>H 7013</b>	Power supply filter 24 VDC	HI 800 269
<b>H 7021</b>	Power supply filter 48 VDC	HI 800 271
<b>K 7205</b>	Fusing and current distribution, up to 63 A	HI 800 273
<b>K 7206</b>	Feeding and decoupling module, up to 63 A with 2 decoupling diodes and 2 network filters Z 6015	HI 800 275
<b>K 7207</b>	Diode mounted on a heat sink	HI 800 277
<b>K 7208</b>	Feeding and current distribution	HI 800 279
<b>K 7209</b>	Fusing and current distribution	HI 800 281
<b>K 7210</b>	Current and voltage display	HI 800 283
<b>K 7211</b>	Current and voltage display	HI 800 285
<b>K 7212</b>	Feeding and current distribution (with mains filter)	HI 800 287
<b>K 7213</b>	Feeding and current distribution, up to 35 A	HI 800 289
<b>K 7214</b>	Feeding and current distribution, up to 150 A	HI 800 291
<b>K 7215</b>	Feeding and current distribution, up to 150 A, with graphical display	HI 800 293
<b>K 7216</b>	Feeding and current distribution, up to 63 A, for SELV and PELV	HI 800 241
<b>K 7901</b>	Feeding and current distribution, up to 63 A, with two mains filters Z 6015	HI 800 297
<b>K 7915</b>	Fuse distributor for lead fuse with certificate of Factory Mutual Research Corporation	HI 800 299
<b>Z 6015</b>	Power supply filter 24 VDC	HI 800 305
<b>Z 6016</b>	Voltage dips buffering 24 VDC	HI 800 295
<b>Z 6019</b>	Power supply filter 48 VDC	HI 800 307



## F 7132: 4-channel power distribution

to distribute L+ (or EL+) and L-  
for PES H41q/H51q



**Figure 1: F 7132 4-channel power distribution**

The contact pins 1, 2, 3, 4 and L- on the front side serve to connect L+ or EL+ and L- to the individual circuits.

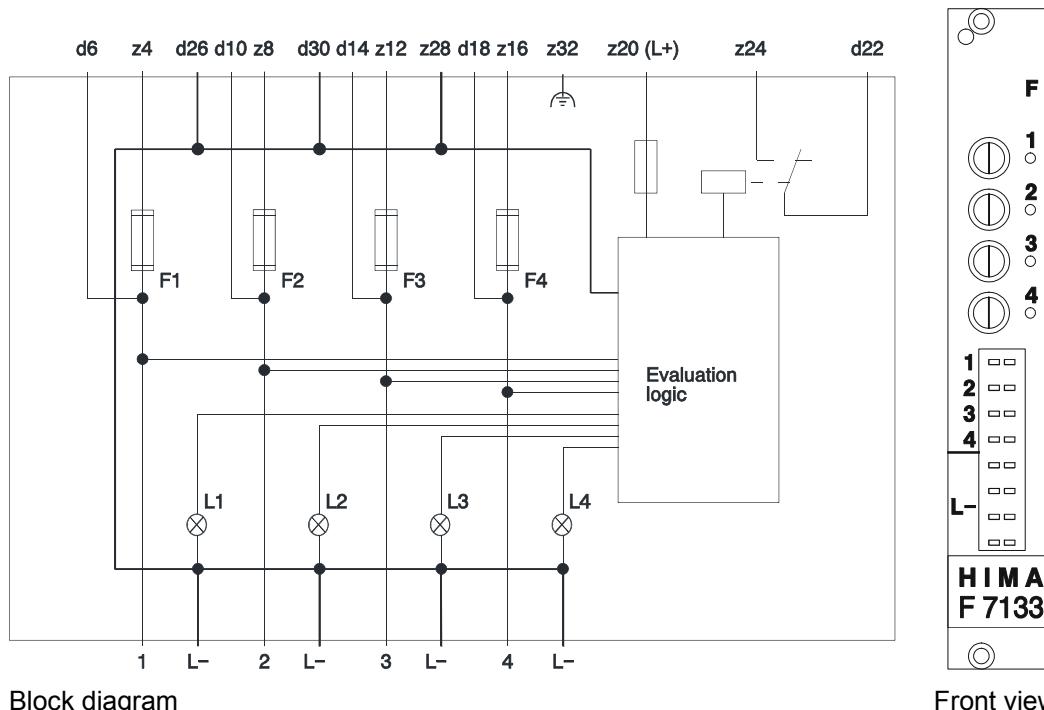
The contacts d6, d10, d14, d18 serves as rear terminals for loads or current distributors.

Loadability of the contacts	max. 4 A
Space requirement	4 SU



## F 7133: 4-channel power distribution

with fuse monitoring and L- distribution



Block diagram

Front view

**Figure 1: F 7133 4-channel power distribution**

The module has four miniature fuses with assigned LEDs. The fuses are monitored via an evaluation logic, and the state of each circuit is signalized to the related LED.

The contact pins 1, 2, 3, 4 and L- on the front side serve to connect L+ or EL+ and L- to supply the I/O modules and the sensors.

The contacts d6, d10, d14, d18 serve as rear terminals for 24 V supply of one I/O slot each.

Fuses	max. 4 A slow blow
Switching time	approx. 100 ms (relay)
Loadability of the relay contacts	30 V / 4 A (continuous load)
Residual voltage in case of fuse tripped	0 V
Residual current in case of fuse tripped	0 mA
Residual voltage in case of missing supply	max. 3 V
Residual current in case of missing supply	< 1 mA
Space requirement	4 SU
Operating data	24 VDC / 60 mA

If all fuses are in order, the relay contact d22-z24 is closed. If a fuse is not equipped or faulty, the relay will be deenergized. Faults are announced via the LEDs as follows:

Supply voltage for path	Fuse	
	In order	faulty/missing
exists	LED on	LED flashing
fails	LED off	LED flashing

Table 1: LED Displays

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**Note** If the module is not wired all LEDs are off.

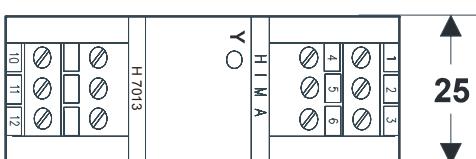
If the input voltage is missing in case of current paths connected together, no statement about the different fuses can be made.

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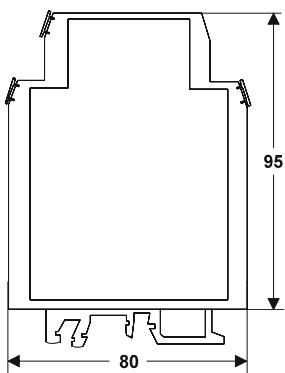


## H 7013: Power supply filter

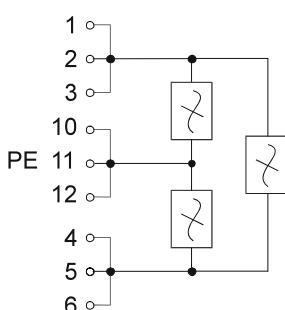
- for power supply systems 24 VDC



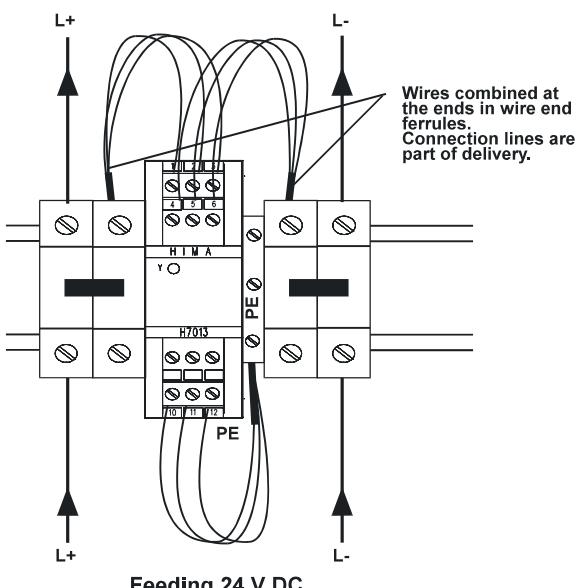
Top view



Side view



Circuit diagram



**Connecting example**  
with terminals on mounting rail

Figure 1: H 7013 power supply filter

The power supply filter H 7013 dampens wide-banded, low energy switching interferences (Burst) according to IEC EN 61000-4-4 up to 2 kV, and wide-banded, high energy overvoltages (Surge) according to IEC EN 61000-4-5 up to 1 kV on a 24 VDC power supply circuit. The interferences are discharged to earth.

Highest effectiveness can be achieved if the filter is installed directly at the 24 V power supply.

### Connection

Height over mounting rail

Electric strength against earth

Max. permissible operation voltage

Power consumption

Ambient conditions

2.5 mm<sup>2</sup> directly on the device terminals,  
combined wires on terminals of min. 10 mm<sup>2</sup>

approx. 100 mm

250 V

30 VAC / 42 VDC

5.5 mA at 24 VDC

-25...+70 °C

## Mounting the H 7013 into Zone 2 (EG guideline 94/9/EG, ATEX)

The device is suitable for mounting into zone 2. The corresponding Declaration of Conformity is added on the following page.

For this mounting the following mentioned special conditions have to be regarded.

### Special conditions X for safety-related application

1. The power supply filter **H 7013** must be mounted, for securing the category 3G, in an enclosure, which fulfills the requirements of the EN 60079-15 with the type of protection at least IP 54, according to EN 60529.
2. This enclosure must be labeled with

### **"Working permitted only in the de-energized state"**

#### **Exception:**

If it is assured that there exists no explosive atmosphere working under voltage is also permitted.

3. The used enclosure must be able to dissipate safely the generated heat. The power dissipation of the power supply filter **H 7013** is **250 mW** max.
4. The following items of the standards

**VDE 0170/0171 part 16, DIN EN 60079-15: 2004-5**

**VDE 0165 part 1, DIN EN 60079-14: 1998-08**

must be regarded:

DIN EN 60079-15:

Chapter 5	Design
Chapter 6	Terminals and cabling
Chapter 7	Air and creeping distances
Chapter 14	Connectors

DIN EN 60079-14:

Chapter 5.2.3	Equipment for use in zone 2
Chapter 9.3	Cabling for zones 1 and 2
Chapter 12.2	Equipment for zones 1 and 2

The power supply filter additionally has the following label:

**HIMA**

**Paul Hildebrandt GmbH  
A.-Bassermann-Straße 28, D-68782 Brühl**

**Ex II 3 G EEx nA II T4 X**

**H 7013**

**-25 °C ≤ Ta ≤ 70 °C**

**Special conditions X must be regarded!**

## Konformitätserklärung Declaration of Conformity



Wir / We

**HIMA Paul Hildebrandt GmbH + Co KG**  
Albert Bassermann-Straße 28 - 68782 Brühl  
Postfach 1261 - 68777 Brühl  
Telefon 0 62 02 / 709-0

erklären in alleiniger Verantwortung, dass die Produkte  
declare under our sole responsibility that the products

QF - H 7013              Netzfilter, 24 VDC  
QF - H 7021              Netzfilter, 48 VDC

auf die sich diese Erklärung bezieht, mit den folgenden Normen übereinstimmt.  
to which this declaration relates is in conformity with the following standards.

**EN 61000-6-4 (08.02)**  
**EN 61000-6-2 (08.02)**

**EN 61131-2 (2003)**

**EN 60079-15 (2003)**

Elektrische Betriebsmittel für gasexplosionsgefährdete Bereiche – Teil 15 : Zündschutzart "n"  
Electrical apparatus for explosive gas atmospheres – Part 15 : Type of protection "n"

Gemäß den Bestimmungen der Richtlinien  
Following the provisions of Directives

**EMV-Richtlinie**              89/336/EWG

**Ex-Richtlinie**              94/9/EG

Brühl, den 22. November 2005

ppa.

Prof. Dr. habil. Josef Börcsök  
Bereichsleiter Entwicklung  
Vice-President Development

i.A.

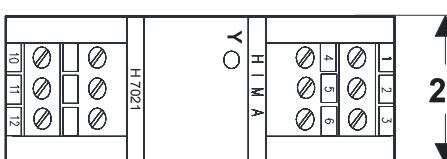
A handwritten signature in blue ink that reads "Hözel".

Jürgen Hözel  
Leiter Vorentwicklung und Qualitätswesen  
Lead Engineer Predevelopment and Quality Assurance

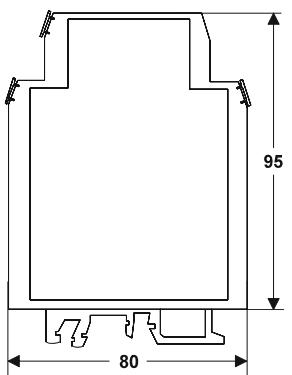


## H 7021: Power supply filter

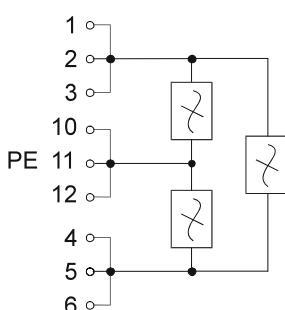
- for power supply systems 48 VDC



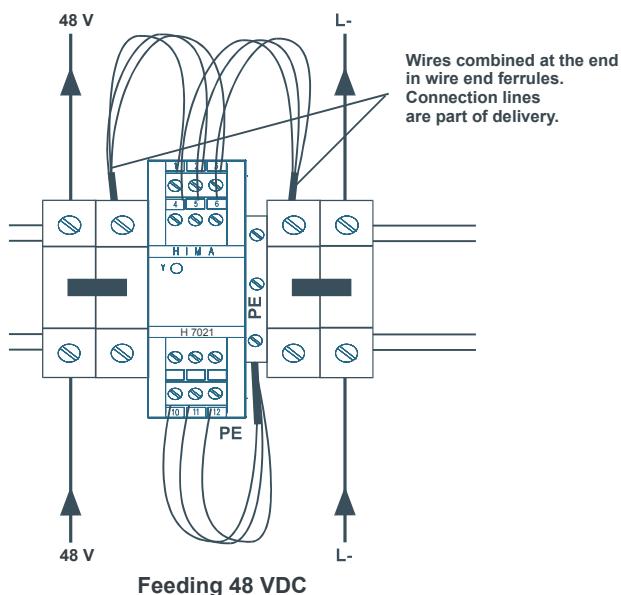
Top view



Side view



Circuit diagram



**Connecting example**  
with terminals on mounting rail

Figure 1: H 7021 power supply filter

The power supply filter H 7021 dampens wide-banded, low energy switching interferences (Burst) according to IEC EN 61000-4-4 up to 2 kV, and wide-banded, high energy overvoltages (Surge) according to IEC EN 61000-4-5 up to 1 kV on a 48 VDC power supply circuit. The interferences are discharged to earth.

Highest effectiveness can be achieved if the filter is installed directly at the 48 V power supply.

### Connection

Height over mounting rail

Electric strength against earth

Max. permissible operation voltage

Power consumption

Ambient conditions

2.5 mm<sup>2</sup> directly on the device terminals,  
combined wires on terminals of min. 10 mm<sup>2</sup>

approx. 100 mm

250 V

48 VAC / 60 VDC

3.0 mA at 48 VDC

-25...+70 °C

## Mounting the H 7021 into Zone 2 (EG guideline 94/9/EG, ATEX)

The device is suitable for mounting into zone 2. The corresponding Declaration of Conformity is added on the following page.

For this mounting the following mentioned special conditions have to be regarded.

### Special conditions X for safety-related application

1. The power supply filter **H 7021** must be mounted, for securing the category 3G, in an enclosure, which fulfills the requirements of the EN 60079-15 with the type of protection at least IP 54, according to EN 60529.
2. This enclosure must be labeled with

### **"Working permitted only in the de-energized state"**

#### **Exception:**

If it is assured that there exists no explosive atmosphere working under voltage is also permitted.

3. The used enclosure must be able to dissipate safely the generated heat. The power dissipation of the power supply filter **H 7021** is **250 mW** max.
4. The following items of the standards

**VDE 0170/0171 part 16, DIN EN 60079-15: 2004-5**

**VDE 0165 part 1, DIN EN 60079-14: 1998-08**

must be regarded:

DIN EN 60079-15:

Chapter 5	Design
Chapter 6	Terminals and cabling
Chapter 7	Air and creeping distances
Chapter 14	Connectors

DIN EN 60079-14:

Chapter 5.2.3	Equipment for use in zone 2
Chapter 9.3	Cabling for zones 1 and 2
Chapter 12.2	Equipment for zones 1 and 2

The power supply filter additionally has the following label:

**HIMA**

**Paul Hildebrandt GmbH  
A.-Bassermann-Straße 28, D-68782 Brühl**

**Ex II 3 G EEx nA II T4 X**

**H 7021**

**-25 °C ≤ Ta ≤ 70 °C**

**Special conditions X must be regarded!**

## Konformitätserklärung Declaration of Conformity



Wir / We

**HIMA Paul Hildebrandt GmbH + Co KG**  
Albert Bassermann-Straße 28 - 68782 Brühl  
Postfach 1261 - 68777 Brühl  
Telefon 0 62 02 / 709-0

erklären in alleiniger Verantwortung, dass die Produkte  
declare under our sole responsibility that the products

QF - H 7013              Netzfilter, 24 VDC  
QF - H 7021              Netzfilter, 48 VDC

auf die sich diese Erklärung bezieht, mit den folgenden Normen übereinstimmt.  
to which this declaration relates is in conformity with the following standards.

**EN 61000-6-4 (08.02)**  
**EN 61000-6-2 (08.02)**

**EN 61131-2 (2003)**

**EN 60079-15 (2003)**

Elektrische Betriebsmittel für gasexplosionsgefährdete Bereiche – Teil 15 : Zündschutzart "n"  
Electrical apparatus for explosive gas atmospheres – Part 15 : Type of protection "n"

Gemäß den Bestimmungen der Richtlinien  
Following the provisions of Directives

**EMV-Richtlinie              89/336/EWG**

**Ex-Richtlinie              94/9/EG**

Brühl, den 22. November 2005

ppa.

Prof. Dr. habil. Josef Börcsök  
Bereichsleiter Entwicklung  
Vice-President Development

i.A.

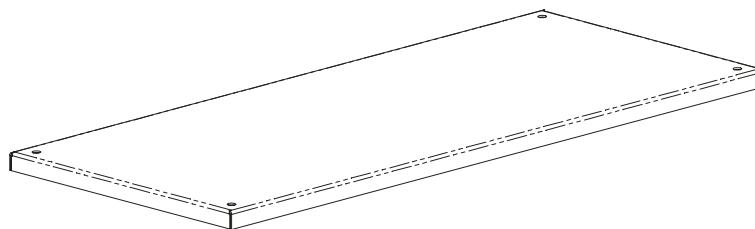
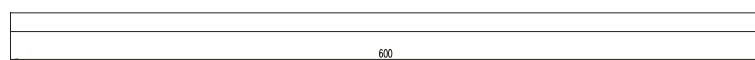
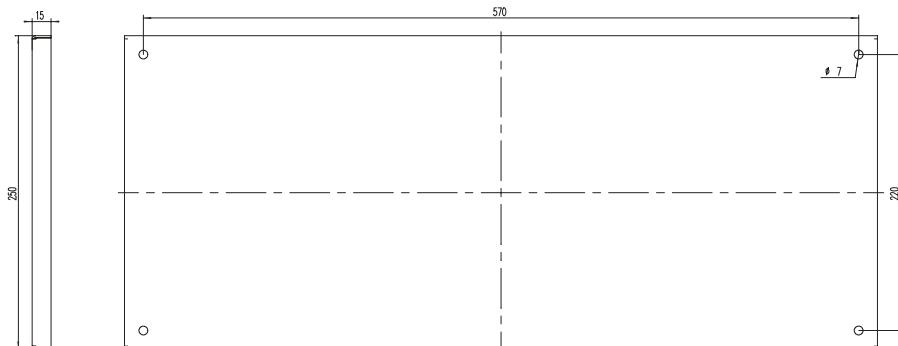
A handwritten signature in blue ink that appears to read "Hözel".

Jürgen Hözel  
Leiter Vorentwicklung und Qualitätswesen  
Lead Engineer Predevelopment and Quality Assurance

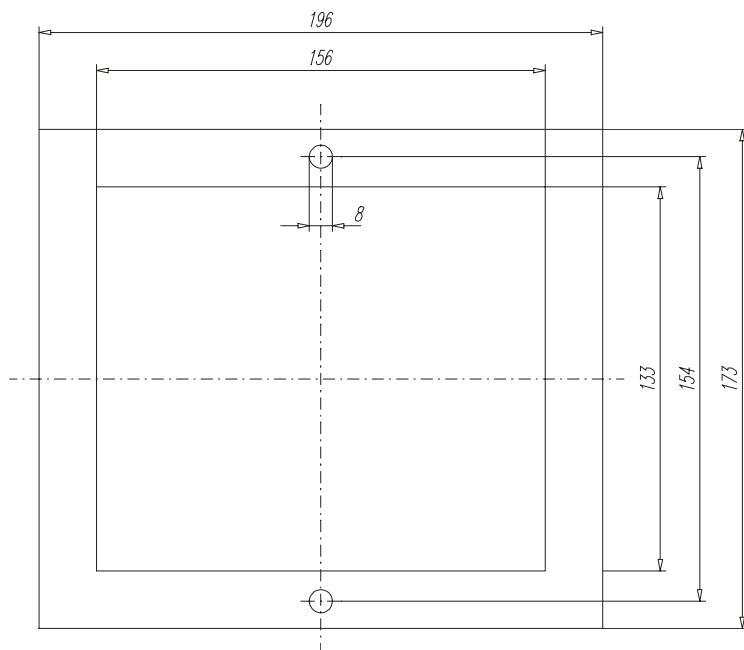


**Mounting Kit IP 42 for Cabinet Fan K 9202**

Mounting kit for cabinets  
in the 19-inches system according to EN 60297



Guard plate for fans



Foam rubber

**Application:**

Obtaining of the protection class IP 42 for cabinets with cabinet fan (without guard plate only protection class IP 40).

**Scope of delivery:**

The mounting kit comprises:

- a welted guard plate with four holes,
- two foam rubber seals,
- four distance screw bolts (length 40 mm),
- four screws with washers for screwing with cabinet fan K 9202.

**Mounting:**

- The foam rubber seals are mounted adhesive on both protective filters in the cover plate of the cabinet to protect against accumulated dripping water.
- In the cover plate of the cabinet four additional holes have to be set, where the distances of the holes correlate with those of the guard plate IP 42. The delivered screw bolts ( $\varnothing$  7mm) are mounted in the holes of the cabinet, the guard plate for IP 42 is set on the screw bolts and screwed with the delivered screws and washers to the screw bolts.

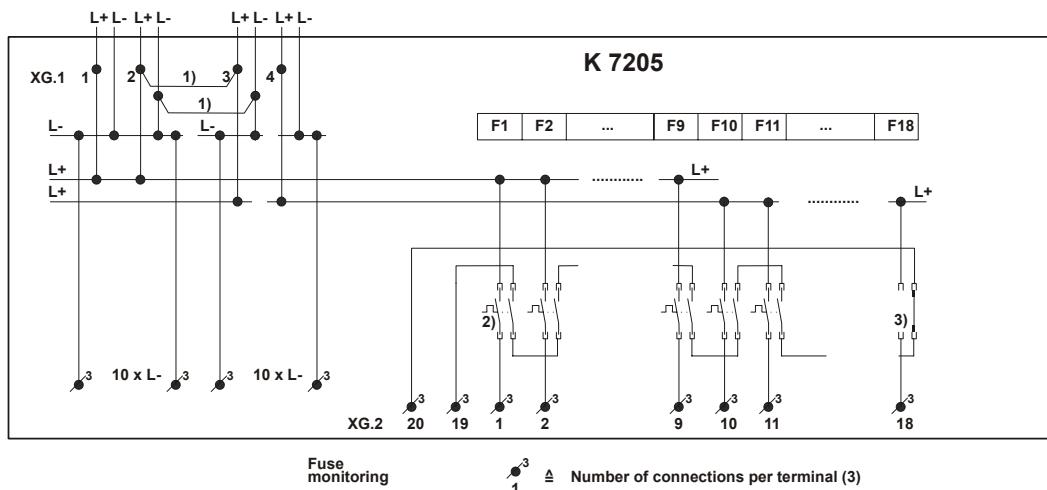
**Material:**

Material	steel plate, hot-dipped
Surface	powder-coated RAL 7035



## K 7205: Fusing and current distribution

- redundant feeding of up to 63 A total current
- fusing up to 18 single circuits with circuit breakers (manufacturer E-T-A® )



- 1) After removal of the jumpers, 2 separated groups each with 9 slots for circuit breakers are available
- 2) Circuit breaker with monitoring contact
- 3) Jumper to bridge non-used monitoring contacts

**Figure 1: Wiring diagram**

### Attention:

With total current > 45 A and single using distribute the L+ (XG.1: 1/2/3/4) and L- on two terminals each.

### Construction:

On the front a mounting plate with sockets provided to install up to 18 circuit breakers (with monitoring) is installed. A connection field is on the rear side. The monitoring of circuit breaker slots not equipped is overridden via jumpers.

### Connections and wiring:

Connection	Max. Cross section of wires
XG.1:1/2/3/4	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	4 mm <sup>2</sup>
XG.2: 1 - 20	2.5 mm <sup>2</sup>

**Table 1: Connections and wiring**

External fusing	63 A max.
Size	19-Zoll, 2 units high according to DIN EN 60287-4
Mounting depth	270 mm
Weight	2.45 kg

**Preferred type of circuit breaker (not delivered with K 7205):**

Nominal current	Manufacturer	Type	HIMA part no.
4 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350040
16 A	E-T-A®	2210-S211-P1T2-H111 16 A	57 0350160

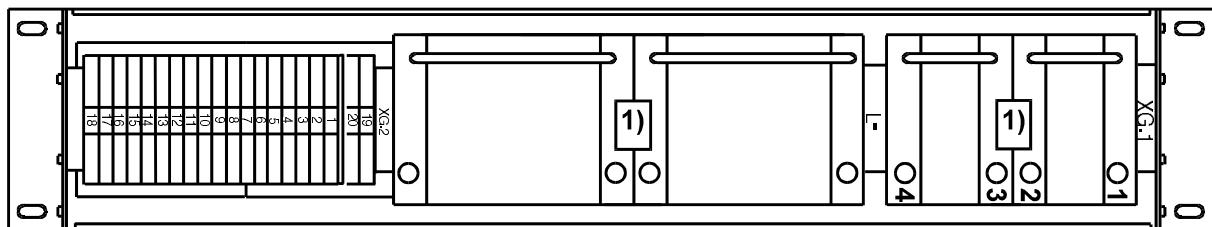
**Table 2: Preferred type of circuit breakers**

For further details refer to the original data sheet E-T-A®.

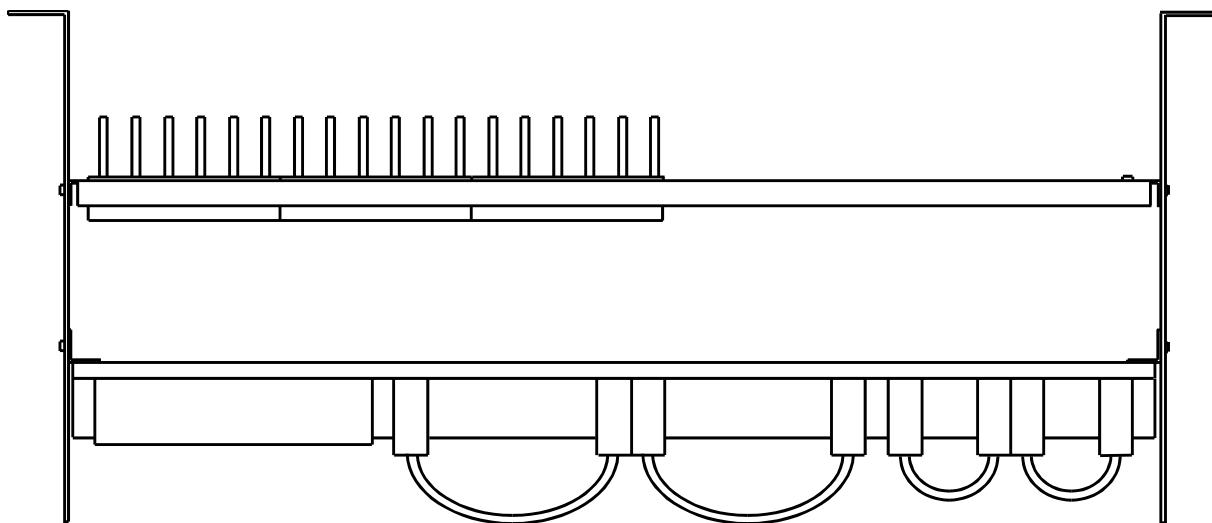
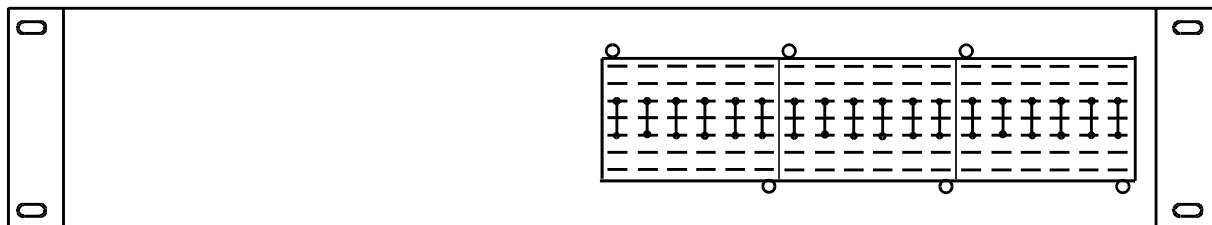
**Accessories:**

Accessories supplied by HIMA:

- M 3447 Labeling field with three guiding rings (1 HU)
- M 3443 Labeling field with cable duct (1 HU)
- M 3445 Labeling field with 2 cable ducts (1 HU)

**Views:**

1) Jumper

**Figure 2: Rear view****Figure 3: Top view****Figure 4: Front view**



## K 7206: Feeding and decoupling module

- redundant feeding of up to 63 A total current
- with 2 decoupling diodes and 2 network filters Z 6015

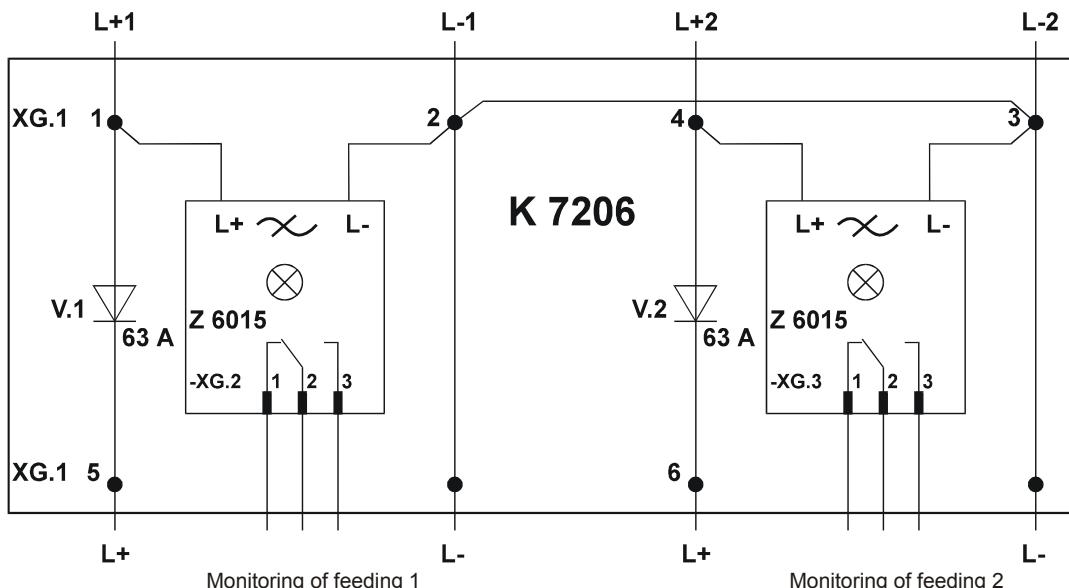


Figure 1: Wiring diagram

### Construction:

On the front, heat sink for the decoupling diodes, on the rear 2 network filters Z 6015 and connection terminals for L+ and L- are mounted.

Each network filter is equipped with a monitoring relay and LED for the feeding. A voltage drop is announced via neutral contacts.

### Note for installation:

Install the K 7206 as near as possible to the cable inlet into the cabinet because of the network filter. With feeding lines > 0.5 m within the cabinet, a screened feeding line 2 x 6 mm<sup>2</sup> (HIMA part. no. 904100001) has to be used.

### Connections and wiring:

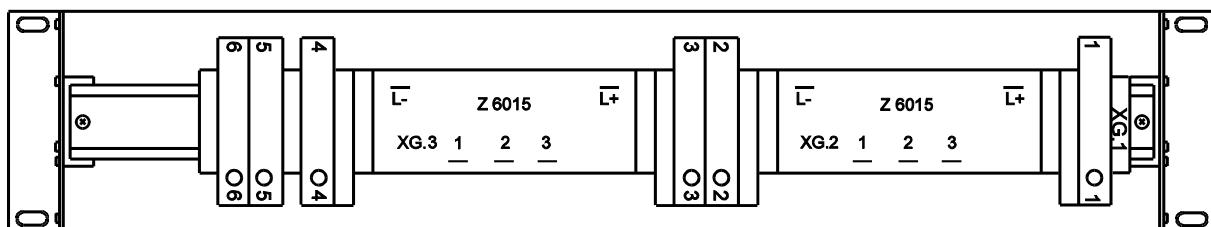
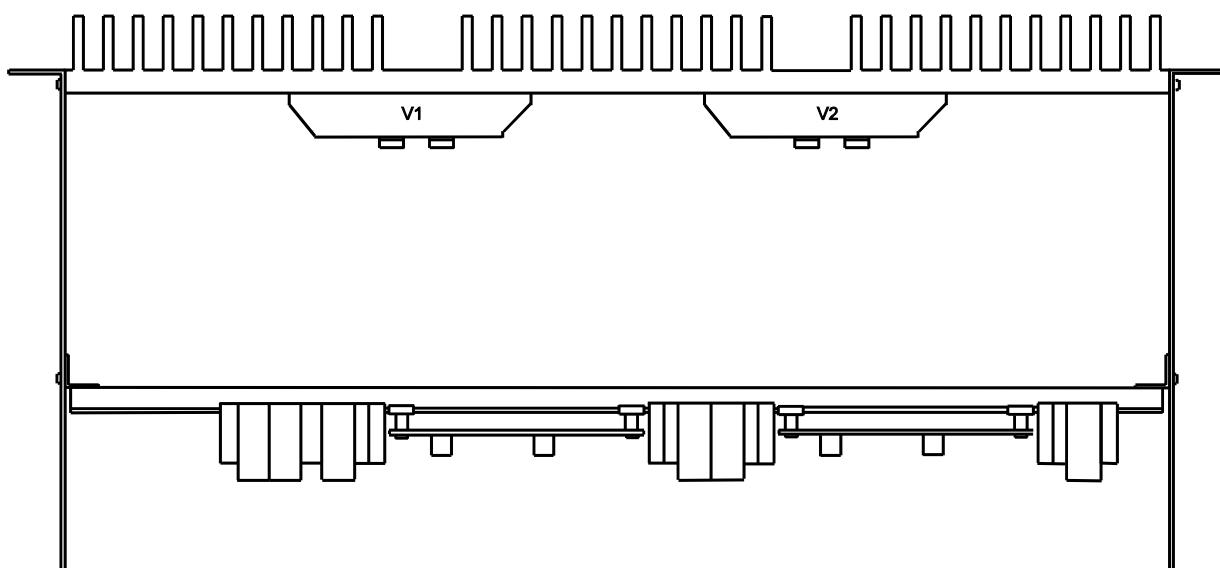
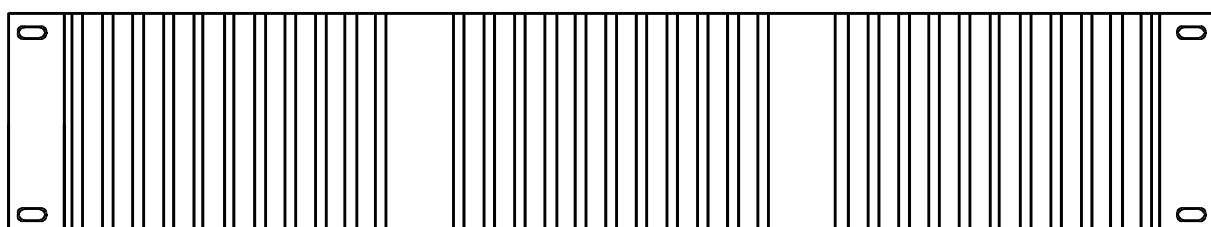
Connection	Max. Cross section of wires
XG.1:1-6	16 mm <sup>2</sup>
XG.2 / XG.3	Flat connector 6.3 x 0.8 on Z 6015

Table 1: Connections and wiring

External fusing	63 A max.
Power dissipation	60 W max.
Size	19-inch, 2 units high according to DIN EN 60287-4
Mounting depth	270 mm
Weight	3.3 kg

**Diode data (Type SKKE81/04, Manufacturer Semikron):**

Reverse voltage	400 V
Conducting state voltage	0.85 V typ.
Insulation voltage	5 kV
(Diode heat sink)	

**Views:****Figure 2: Rear view****Figure 3: Top view****Figure 4: Front view**



## K 7207: Diode mounted on a heat sink

- with locking hook for mounting on a mounting rail

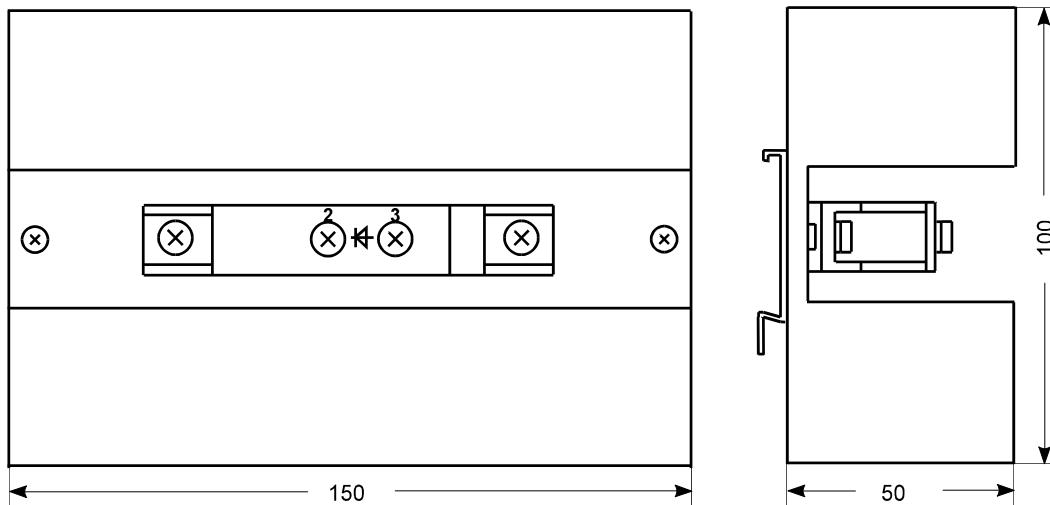


Figure 1: View diode mounted on a heat sink

### Loadability

with vertical mounting\*      25 A max.  
with horizontal mounting      16 A max.

### Connection

Screws size M5

### Mounting

on a mounting rail NS 35 according to EN 50022

### Weight

0.75 kg

### Diode data (Type SKKE81/04, manufacturer Semikron):

Reverse voltage	400 V
Conducting state current	0.85 V typ.
Isolation voltage (diode / heat sink)	5 kV

\* with vertical mounting of several K 7207 one over the other a distance of  $\geq 150$  mm between the heat sinks is required!



## K 7208: Feeding and current distribution

- redundant feeding up to 35 A total current
- with 2 decoupling diodes and 2 network filters Z 6015
- fusing of up to 6 single circuits with circuit breakers (manufacturer E-T-A®)

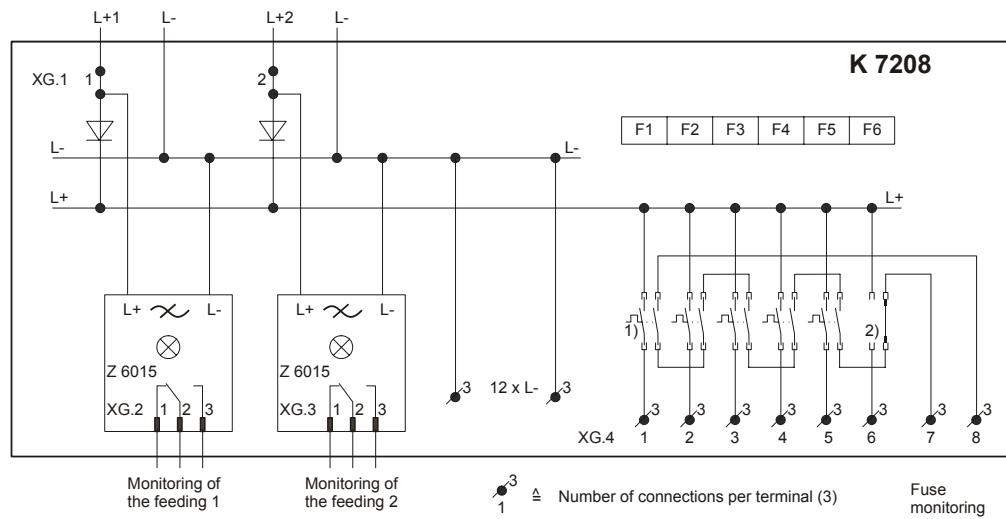


Figure 1: Wiring diagram

### Construction:

On the front heat sink for the 2 decoupling diodes, behind a mounting plate for up to 6 circuit breakers. On the rear 2 network filters Z 6015 and the connection terminal are mounted. The monitoring of the circuit breaker slots not equipped is overridden via jumpers.

Each network filter is equipped with a monitoring relay with LED for the feeding. A voltage failure is announced via neutral contacts.

### Note for installation:

Install K 7208 as near as possible to the cable inlet into the cabinet because of the network filter. With feeding lines > 0.5 m within the cabinet, a screened feeding line 2 x 6 mm<sup>2</sup> (HIMA part no. 90 4100001) has to be used.

External fusing	35 A max.
Power dissipation	35 W max.
Size	19-inch, 2 units high according to DIN EN 60287-4
Mounting depth	270 mm
Weight	3.25 kg

### Diode data (Type SKKE81/04, manufacturer Semikron):

Reverse voltage	400 V
Conducting state current	0.85 V typ.
Isolation voltage (diode / heat sink)	5 kV

**Preferred type of circuit breaker (not delivered with K 7208):**

Nominal current	Manufacturer	Type	HIMA part no.
4 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350040
16 A	E-T-A®	2210-S211-P1T2-H111 16 A	57 0350160

**Table 1: Preferred type of circuit breakers**

For further details refer to the original data sheet E-T-A®.

**Connections and wiring:**

Connection	Max. Cross section of wires
XG.1.1, XG.1.2	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	4 mm <sup>2</sup>
XG.4: 1 - 8	2.5 mm <sup>2</sup>
XG.2 / XG.3	Flat pin plug 6.3 x 0.8 on Z 6015

**Table 2: Connections and wiring****Accessories:**

Accessories supplied by HIMA:

- M 3447 Labeling field with three guiding rings (1 HU)
- M 3443 Labeling field with cable duct (1 HU)
- M 3445 Labeling field with 2 cable ducts (1 HU)

## Views:

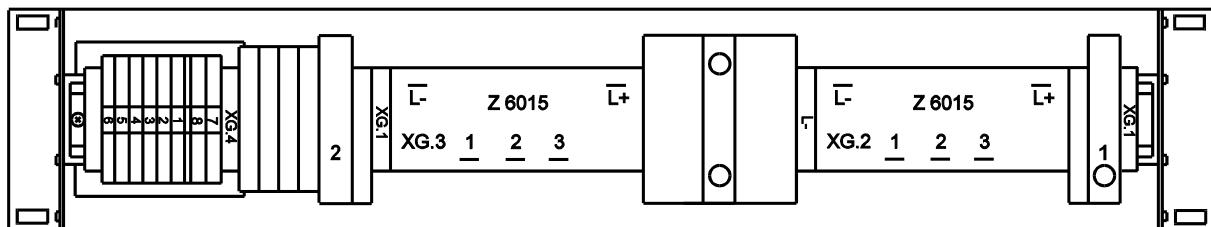


Figure 2: Rear view

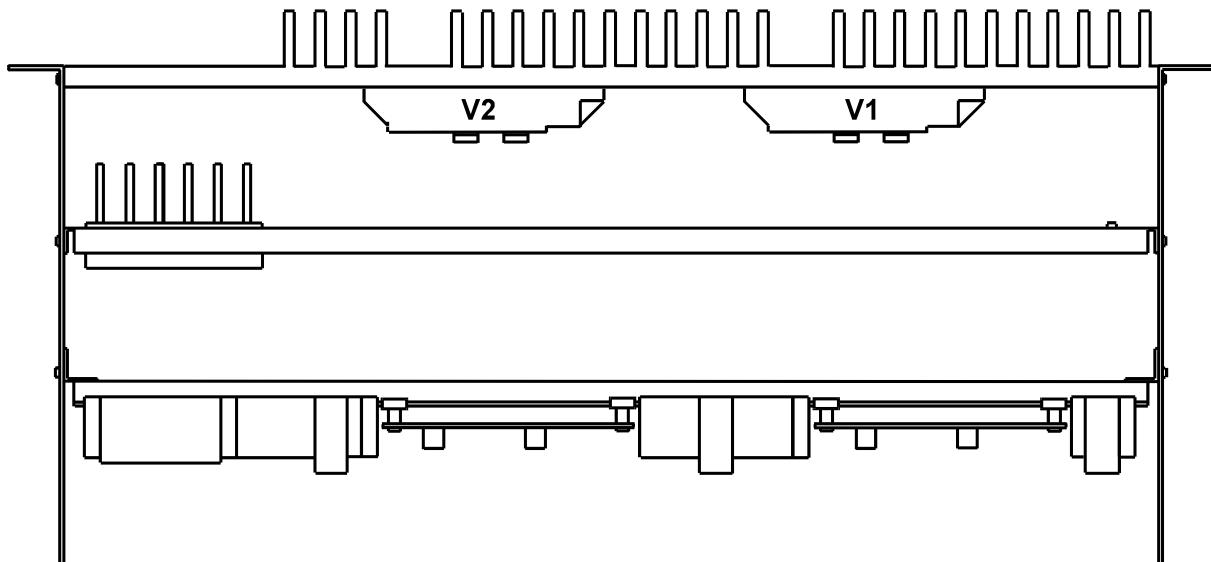


Figure 3: Top view

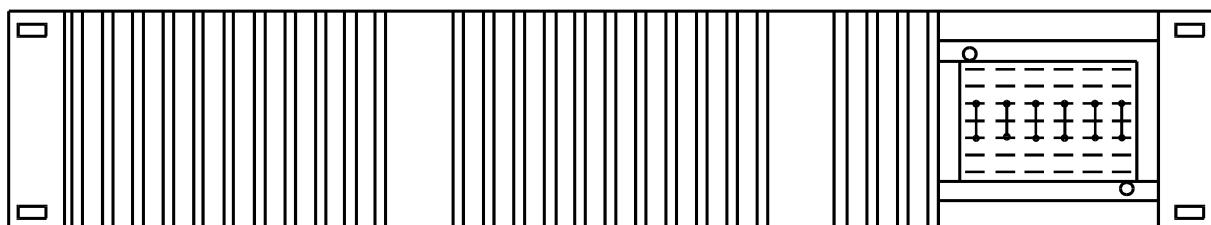
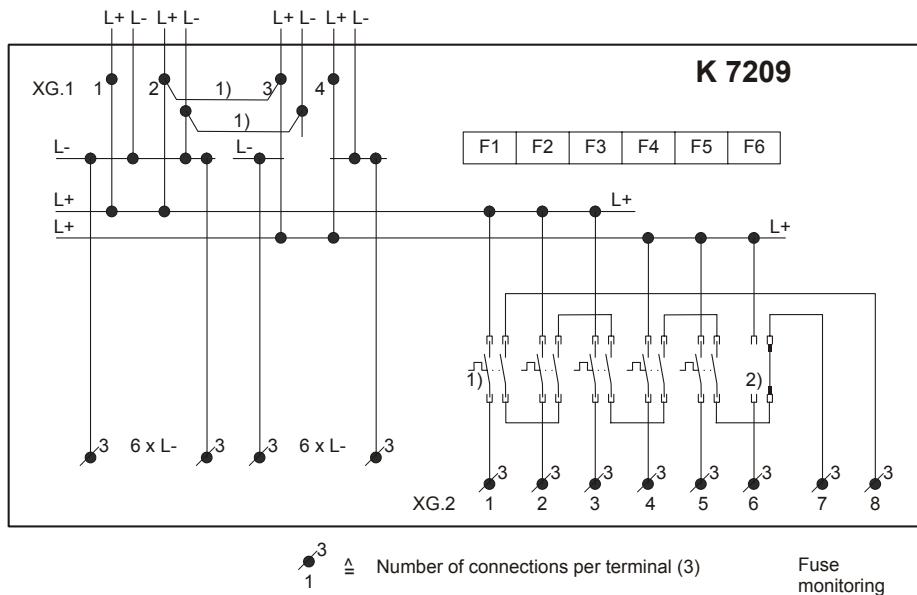


Figure 4: Front view



## K 7209: Fusing and current distribution

- redundant feeding up to 35 A total current
- fusing of up to 6 single circuits with circuit breakers (manufacturer E-T-A®)



- 1) After removal of the jumpers, 2 separated groups each with 3 slots for circuit breakers are available
- 2) Circuit breaker with monitoring contact
- 3) Jumper to bridge non-used monitoring contacts

Figure 1: Wiring diagram

### Construction:

On the front a mounting plate with sockets provided to install up to 6 circuit breakers (with monitoring) is installed. A connection field is on the rear side. The monitoring of circuit breaker slots not equipped is overridden via jumpers.

External fusing	35 A max.
Size	19-inch, 2 units high according to DIN EN 60287-4
Mounting depth	270 mm
Weight	1.5 kg

### Preferred type of circuit breaker (not delivered with K 7209):

Nominal current	Manufacturer	Type	HIMA part no.
4 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350040
16 A	E-T-A®	2210-S211-P1T2-H111 16 A	57 0350160

Table 1: Preferred type of circuit breakers

For further details refer to the original data sheet E-T-A®.

**Connections and wiring:**

Connection	Max. Cross section of wires
XG.1:1/2/3/4	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	4 mm <sup>2</sup>
XG.2: 1 - 8	2.5 mm <sup>2</sup>

**Table 2: Connections and wiring****Accessories:**

Accessories supplied by HIMA:

- M 3447 Labeling field with three guiding rings (1 HU)
- M 3443 Labeling field with cable duct (1 HU)
- M 3445 Labeling field with 2 cable ducts (1 HU)

## Views:

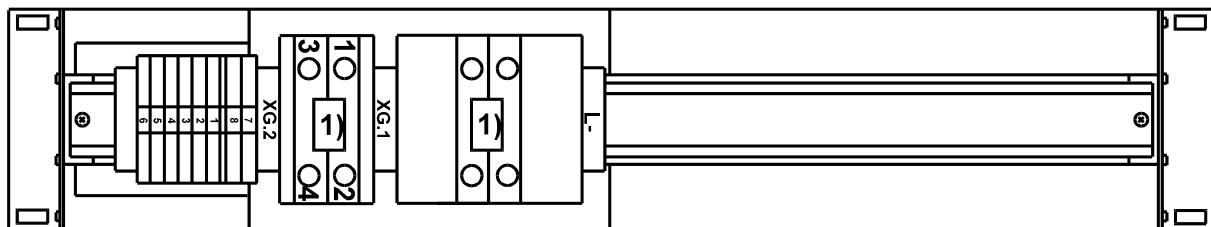


Figure 2: Rear view

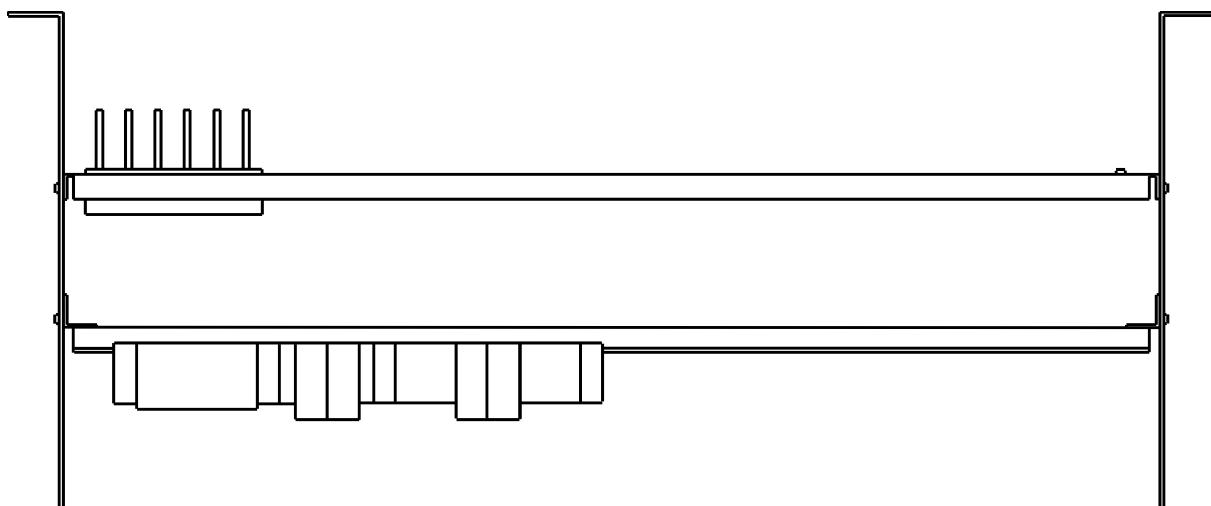


Figure 3: Top view

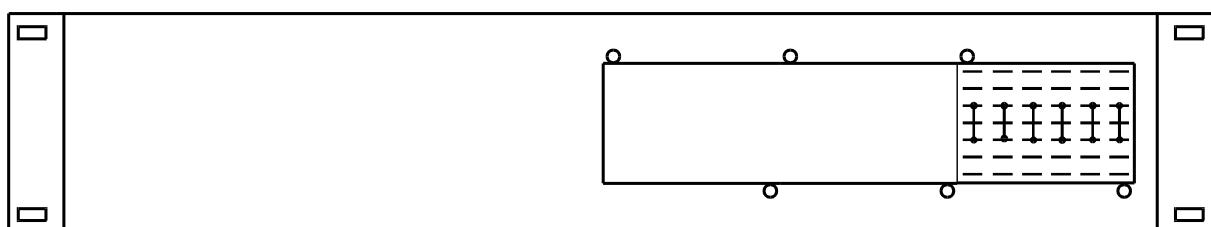
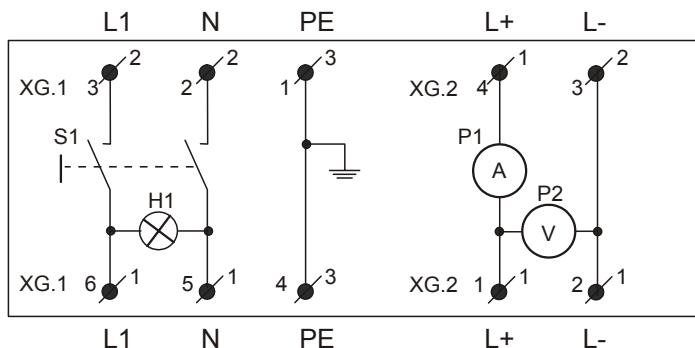


Figure 4: Front view



## K 7210: Current and voltage display

- with main switch for the primary switch off of one power supply



$\triangleq$  Number of connections per terminal (2)

Figure 1: Wiring diagram

### Construction:

On the front a mounting plate with one ampere meter and volt meter each and one main switch for power supplies with pilot lamp. The connection is performed via terminal strips mounted on a mounting rail at the rear.

### Type of the measuring instruments:

- moving coil instruments
- vertical installation
- accuracy class 1.5
- test voltage 2 kV
- display range of the ampere meter 0 ... 60 A
- display range of the volt meter 0 ... 40 V=

### Terminals:

- XG.1 max. 4 mm<sup>2</sup> (feeding)
- XG.2 max. 16 mm<sup>2</sup> (24 V level)

Spare glow lamp for the pilot lamp: HIMA part no. 557150500

Dimensions	19-inch, 2 units high according to DIN EN 60287-4
Depth	270 mm
Weight	2.15 kg

## Views:

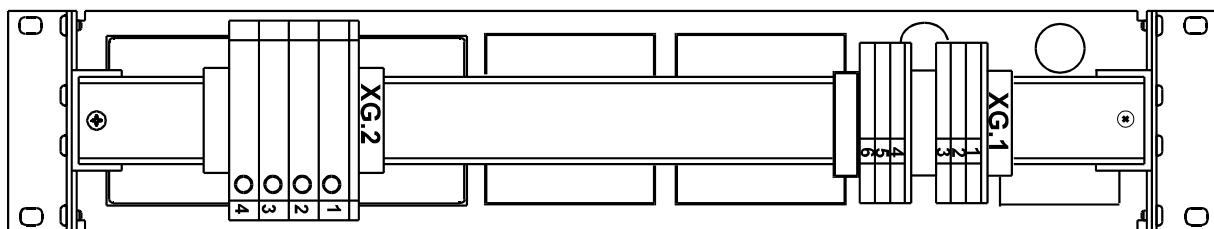


Figure 2: Rear view

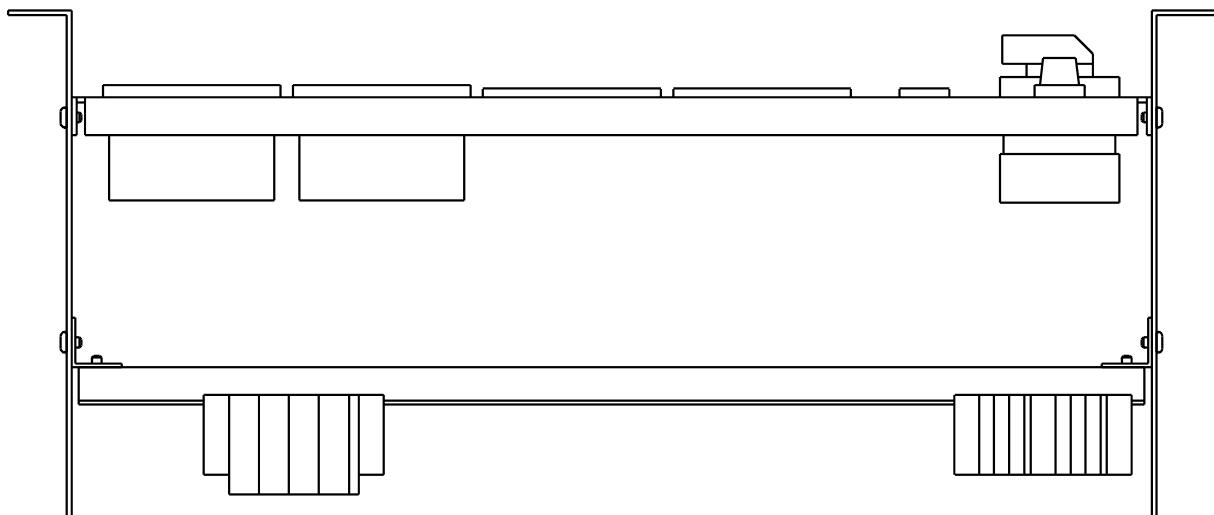


Figure 3: Top view

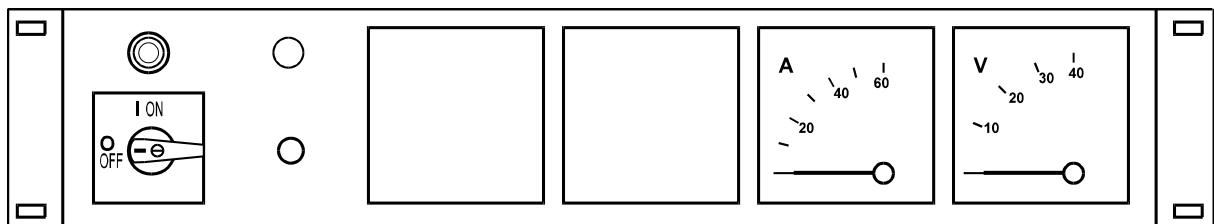


Figure 4: Front view



## K 7211: Current and voltage display

- with main switches for the primary switch off of two power supplies for redundant feeding

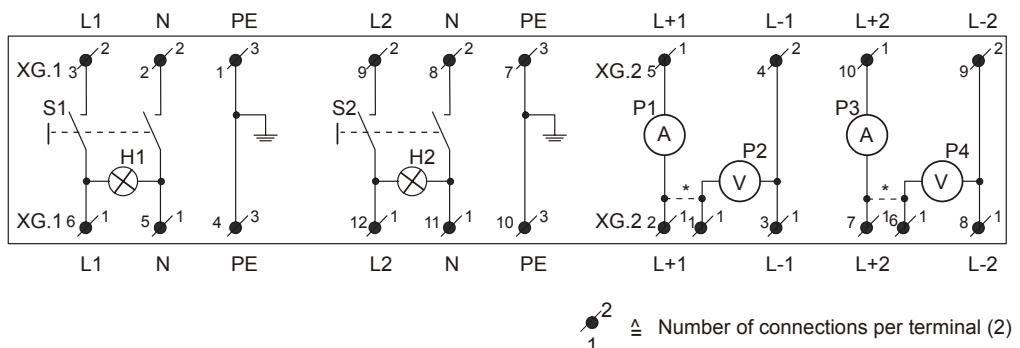


Figure 1: Wiring diagram

### Construction:

On the front a mounting plate with two ampere meters and volt meters each and two main switches for power supplies with pilot lamp. The connection is performed via terminal strips mounted on a mounting rail at the rear.

### Type of the measuring instruments:

- moving coil instruments
- vertical installation
- accuracy class 1.5
- test voltage 2 kV
- display range of the ampere meter 0 ... 60 A
- display range of the volt meter 0 ... 40 V=

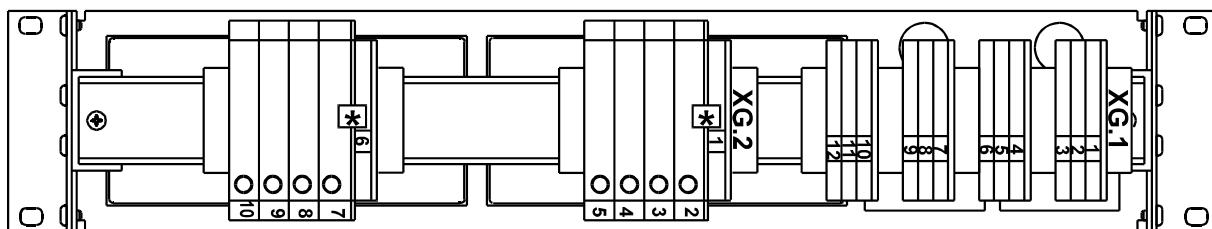
### Terminals:

- XG.1 max. 4 mm<sup>2</sup> (feeding)
- XG.2 max. 16 mm<sup>2</sup> (24 V level)

Spare glow lamp for the pilot lamp: HIMA part no. 557150500

Dimensions	19-inch, 2 units high according to DIN EN 60287-4
Depth	270 mm
Weight	2.15 kg

## Views:



\*remove the jumpers to get a separate connection of the volt meters, e.g. with redundant feedings

Figure 2: Rear view

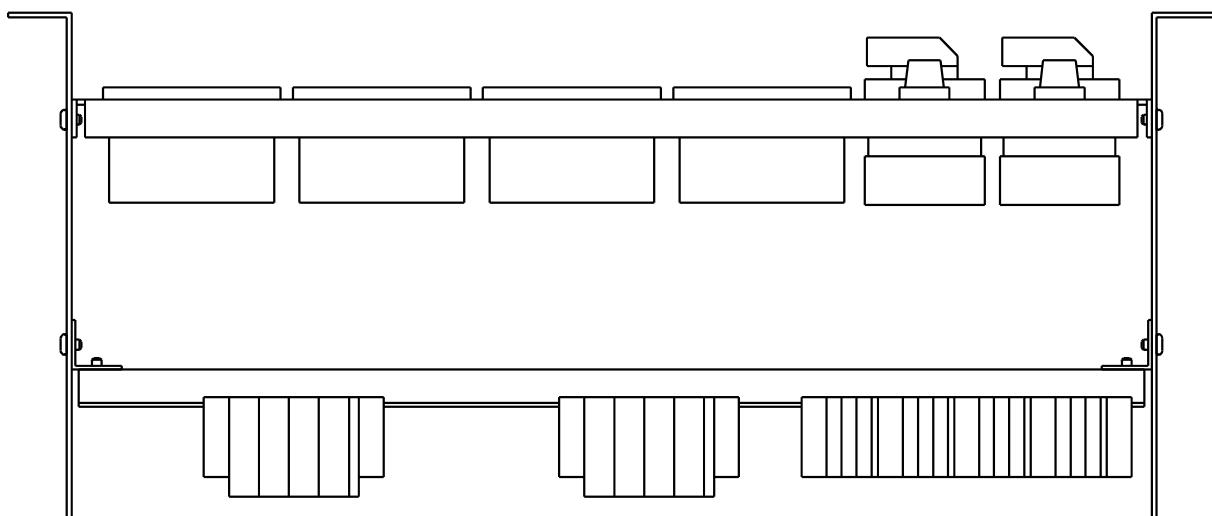


Figure 3: Top view

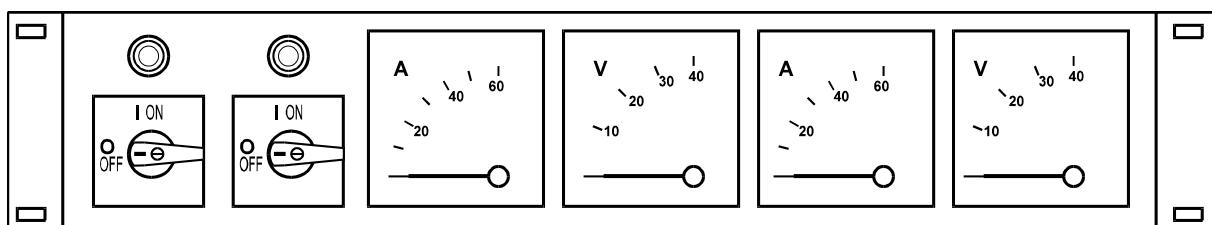
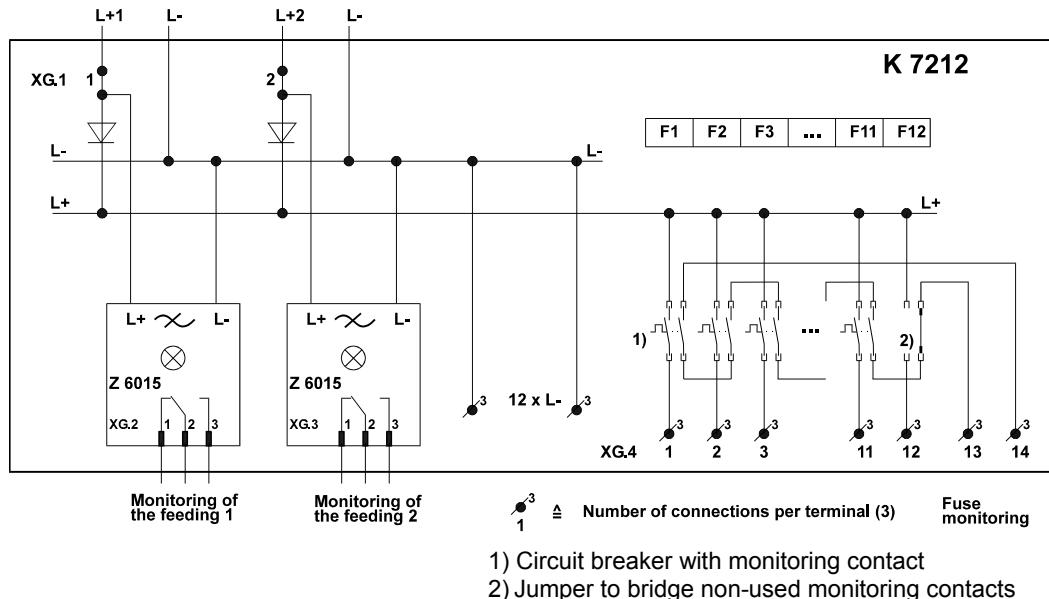


Figure 4: Front view



## K 7212: Fusing and current distribution

- redundant feeding up to 35 A total current
- with 2 decoupling diodes and 2 network filters Z 6015
- fusing of up to 12 single circuits with circuit breakers (manufacturer E-T-A®)



**Figure 1: Wiring diagram**

### Construction:

On the front heat sink for the two decoupling diodes, behind a mounting plate for up to 12 circuit breakers (with monitoring). On the rear two network filters Z 6015 and the connection terminals are mounted. The monitoring contacts of non-equipped circuit breakers are overridden via jumpers.

Each network filter is equipped with a monitoring relay with LED for the feeding. Voltage failure is announced via neutral contacts.

### Note for installation:

Install K 7212 as near as possible to the cable inlet into the cabinet because of the network filter. With feeding lines > 0.5 m within the cabinet, a screened feeding line 2 x 6 mm<sup>2</sup> (HIMA part no. 90 4100001) has to be used.

External fusing	35 A max.
Power dissipation	35 W max.
Size	19 inches, 2 units high
Mounting depth	270 mm
Weight	3.25 kg

**Diode data (Type SKKE81/04, manufacturer Semikron):**

Reverse voltage	400 V
Conducting state current	0.85 V typ.
Isolation voltage (diode / heat sink)	5 kV

**Preferred type of circuit breaker (not delivered with K 7212):**

Nominal current	Manufacturer	Type	HIMA part no.
4 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350040
16 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350160

**Table 1: Preferred type of circuit breakers**

For further details refer to the original data sheet E-T-A®.

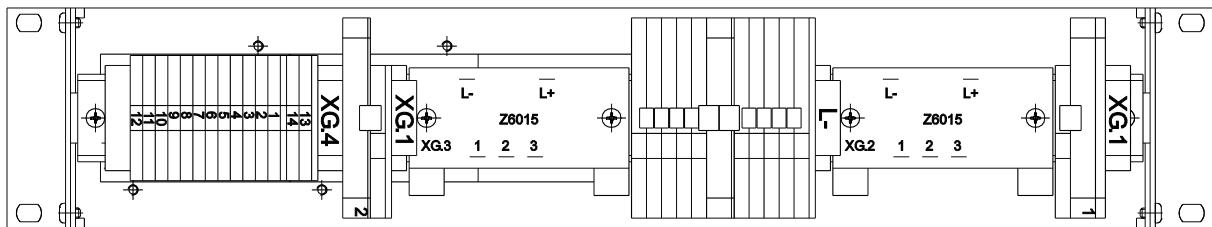
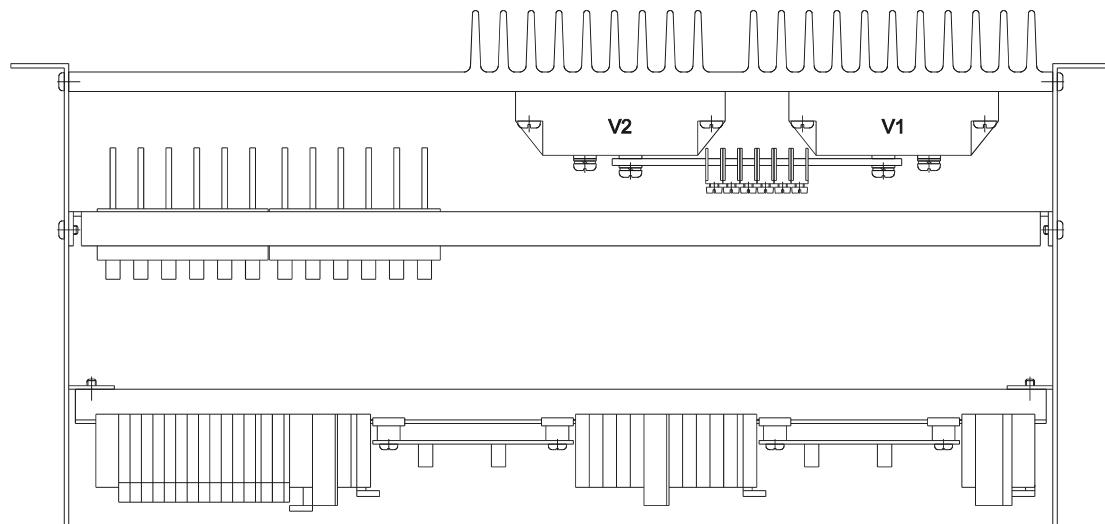
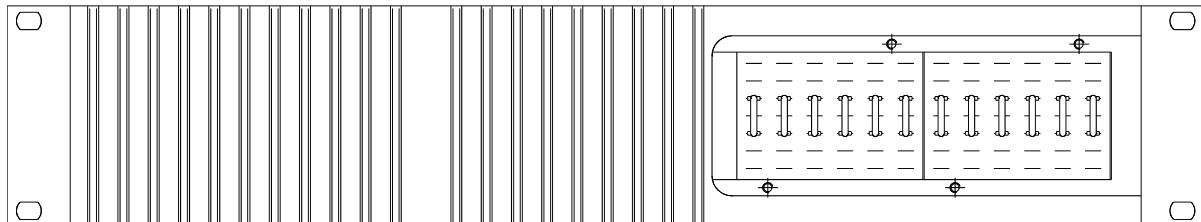
**Connections and wiring:**

Connection	Max. Cross section of wires
XG.1:1, XG.1:2	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	4 mm <sup>2</sup>
XG.4: 1 - 14	2.5 mm <sup>2</sup>
XG.2 / XG.3	Flat pin plug 6.3 x 0.8 on Z 6015

**Table 2: Connections and wiring****Accessories:**

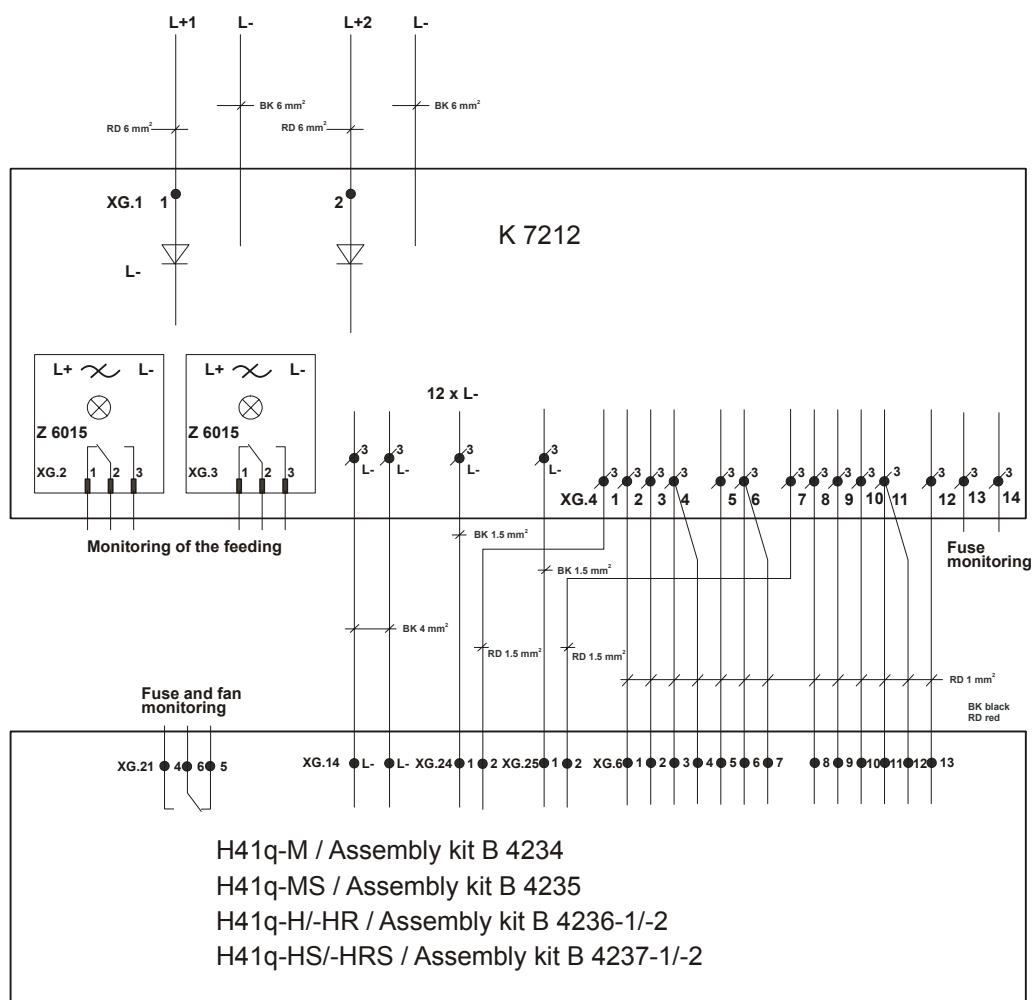
Accessories supplied by HIMA:

- M 3447 Labeling field with three guiding rings (1 HU)
- M 3443 Labeling field with cable duct (1 HU)
- M 3445 Labeling field with 2 cable ducts (1 HU)

**Views:****Figure 2: Rear view****Figure 3: Top view****Figure 4: Front view**

**Application example:**

Redundant feeding K 7212 with 24 VDC up to 35 A secondary fused

**Figure 5: Application example**

The circuit breakers 1 and 7 of K 7212 with nominal current of 16 A are for the redundant fusing of the H41q system.

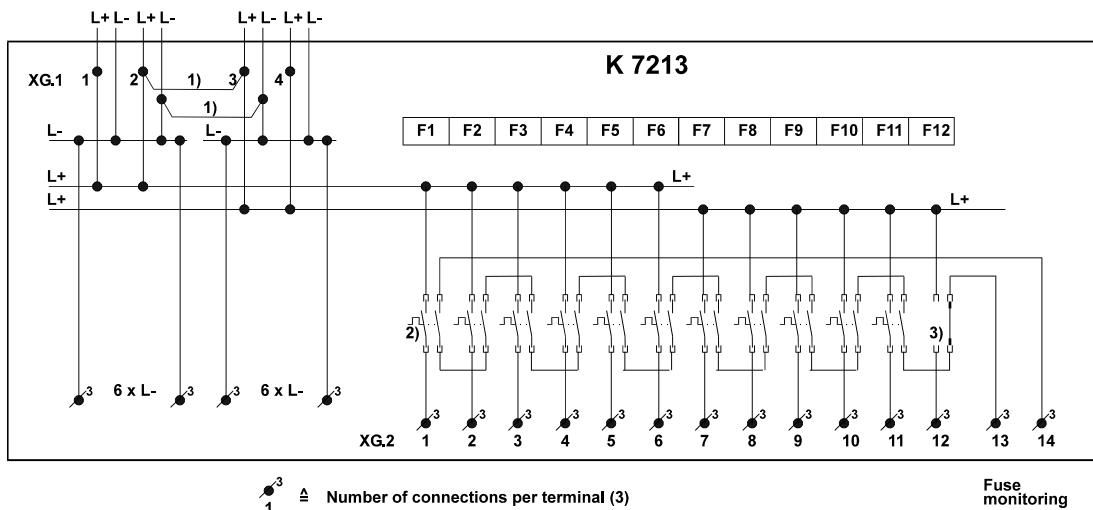
All the other circuit breakers with nominal current of 4 A are for the fusing of the modules in the H41q system. The modules will be grouped and in accordance to the power demand protected by fuses.

The fusing of the modules with circuit breakers from the feeding and current distribution K 7212 is only an example.



## K 7213: Feeding and current distribution

- redundant feeding up to 35 A total current
- with fusing of up to 12 single circuits with circuit breakers  
(manufacturer E-T-A® )



**Figure 1: Wiring diagram**

- 1) After removal of the jumpers two separated groups each with 6 slots for circuit breakers are available
- 2) Circuit breaker with monitoring contact
- 3) Jumper to bridge non-used monitoring contacts

### Construction:

On the front, a mounting plate with sockets is provided to install up to 12 circuit breakers (with monitoring). A connection field is on the rear side. The monitoring contacts of non-equipped circuit breakers are overridden via jumpers.

External fusing	35 A max.
Size	19 inches, 2 units high
Mounting depth	270 mm
Weight	1.50 kg

**Preferred type of circuit breakers (not delivered with K 7213):**

Nominal current	Manufacturer	Type	HIMA part no.
4 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350040
16 A	E-T-A®	2210-S211-P1T2-H111 16 A	57 0350160

**Table 1: Preferred type of circuit breakers**

For further details refer to the data sheet from E-T-A®.

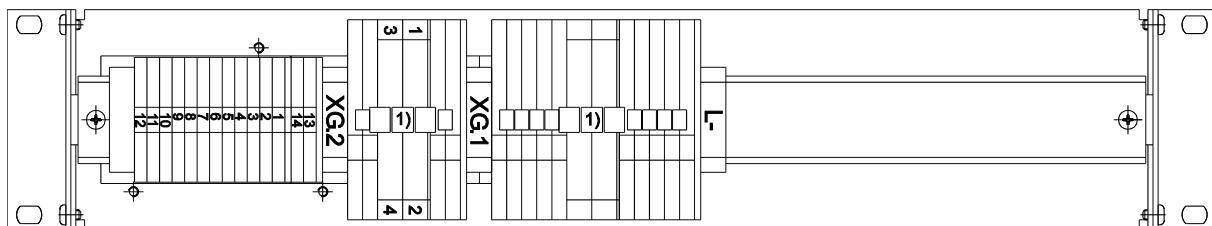
**Connections and wiring:**

Connection	Max. Cross section of wires
XG.1:1 / 2 / 3 / 4	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	4 mm <sup>2</sup>
XG.2: 1 - 14	2.5 mm <sup>2</sup>

**Table 2: Connections and wiring****Accessories:**

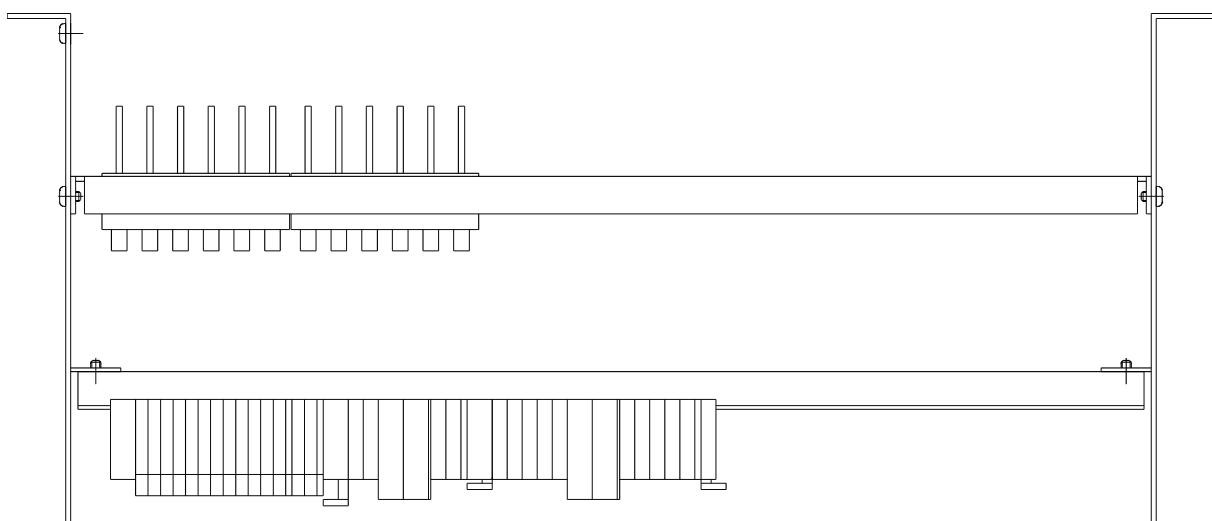
Accessories supplied by HIMA:

- M 3447 Labeling field with three guiding rings (1 HU)
- M 3443 Labeling field with cable duct (1 HU)
- M 3445 Labeling field with 2 cable ducts (1 HU)

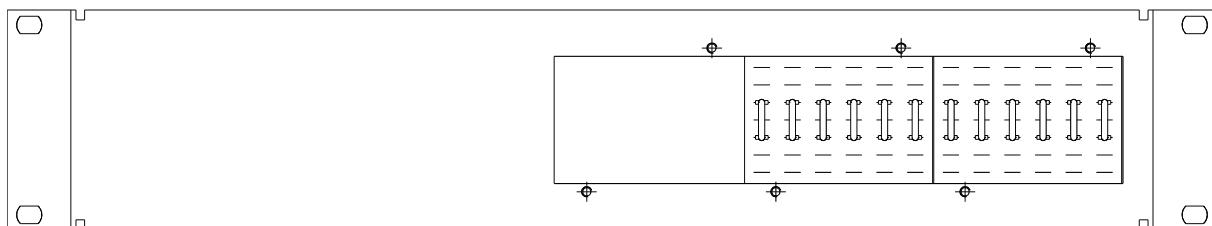
**Views:**

1) Jumper

**Figure 2: Rear view**



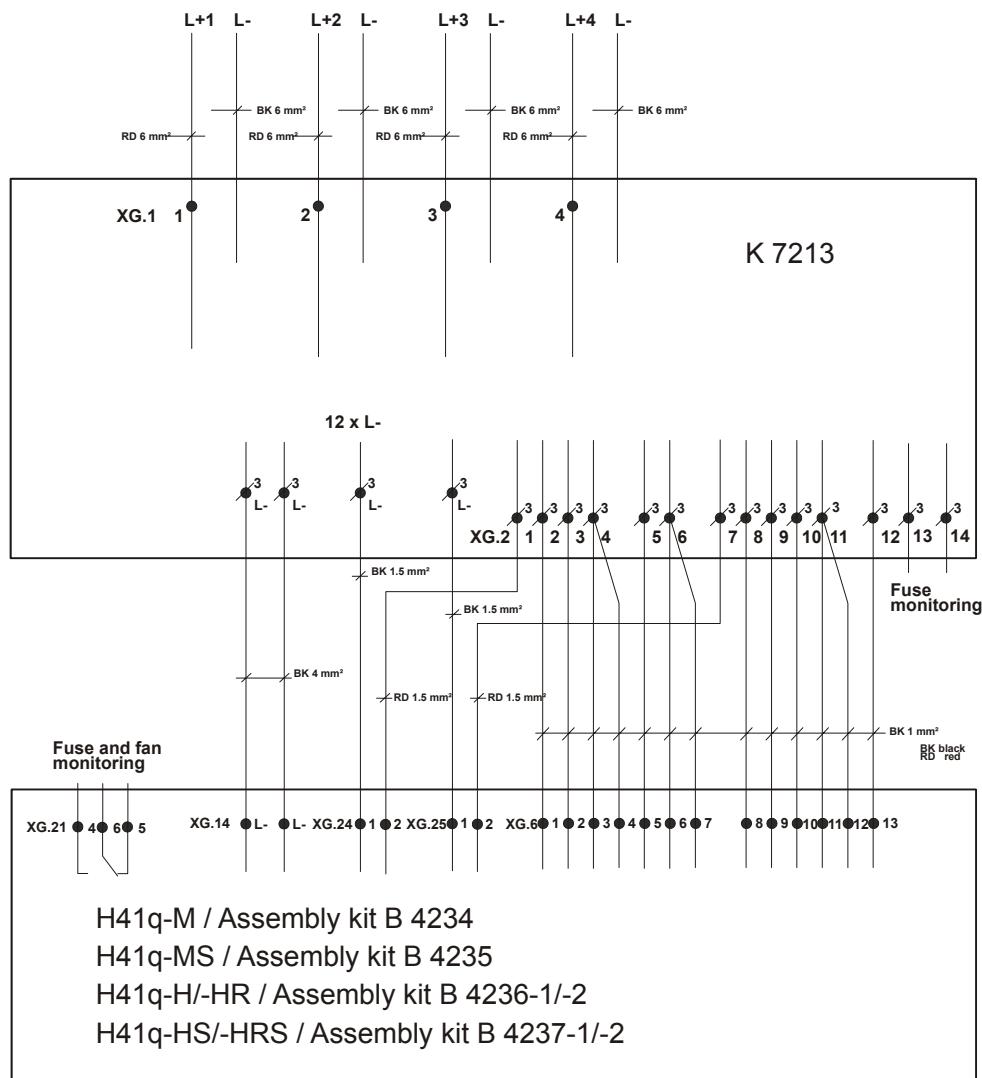
**Figure 3: Top view**



**Figure 4: Front view**

**Application example:**

Redundant feeding K 7213 with 24 VDC up to 35 A secondary.

**Figure 5: Application example**

The circuit breakers 1 and 7 of K 7213 with nominal current of 16 A are for the redundant fusing of the H41q system.

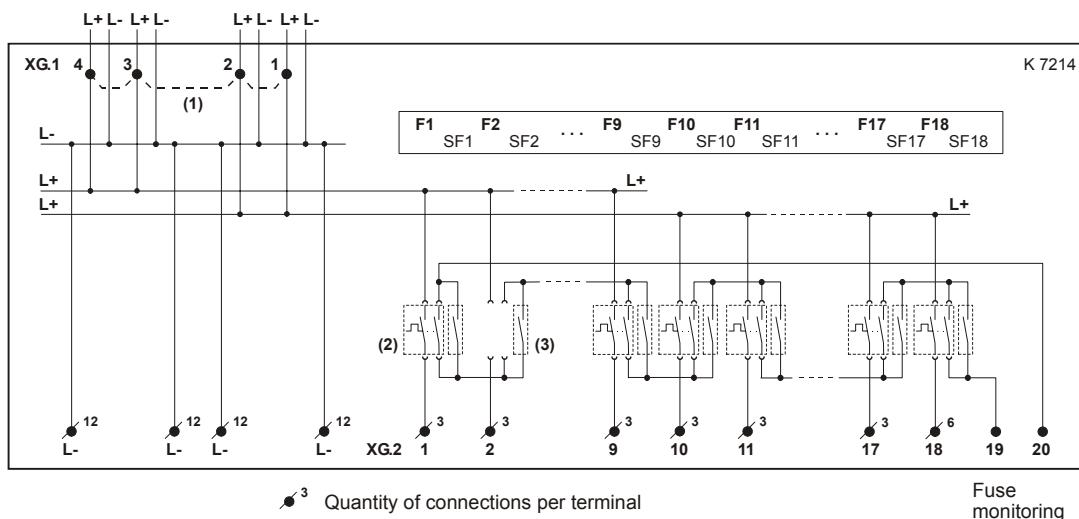
All the other circuit breakers with nominal current of 4 A are for the fusing of the modules in the H41q system. The modules will be grouped and in accordance to the power demand protected by fuses.

The fusing of the modules with circuit breakers from the feeding and current distribution K 7213 is only an example.



## K 7214: Feeding and current distribution

- for SELV and PELV
- redundant feeding up to 150 A total current
- for fusing of up to 18 single circuits with circuit breakers (manufacturer E-T-A ®)



**Figure 1: Wiring diagram**

### Explanations

- (1) After inserting the provided jumper into the terminal the two separated groups with 9 circuit breakers each are interconnected
  - (2) Circuit breaker F.. with monitoring contact
  - (3) The monitoring contacts of non-equipped circuit breaker slots can be overridden with the slide switches SF..
- |            |                              |
|------------|------------------------------|
| Position 1 | circuit breaker not equipped |
| Position 2 | circuit breaker equipped     |

### Construction:

Printed circuit board with front sockets for up to 18 circuit breakers (with monitoring), connecting field on the rear with tension spring clamps.

Total current	150 A max.
Power Supply	SELV or PELV with 24 VDC or 48 VDC
Dimensions	19 inches, 2 units high
Mounting depth	approx. 180 mm
Protection class	IP 00
Weight	1.2 kg (without circuit breakers)

**Preferred type of circuit breakers (not delivered with K 7214):**

Nominal current	Manufacturer	Type	HIMA part no.
4 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350040
16 A	E-T-A®	2210-S211-P1T2-H111 16 A	57 0350160

**Table 1: Preferred type of circuit breakers**

For further details refer to the data sheet from E-T-A®.

**Connections and wiring:**

Connection	Max. Cross section of wires
XG.1:1 / 2 / 3 / 4	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	4 mm <sup>2</sup>
XG.2: 1 ... 20	2.5 mm <sup>2</sup>

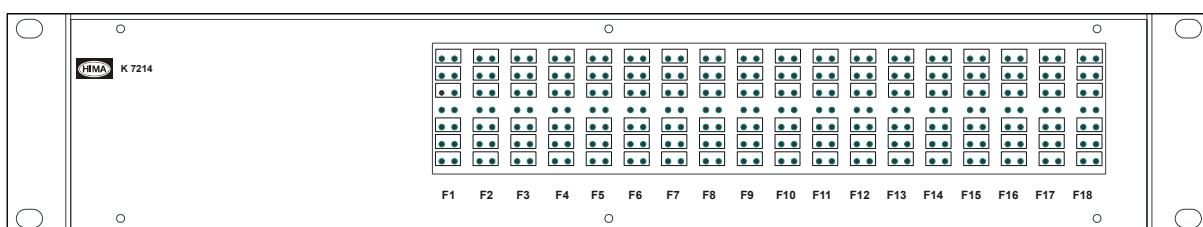
**Table 2: Connections and wiring**

**Accessories:**

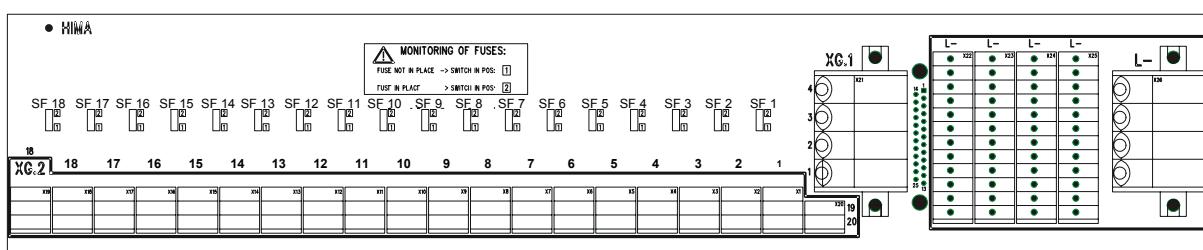
Accessories supplied by HIMA:

- M 3447 Labeling field with three guiding rings (1 HU)
- M 3443 Labeling field with cable duct (1 HU)
- M 3445 Labeling field with 2 cable ducts (1 HU)

**Views:**



**Figure 2: Front view with slots for circuit breakers F1 to F18**



**Figure 3: Rear view with switches SF1 to SF18**



## K 7215: Feeding and current distribution

- for SELV and PELV with display module for 24 VDC or 48 VDC
- redundant feeding up to 150 A total current
- for fusing of up to 18 single circuits with circuit breakers (manufacturer E-T-A ®)

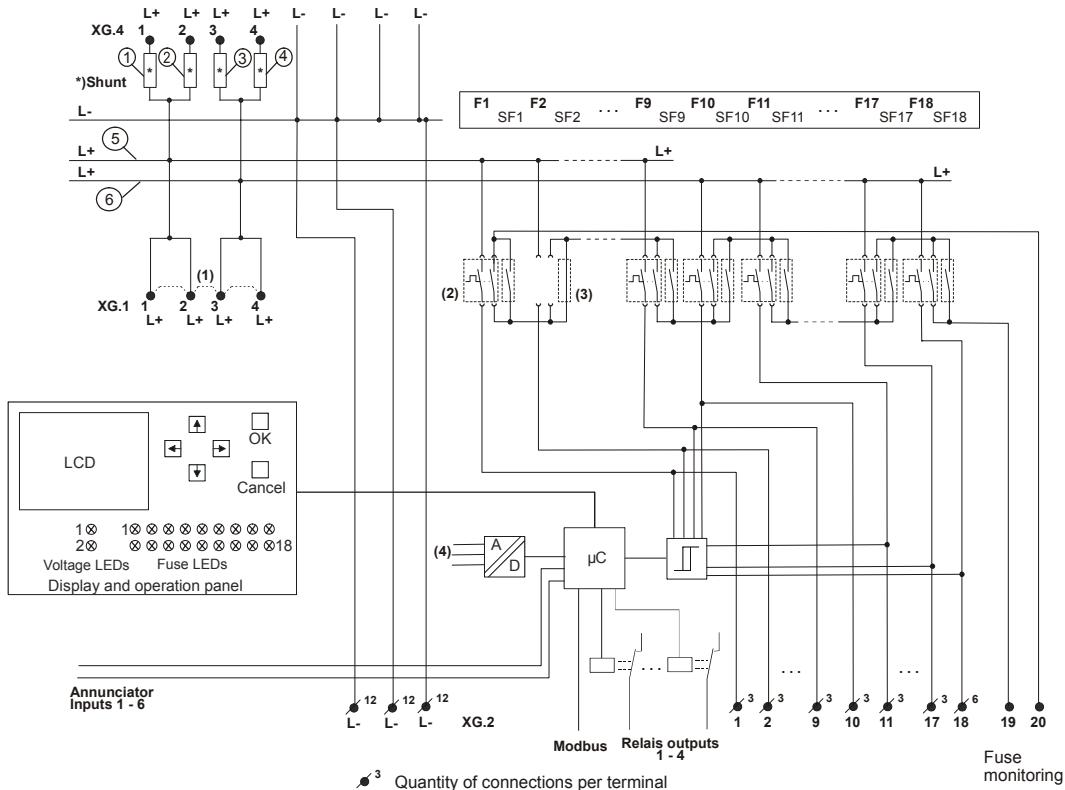


Figure 1: Wiring diagram

### Explanations

The supply inputs are XG.1 (without current measurement) or XG.4 (with current measurement)

(1) After inserting the provided jumper into the terminal the two separated groups are interconnected (see "Groups of Supply Terminals" on page 5)

(2) Circuit breaker F.. with monitoring contact

(3) The monitoring contacts of non-equipped circuit breaker slots can be overridden with the slide switches SF..

Position 1	circuit breaker not equipped
Position 2	circuit breaker equipped.

(4) The following analog values are measured:

- the voltages at the measuring points (5) and (6),
- the current at the measuring points (1) to (4),
- 2 temperatures with PT 1000 sensors

### Construction:

Printed circuit board with front sockets for up to 18 circuit breakers (with monitoring), connecting field on the rear with tension spring clamps.

Technical Data		
Total current Power supply	150 A max. SELV or PELV, 24 VDC or 48 VDC	
Operating voltage min. ( $\geq - 15 \%$ ) max. ( $\geq + 20 \%$ ) Current consumption Ripple W <sub>ss</sub>	24 VDC 20.4 V 28.8 V 110 mA $\pm 15 \%$	48 VDC 40.8 V 57.6 V 85 mA $\pm 15 \%$
Protection class	IP00	
Inputs for voltage measurement		
Measuring range Resolution Accuracy Input resistance Quantity	0 ... 60 V 0.1 V 2 % 23 k $\Omega$ 6	
Inputs for current measurement		
Measuring range Resolution Accuracy Input resistance Quantity	0 ... 60 A 0.1 A 1 % 1 M $\Omega$ 4	
Inputs for PT1000 temperature sensors		
Measuring range Resolution Accuracy Measuring current Quantity	-10 ... 100 °C 0.1 °C +/- 2 °C 250 $\mu$ A 2	
Monitoring inputs for circuit breakers		
Range of voltage Low level High level Input resistance Quantity	0 ... 48 V < 6 V > 14 V 25 k $\Omega$ 18	
Annunciation inputs		
Type Loop current Quantity	Current loop < 6 mA 6	
Annunciation outputs		
Type Permissible switching voltage Permissible switching current Quantity	Floating, normally open 48 VDC 500 mA 4	
Communication interface	MODBUS slave over RS 485	
Ambient temperature	0 °C...+60 °C	
Storage temperature	-40 °C...+85 °C	
Dimensions Mounting depth	19 inches, 2 units high approx. 180 mm	
Weight	1.4 kg (without circuit breakers)	

Table 1: Technical Data

**Preferred type of circuit breakers (not delivered with K 7215):**

Nominal current	Manufacturer	Type	HIMA part no.
4 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350040
16 A	E-T-A®	2210-S211-P1T2-H111 16 A	57 0350160

**Table 2: Preferred type of circuit breakers**

For further details refer to the original data sheet E-T-A®.

**Connections and wiring:**

Connection	Max. Cross section of wires
XG.1, XG.4: 1 / 2 / 3 / 4	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	2.5 mm <sup>2</sup>
XG.2: 1...20	2.5 mm <sup>2</sup>

**Table 3: Connections and wiring****Pin assignment of the SUB-D socket for Modbus:**

Modbus slave

Connection	Signal	Function
1	- - -	- - -
2	- - -	- - -
3	RxD/TxD-A	Receive/Transmit data A
4	CNTR-A	Control signal A
5	DGND	Data reference potential
6	VP	5 V, positive pole of supply voltage
7	- - -	- - -
8	RxD/TxD-B	Receive/Transmit data B
9	CNTR-B	Control signal B

**Table 4: Pin assignment of the SUB-D socket for Modbus**


---

**Note** The connecting cable BV 7043 must **not** be used to connect this device.

---

**Accessories:**

Accessories supplied by HIMA:

- M 3447 Labeling field with three guiding rings (1 HU)
- M 3443 Labeling field with cable duct (1 HU)
- M 3445 Labeling field with 2 cable ducts (1 HU)

## Functionality of the device

The device is a current distribution, equipped with monitoring and display possibilities. The device is capable of distributing the current, fed in from up to 4 sources (via XG.1 or XG.4), to 18 circuit breakers maximum. Sources and circuit breakers may be separated into two groups of up to 2 sources and 9 circuit breakers each. The voltage and current values, as well as two temperature values, can be displayed at the device, can control relay outputs, and can be transported via MODBUS to process monitoring systems, etc. The states of 6 current loop inputs can also be transported via MODBUS.

## Operating states and display

The operating states of the K 7215 are displayed by the following display elements:

- 18 red-green LEDs labeled "F1" to "F18": one for each of the 18 circuit breakers, the device K 7215 can be equipped with
- 2 red-green LEDs labeled "1" and "2": one for the voltage monitoring of each group of 9 circuit breakers
- graphical LCD, 128 by 64 pixels, to display measurement values, and for configuration.

### Display of Circuit Breakers

Each of the 18 LEDs "F1" to "F18" displays the state of the corresponding circuit breaker according to the table.

Voltage behind Circuit Breaker?	Slot Configuration	LED displays
Yes	Circuit breaker plugged in	Green
Yes	Circuit breaker plugged in, but not configured	Red blinking
No	Circuit breaker plugged in	Red
No	Free	Off

Table 4: Display of Circuit Breakers

### Monitoring of the Supply Voltage

As the device K 7215 can operate as well at a supply voltage of 24 V as at 48 V, the supply voltage used in each group is detected at power-up, and depending on this, the voltage measured during operation is displayed with LED "1" and "2" in the following way:

Supply Voltage	Measured Voltage	LED displays
24 V	20.4 to 28.8 V	Green
24 V	Outside of 20.4 to 28.8 V	Red
48 V	40.8 to 57.6 V	Green
48 V	Outside of 40.8 to 57.6 V	Red

Table 5: Monitoring of the Supply Voltage

---

**Note** If after the self test (circa 5 seconds), one of the supply voltages is outside of the named ranges during power-up, the voltage cannot be monitored!

---

LCD Panel

After the end of the self test at power-up time, the main display is shown. It displays the currents and voltages of the two voltage supply groups, and the two temperatures. In the lowest line, the state of the device is shown, i.e. overflows in voltage or temperatures, etc. are pointed out, or "normal operation" is displayed.

HIMA K7215	
U1: 24.1V	U2: 23.8V
I1: 40.5A	I3: 35.5A
I2: 40.0A	I4: 33.0A
T1: 57°C	T2: 42°C
normal operation	

**Figure 2: Main display**

Messages that may appear in the lowest line:

normal operation	Normal operation
under voltage	The supply voltage of one group is below the tolerance range (< -15 %)
over voltage	The supply voltage of one group is above the tolerance range (> +20 %)
over temperature	One of the temperatures has exceeded the limit set for it
over load	Overcurrent, i.e. <ul style="list-style-type: none"> <li>• one of the currents at the measuring points 1 to 4 is higher than 50 A</li> <li>• the sum of the currents at the measuring points 1 to 4 is higher than 150 A</li> </ul>

### Groups of supply terminals

The device has 4 terminals L+ (XG.1 without, or XG.4 with current measurement) to which the supply voltage (either 24 V or 48 V) can be connected. Each 2 of these inputs form a group together with 9 slots for circuit breakers:

- the terminals 1 and 2 together with the slots F1...F9, and
- the terminals 3 and 4 together with the slots F10...F18.

The two separated groups may be connected by a jumper.

---

**Note** If the jumper is mounted, both groups must be connected to the same supply voltage, i.e., either both groups are connected to 24 V or both to 48 V!

If the groups are separated, the supply voltages may be different.

---

**Note** It is only allowed to install signal lines at an input and output of the K 7215 with a maximum length of 30 m.

## Inputs

The module K 7215 has 2 temperature inputs and 6 current loop inputs which can be assigned freely by the user.

The values of all inputs can be read via MODBUS.

### Temperature Inputs

To both temperature inputs, PT1000 sensors may be connected to measure temperatures at critical places.

The temperatures are checked against their limit values configured. If one of the limit values is exceeded, the message "over temperature" appears in the main display, and the relay output number 3 is opened. The limits have a hysteresis of 2 °C.

### Current Loop Inputs

The 6 current loop inputs only can be read via MODBUS and do not have any functionality within the device. If the current loop is interrupted, or if the input is not connected, the value 1 can be read via MODBUS, otherwise 0.

If a current loop input is connected to the terminals 19 and 20, the tripping of one circuit breaker or several circuit breakers can be reported.

## Relay outputs

The 4 relay outputs each have a contact being closed in the normal state, but opened in the failure state.

### Relay Output 1

This opens if the supply voltage of the group 1 is outside of the tolerance range: -15 % up to +20 %.

### Relay Output 2

This opens if the supply voltage of the group 2 is outside of the tolerance range: -15 % up to +20 %.

### Relay Output 3

This opens if one of the temperatures has exceeded its limit value.

### Relay Output 4

This opens if overcurrent appears, i.e.

- one of the currents at the measuring points ① to ④ exceeds 50 A
- the sum of the currents at the measuring points ① to ④ exceeds 150 A.

## Communication over MODBUS

The module contains a MODBUS slave, which can be configured concerning baud rate, parity, and slave address.

The values can be read as follows:

MODBUS Function Code 04 (Analog values represented by integers)

Address	Type	Range	Unit	Explanation
1	Unsigned int	0..6000	0.01 A	Current at meas. point 1
2	Unsigned int	0..6000	0.01 A	Current at meas. point 2
3	Unsigned int	0..6000	0.01 A	Current at meas. point 3
4	Unsigned int	0..6000	0.01 A	Current at meas. point 4
5	Unsigned int	0..6000	0.01 V	Voltage of group 1
6	Unsigned int	0..6000	0.01 V	Voltage of group 2
7	Int	-1000..10000	0.01 °C	Temperature 1
8	Int	-1000..10000	0.01 °C	Temperature 2

**Table 6: MODBUS Function Code 04**

MODBUS Function Code 02 (Binary values)

Address	Type	Explanation
1	Bool	Circuit breaker 1 on
2	Bool	Circuit breaker 2 on
3	Bool	Circuit breaker 3 on
4	Bool	Circuit breaker 4 on
5	Bool	Circuit breaker 5 on
6	Bool	Circuit breaker 6 on
7	Bool	Circuit breaker 7 on
8	Bool	Circuit breaker 8 on
9	Bool	Circuit breaker 9 on
10	Bool	Circuit breaker 10 on
11	Bool	Circuit breaker 11 on
12	Bool	Circuit breaker 12 on
13	Bool	Circuit breaker 13 on
14	Bool	Circuit breaker 14 on
15	Bool	Circuit breaker 15 on
16	Bool	Circuit breaker 16 on
17	Bool	Circuit breaker 17 on
18	Bool	Circuit breaker 18 on
19	Bool	Current loop input 1
20	Bool	Current loop input 2
21	Bool	Current loop input 3
22	Bool	Current loop input 4
23	Bool	Current loop input 5
24	Bool	Current loop input 6

**Table 7: MODBUS Function Code 02**

The binary values for the circuit breakers are 1, if there is voltage at the output of the circuit breaker.

The binary values for the current loop inputs are 1, if the loop is open or the terminal is not connected.

## Configuration

If the main display is shown on the LCD panel, the "Setup Menu" can be called by pressing the button "OK".

Operating within the menus:

- Using the buttons ↑ and ↓, the cursor can be moved up and down to select a menu item.
- Using the button "OK", within the "Setup Menu" the submenu of the selected main menu item is entered, the values modified in the submenu items are stored, and the main menu is displayed again.
- Using the button "Cancel" in the "Setup Menu", the main display is displayed again within the submenus, the modified values are discarded, and the main menu is displayed again.
- Using the buttons ← and →, the value of a submenu item can be modified by increasing/decreasing numerical values, selecting of alternatives, etc.

### "Setup Menu"

The "Setup menu" contains the following items for submenus, in this order:

- Fuses
- Temperature Alarm
- MODBUS
- Display
- Self Test
- Info

Selecting a menu item and pressing the button "OK" opens the submenu having the same name.

### Menu "Fuses"

This menu is a list of all circuit breakers, which does not displayed complete on the LCD panel. Therefore it is scrolled when the cursor is moved to select a circuit breaker.

For each circuit breaker, one of two states can be set:

- Free (the slot is free)
- In Place (a circuit breaker is plugged into the slot)

### Menu "Temperature Alarm"

Settings for the limit and availability of the sensors.

- T1/2 Alarm: threshold for excess temperature  
Can be set to values from 20°C up to 100°C in steps of 1°.
- T1/2 installed:  
Setting, if a temperature sensor is installed, possible values are "yes" and "no". If "yes" is set for a sensor, its value is displayed in the main display, and is used to calculate the value of the relay output.

Menu "MODBUS"

The following parameters of the MODBUS slave can be set:

- Baud rate  
possible values are 9600, 19200, 38400, and 57600 Baud.
- Parity  
Possible values are "Even", "Odd", and "None".
- Address  
MODBUS slave address in the range of 1 to 247.

Menu "Display"

It contains the following settings:

- Brightness:  
Setting of the brightness. A bar chart shows the brightness set.  
This parameter only influences the background light.
- Contrast:  
Setting of the contrast. A bar chart shows the contrast set.

Menu "Self Test"

The menu has the following items:

- Red LED  
Value range from 0 to 19
- Green LED  
Value range from 0 to 19
- LCD Test  
Values 0 and 1

The first two menu items make it possible that each of the 20 LEDs lights in the wanted color, without respect to the color reflecting the device's current state.

For the red and the green LEDs, there are two menu items. To make one LED light, the number has to be set in one of the menu items. The assignment of number and LED is given in the table.

Number	LED	Remarks
0	F1	
1	F2	
...	...	LEDs for the circuit breakers 1 ... 18
17	F18	
18	1	Voltage-LED for group 1
19	2	Voltage-LED for group 2

Table 8: LEDs Menu "Self Test"

If the same LED is set in the red and the green menu item at once, it lights in orange color. An LED lights in test mode, until another one is selected, or until pressing the "OK" or "Cancel" buttons leaves the menu. Then, the LEDs display the state of the module again.

The menu item "LCD Test" starts the display test, if its value is changed. If the value is set to 1, the complete display is made dark (all pixels are ON) and if set to 0, the display is made bright (all pixels are OFF). This state is kept until pressing the other arrow key activates either the opposite state, or until pressing the button "OK" or "Cancel" leaves the submenu.

Menu "Info"

The menu simply displays the software revision of the device.

The user can leave the menu by pressing either the "OK" or the "Cancel" button.

## Mechanical Design

## Views

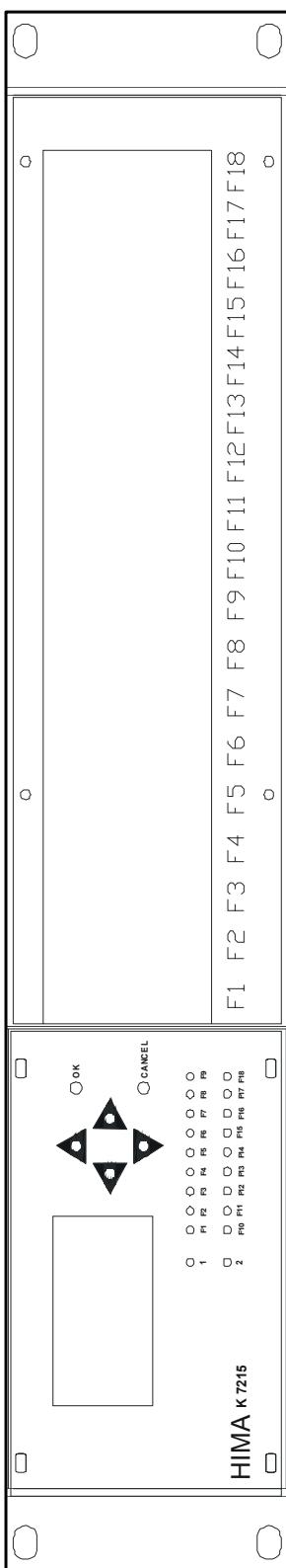


Figure 3:

Figure 3: Front view with control panel and slots for circuit breakers F1 to F18

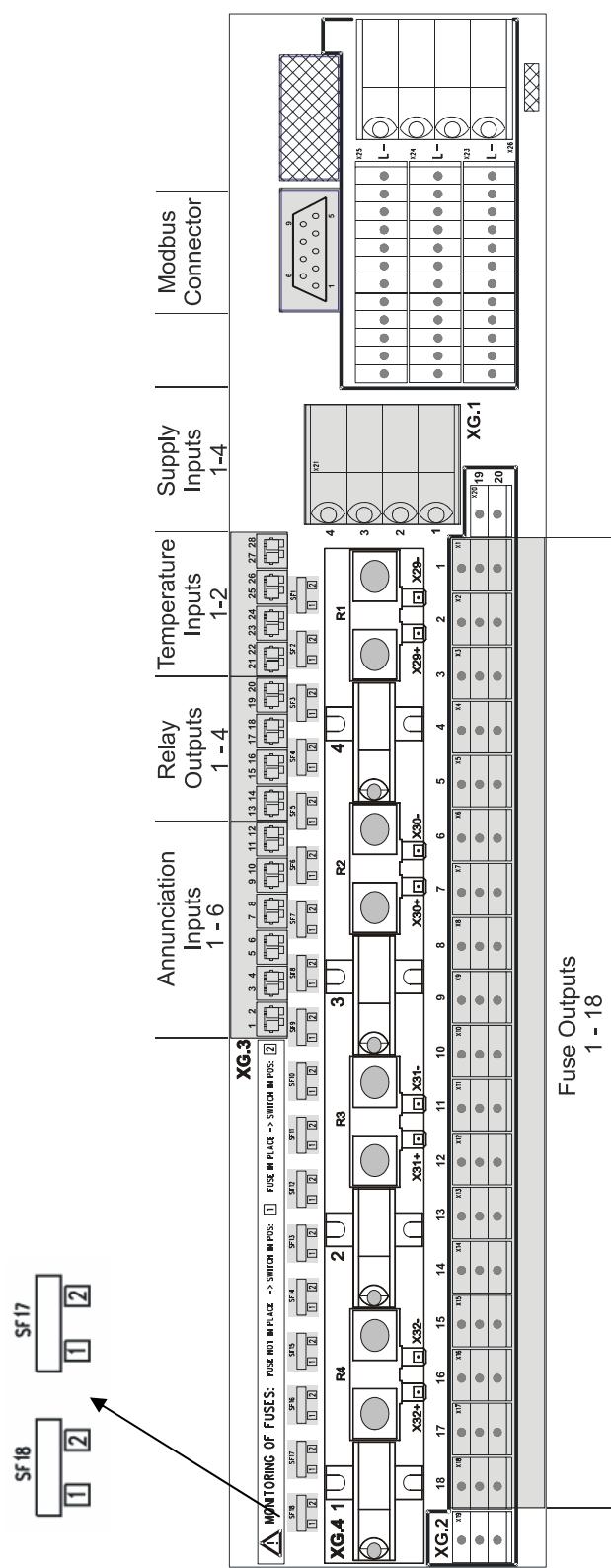


Figure 4:

Figure 4: Rear view with slide switches SF1 to SF18 and terminals (highlighted by grey color and labeled)



## K 7216: Feeding and current distribution

- for SELV and PELV
- redundant feeding up to 63 A total current
- for fusing up to 32 single circuits in eight groups with four micro-fuses each
- Fusing of the eight groups via circuit breakers (manufacturer E-T-A ®)

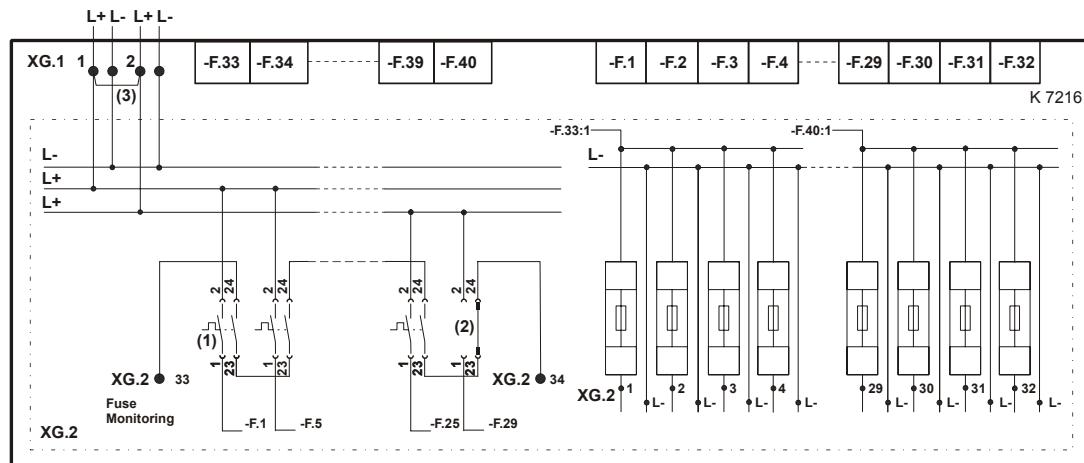


Figure 1: Wiring diagram

### Explanations

- (1) Circuit breaker with fuse monitoring contact
- (2) Jumper to bridge not-used monitoring contacts  
The monitoring contacts of not-equipped circuit breakers are bridged via jumpers.
- (3) Remove the jumper (3) for separate power supply.  
After removal of the jumper, two separate power supply groups F.33...F.36 and F.37...F.40 will be generated, fused with each four circuit breakers.

### Construction:

Front plate with 32 fuse compartments and receptacles for eight circuit breakers (with monitoring). On the rear terminal block with tension spring clamps.

Total current	63 A max.
Supply voltage	48 VDC, SELV or PELV *)
Dimensions	19 inches, 2 units high
Mounting depth	approx. 180 mm
Protection class	IP 20
Weight	3.0 kg (without circuit breakers)

\*) IEC 61131-2: 2003

**Fuse compartments F.1...F.32:**

Fuse compartments F.1...F.32 for micro-fuse 5 x 20 mm according to IEC 60127-2, max. rating 6.3 A (micro-fuses not delivered with K 7216).

**Preferred type of circuit breakers (not delivered with K 7216):**

Nominal current	Manufacturer	Type	HIMA part no.
4 A	E-T-A®	2210-S211-P1T2-H111 4 A	57 0350040
10 A	E-T-A®	2210-S211-P1T2-H111 10 A	57 0350100
16 A	E-T-A®	2210-S211-P1T2-H111 16 A	57 0350160

**Table 1: Preferred type of circuit breakers**

For further details refer to the original E-T-A® data sheet.

**Connections and wiring:**

Connection	Max. Cross section of wires
XG.1:1 / 2	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	2.5 mm <sup>2</sup>
XG.2: 1 - 34	2.5 mm <sup>2</sup>

**Table 2: Connections and wiring**

The internal wiring is done with white (L+) and brown (L-) cables.

**Accessories:**

Accessories supplied by HIMA:

- M 3447 Labeling field with three guiding rings (1 HU)
- M 3443 Labeling field with cable duct (1 HU)
- M 3445 Labeling field with 2 cable ducts (1 HU)

Views (wiring is not depicted):

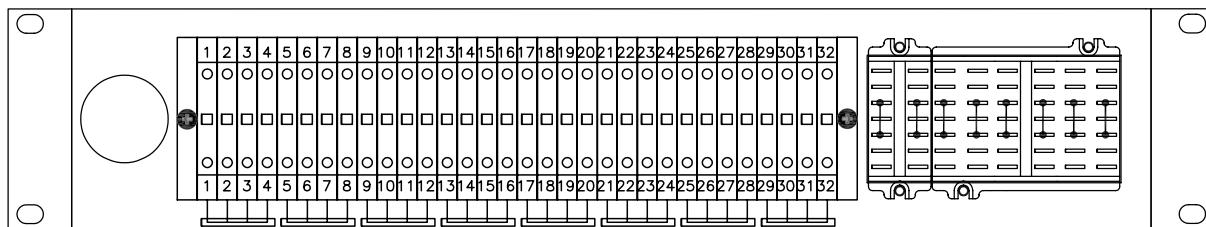


Figure 2: Front view with fuse compartments F1...F32 and receptacles for circuit breakers F 33...F 40

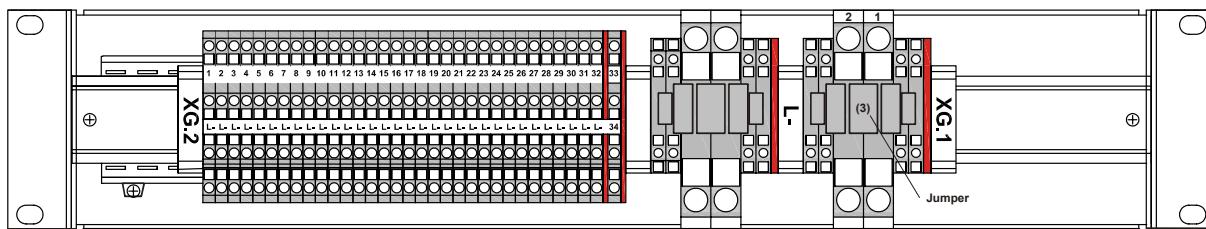


Figure 3: Rear view with clamps



## K 7901: Feeding and current distribution

- redundant feeding up to 63 A total current
- with two decoupling diodes and two mains filters Z 6015
- for fusing of up to 18 single circuits with fuse switch-disconnectors

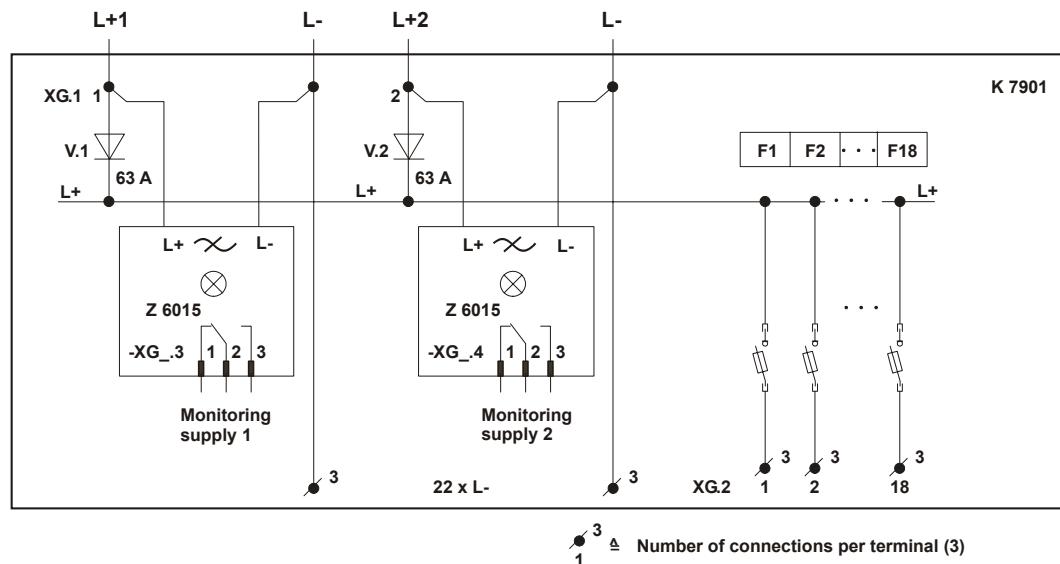


Figure 1: Wiring diagram

### Design:

At the front mounting rail with 18 fuse switch-disconnectors and labeling fields above and below, behind it two decoupling diodes on heat sinks.

At the rear connection panel und cable tray 60 mm high.

### Connections and wiring:

Connection	Max. Cross section of wires
XG.1: 1 / 2	16 mm <sup>2</sup>
Feeding L-	16 mm <sup>2</sup>
Distribution L-	4 mm <sup>2</sup>
XG.4: 1 ... 18	4 mm <sup>2</sup>

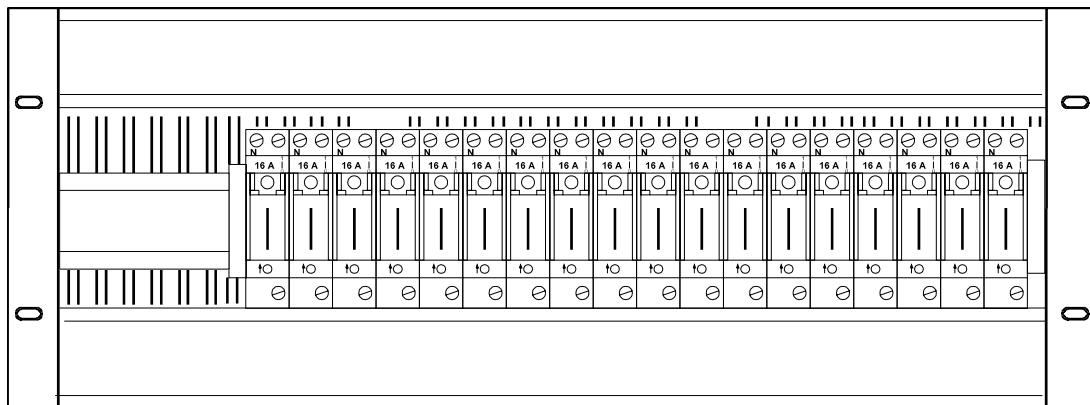
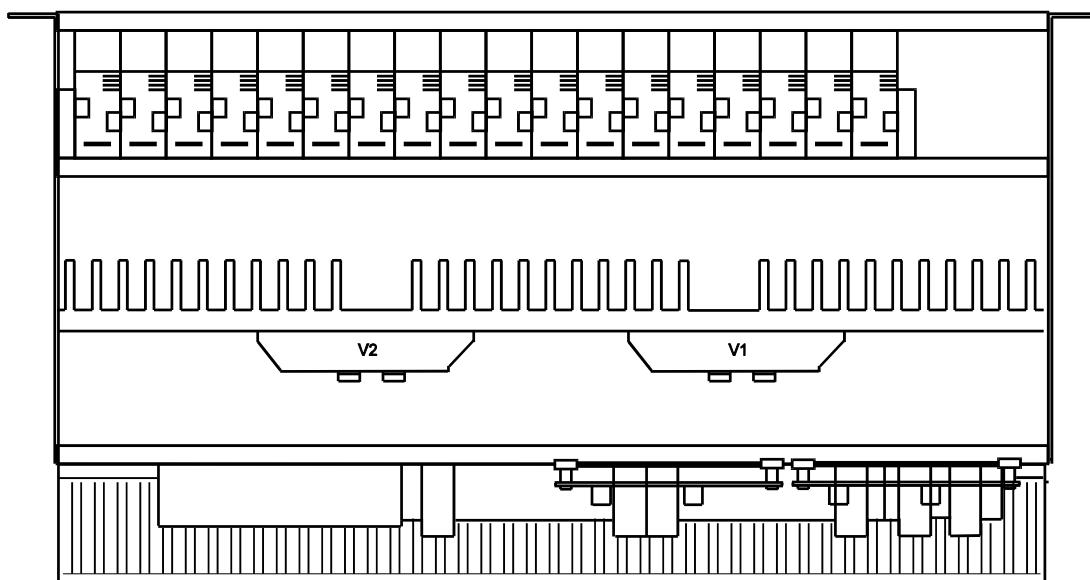
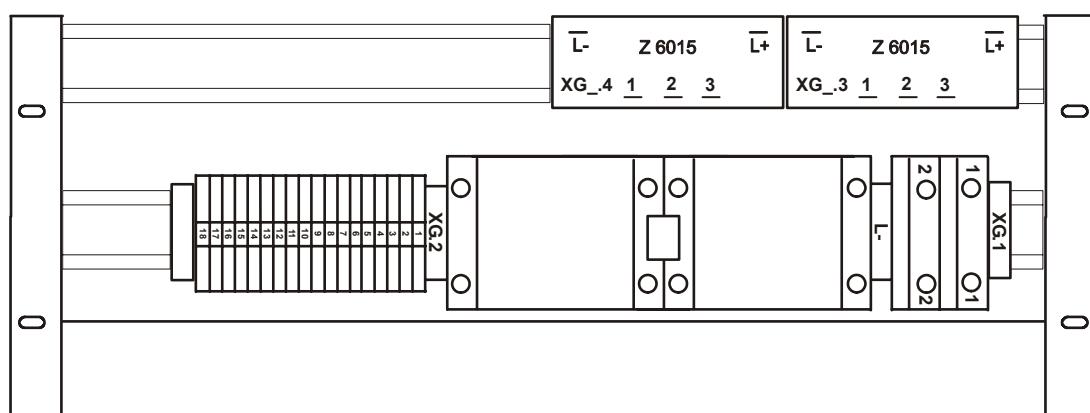
Table 1: Connections and wiring

### Fuse switch-disconnectors:

Nominal current	Manufacturer	Type
16 A gL	Lindner	NEOKIT equipped with D01 (Neozed)

Table 2: Fuse switch-disconnectors

External fusing	2 x 63 A
Dimensions	482.6 mm (19 inches), 4 HU
Mounting depth	270 mm
Weight	6.2 kg

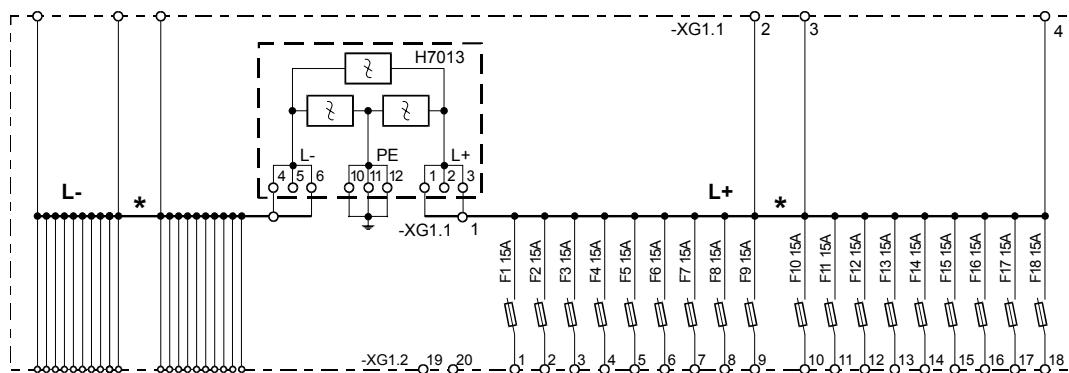
**Views:****Figure 2: Front view****Figure 3: Top view****Figure 4: Rear view**



## K 7915: Fuse distributor for fuses

- Redundant feeding 24 VDC
- Outputs L+ via 18 fuses 15 A
- Approved by:

Factory Mutual Research Corporation, Norwood, Massachusetts (USA)



**Figure 1: Wiring diagram**

### Design:

The fuse distributor is constructed as a 19-inches drawer with a height of 4 units. The connections L+ are brought out via 18 fuses of 15 A each to the terminal strip XG 1.2.

After removing of the two plug-in jumpers (\* cf. drawing above) on the terminals two separated groups for L+ and L- are existing.

The mains filter H 7013 is already built in.

The fuses are easily to replace when the flaps of the fuse switches accessible from the front of the distributor are opened.

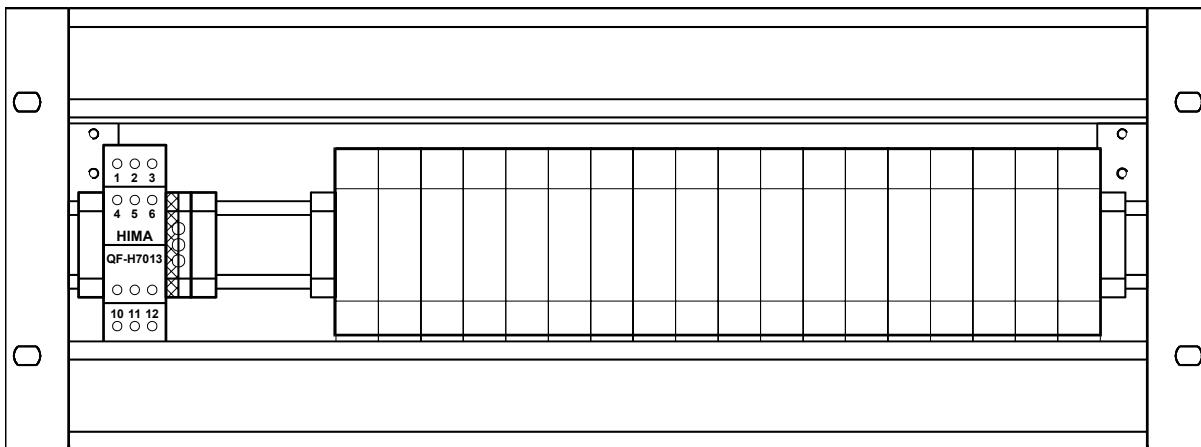
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**Note** The fuse distributor K 7915 is delivered without fuses.

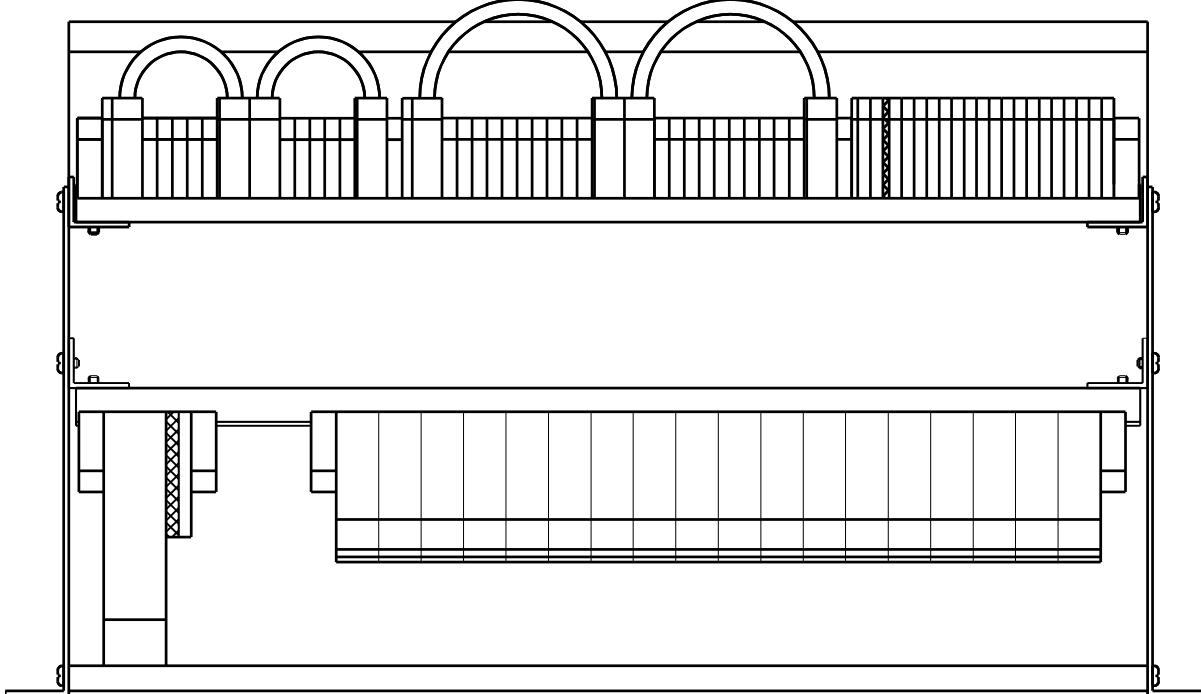
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### Connecting cross-sections of the terminals

Inputs L+, L-:	max. 16 mm <sup>2</sup>
Outputs L+:	max. 2.5 mm <sup>2</sup>
Outputs L-:	max. 4 mm <sup>2</sup>
External fusing	max. 63 A gL
Maximum admissible operating voltage	38 VDC
Electric strength	250 VAC
Ambient temperature	-25...+70 °C

**Mechanical construction and dimensions:****Figure 2: Front view**

Width x height: 482.6 mm x 177.0 mm (19 inches, 4 units high)

**Figure 3: Top view**

Mounting depth: 290.0 mm

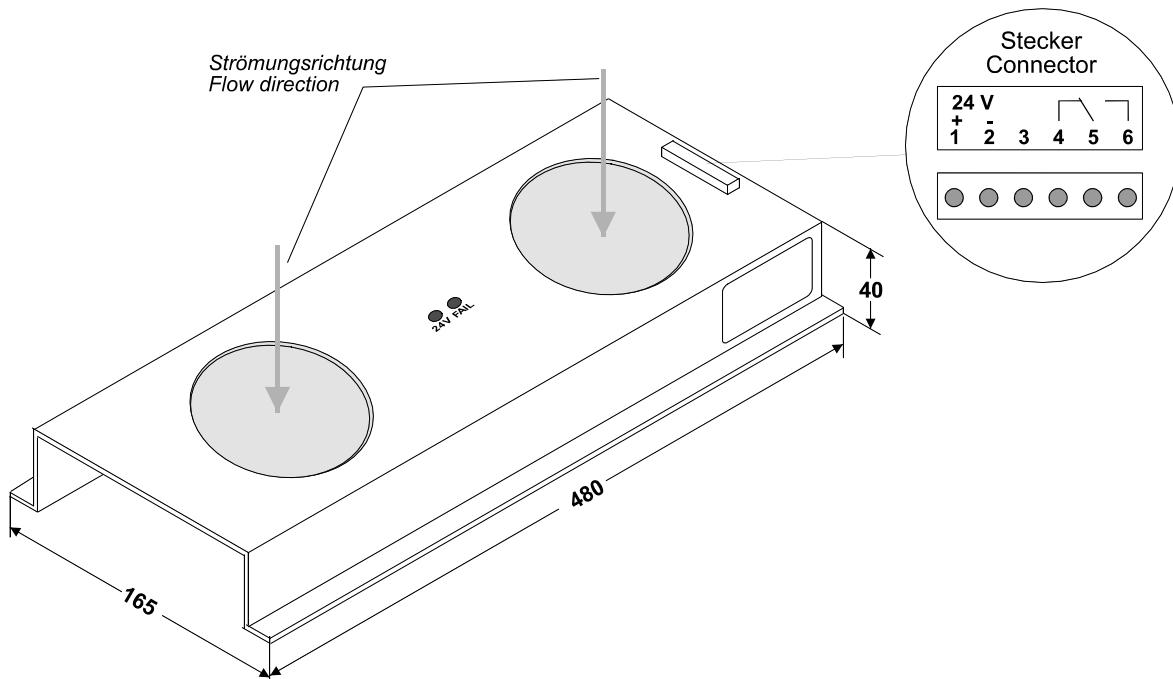
Fuses    Type ATDR15, Delay Class CC  
          38 x 10 mm, 15 A  
          HIMA part no. 88 0004856



K 9202

**Cabinet Fan K 9202**

Forced-draft fan drawer with two axial fans,  
with fan run monitoring



**Installation:** Below the top plate cutout of the cabinet

**Application:** For the ventilation of the cabinet

**Accessories:** Air discharge opening grill and fixing accessories for top plate cutout, already mounted in the standard cabinet

**Display of operation and errors:**

Operation status	Connector pin 4-5 Contact	Connector pin 5-6 Contact	LED FAIL	LED 24 V
Without error	open	closed	OFF	ON
Operating voltage missing or fuse failure	closed	open	OFF	OFF
Fan fault *	closed	open	ON	ON

\* Fan speed < 75...85 % of the rated speed

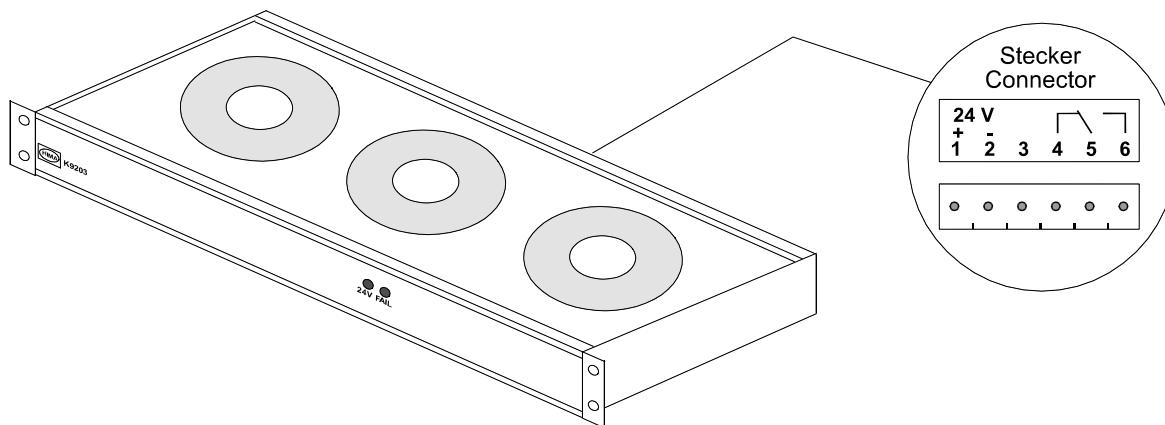
Material	Aluminium, anodized
Operating data	24 VDC / 500 mA
Air flow rate	200 m <sup>3</sup> per hour
Life at 40 °C	70 000 h
Weight	1.2 kg



K 9203

**Cabinet Fan K 9203**

Circulating fan drawer with three axial fans,  
with fan run monitoring



**Installation:** At any location in the 19-inches field

**Application:** Forced ventilation of 19-inches installations

Note: The positions of the axial fans in the K 9203 drawer are adapted to the subracks of the recessed HIMA subrack systems.

**Display of operation and errors:**

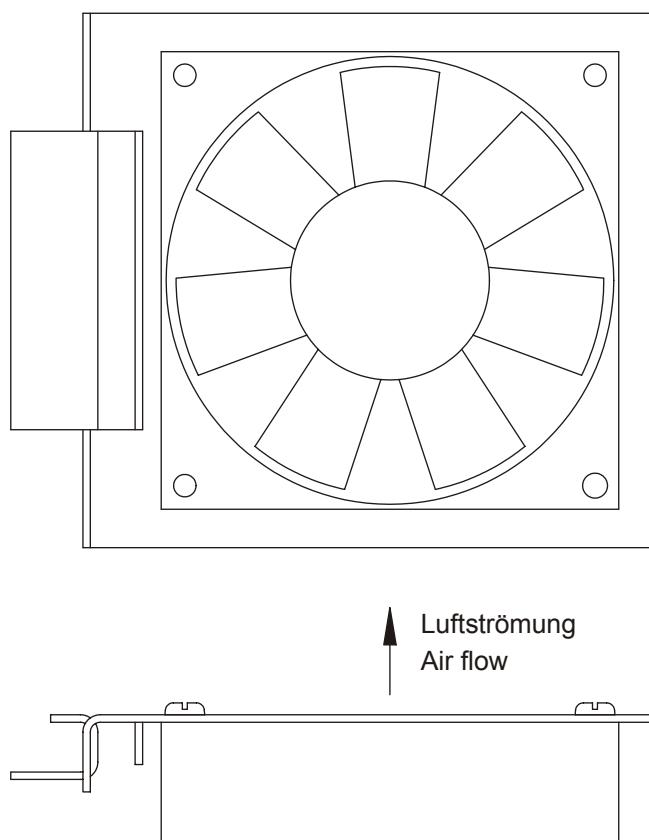
Operation status	Connector pin 4-5 Contact	Connector pin 5-6 Contact	LED FAIL	LED 24 V
Without error	open	closed	OFF	ON
Operating voltage missing or fuse failure	closed	open	OFF	OFF
Fan fault *	closed	open	ON	ON

\* Fan speed < 75...85 % of the rated speed

Material	Aluminium, anodized
Operating data	24 VDC / 750 mA
Air flow rate	280 m <sup>3</sup> per hour
Life time at 40 °C	70 000 h
Space requirement	19 inches, 1 unit high, depth 215 mm
Weight	1.8 kg

**Module Fan K 9212**

Axial fan module  
for mounting in the subrack



**Installation:** Snap-in mounting on a subrack's profiles  
Up to four fans can be assembled side by side. Free spaces are filled up with perforated plates for lateral adjustment (see accessories).

**Application:** Selective ventilation for modules with enhanced power dissipation in all HIMA central subracks (H41q, H51q).

**Electric connection:** To the fan monitoring unit Z 6018

**Accessories:**

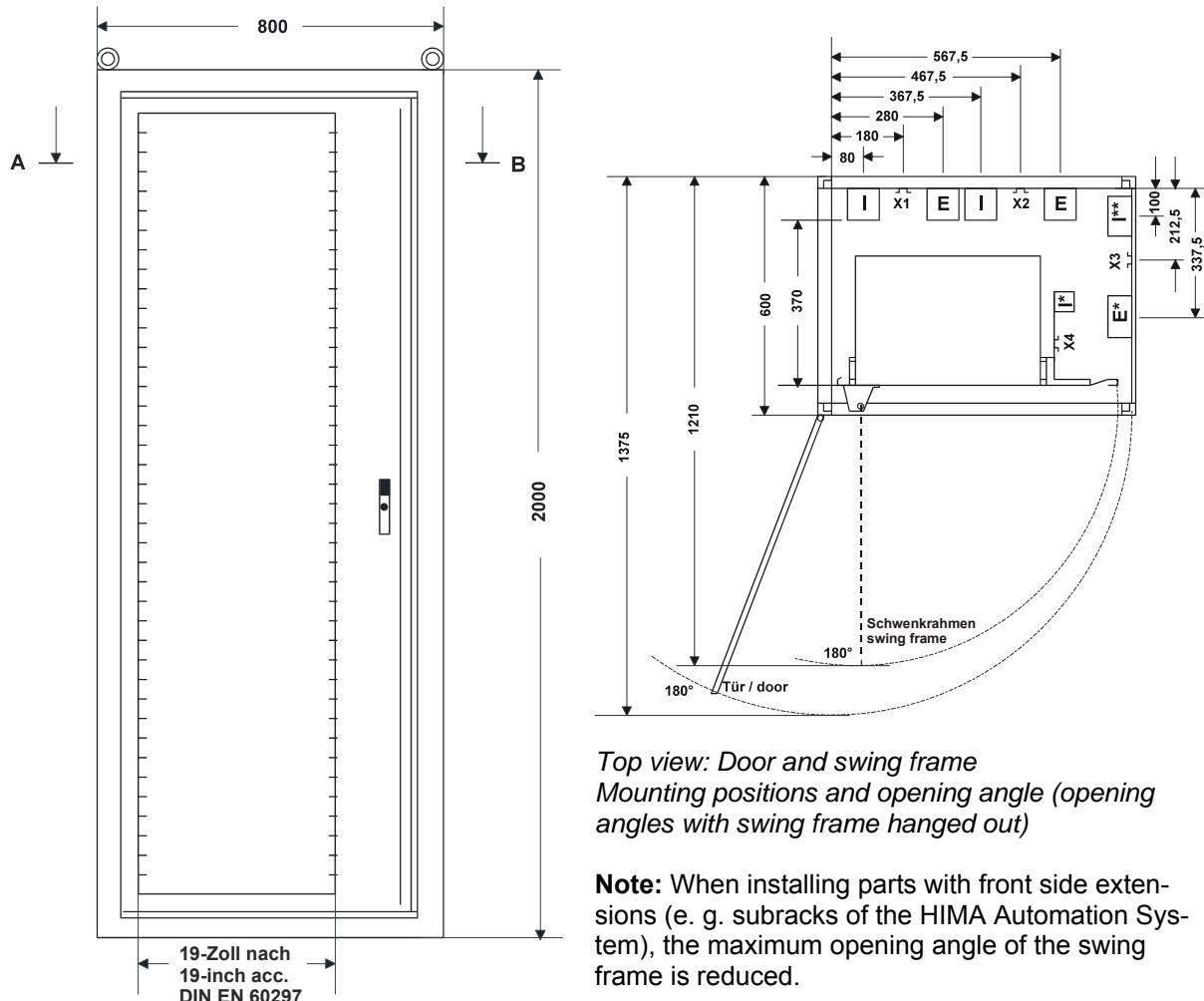
Perforated plate 1	107.3 mm	Part no. 605290006
Perforated plate 2	53.3 mm	Part no. 605290007

Material	Chassis: Aluminium
Air flow rate	80 m <sup>3</sup> per hour
Lifetime	70,000 h (at 40 °C)
Operating data	24 VDC / 200 mA
Weight	0.3 kg

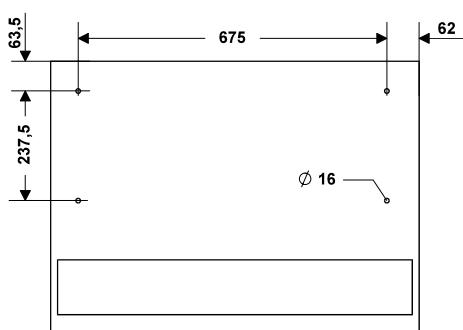


## Standard Cabinet M 1511 / RITTAL TS8806

Width x Height x Depth: 800 x 2000 x 600 mm



Front view with swing frame, without door



Ground fixing without platform

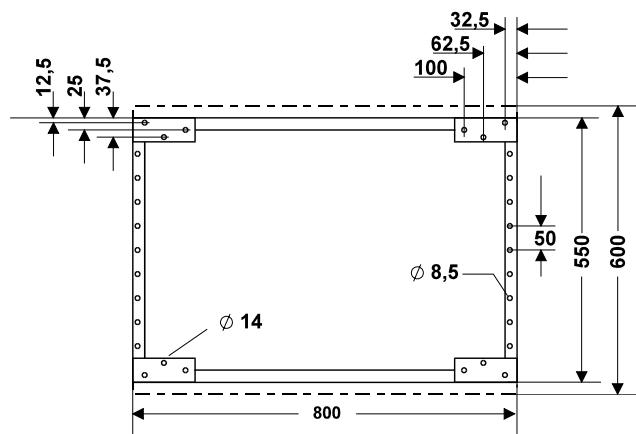
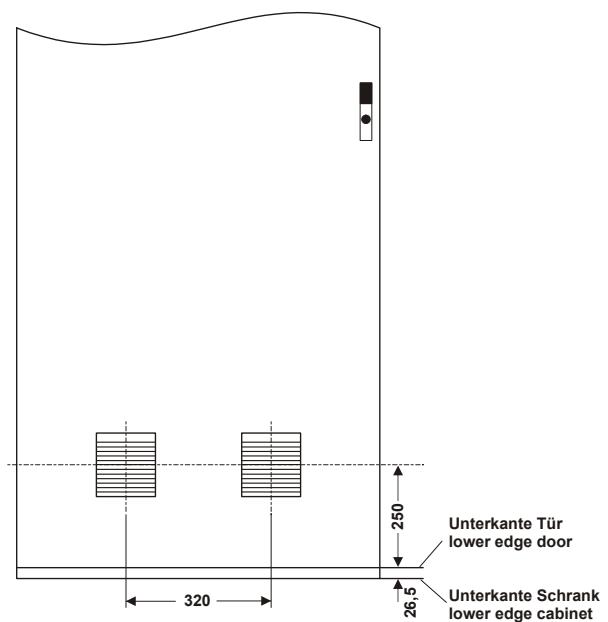
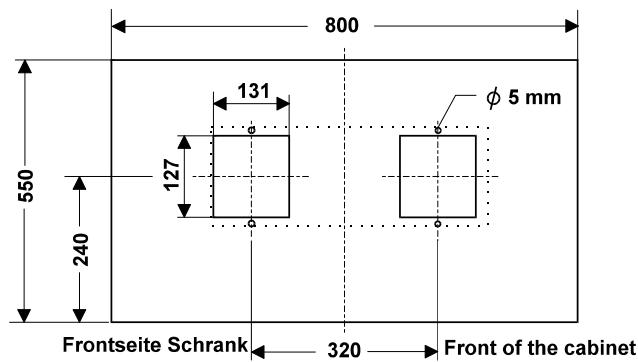
Internal size of cable ducts:

(internal)	I	80 x 80 mm
	I*	60 x 60 mm
	I**	100 x 60 mm
(external)	E	80 x 80 mm
	E*	100 x 60 mm
	Length each 1650 mm	

Effective length of mounting rails:

X1, X2, X3	1650 mm
X4	1800 mm

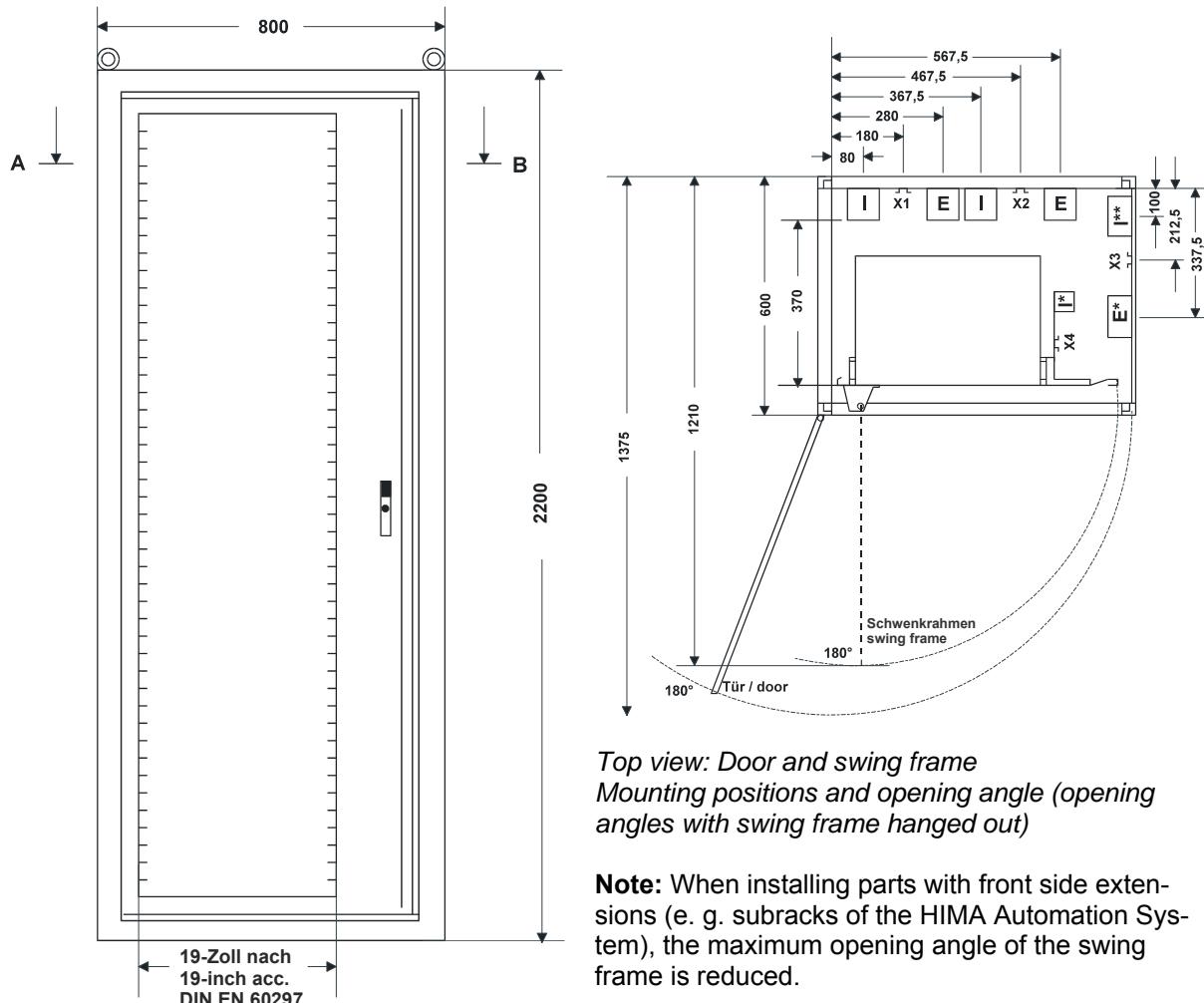
**Note:** Mounting positions of the cable ducts can be adapted as required.

*Ground fixing with platform**Position of the air supply filters SK 3162 S in the door**Cutout of the fan K 9202*



## Standard Cabinet M 1512 / RITTAL TS8826

Width x Height x Depth: 800 x 2200 x 600 mm

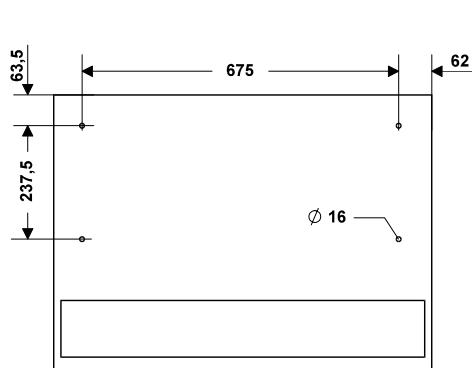


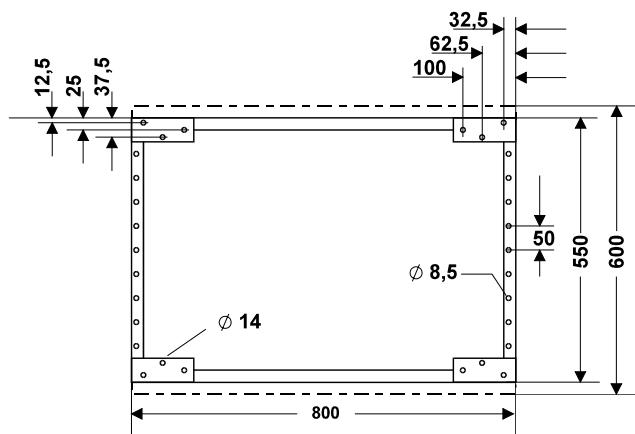
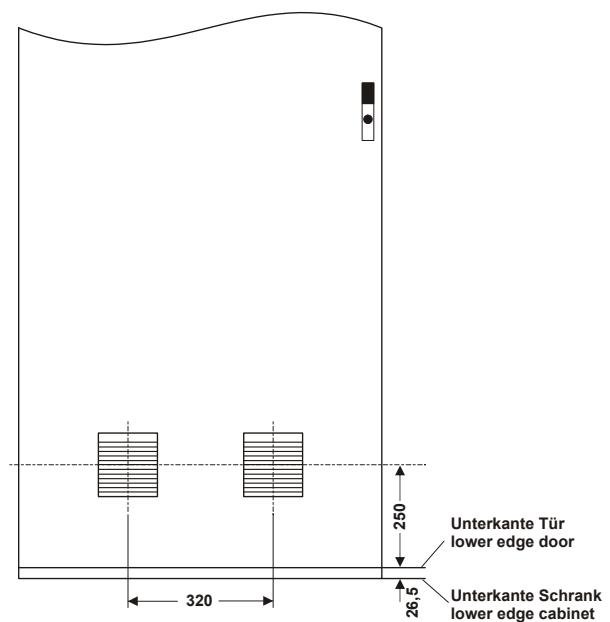
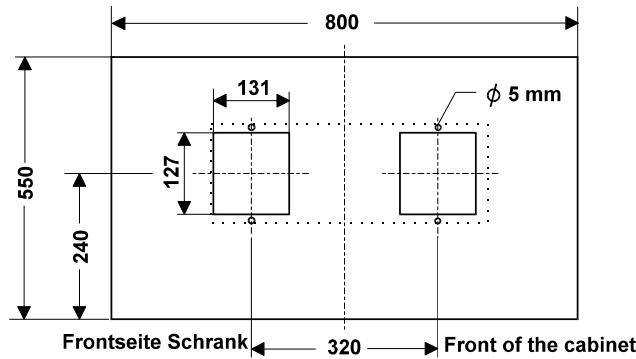
Internal size of cable ducts:

(internal)	I	80 x 80 mm
	I*	60 x 60 mm
	I**	100 x 60 mm
(external)	E	80 x 80 mm
	E*	100 x 60 mm
	Length each 1850 mm	

Effective length of mounting rails:

X1, X2, X3	1850 mm
X4	2000 mm

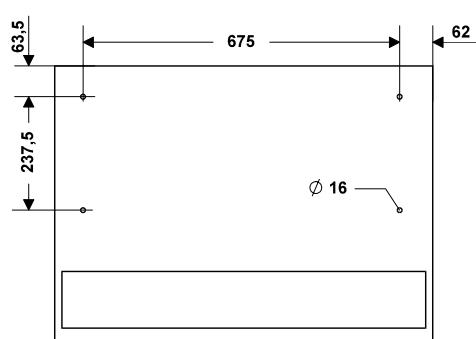
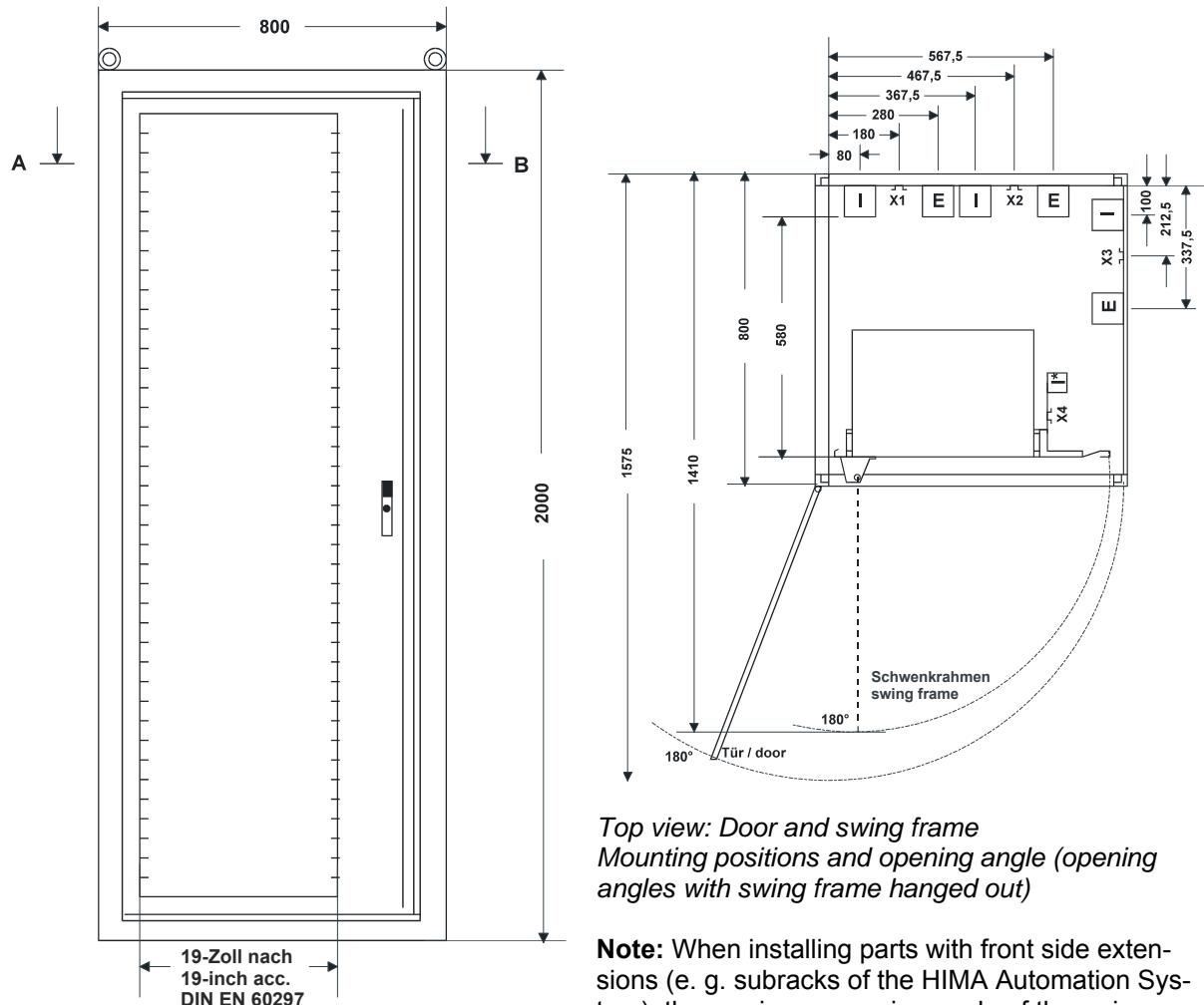
**Note:** Mounting positions of the cable ducts can be adapted as required.*Ground fixing without platform*

*Ground fixing with platform**Position of the air supply filters SK 3162 S in the door**Cutout of the fan K 9202*



## Standard Cabinet M 1513 / RITTAL TS8808

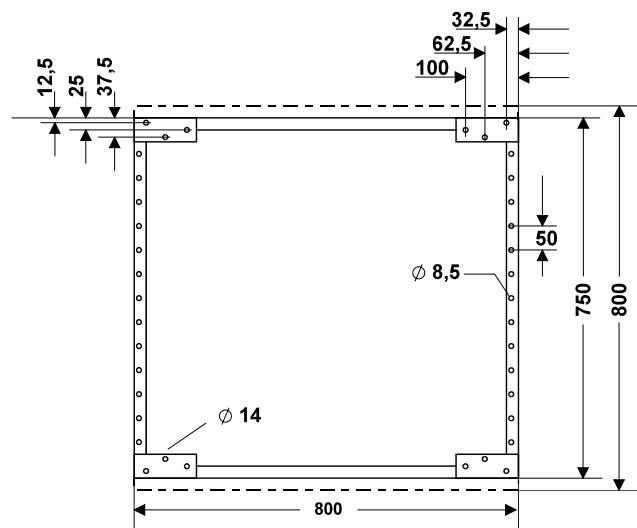
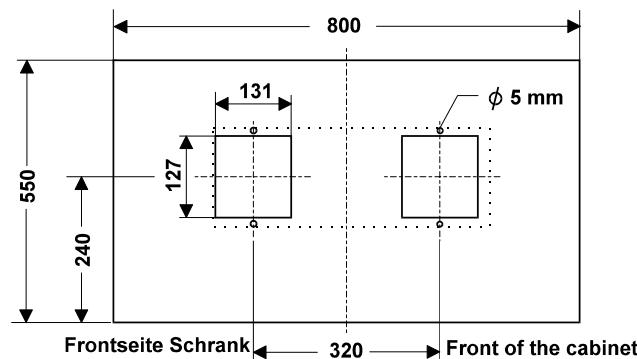
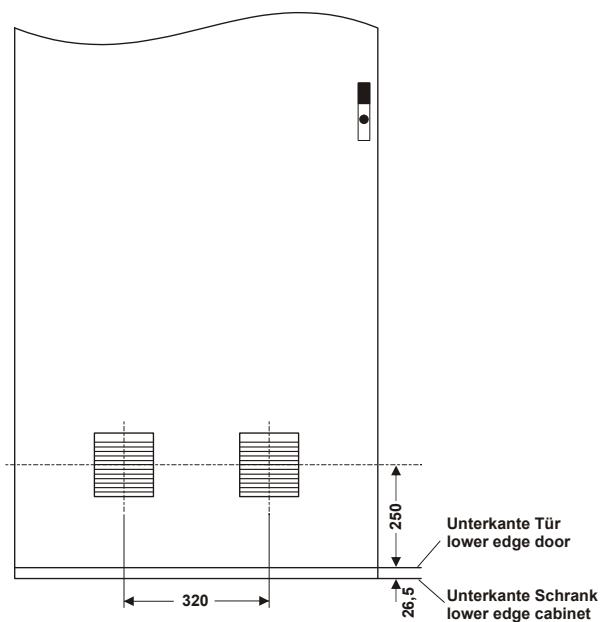
Width x Height x Depth: 800 x 2000 x 800 mm

*Ground fixing without platform*

Internal size of cable ducts:  
 (internal) I 80 x 80 mm  
               I\* 60 x 60 mm  
 (external) E 80 x 80 mm  
 Length each 1650 mm

Effective length of mounting rails:  
 X1, X2, X3 1650 mm  
 X4 1800 mm

**Note:** Mounting positions of the cable ducts can be adapted as required.

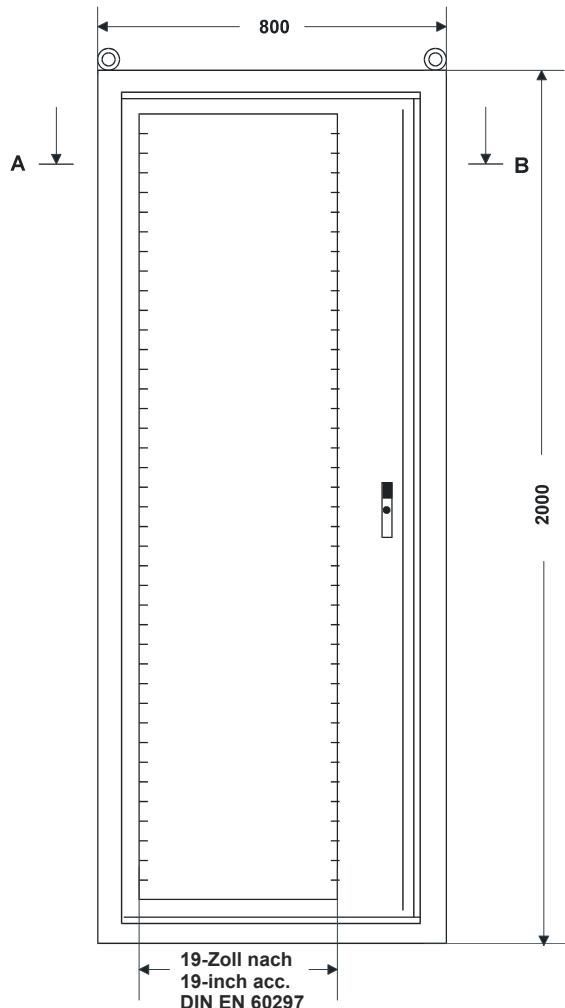
*Ground fixing with platform**Cutout of the fan K 9202*

*Position of the air supply filters SK 3162 S in the door*

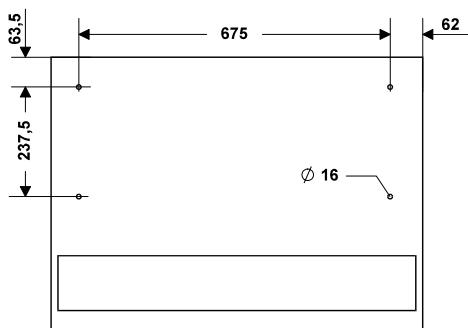


## Standard Cabinet M 1514 / RITTAL TS8805

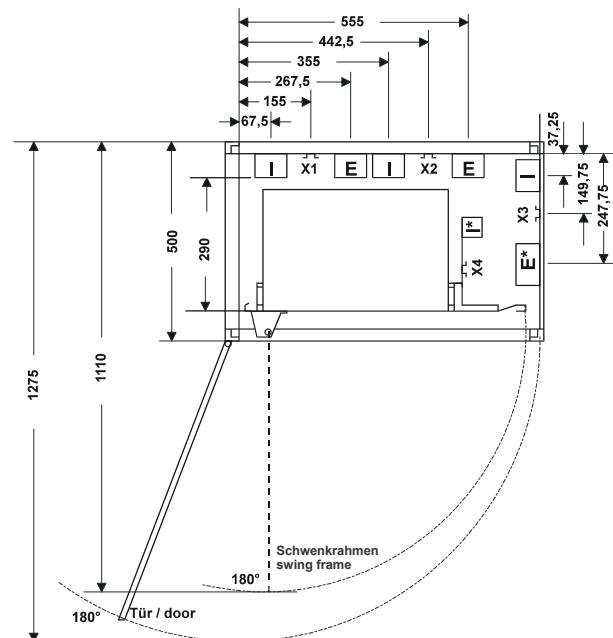
Width x Height x Depth: 800 x 2000 x 500 mm



Front view with swing frame, without door



Ground fixing without platform



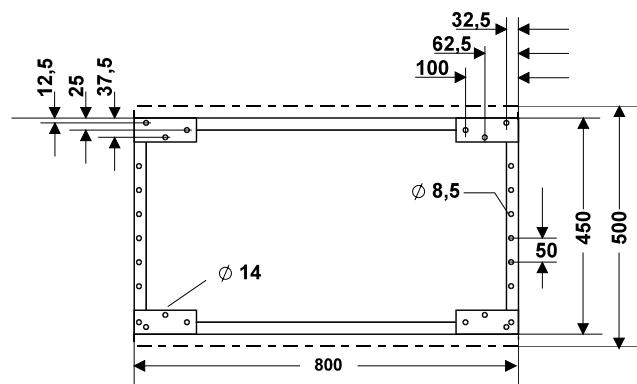
**Top view: Door and swing frame  
Mounting positions and opening angle (opening angles with swing frame hanged out)**

**Note:** When installing parts with front side extensions (e.g. subracks of the HIMA Automation System), the maximum opening angle of the swing frame is reduced.

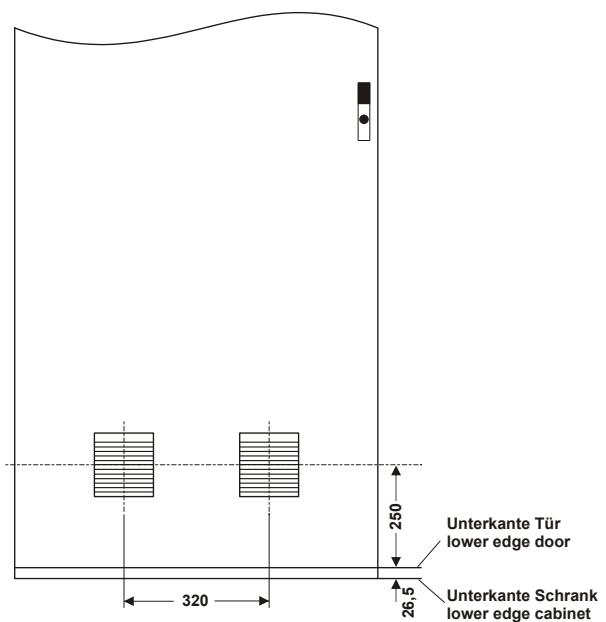
Internal size of cable ducts:	
(internal)	I      80 x 60 mm
	I*    60 x 60 mm
(external)	E      80 x 60 mm
	E*    100 x 60 mm
Length each	
	1650 mm

Effective length of mounting rails:	
X1, X2, X3	1650 mm
X4	1800 mm

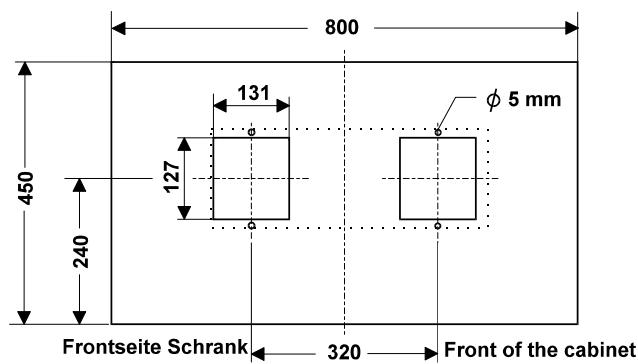
**Note:** Mounting positions of the cable ducts can be adapted as required.



*Ground fixing with platform*



*Position of the air supply filters SK 3162 S in the door*



*Cutout of the fan K 9202*

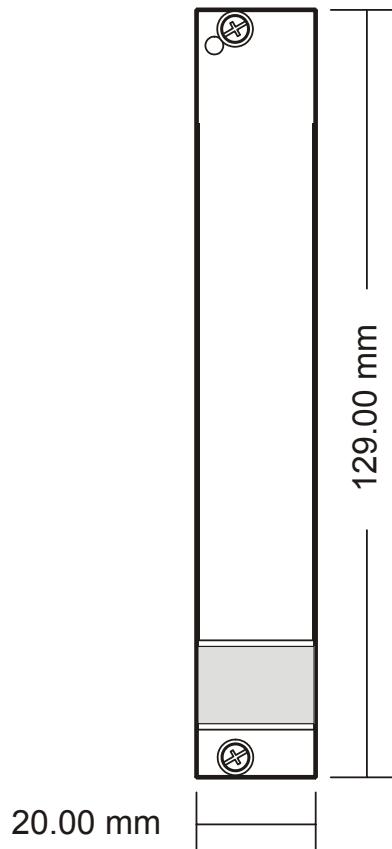


**M 2215**

**Cover plate**

Cover plate in 19-inches system according to EN 60297-3

**M 2215**



**Application:** Blank plate or filling plate

Material

plastic

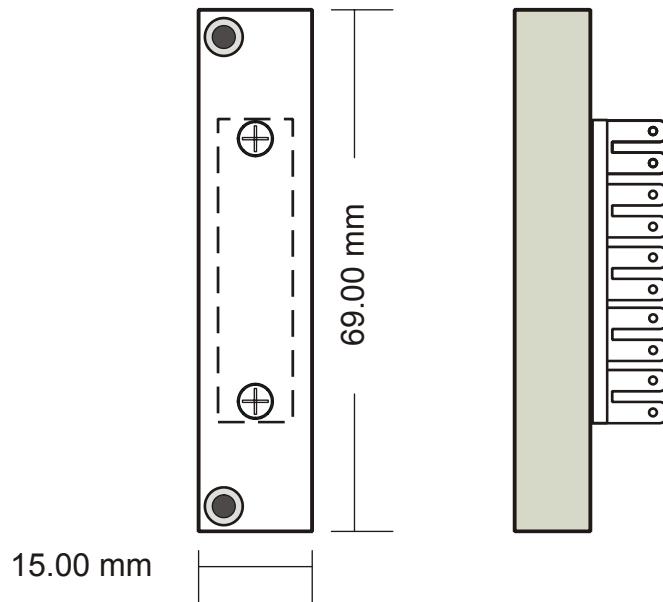
Space requirement

19 inches, 3 units high, 4 units deep



Distributor 10-pole with socket for Planar4

M 2218



**Application:** Distributor 10-pole with socket

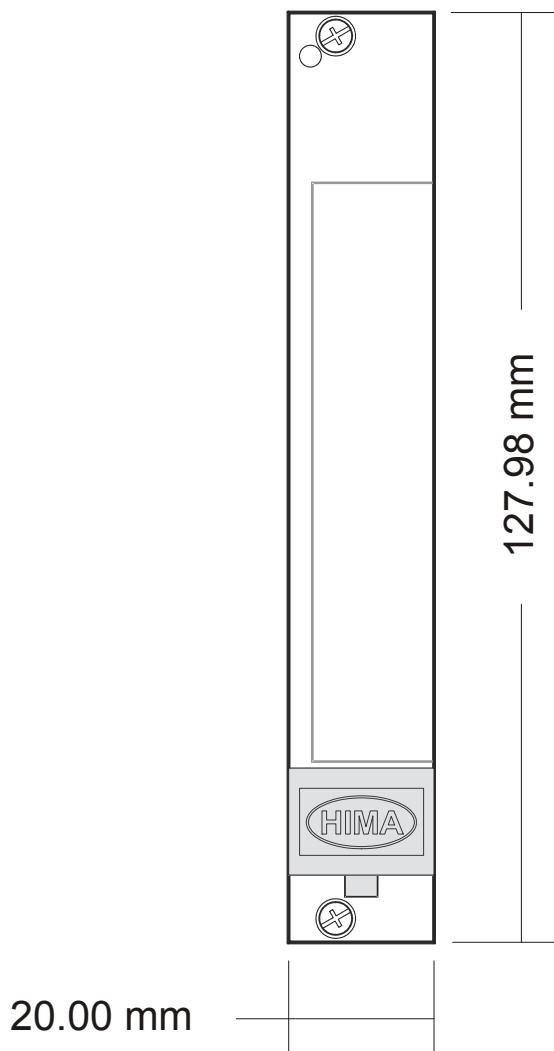
Material                    plastic and metal



**Cover plate for Planar4**

Cover plate in 19-inches system according to EN 60297-3

**M 2225**

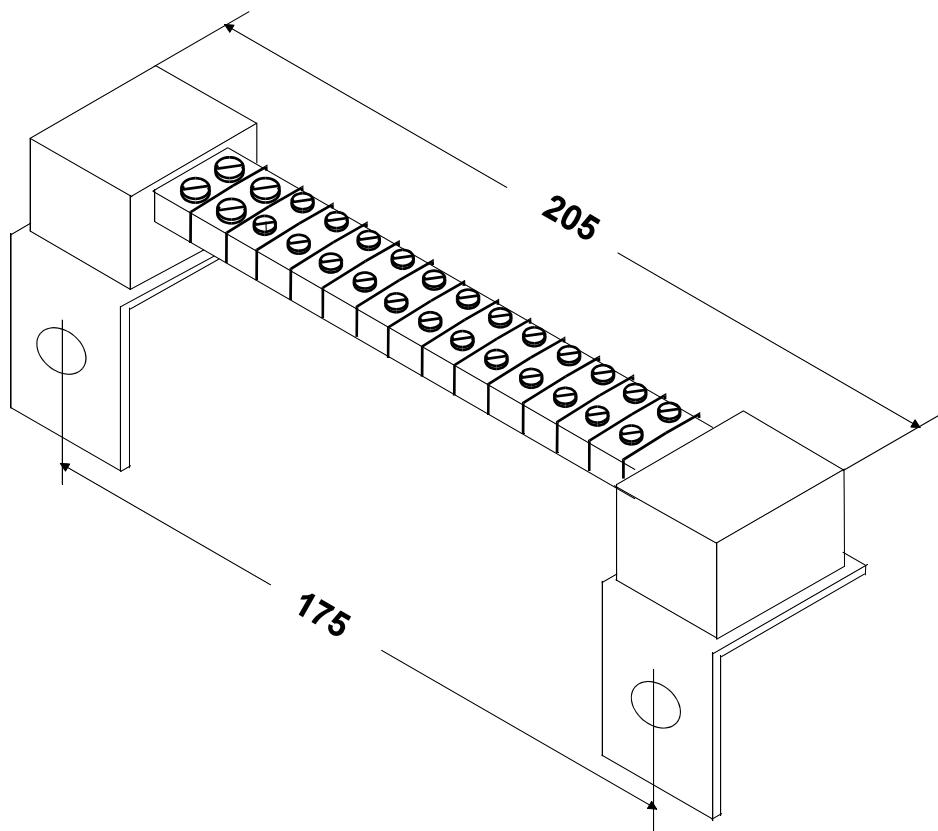


**Application:** Blank plate or filling plate

Material	plastic
Space requirement	19 inches, 3 units high, 4 units deep



Bus bar M 2500



**Construction:**

16 terminals for connectors up to 16 mm<sup>2</sup>, 2 terminals for connectors up to 35 mm<sup>2</sup>, on a common rail 3 mm x 16 mm; mounted on insulating supports with angles

**Installation:**

At any location in the HIMA standard cabinet on the mounting grid within the framework

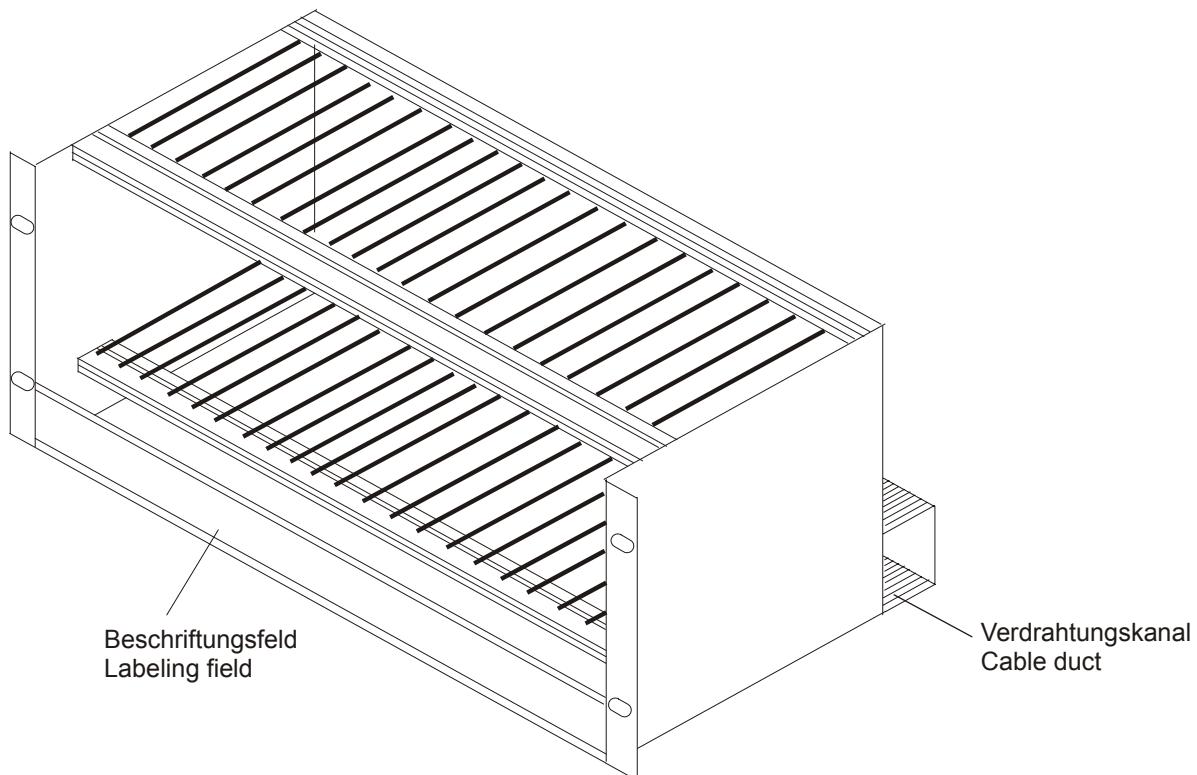
The HIMA standard cabinets are equipped with two M 2500 bus bars connected to the framework via earthing strips.



**Subrack**

**M 3410, M 3411, M 3412, M 3413, M 3414, M 3415, M 3419**

Subrack in the 19-inches system according to EN 60297-3,  
ready for wiring



The subracks have 21 slots (4 spacing units each) and are provided with one labeling field and one cable duct (two cable ducts for (Ex)i). They differ in their equipment with socket connectors:

**M 3410** 32-pole socket connectors, solder terminations  
**M 3411** 28-pole socket connectors (Ex)i, solder terminations

**M 3412** 32-pole socket connectors, termi-point / wire-wrap  
**M 3413** 26-pole socket connectors (Ex)i, termi-point / wire-wrap

**M 3414** 32-pole socket connectors, wire-wrap  
**M 3415** 28-pole socket connectors (Ex)i, wire-wrap

**M 3419** without equipment,  
for connectors according to EN 60303-2

Material	Aluminium
Surface	chromated
Space requirement	19 inches, 4 units high, depth 203.5 mm

**Subrack M 3420**

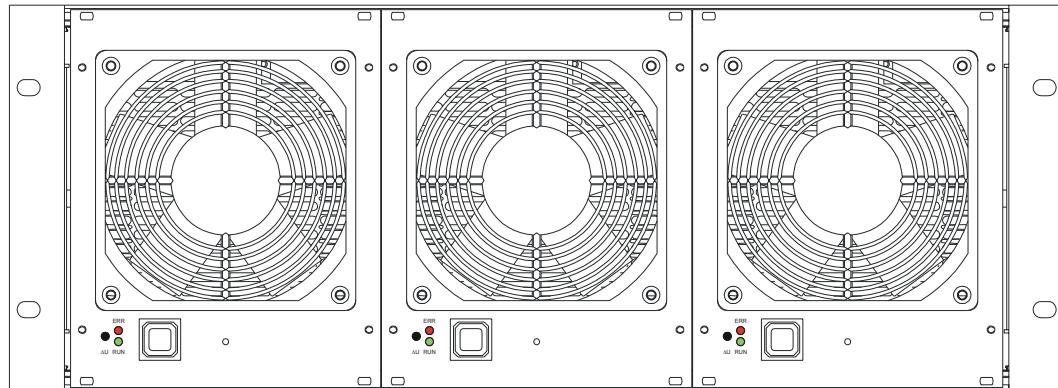
Subrack for the 19-inches system according to EN 60297-3, 4 units high for up to three power supply units PS 1000

## Contents

	Page
<b>1 Subrack M 3420 .....</b>	<b>2</b>
1.1 Construction .....	2
1.2 Accessories for Subrack M 3420 .....	3
1.3 Technical Data Subrack M 3420 .....	4

# 1 Subrack M 3420

## 1.1 Construction

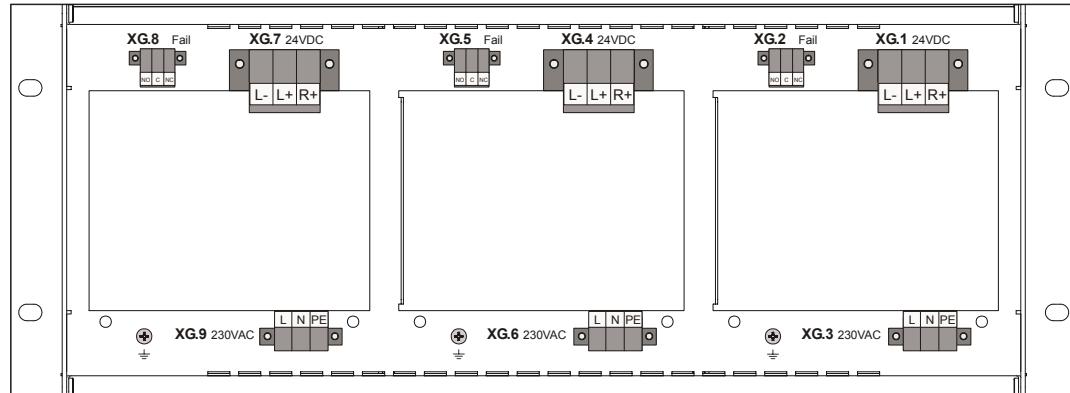


**Front view with power supply units** (Delivery without power supply units)

**Figure 1: Front view subrack M 3420**

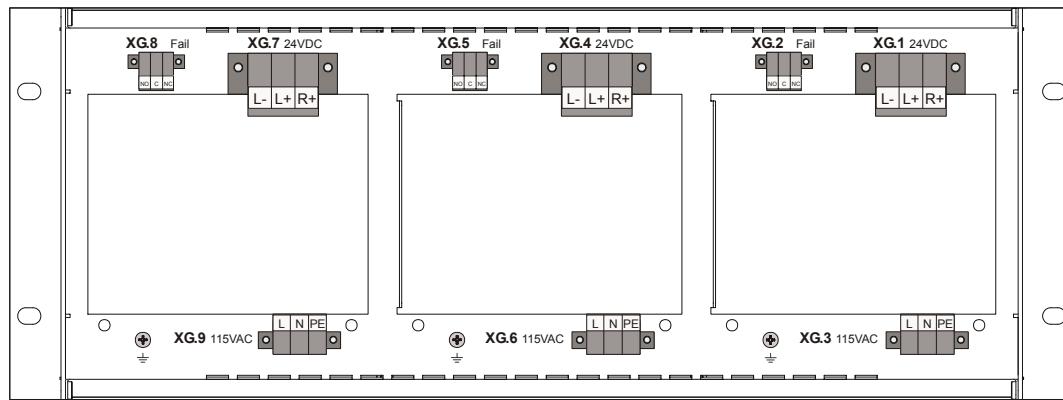
Each power supply is equipped with a fan at the front. It is important for mounting the subrack to ensure an easy air flow at its front and rear.

When a power supply unit is plugged into a slot of the subrack, all connections of it are made automatically via plug-in terminals on the rear of the subrack.



**Terminals for separated connection of the power supply units**

**Figure 2: Rear view (240 VAC)**



**Terminals for separated connection of the power supply units**

**Figure 3: Rear view (120 VAC)**

#### **Notes for parallel or redundant operation of power supply units**

For parallel or redundant operation of the power supply units the concerning terminals R+ are interconnected (with L- as reference pole). Additional decoupling diodes are not required.

Redundant switched off power supply units can be replaced during operation without switching off any other unit.

## **1.2 Accessories for Subrack M 3420**

Cable tray M 4412 for assembly at the rear (top or bottom), with mounting screws	Part no. 60 5240001
Blind plate M 4413 4 units high, 28 spacing units for front covering of an empty slot, with mounting screws	Part no. 60 5240002
Air guide M 7202, 19 inches, 1 unit high with labeling field Use with components built-in below the subrack M 3420	Part no. 78 1990009

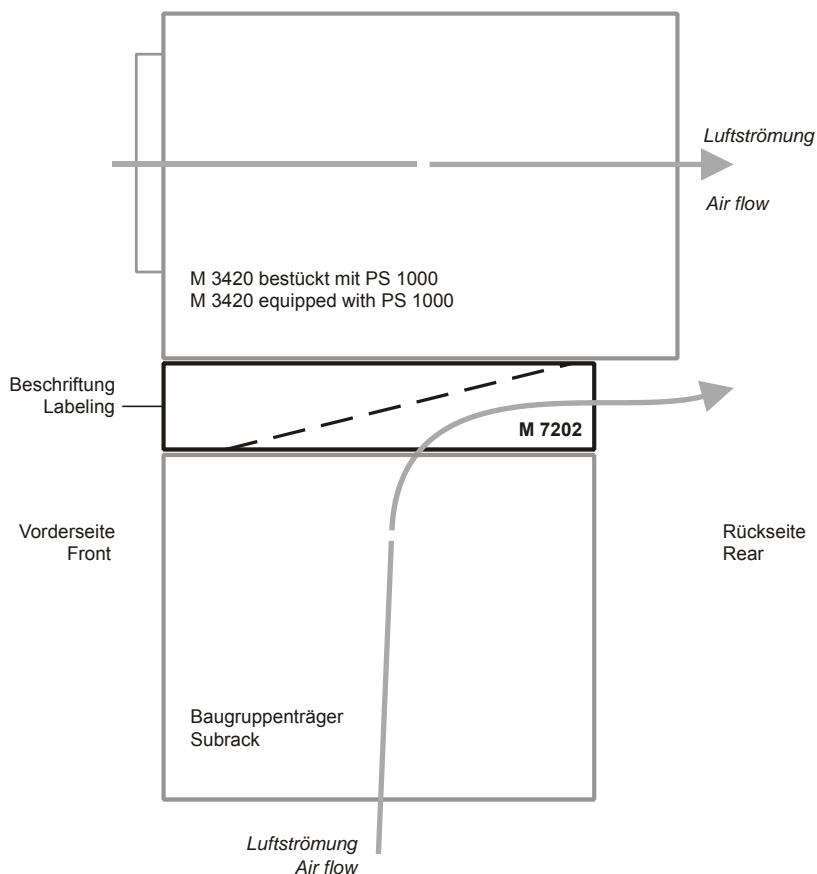


Figure 4: Air guiding with M 7202

### 1.3 Technical Data Subrack M 3420

Subrack M 3420		
Material	Housing: Side walls:	Steel sheet, galvanized Aluminium, surface chromated
Equipment	max. 3 power supply units PS 1000 (24V)	
Total load (fully equipped)	120 A continuously (40 A per unit)	
Connections	Cross section of terminals per slot: 240 VAC      4 mm <sup>2</sup> 24 VDC      10 mm <sup>2</sup> Fail            1.5 mm <sup>2</sup>	
Dimensions	482.6 mm (19 inches), 4 units high	
Mounting depth	340 mm (including cable supply)	
Weight	approx. 3.3 kg (without equipment)	

**Subrack M 3421**

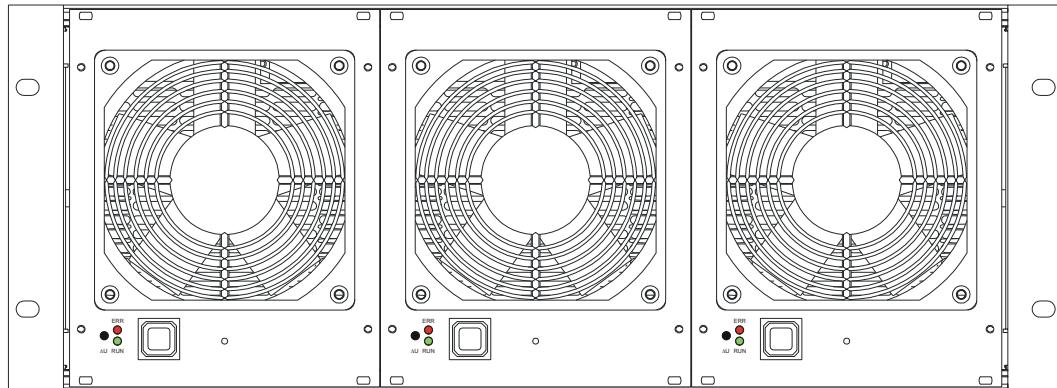
Subrack for the 19-inches system according to EN 60297-3,  
4 units high, for up to three power supply units PS 1000 (24V or 48V)

**Contents**

	Page
<b>1 Subrack M 3421 .....</b>	<b>2</b>
1.1 Construction.....	2
1.2 Accessories for Subrack M 3421 .....	3
1.3 Technical data Subrack M 3421 .....	4

# 1 Subrack M 3421

## 1.1 Construction

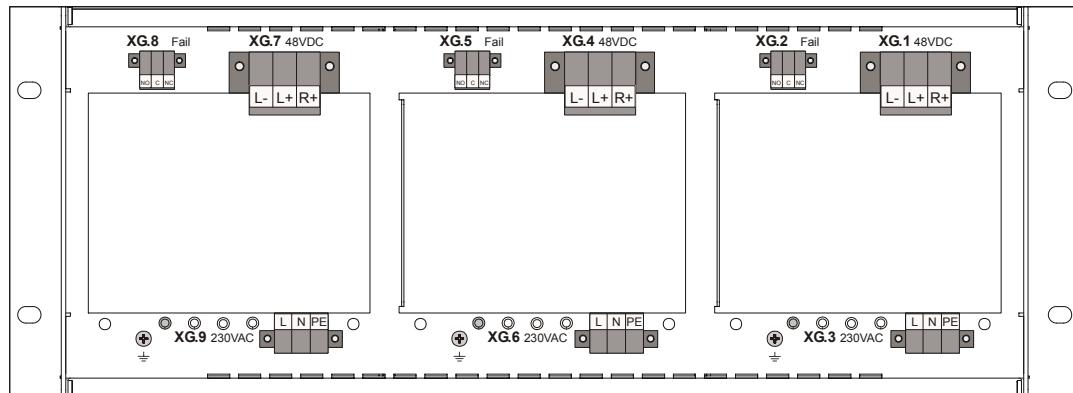


**Front view with power supply units** (Delivery without power supply units)

**Figure 1: Front view subrack M 3421**

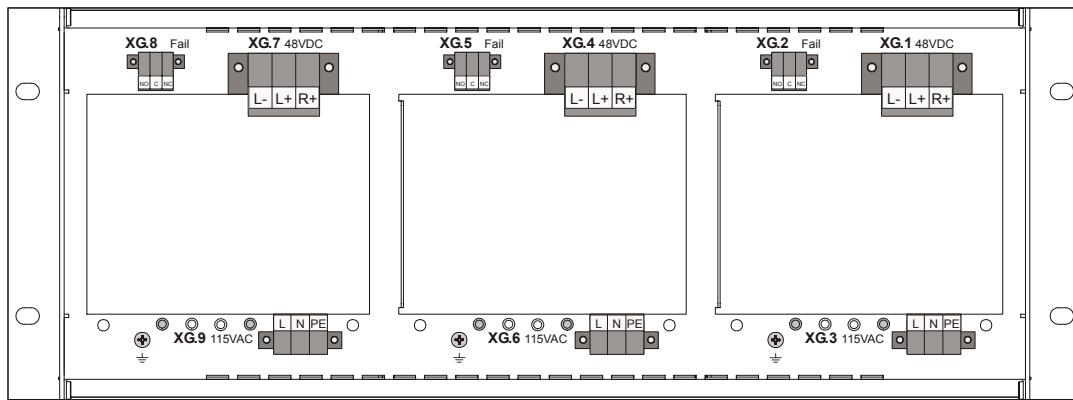
Each power supply is equipped with a fan at the front. It is important for mounting the subrack to ensure an easy air flow at its front and rear.

When a power supply unit is plugged into a slot of the subrack, all connections of it are made automatically via plug-in terminals on the rear of the subrack.



**Terminals for separated connection of the power supply units  
(Example for 48 V output voltage)**

**Figure 2: Rear view (240 VAC)**



**Terminals for separated connection of the power supply units  
(Example for 48 V output voltage)**

**Figure 3: Rear view (120 VAC)**

A coding field is located below the ventilation slots on the back plate of the power supply series with 48 VDC output voltage. This field has four plain holes for guide pins.

In case of the power supply unit 120 V the left and the right guide pin of the coding field are screwed from the inside of the power supply (see rear view 120 VAC, gray circles).

At the 240 V power supply unit only the left guide pin exists (see rear view 240 VAC, gray circle). In this way one could distinguish the different power supply series (120 VAC / 240 VAC) on the rear side of the subrack M 3421.

The guide pins code the type of power supply.

They also help when the power supply is plugged into the subrack. The pins fit to the according plain holes in the back plate of the subrack.

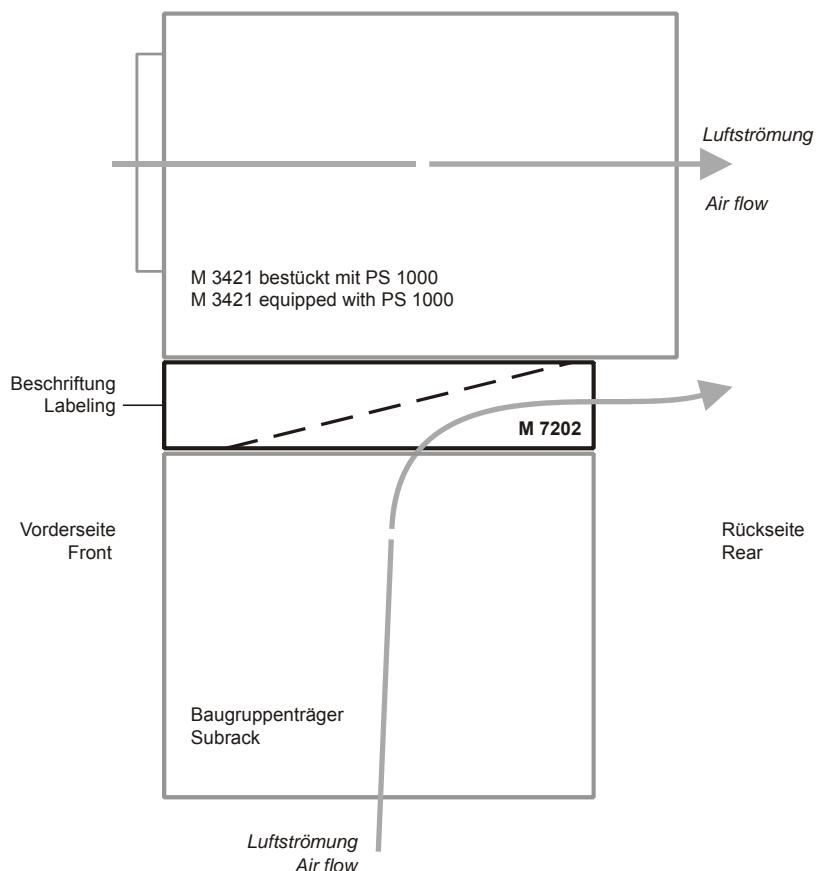
#### **Notes for parallel or redundant operation of power supply units**

For parallel or redundant operation of the power supply units the concerning terminals R+ are interconnected (with L- as reference pole). Additional decoupling diodes are not required.

Redundant switched off power supply units can be replaced during operation without switching off any other unit.

## **1.2 Accessories for Subrack M 3421**

Cable tray M 4412, for assembly at the rear (top or bottom), with mounting screws	Part no. 60 5240001
Blind plate M 4413, 4 units high, 28 spacing units for front covering of an empty slot, with mounting screws	Part no. 60 5240002
Air guide M 7202, 19 inches, 1 unit high with labeling field Use with components built-in below the subrack M 3421	Part no. 78 1990009



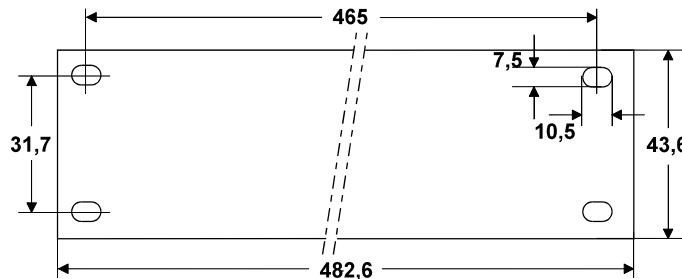
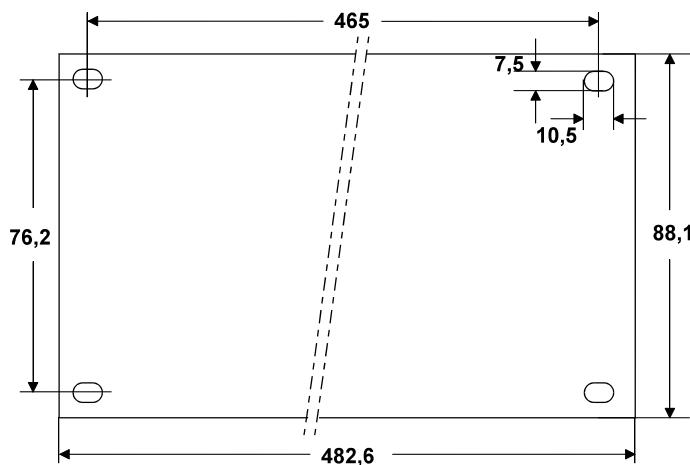
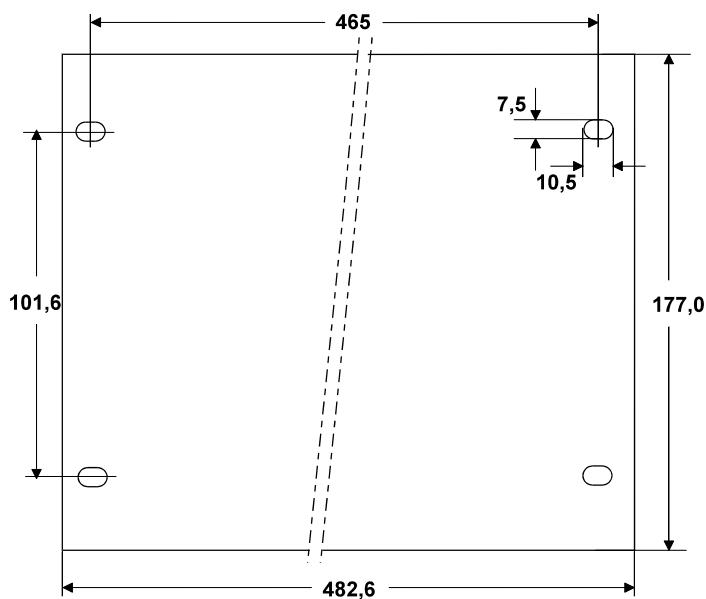
**Figure 4: Air guiding with M 7202**

### 1.3 Technical Data Subrack M 3421

<b>Subrack M 3421</b>		
Material	Housing: Side walls:	Steel sheet, galvanized Aluminium, surface chromated
Equipment	max. 3 power supply units PS 1000 (24V or 48V)	
Total load (fully equipped)	120 A continuously (40 A per unit)	
Connections	Cross section of terminals per slot: 240/120 VAC 4 mm <sup>2</sup> 24/48 VDC 10 mm <sup>2</sup> Fail 1.5 mm <sup>2</sup>	
Dimensions	482.6 mm (19 inches), 4 units high	
Mounting depth	340 mm (including cable supply)	
Weight	approx. 3.3 kg (without equipment)	

**Front Plate****M 3431, M 3432, M 3434**

Front plates in the 19-inches system according to EN 60297-3

**M 3431****M 3432****M 3434****Application:** Blank plate or mounting plate

Material

Aluminium, surface: chromated

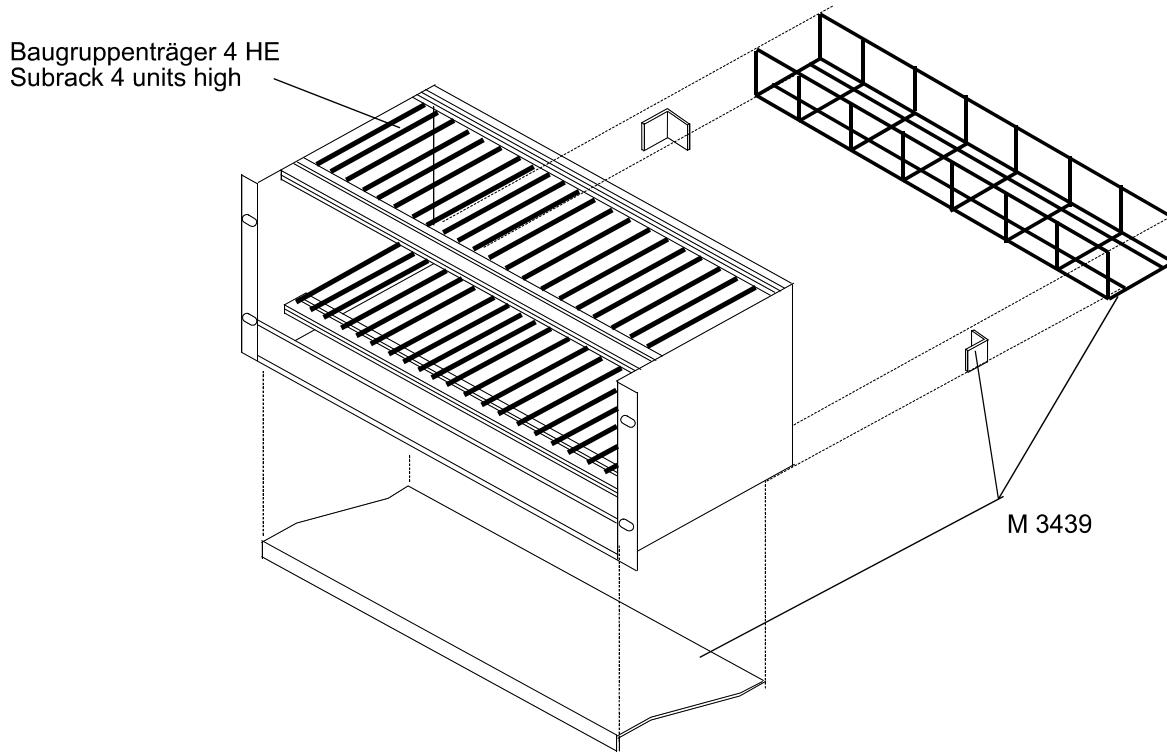
Space requirement

19 inches, **M 3431:** 1 unit high**M 3432:** 2 units high**M 3434:** 4 units high



**Partition Plate M 3439**

Extension kit for subracks 4 units high



The extension kit includes:

- partition plate,
- wire tray with fixing element,
- 2 fixing angles,
- fixing accessories (self-locking Phillips screws)

**Installation:**

- The partition plate can be mounted in two positions. The air supply and discharge is made via the wire tray.
- When the kit is used to upgrade a subrack 4 units high, the mounting plate with cable duct and labeling field must be removed from this subrack.

**Application:**

Partition plate for air duct and with wire tray for cable support

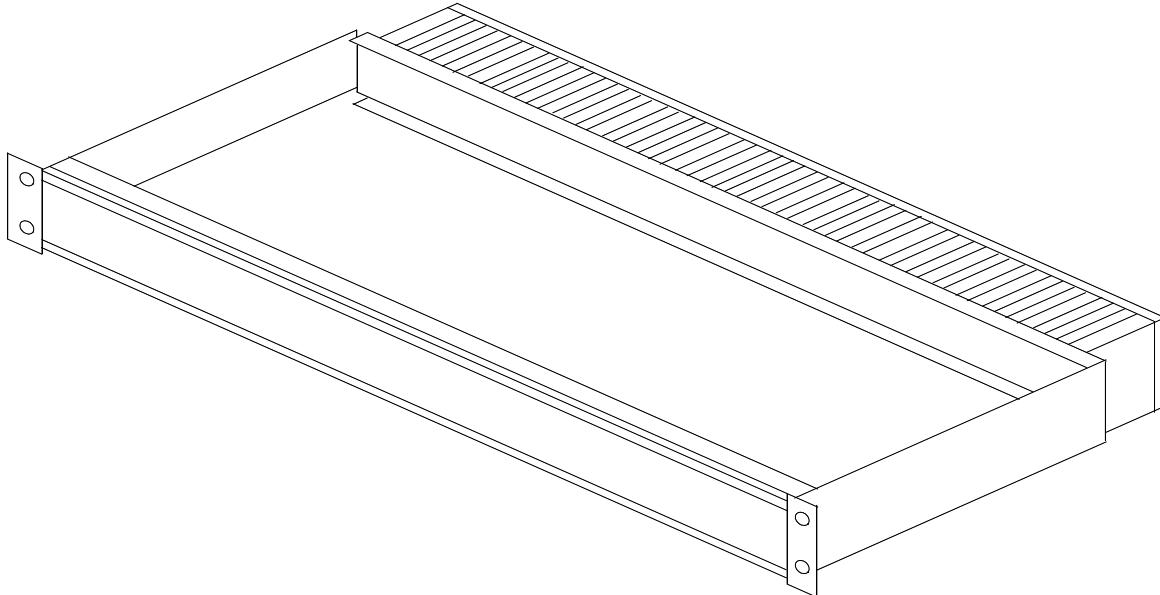
Material of partition plate	Aluminium
Surface of partition plate	chromated
Material of wire tray	plastic-coated steel wire



## M 3443, M 3445

### Labeling Field M 3443, M 3445

Labeling fields with cable duct support  
in the 19-inches system according to EN 60297-3



**Types:**

- M 3443** with 1 cable duct 40 x 60
- M 3445** with 2 cable ducts 15 x 60

**Installation:** At any location in the 19-inches field

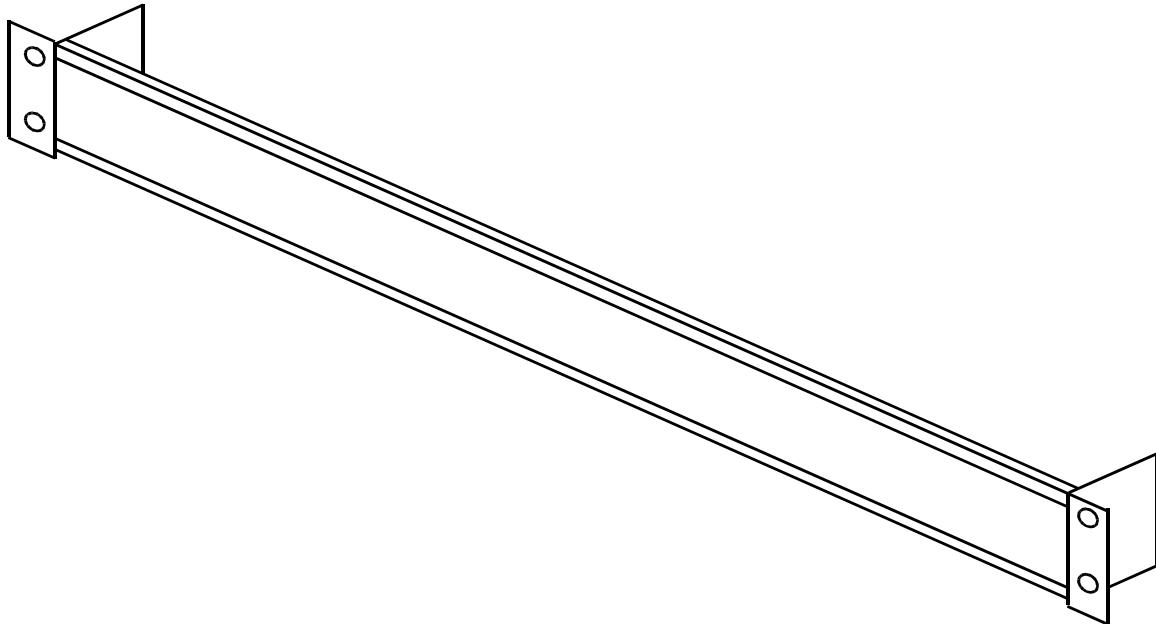
**Application:** As labeling field and to keep the connecting wires

Material	Aluminium
Surface	chromated
Space requirement	19 inches, 1 unit high, depth 203.5 mm, with cable duct 263.5 m



**Labeling Field M 3444**

Labeling field with fixing angles  
In the 19-inches system according to EN 60297-3



**Installation:** At any location in the 19-inches field

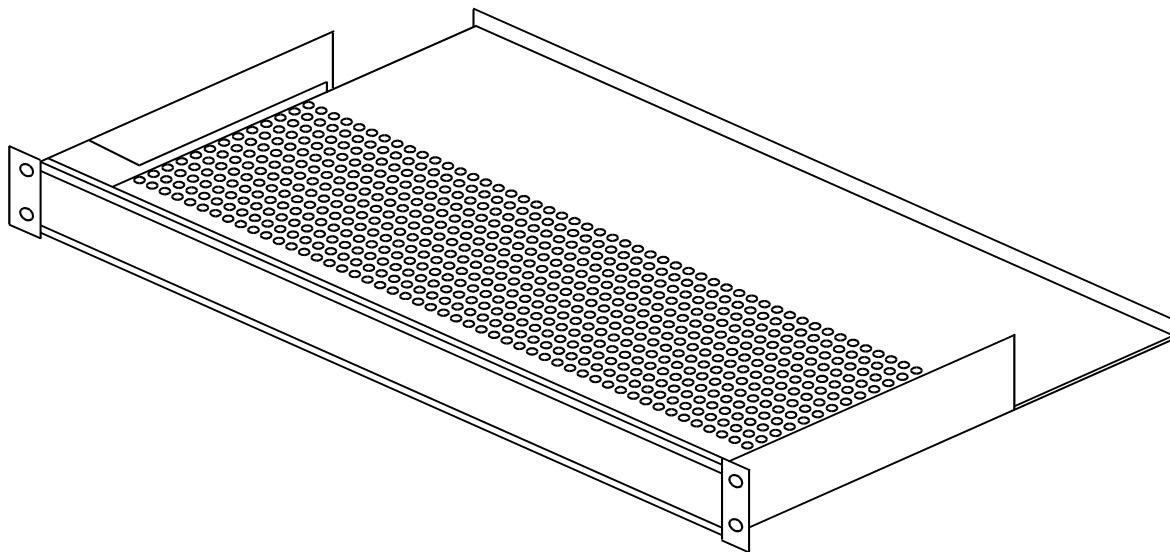
**Application:** For installation of small parts, e.g. elements for operation and display

Material	Aluminium
Surface	chromated
Space requirement	19 inches, 1 unit high



**Cable Duct M 3446**

Cable duct for wiring and cabling  
in the 19-inches system according to EN 60297-3



**Installation:** At any location in the 19-inches field

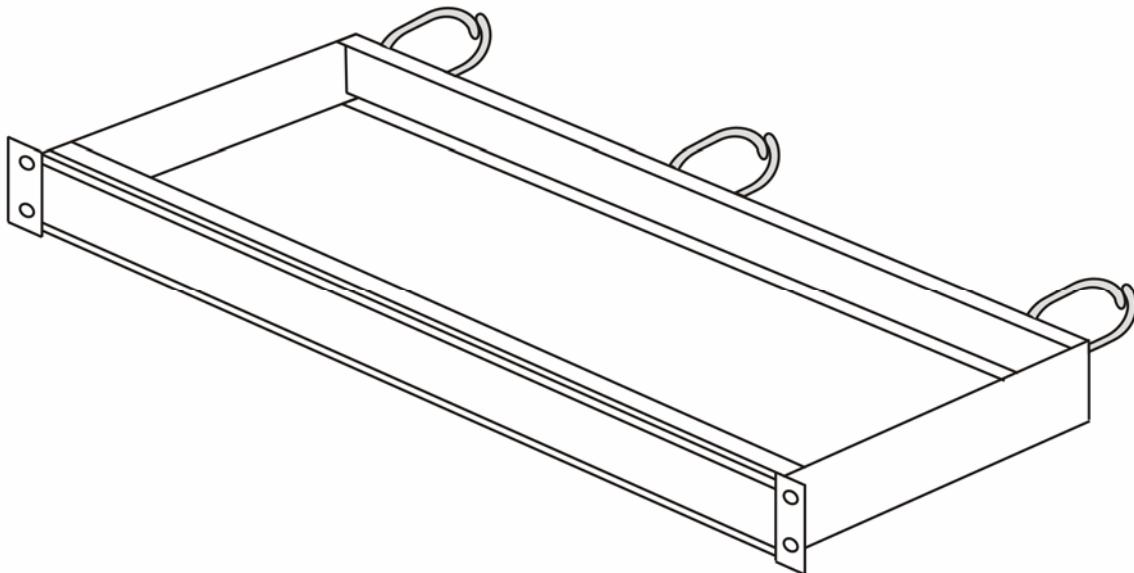
**Application:** Cable duct for conductor routing and fixing of cables, with a hinged receptacle for the label

Material	Aluminium
Surface	chromated
Space requirement	19 inches, 1 unit high, depth 307 mm



**Labeling field M 3447**

Labeling field with three guiding rings  
in 19-inches system according to EN 60297-3



**Construction:**

Labeling field equipped with three guiding rings 60 x 32 mm at the rear of the unit.

**Installation:** At any location in the 19-inches rack

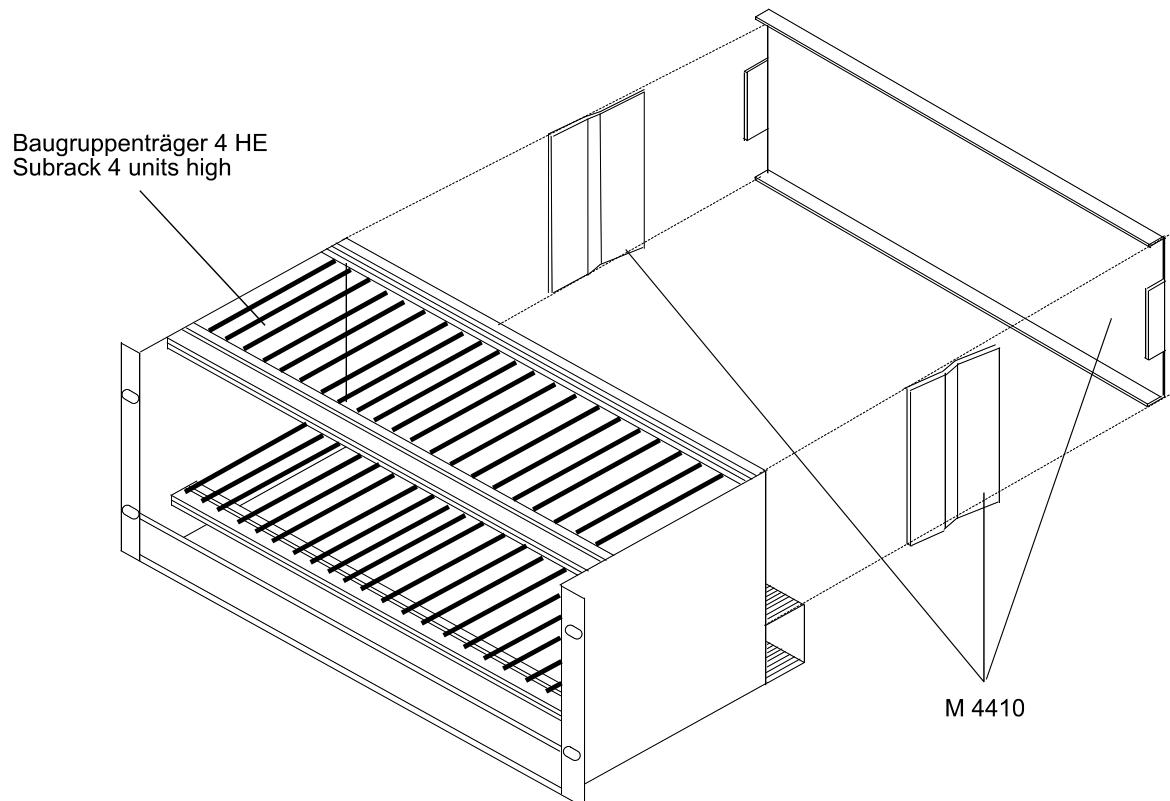
**Application:** Labeling field and cable mount

Material	Aluminium
Surface	chromated
Space requirements	19 inches, 1 unit high, depth 203.5 mm, with guiding rings 283.5 mm



**Cover Plate M 4410**

Extension kit for subracks  
in the 19-inches system according to EN 60297-3



The extension kit includes:

- cover plate,
- 2 subrack extension elements for side panels, 3 units high,
- fixing accessories (self-locking Phillips screws)

**Installation:**

- Fix the side panel extensions with the existing screws
- Mount the cover plate between the extensions

**Application:**

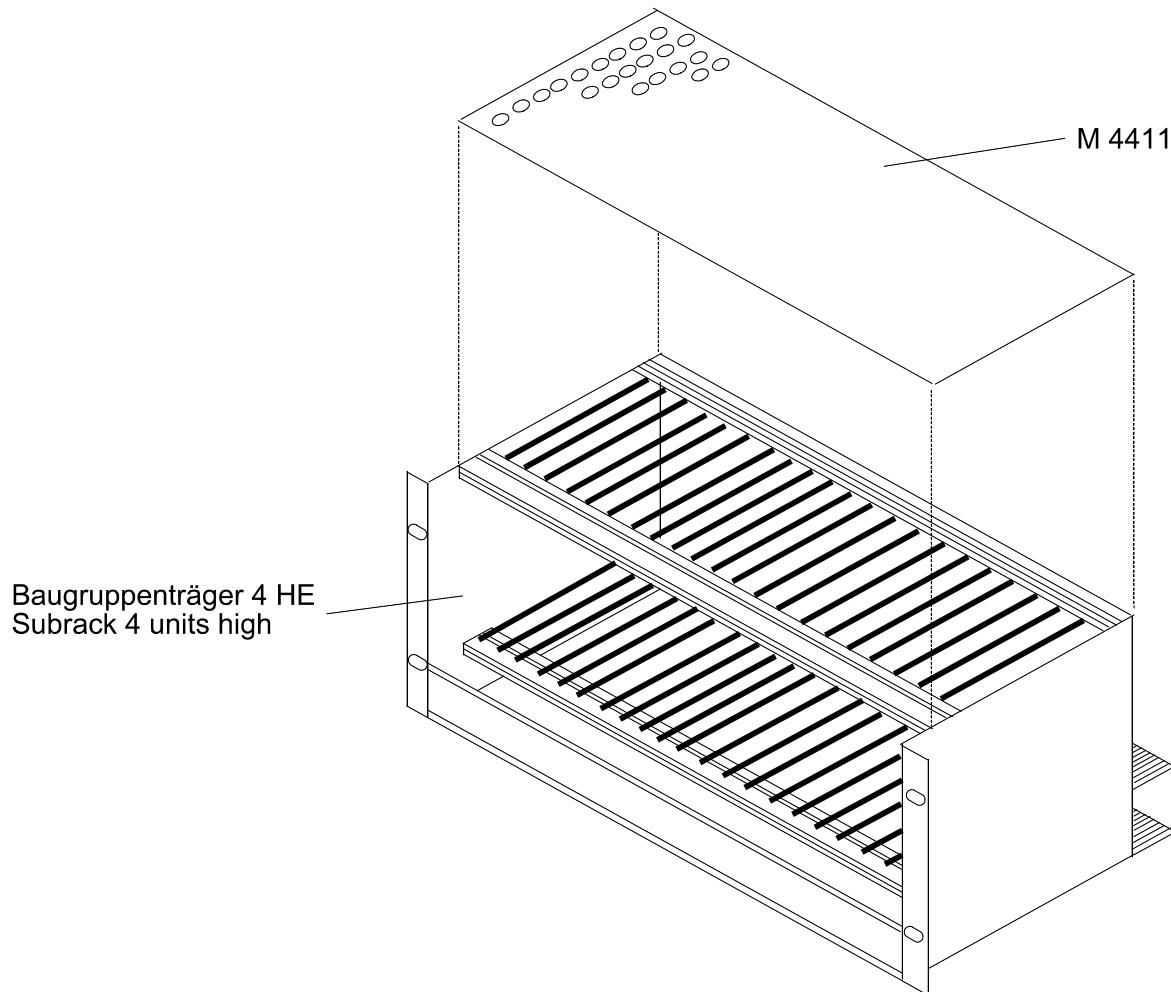
To cover the rear side of the subrack

Material	Aluminium
Surface	chromated



**Perforated Plate M 4411**

Perforated plate for subracks  
In the 19-inches system according to EN 60297-3



**Installation:**

- Dismantle one side panel of the subrack
- Move the perforated plate between the front and rear shape of the subrack (possible above as well as below)
- Fix the side panel again

**Application:**

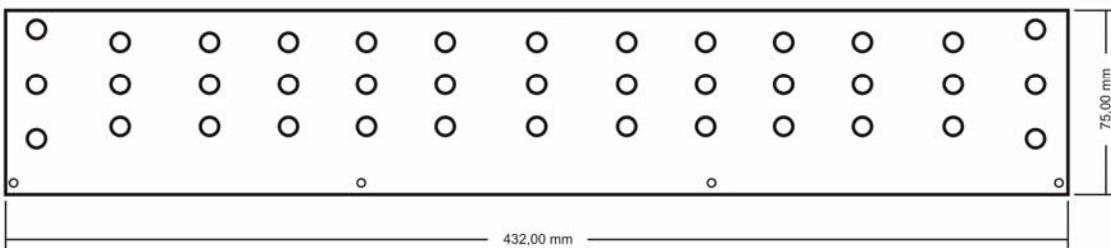
For protection against electric shock and for screening the subrack

Material	Aluminium
Surface	chromated



**Cable mount M 4412**

Cable mount for subracks M 3420 and M 3421



**Application:**

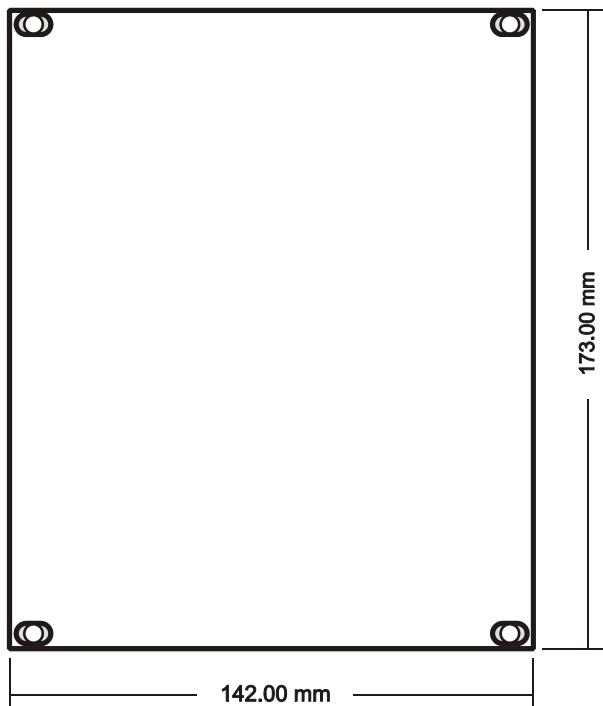
For mounting at the rear of the subracks M 3420/21 (top or bottom),  
with screws

Material            sheet steel, galvanized



**Cover plate M 4413**

Cover plate for subracks M 3420 and M 3421



**Application:**

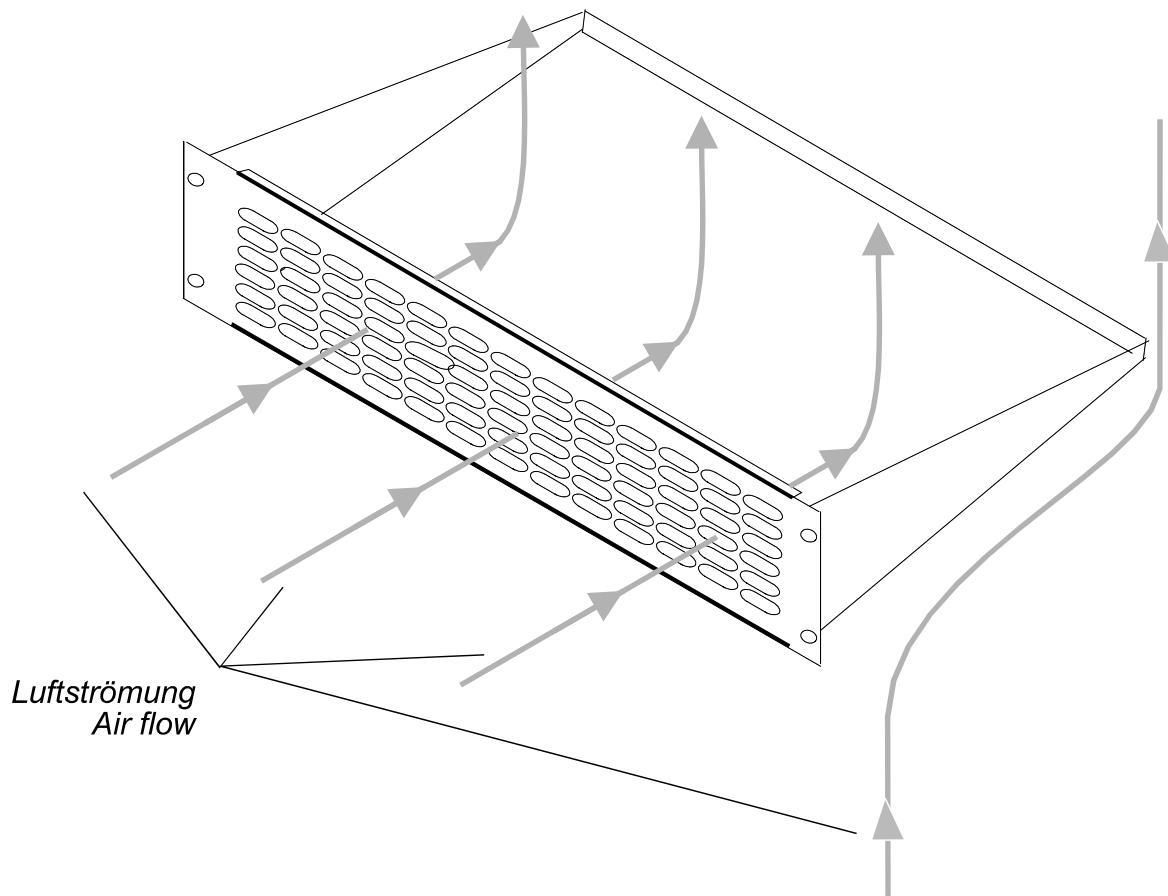
Blank plate or filling plate to cover an empty slot,  
with screws

Material	Aluminium
Surface	chromated
Space requirement	19 inches, 4 units high, 28 units deep



Air Guide M 7200

Air guide for the 19-inches system according to EN 60297-3,  
2 units high



**Installation:**

At any location in the 19-inches field

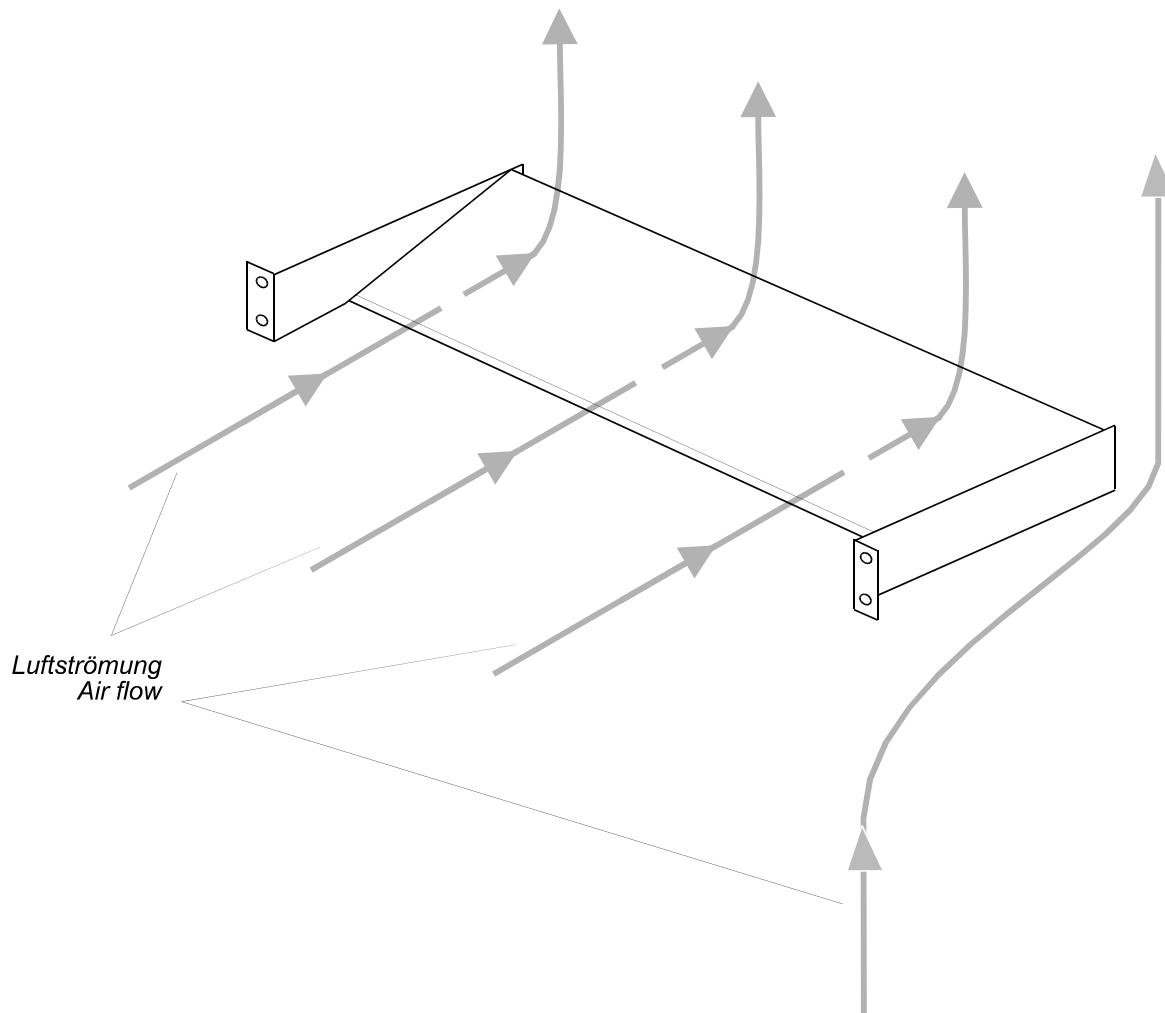
**Application:**

Air supply for built-in equipment above, air discharge to the rear for built-in equipment below

Material	Aluminium
Surface	chromated
Space requirement	19 inches, 2 units high, depth 250 mm

**Air Guide M 7201**

Air guide for the 19-inches system according to EN 60297-3,  
1 unit high

**Installation:**

See application examples on the next side of the data sheet

**Application:**

Air supply at the front side for built-in equipment above, air discharge to the rear for built-in equipment below

Material

side panels: Aluminium, surface chromated

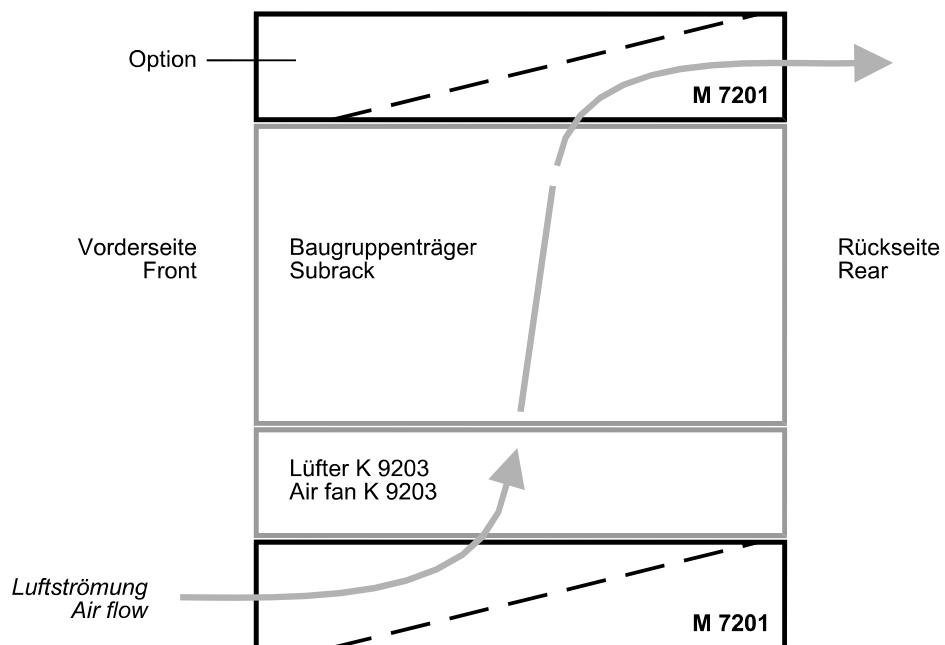
air guide sheet: high-grade steel

Space requirement

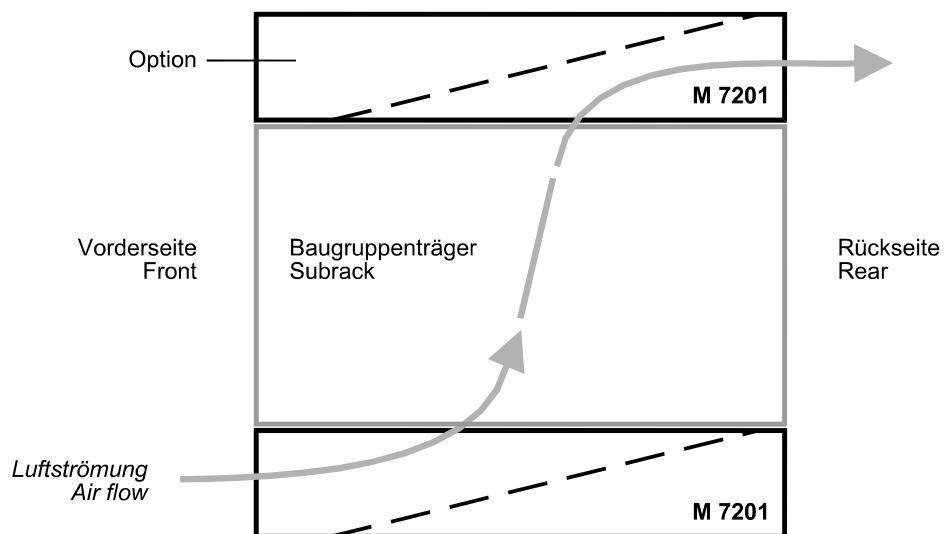
19 inches, 1 unit high, depth 205 mm

**Examples for installation**

Application with a circulating fan K 9203 (1 unit high)

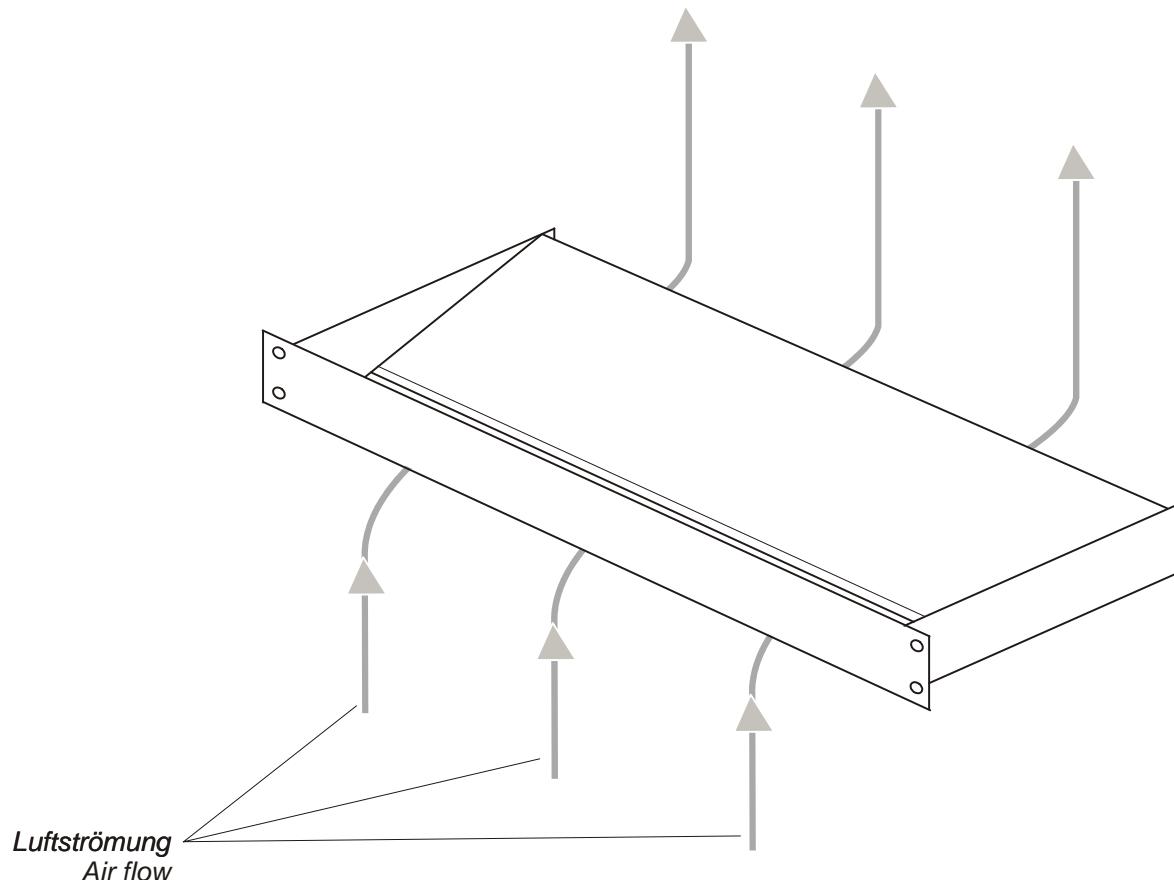


Application only as an air guide between subracks



**Air Guide M 7202**

Air guide for the 19-inches system according to EN 60297-3,  
1 unit high with labeling field

**Installation:**

See application example on the next side of the data sheet

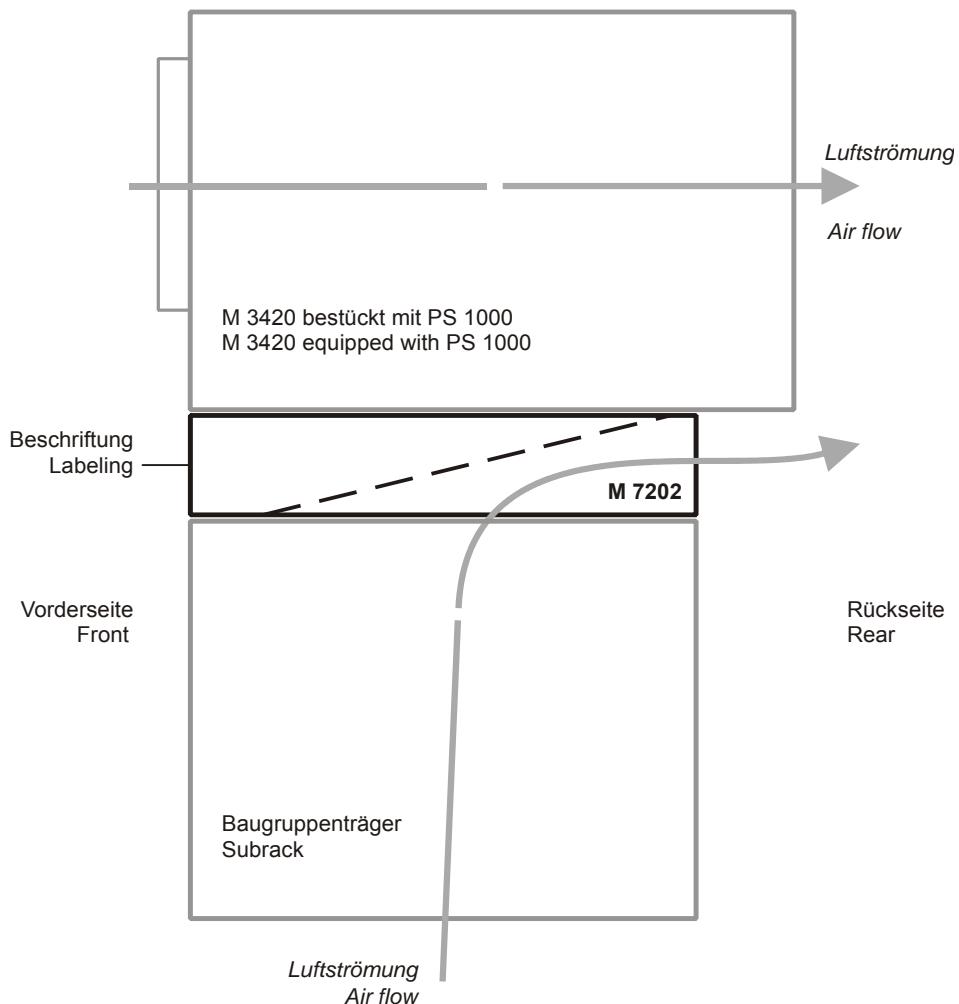
**Application:**

Air discharge to the rear for built-in equipment below

Material	Front and side panels: Aluminium, surface chromated Air guide sheet: high-grade steel
Space requirement	19 inches, 1 unit high, depth 205 mm

**Example for installation**

Application with power supply PS 1000



**Power Supply Unit PS 1000/115 01**

**120 VAC / 24 VDC  
Continuous load 40 A**

Electronically controlled power supply unit for 19-inches subracks

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# 1 Power Supply PS 1000/115 01

## 1.1 Construction

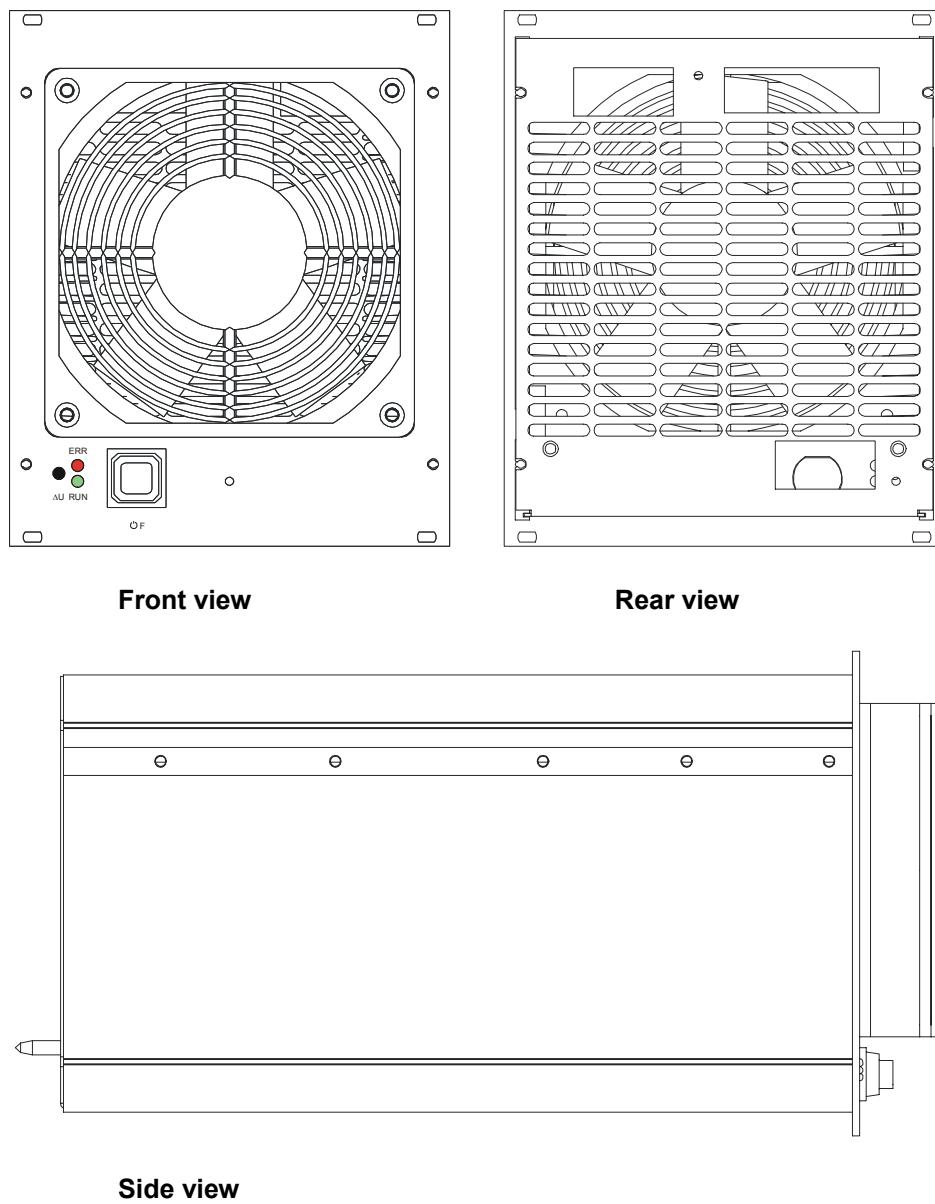


Figure 1: Views power supply PS 1000/115 01

The power supply PS 1000/115 01 is an electronically controlled modular module to be used in the 19-inches subrack M 3421, 4 units high (cf. data sheet M 3421).

The output of the power supply is short-circuit-proof.

The function of the power supply is indicated by a green LED on the front plate.

The fan speed is monitored, and faults are indicated via the red error LED and the contact.

All connections of the power supply are made automatically via plug-in terminals when it is plugged into its slot in the subrack.

The power supply meets the IEC 61131-2 standard.

The output voltage (R+ / L+ / L-) of the device meets the requirements for SELV and/or PELV circuits.

## 1.2 Block Diagram

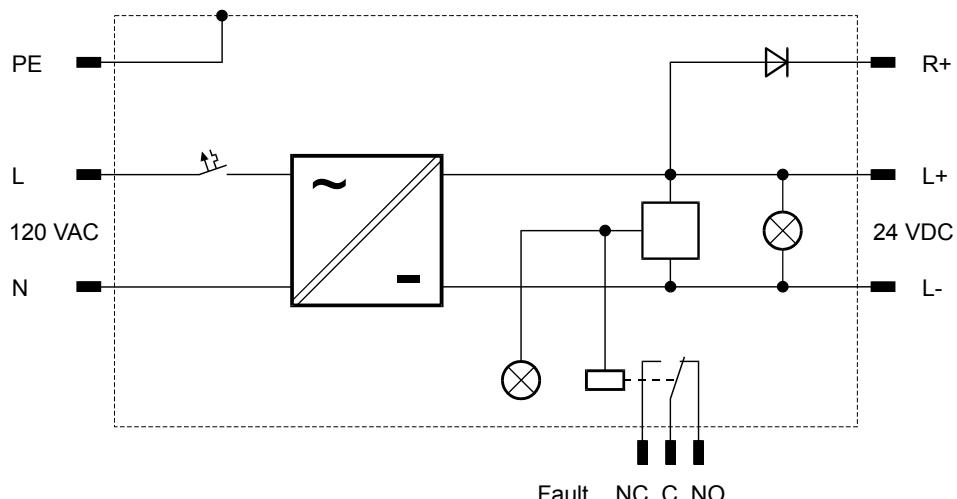


Figure 2: Block diagram, elements non-operated / de-energized

## 1.3 ESD Protective Measures

Only personnel who have knowledge of ESD protective measures are permitted to replace a power supply unit.



An electrostatic discharge can damage the built-in electronic components!

- Touch an earthed object to discharge any static in your body.
- When carrying out the work, make sure the working area is free of static and wear an earthing strip.
- When the module is not in use, ensure it is protected from electrostatic charges, e. g. keep it in its packaging.

## 1.4 Fault Messages

Faults occurring in the power supply are displayed via the red LED indicator on the front plate and annunciated by a potential-free changeover contact (cf. block diagram).

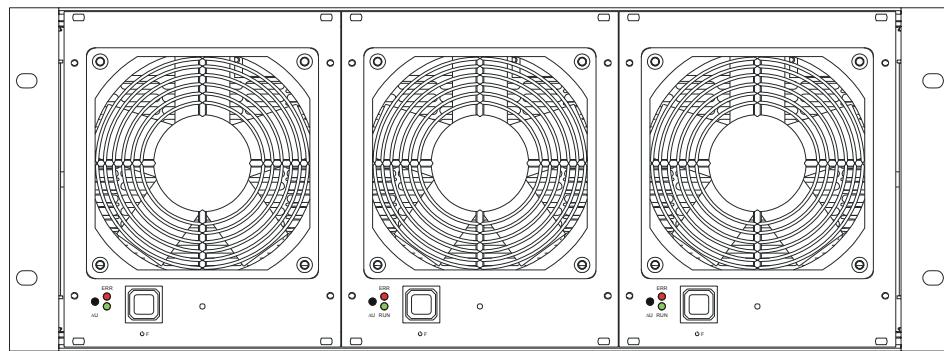
Error contact (Fail)	State
C-NC closed (C-NO open)	Relay energized, normal unit function
C-NC open (C-NO closed)	Relay de-energized, fault in the unit

Table 1: Changeover contact of the power supply

The electrical connection of the error contact is made with three plug-in terminals at the rear of the subrack M 3421.

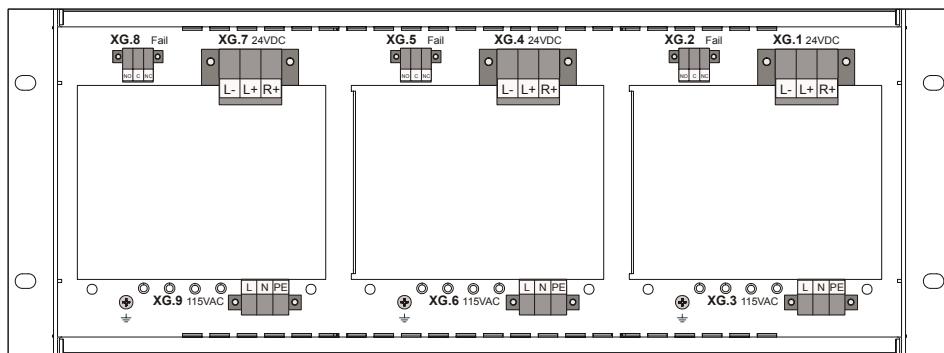
Up to three power supply units can be inserted into one subrack M 3421, also for parallel or redundant operation without additional decoupling diodes.

Redundant switched off units can be replaced during operation without switching off any other unit.



**Figure 3: Front view of a fully equipped subrack M 3421**

Each power supply is equipped with a fan at the front. It is important for mounting the subrack to ensure an easy air flow at its front and rear.



**Figure 4: Rear view of the subrack M 3421 with terminals**

All connections for the power supplies are made via plug-in terminals at the rear of the subrack.

**Note**

The 4 coding holes (for 48 V power supplies) in the subrack below the rear front of the power supply must be screwed with the delivered screws, so it is impossible to mount 48 V power supplies in 24 V power supply slots.



**The use of 48 V power supplies in 24 V plants results in the destruction of the 24 V devices!**

**Note**

At manual switch-on and switch-off of the power supplies a latency of one minute must be regarded as time between switch-off and switch-on.

Reason: Recovery time of the soft start circuit.

## 1.5 Use of several Power Supplies

If several 24 V power supplies are used in redundant operation (parallel operation), the common output current  $I$  must be set to the same value for all power supplies via the  $\Delta U$  potentiometer at the front of each power supply. The output current of the power supplies can be measured with a clamp measuring unit at the current terminals at the rear front of the subrack.

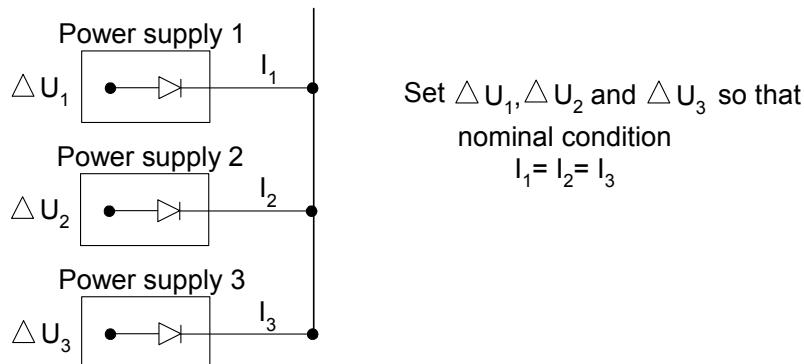


Figure 5: Adjustment of several power supplies via the  $\Delta U$  potentiometer

## 1.6 Technical Data PS 1000/115 01

Power supply	
Input voltage	120 VAC, -15...+10 %, 50...60 Hz
Output voltage	24 VDC, adjustable $\pm 10\%$ via potentiometer $\Delta U$ in the front plate
Fuse	120 VAC 16 A automat
Maximum load	40 A continuously
Regulation	< 100 mV at load change 0...100 %
Efficiency	> 89 %
Power dissipation	< 110 W
Hold-up time	20 ms
Degree of protection	IP 20
Humidity	< 95 % rel., non-condensing
Ambient temperature	0...60 °C
Storage temperature	-40...+85 °C
Dimensions	28 SU, 4 units high W x H x D: 142 x 173 x 281 mm
Weight	approx. 6 kg
External fusing	16 A gL
Connections	min. cross sections for wiring: 120 VAC      2.5 mm <sup>2</sup> 24 VDC      10 mm <sup>2</sup> Fail      0.5 mm <sup>2</sup>
Fault contact (Fail)	one potential-free changeover contact, connection via terminals 3 x 1.5 mm <sup>2</sup> in the subrack
Switching capacity	30 VDC / 1 A 30 VAC / 0.5 A
MTTF	30 years

**Power Supply Unit PS 1000/115 02**

**120 VAC / 48 VDC  
Continuous load 20 A**

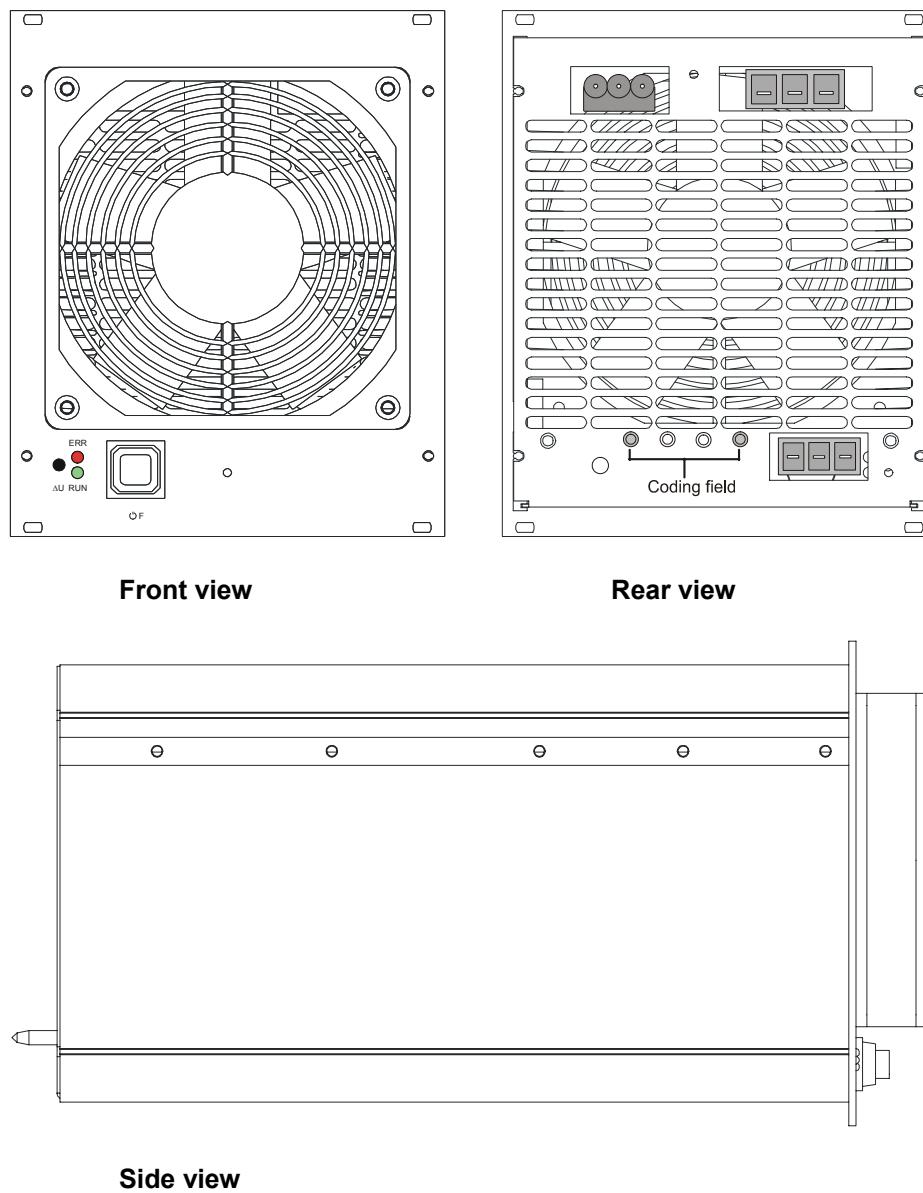
Electronically controlled power supply unit for 19-inches subracks

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# 1 Power Supply PS 1000/115 02

## 1.1 Construction



**Figure 1: Views power supply PS 1000/115 02**

The power supply PS 1000/115 02 is an electronically controlled modular module to be used in the 19-inches subrack M 3421, 4 units high (cf. data sheet M 3421).

The output of the power supply is short-circuit-proof.

The function of the power supply is indicated by a green LED on the front plate.

The fan speed is monitored, and faults are indicated via the red error LED and the contact.

All connections of the power supply are made automatically via plug-in terminals when it is plugged into its slot in the subrack.

A coding field is located on the back plate of the power supply below the ventilation slots. This field has four plain holes for guide pins.

In case of the power supply unit 120 V the left and the right guide pin of the coding field are screwed from the inside of the power supply (see fig. rear view).

The guide pins code the type of power supply.

They also help when the power supply is plugged into the subrack. The pins fit to the according plain holes in the back plate of the subrack.

The power supply meets the IEC 61131-2 standard.

The output voltage (R+ / L+ / L-) of the device meets the requirements for SELV and/or PELV circuits.

## 1.2 Block Diagram

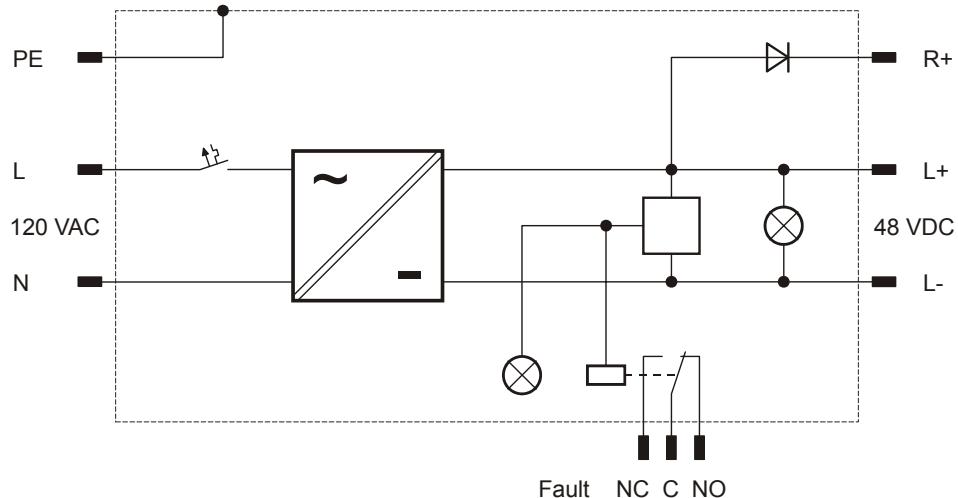


Figure 2: Block diagram, elements non-operated / de-energized

## 1.3 ESD Protective Measures

Only personnel who have knowledge of ESD protective measures are permitted to replace a power supply unit.



An electrostatic discharge can damage the built-in electronic components!

- Touch an earthed object to discharge any static in your body.
- When carrying out the work, make sure the working area is free of static and wear an earthing strip.
- When the module is not in use, ensure it is protected from electrostatic charges, e. g. keep it in its packaging.

## 1.4 Fault Messages

Faults occurring in the power supply are displayed via the red LED indicator on the front plate and annunciated by a potential-free changeover contact (cf. block diagram).

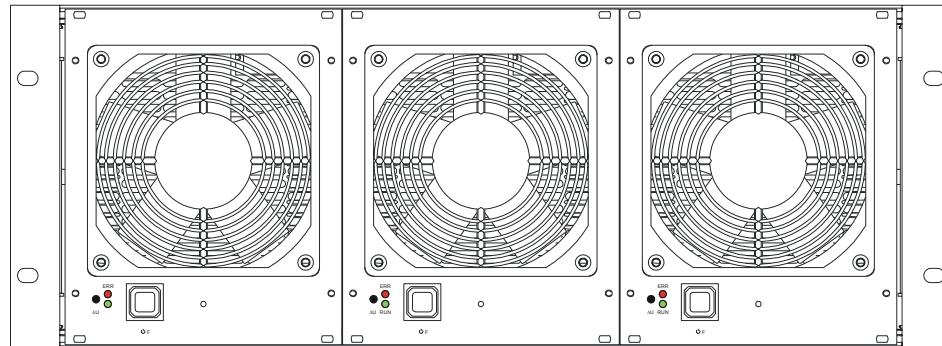
Error contact (Fail)	State
C-NC closed (C-NO open)	Relay energized, normal unit function
C-NC open (C-NO closed)	Relay de-energized, fault in the unit

Table 1: Changeover contact of the power supply

The electrical connection of the error contact is made with three plug-in terminals at the rear of the subrack M 3421.

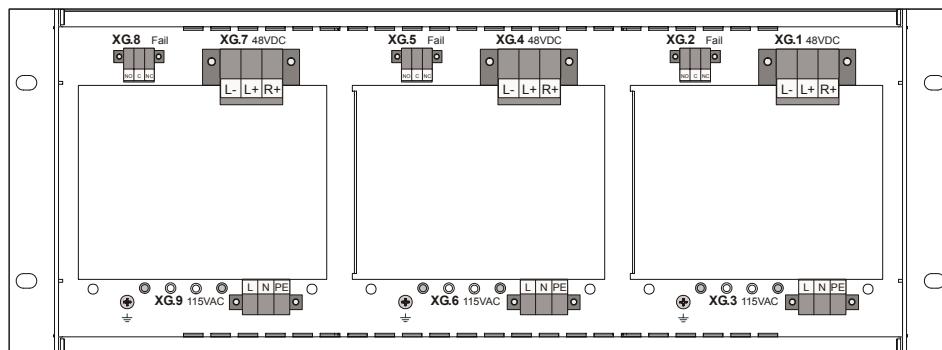
Up to three power supply units can be inserted into one subrack M 3421, also for parallel or redundant operation without additional decoupling diodes.

Redundant switched off units can be replaced during operation without switching off any other unit.



**Figure 3: Front view of a fully equipped subrack M 3421**

Each power supply is equipped with a fan at the front. It is important for mounting the subrack to ensure an easy air flow at its front and rear.



**Figure 4: Rear view of the subrack M 3421 with terminals**

All connections for the power supplies are made via plug-in terminals at the rear of the subrack.



**The use of 48 V power supplies in 24 V plants results in the destruction of the 24 V devices!**

---

**Note** At manual switch-on and switch-off of the power supplies a latency of one minute must be regarded as time between switch-off and switch-on.

Reason: Recovery time of the soft start circuit.

---

## 1.5 Use of several Power Supplies

If several 48 V power supplies are used in redundant operation (parallel operation), the common output current  $I$  must be set to the same value for all power supplies via the  $\Delta U$  potentiometer at the front of each power supply. The output current of the power supplies can be measured with a clamp measuring unit at the current terminals at the rear front of the subrack.

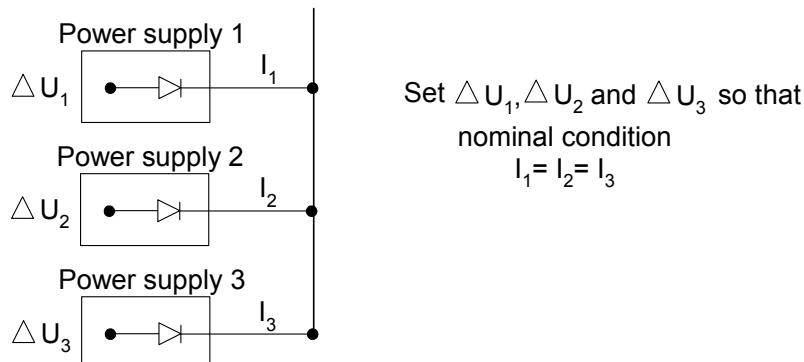


Figure 5: Adjustment of several power supplies via the  $\Delta U$  potentiometer

## 1.6 Technical Data PS 1000/115 02

Power supply	
Input voltage	120 VAC, -15...+10 %, 50...60 Hz
Output voltage	48 VDC, adjustable +5 / -10 % via potentiometer $\Delta U$ in the front plate
Fuse	120 VAC 16 A automat
Maximum load	20 A continuously
Regulation	< 100 mV at load change 0...100 %
Efficiency	> 89 %
Power dissipation	< 110 W
Hold-up time	20 ms
Degree of protection	IP 20
Humidity	< 95 % rel., non-condensing
Ambient temperature	0...60 °C
Storage temperature	-40...+85 °C
Dimensions	28 SU, 4 units high W x H x D: 142 x 173 x 281 mm
Weight	approx. 6 kg
External fusing	16 A gL
Connections	min. cross sections for wiring: 120 VAC      2.5 mm <sup>2</sup> 48 VDC      10 mm <sup>2</sup> Fail            0.5 mm <sup>2</sup>
Fault contact (Fail)	one potential-free changeover contact, connection via terminals 3 x 1.5 mm <sup>2</sup> in the subrack
Switching capacity	30 VDC / 1 A 30 VAC / 0.5 A
MTTF	30 years

**Power Supply Unit PS 1000/230 01**

**230 VAC / 24 VDC  
Continuous load 40 A**

Electronically controlled power supply unit for 19-inches subracks

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# 1 Power Supply PS 1000/230 01

## 1.1 Construction

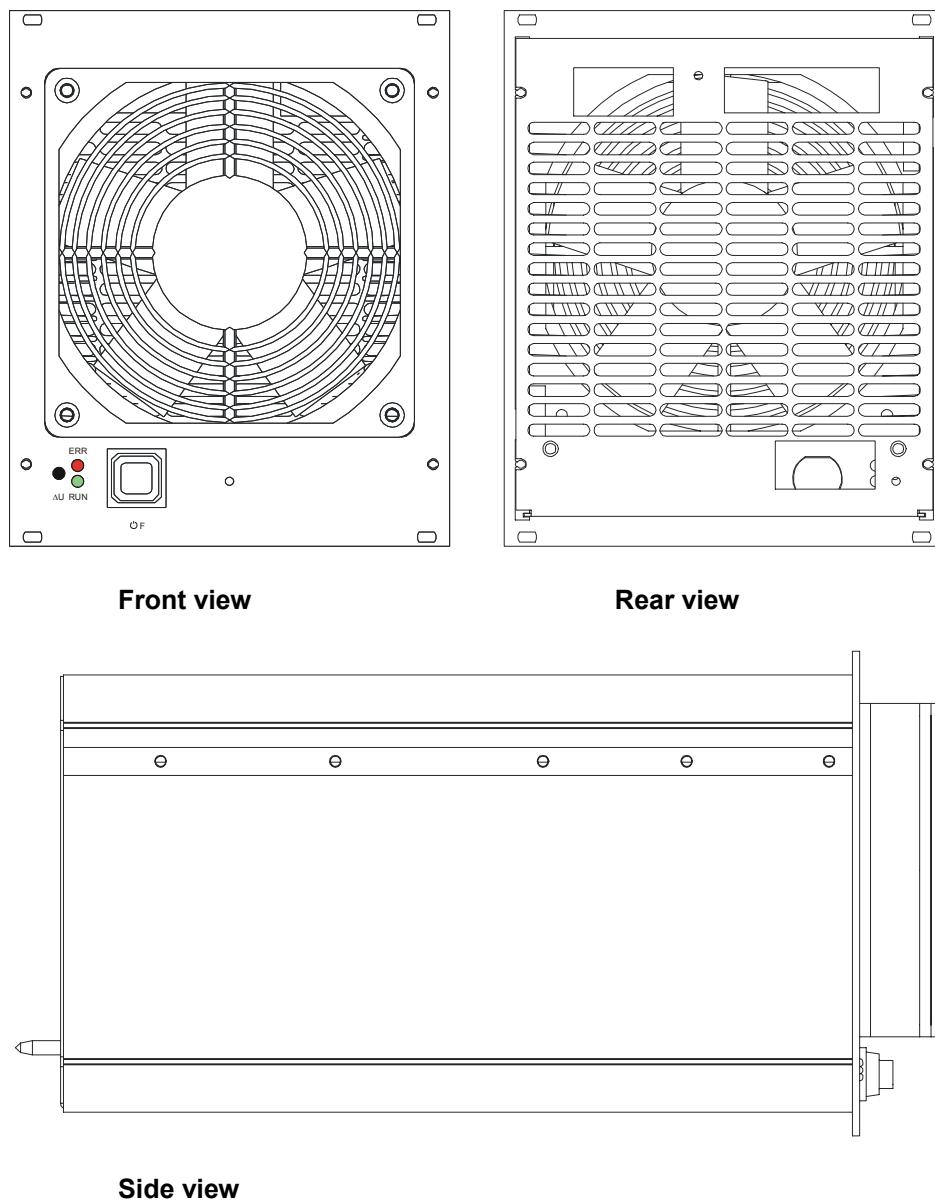


Figure 1: Views power supply PS 1000/230 01

The power supply PS 1000/230 01 is an electronically controlled modular module to be used in the 19-inches subrack M 3421, 4 units high (cf. data sheet M 3421).

The output of the power supply is short-circuit-proof.

The function of the power supply is indicated by a green LED on the front plate.

The fan speed is monitored, and faults are indicated via the red error LED and the contact.

All connections of the power supply are made automatically via plug-in terminals when it is plugged into its slot in the subrack.

The power supply meets the IEC 61131-2 standard.

The output voltage (R+ / L+ / L-) of the device meets the requirements for SELV and/or PELV circuits.

## 1.2 Block Diagram

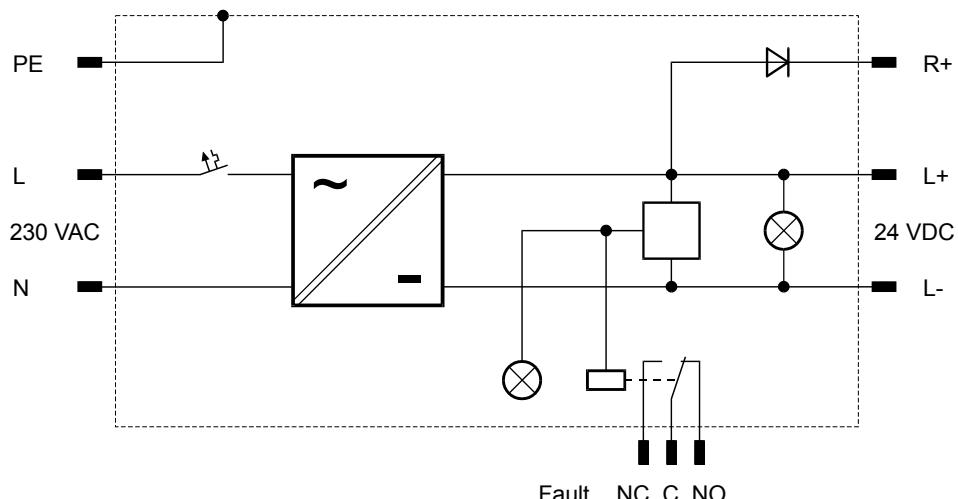


Figure 2: Block diagram, elements non-operated / de-energized

## 1.3 ESD Protective Measures

Only personnel who have knowledge of ESD protective measures are permitted to replace a power supply unit.



An electrostatic discharge can damage the built-in electronic components!

- Touch an earthed object to discharge any static in your body.
- When carrying out the work, make sure the working area is free of static and wear an earthing strip.
- When the module is not in use, ensure it is protected from electrostatic charges, e. g. keep it in its packaging.

## 1.4 Fault Messages

Faults occurring in the power supply are displayed via the red LED indicator on the front plate and annunciated by a potential-free changeover contact (cf. block diagram).

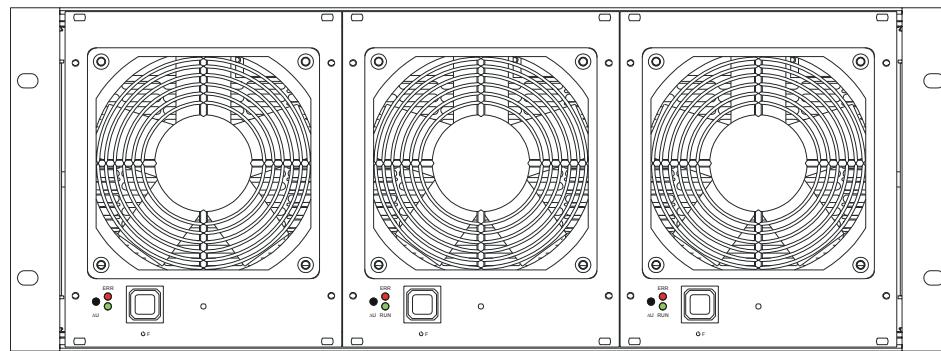
Error contact (Fail)	State
C-NC closed (C-NO open)	Relay energized, normal unit function
C-NC open (C-NO closed)	Relay de-energized, fault in the unit

Table 1: Changeover contact of the power supply

The electrical connection of the error contact is made with three plug-in terminals at the rear of the subrack M 3421.

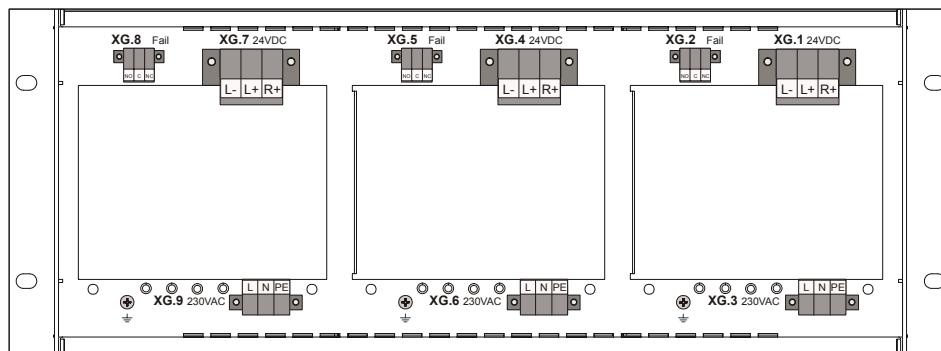
Up to three power supply units can be inserted into one subrack M 3421, also for parallel or redundant operation without additional decoupling diodes.

Redundant switched off units can be replaced during operation without switching off any other unit.



**Figure 3: Front view of a fully equipped subrack M 3421**

Each power supply is equipped with a fan at the front. It is important for mounting the subrack to ensure an easy air flow at its front and rear.



**Figure 4: Rear view of the subrack M 3421 with terminals**

All connections for the power supplies are made via plug-in terminals at the rear of the subrack.

**Note**

The 4 coding holes (for 48 V power supplies) in the subrack below the rear front of the power supply must be screwed with the delivered screws, so it is impossible to mount 48 V power supplies in 24 V power supply slots.



**The use of 48 V power supplies in 24 V plants results in the destruction of the 24 V devices!**

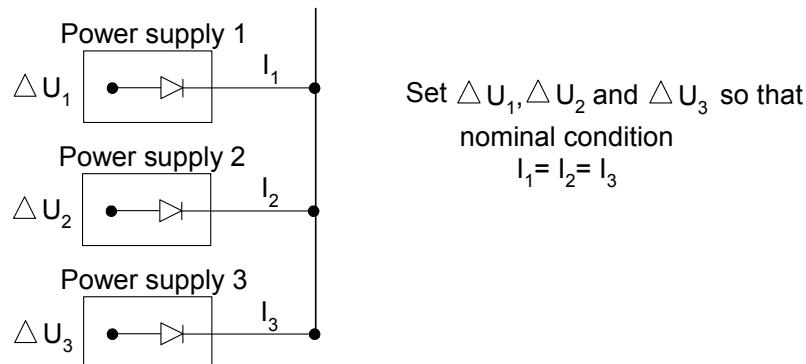
**Note**

At manual switch-on and switch-off of the power supplies a latency of one minute must be regarded as time between switch-off and switch-on.

Reason: Recovery time of the soft start circuit.

## 1.5 Use of several Power Supplies

If several 24 V power supplies are used in redundant operation (parallel operation), the common output current  $I$  must be set to the same value for all power supplies via the  $\Delta U$  potentiometer at the front of each power supply. The output current of the power supplies can be measured with a clamp measuring unit at the current terminals at the rear front of the subrack.



Set  $\Delta U_1, \Delta U_2$  and  $\Delta U_3$  so that  
nominal condition  
 $I_1 = I_2 = I_3$

Figure 5: Adjustment of several power supplies via the  $\Delta U$  potentiometer

## 1.6 Technical Data PS 1000/230 01

Power supply	
Input voltage	230 VAC, -15...+10 % and 240 VAC, -15...+10 %, 50...60 Hz
Output voltage	24 VDC, adjustable $\pm 10\%$ via potentiometer $\Delta U$ in the front plate
Fuse	240 VAC 10 A automat
Maximum load	40 A continuously
Regulation	< 100 mV at load change 0...100 %
Efficiency	> 89 %
Power dissipation	< 110 W
Hold-up time	20 ms
Degree of protection	IP 20
Humidity	< 95 % rel., non-condensing
Ambient temperature	0...60 °C
Storage temperature	-40...+85 °C
Dimensions	28 SU, 4 units high W x H x D: 142 x 173 x 281 mm
Weight	approx. 6 kg
External fusing	16 A gL
Connections	min. cross sections for wiring: 240 VAC 1.5 mm <sup>2</sup> 24 VDC 10 mm <sup>2</sup> Fail 0.5 mm <sup>2</sup>
Fault contact	one potential-free changeover contact, connection via terminals 3 x 1.5 mm <sup>2</sup> in the subrack
Switching capacity	30 VDC / 1 A 30 VAC / 0.5 A
MTTF	30 years

**Power Supply Unit PS 1000/230 02**

**230 VAC / 48 VDC  
Continuous load 20 A**

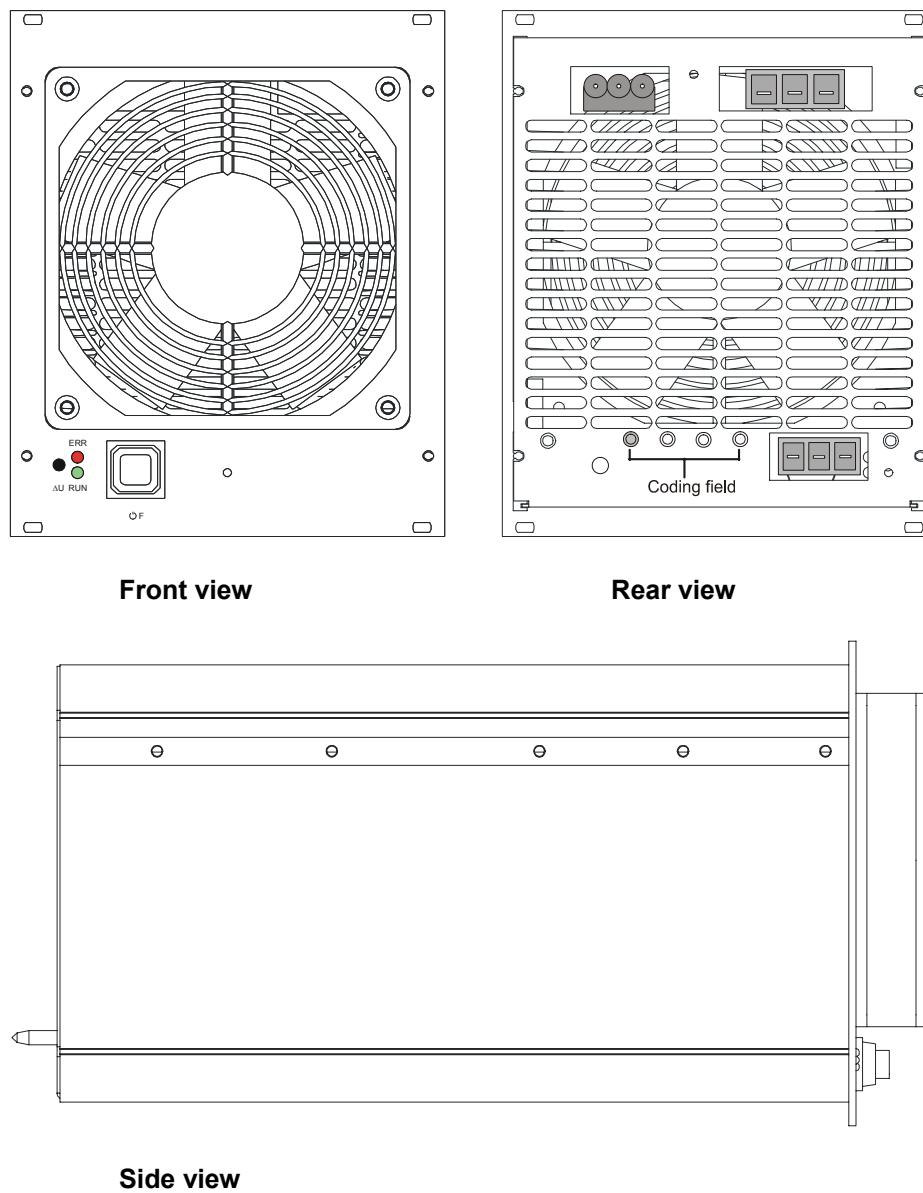
Electronically controlled power supply unit for 19-inches subracks

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# 1 Power Supply PS 1000/230 02

## 1.1 Construction



**Figure 1: Views power supply PS 1000/230 02**

The power supply PS 1000/230 02 is an electronically controlled modular module to be used in the 19-inches subrack M 3421, 4 units high (cf. data sheet M 3421).

The output of the power supply is short-circuit-proof.

The function of the power supply is indicated by a green LED on the front plate.

The fan speed is monitored, and faults are indicated via the red error LED and the contact.

All connections of the power supply are made automatically via plug-in terminals when it is plugged into its slot in the subrack.

A coding field is located on the back plate of the power supply below the ventilation slots. This field has four plain holes for guide pins.

In case of the power supply unit 240 V only the left guide pin of the coding field is screwed from the inside of the power supply (see fig. rear view).

The guide pin codes the type of power supply.

It also helps when the power supply is plugged into the subrack. The pin fits to the according plain hole in the back plate of the subrack.

The power supply meets the IEC 61131-2 standard.

The output voltage (R+ / L+ / L-) of the device meets the requirements for SELV and/or PELV circuits.

## 1.2 Block Diagram

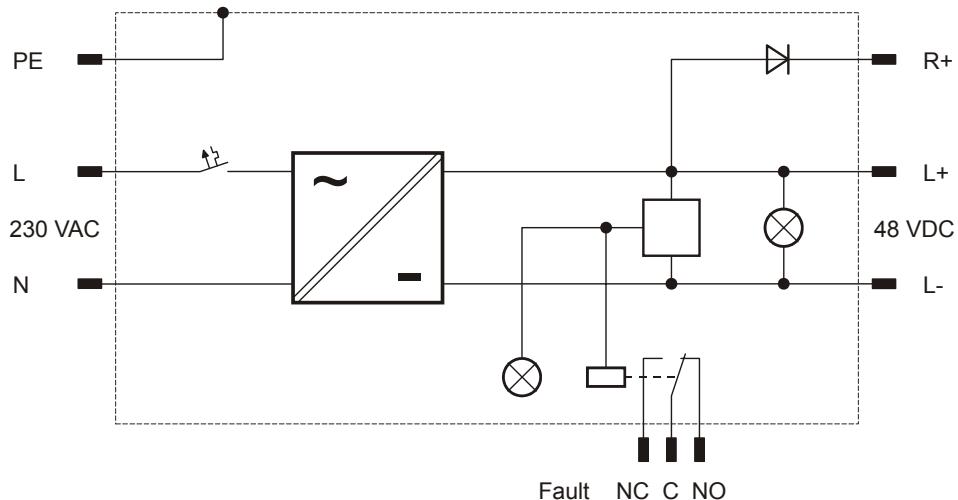


Figure 2: Block diagram, elements non-operated / de-energized

## 1.3 ESD Protective Measures

Only personnel who have knowledge of ESD protective measures are permitted to replace a power supply unit.



An electrostatic discharge can damage the built-in electronic components!

- Touch an earthed object to discharge any static in your body.
- When carrying out the work, make sure the working area is free of static and wear an earthing strip.
- When the module is not in use, ensure it is protected from electrostatic charges, e. g. keep it in its packaging.

## 1.4 Fault Messages

Faults occurring in the power supply are displayed via the red LED indicator on the front plate and annunciated by a potential-free changeover contact (cf. block diagram).

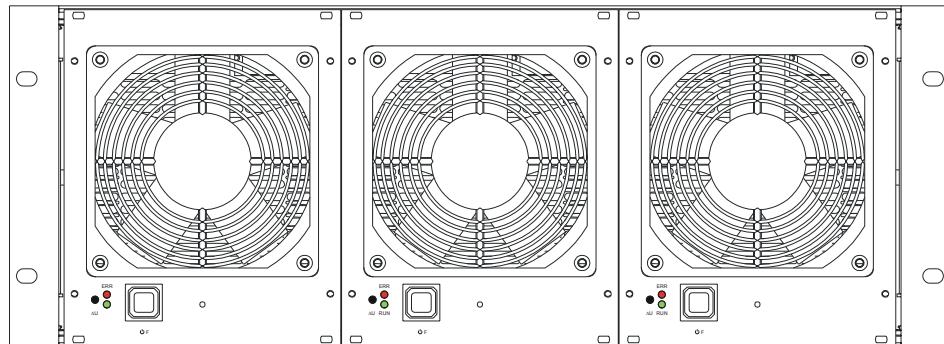
Error contact (Fail)	State
C-NC closed (C-NO open)	Relay energized, normal unit function
C-NC open (C-NO closed)	Relay de-energized, fault in the unit

Table 1: Changeover contact of the power supply

The electrical connection of the error contact is made with three plug-in terminals at the rear of the subrack M 3421.

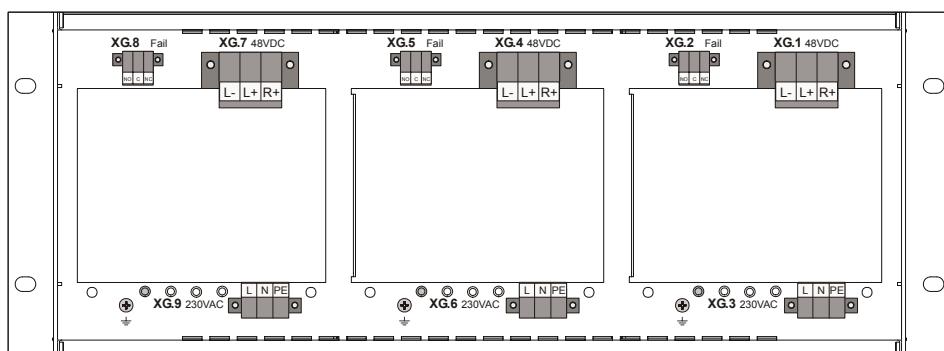
Up to three power supply units can be inserted into one subrack M 3421, also for parallel or redundant operation without additional decoupling diodes.

Redundant switched off units can be replaced during operation without switching off any other unit.



**Figure 3: Front view of a fully equipped subrack M 3421**

Each power supply is equipped with a fan at the front. It is important for mounting the subrack to ensure an easy air flow at its front and rear.



**Figure 4: Rear view of the subrack M 3421 with terminals**

All connections for the power supplies are made via plug-in terminals at the rear of the subrack.



**The use of 48 V power supplies in 24 V plants results in the destruction of the 24 V devices!**

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**Note**

At manual switch-on and switch-off of the power supplies a latency of one minute must be regarded as time between switch-off and switch-on.

Reason: Recovery time of the soft start circuit

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## 1.5 Use of several Power Supplies

If several 48 V power supplies are used in redundant operation (parallel operation), the common output current  $I$  must be set to the same value for all power supplies via the  $\Delta U$  potentiometer at the front of each power supply. The output current of the power supplies can be measured with a clamp measuring unit at the current terminals at the rear front of the subrack.

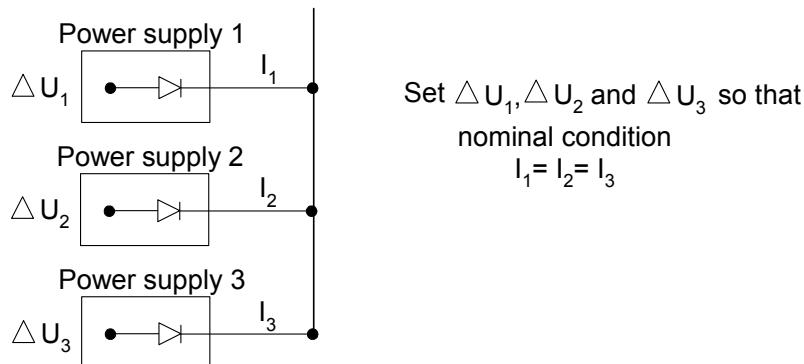


Figure 5: Adjustment of several power supplies via the  $\Delta U$  potentiometer

## 1.6 Technical Data PS 1000/230 02

Power supply	
Input voltage	230 VAC, -15...+10 % and 240 VAC, -15...+10 %, 50...60 Hz
Output voltage	48 VDC, adjustable +5 / -10 % via potentiometer $\Delta U$ in the front plate
Fuse	240 VAC 10 A automat
Maximum load	20 A continuously
Regulation	< 100 mV at load change 0...100 %
Efficiency	> 89 %
Power dissipation	< 110 W
Hold-up time	20 ms
Degree of protection	IP 20
Humidity	< 95 % rel., non-condensing
Ambient temperature	0...60 °C
Storage temperature	-40...+85 °C
Dimensions	28 SU, 4 units high W x H x D: 142 x 173 x 281 mm
Weight	approx. 6 kg
External fusing	16 A gL
Connections	min. cross sections for wiring: 240 VAC 1.5 mm <sup>2</sup> 48 VDC 10 mm <sup>2</sup> Fail 0.5 mm <sup>2</sup>
Fault contact	one potential-free changeover contact, connection via terminals 3 x 1.5 mm <sup>2</sup> in the subrack
Switching capacity	30 VDC / 1 A 30 VAC / 0.5 A
MTTF	30 years



## Z 6015: Power supply filter

- for power supply systems 24 VDC

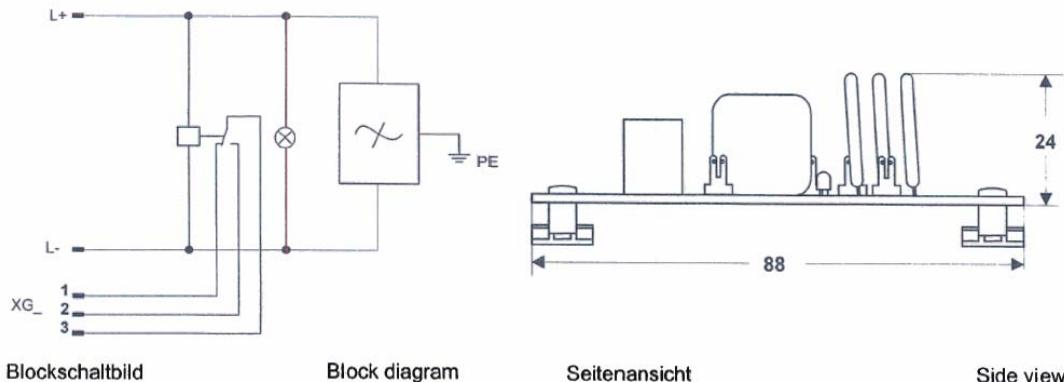


Figure 1: Block diagram and side view

### **Construction:**

EMC interference suppressor filter:

The power supply filter Z 6015 dampens wide-banded, low energy switching interferences (burst) according to IEC EN 61000-4-4 up to 2 kV, and wide-banded, high energy switching overvoltages (surge) according to IEC EN 61000-4-5 up to 1 kV on a 24 VDC power supply circuit. The interferences are discharged to earth.

### **Signalling:**

The power supply filter contains a potential-free changeover contact to announce a power failure. Correct function is announced via a green LED.

### **Installation:**

The power supply filter should be installed as near as possible to the 24 V feeding. With feeding lines > 0.5 m within the cabinet, the feeding line has to be screened:

- up to 35 A: 2 x 6 mm<sup>2</sup>, HIMA part no. 904 100001
- up to 63 A: 2 x 16 mm<sup>2</sup>, HIMA part no. 904 100002

### **Mounting:**

The power supply filter is mounted with a locking hook on a mounting rail. Thereby the contact to the housing earth is realized.

Connection	flat pin plug 6.3 x 0.8 mm
Construction	printed circuit board, IP 00
Dimensions	40 x 20 x 88 mm (W x H x D)
Operating voltage	24 VDC / -15 ... +20%
Loadability of the relay contacts	1 A, 30 VDC
Power consumption	16 mA at 24 VDC
Ambient conditions	-25 ... +70 °C



## Z 6016: Voltage dips buffering

- for feeding 24 VDC, 2 A, 20 ms

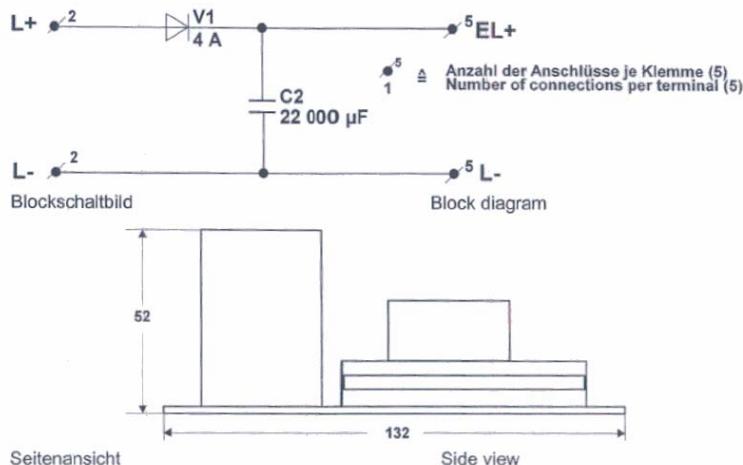


Figure 1: Block diagram and side view

### **Construction:**

The module with diode and electrolytic capacitor saves the 24 V power supply in case of voltage dips for up to 20 ms and up to 2 A current. The required connections are performed via a 14-pole terminal strip.

### **Mounting:**

The module can be used

- in HIMA Planar system with 24 VDC feeding and
- in HIMA Planar system with power supplies without voltage dips buffering

### **Planting hint:**

To calculate the number of the required buffering modules please refer to the operating data in the data sheets of the used modules.

### **Installation applications:**

- on a side wall extension in subracks, with a spacer
- vertical, between 2 profile channels with thread out of the HIMA Mechanical System
- vertical in the fixing centres of the HIMA Mechanical System. With spacer (e.g. in the device rack)
- vertical or horizontal with two locking hooks on a mounting rail

### **Accessories:**

Fixing material consisting of

- Spacer
- Locking hook with screw in an additional assignment

Fusing	4 A gL
Connection	Terminal strip, up to 2.5 mm <sup>2</sup>
Construction	Printed Circuit Board, IP 00
Dimensions	40 x 52 x 132 mm (W x H x D)
Operating voltage	24 VDC / -15 ... +20%
Ambient conditions	-25 ... +70 °C



## Z 6019: Power supply filter

- for power supply systems 48 VDC

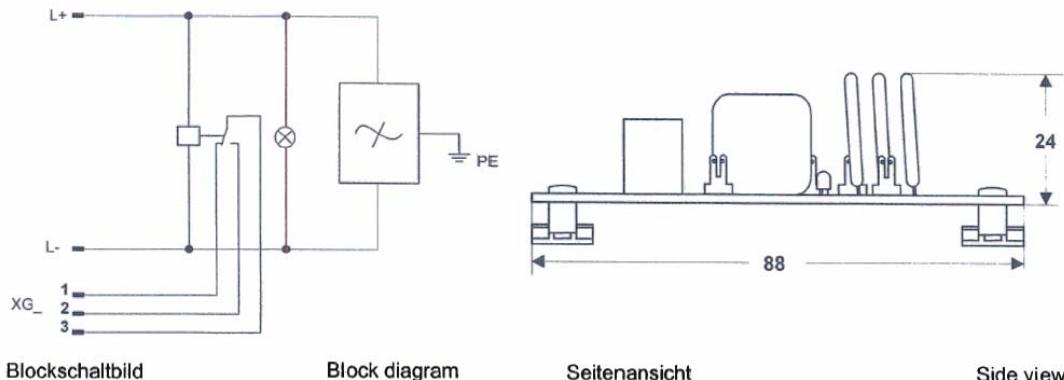


Figure 1: Block diagram and side view

### **Construction:**

EMC interference suppressor filter:

The power supply filter Z 6019 dampens wide-banded, low energy switching interferences (burst) according to IEC EN 61000-4-4 up to 2 kV, and wide-banded, high energy switching overvoltages (surge) according to IEC EN 61000-4-5 up to 1 kV on a 48 VDC power supply circuit. The interferences are discharged to earth.

### **Signalling:**

The power supply filter contains a potential-free changeover contact to announce a power failure. Correct function is announced via a green LED.

### **Installation:**

The power supply filter should be installed as near as possible to the 48 V feeding. With feeding lines > 0.5 m within the cabinet, the feeding line has to be screened:

- up to 35 A: 2 x 6 mm<sup>2</sup>, HIMA part no. 904 100001
- up to 63 A: 2 x 16 mm<sup>2</sup>, HIMA part no. 904 100002

### **Mounting:**

The power supply filter is mounted with a locking hook on amounting rail. Thereby the contact to the housing earth is realized.

Connection	flat pin plug 6.3 x 0.8 mm
Construction	printed circuit board, IP 00
Dimensions	40 x 20 x 88 mm ( W x H x D )
Operating voltage	48 VDC / -15 ... +20%
Loadability of the relay contacts	1 A, 60 VDC
Power consumption	8 mA at 48 VDC
Ambient conditions	-25 ... +70 °C



**HIMA**  
...the safe decision.



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