

Installation and Operating Instructions

Metered PSM PowerSystemModule with 2 Infeeds

DK 7856.016

6th Version: January 25, 2007



Designed according to
DIN EN 60950-1 (VDE 0805):2003-03

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1. Introduction

The stable flow of information and production is the 'lifeline' of an enterprise.

Loss of data, failure of function and production cause extensive and in many cases life-threatening damage. Therefore, it is the declared company objective to ensure a maximum of safety and reliability.

Rittal offers the support to achieve this: By means of universal competence in effective prevention, comprehensive safety, and centralised organisation, i.e. teamwork for IT safety and reliability! This results in the optimum combination of power management, enclosure monitoring, server administration and climate control components.

The solution for power management is called Rittal Metered PSM. This concept covers all aspects of power management in the enclosure, i.e. infeed, distribution and protection as well as measurement of the electrical current, voltage, power, output, and frequency parameters.

The system is enhanced still further by its modular structure. A basic installation can be realised with a bare minimum of outlay. When demands then grow over time, the original system can simply be expanded with further plug-in modules, also available in various country-specific versions.

The principal features of Rittal Metered PSM are:

- Two separate 3~ infeeds, permitting redundant configurations
- 96 A current in total, i.e. 48 A per infeed
- 6 plug-in modules can be accommodated on a 2-metre busbar, which corresponds to 36 IEC 320 appliance sockets
- Shock-hazard-protected design, i.e. it is not necessary to configure the whole busbar at once
- Modular design for simple installation
- Full compatibility with Rittal enclosure systems
- Connection to the CMC-TC

Notes on the documentation

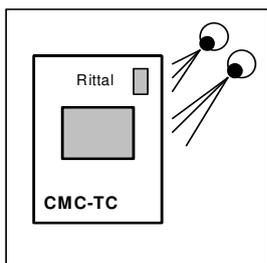
You absolutely must read this operating manual before starting operation and store this manual for further use in an easily accessible place.

Rittal cannot be made liable for damage and breakdowns that result when the instructions in this manual are not followed.

Storing the documents

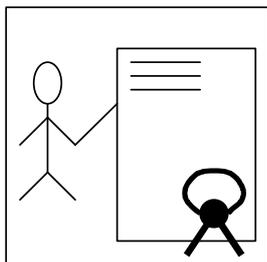
This manual and all applicable documents are part of the product. They must be handed over to the operator of the device. The operator then stores the documents so that they are available when needed.

2. Safety Instructions



General remarks

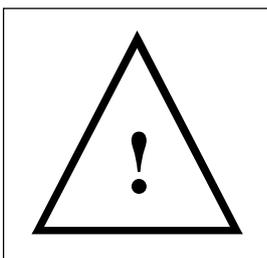
The installation and operating instructions contain basic information for installation, for putting into operation, and for operating the Rittal Metered PSM. It is a must to make the instructions available to the installation technician and the administrative operating personnel and that they should read these carefully. Rittal cannot accept liability for personal injury and material damage resulting from non-observance of the safety advice in the installation and operating instructions. It is essential to observe not only the general safety advice given in this chapter, but also the special safety advice given in the other chapters.



Personnel qualification and authorisation

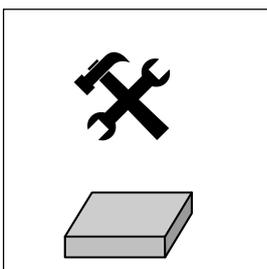
Operation and any changes may be carried out only by authorised specialist personnel or by authorised trained operating personnel.

The PSM may only be connected with the connector provided by a qualified electrician.



Risks due to non-observance of safety advice

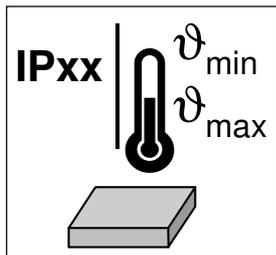
Non-observance of the safety advice may result in risks for the personnel, as well as to the Rittal Metered PSM together with the connected equipment. Non-observance of the safety advice involves loss of the right to claim for all and any damages.



Working at the PSM

The generally applicable electrical regulations of the country in which the unit is installed and operated must be observed, just as the existing national regulations for the prevention of accidents and any internal rules (work, operating, safety regulations) issued by the operator. Prior to working at the unit this must be disconnected from the supply and secured against being switched on again. Original accessories and accessories authorised by the manufacturer ensure safety. The use of other parts may make void the liability for consequences resulting from this. Repair work at the PSM may be done only by Rittal or by authorised personnel.

Operating reliability



The operating reliability of the product supplied is only warranted in case of use as intended and according to the rules. The limit values quoted in the technical data (see Chapter 18. Technical Data) must not be exceeded under any circumstances. This applies particularly to the allowed ambient temperature range and the allowed IP protection category. For applications with a higher specified IP protection category the Rittal Metered PSM must be installed in an enclosure of a higher IP protection category, complying with the specified protection category. Operation of the Metered PSM system in direct contact with water, aggressive media, or inflammable gases and fumes is prohibited.

Caution:

You must make sure that the “N” and “L” cables of the infeed are not swapped because otherwise the Rittal Metered PSM will be damaged.

3. Service and Service Address

If you have any questions concerning technical or other issues related to our product range, Rittal will be pleased to provide any required support. You can also contact us at the following address.

RITTAL GmbH & Co. KG
PM IT-Service
Auf dem Stützelberg

D-35745 Herborn
Germany

<http://www.rittal.de>

Email: info@rittal.de

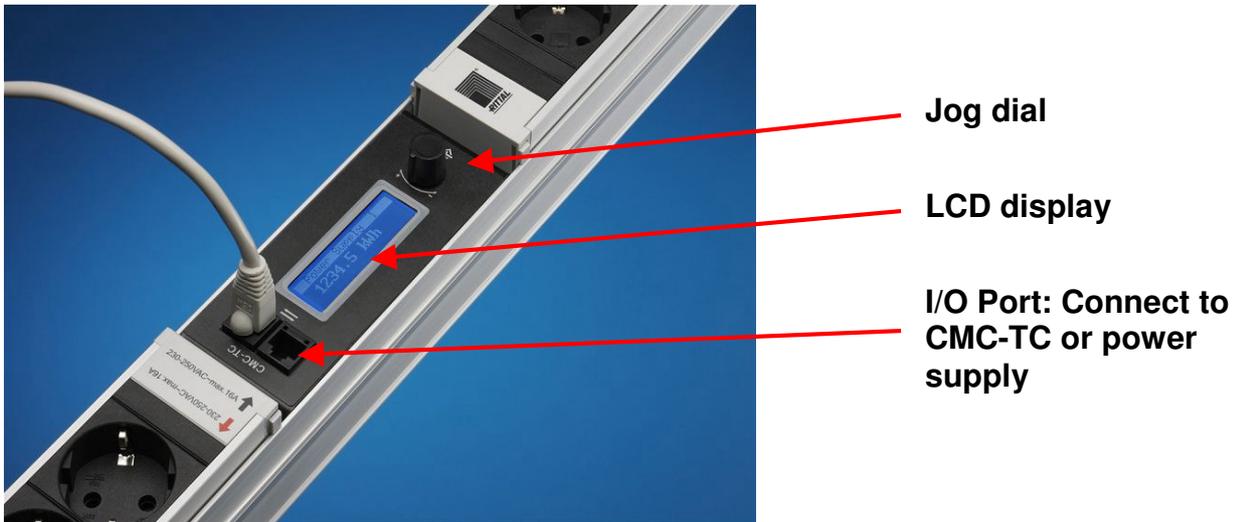
Note: Please always specify the item number in the reference line

Tel.: +49 (0)2772/505-0
Fax: +49 (0)2772/505-2319

Further information for the Rittal Metered PSM is ready for downloading from the Rittal homepage.

4. Description

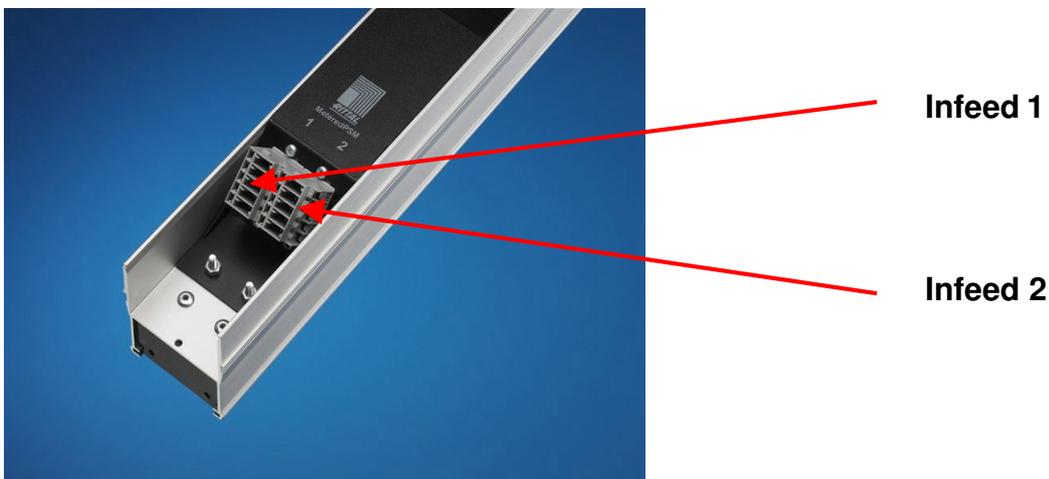
The Power System Module PSM offers revolutionary power management for IT racks. The modular power supply system realises power input via a vertical mounting rail (busbar) with a three-phase infeed. The individual Power System Modules are simply clipped to this rail. The Metered PSM rail offers you the ability to measure the voltage, current, power, and output per infeed and per phase. In addition, the network frequency can be measured on each infeed. The Metered PSM rail also offers you the ability to specify upper and lower thresholds for the voltage and current in each phase.



The Jog dial is used to configure the Metered PSM rail and to navigate through the display menu shown in the LCD display. When connected to the CMC-TC it is possible to query all rail parameters in a web interface. It can also be integrated into a network management system using SNMP.

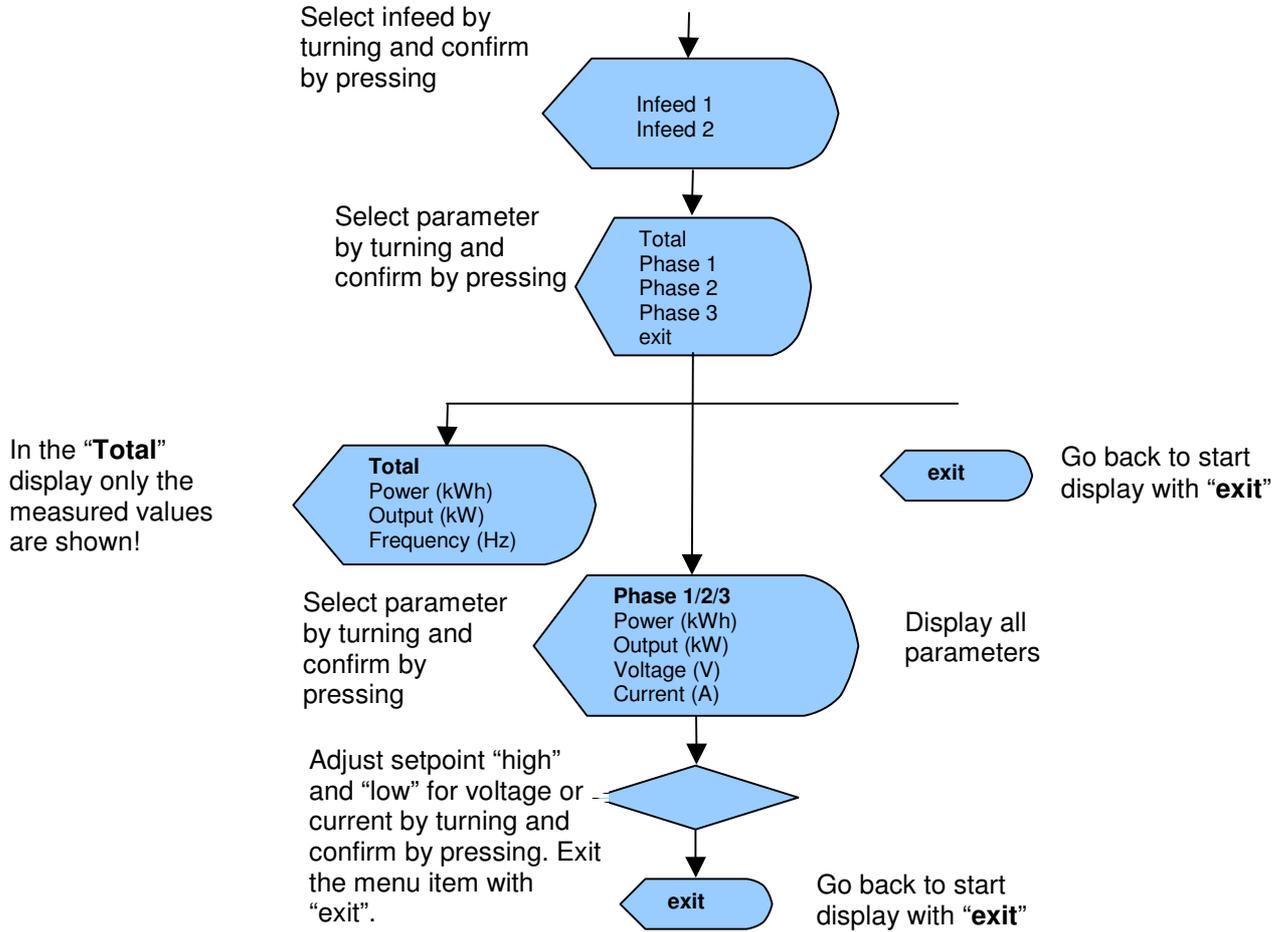
If the Metered PSM rail is operated directly with a power supply, then all values can be read off the display. The power supply is connected to the I/O port. Remote configuration and administration capabilities are not available when the Metered PSM rail is operated with a power supply.

When a value drops below or rises above a threshold setting on the Metered PSM rail, the display blinks and an error message appears on the bottom of the screen.

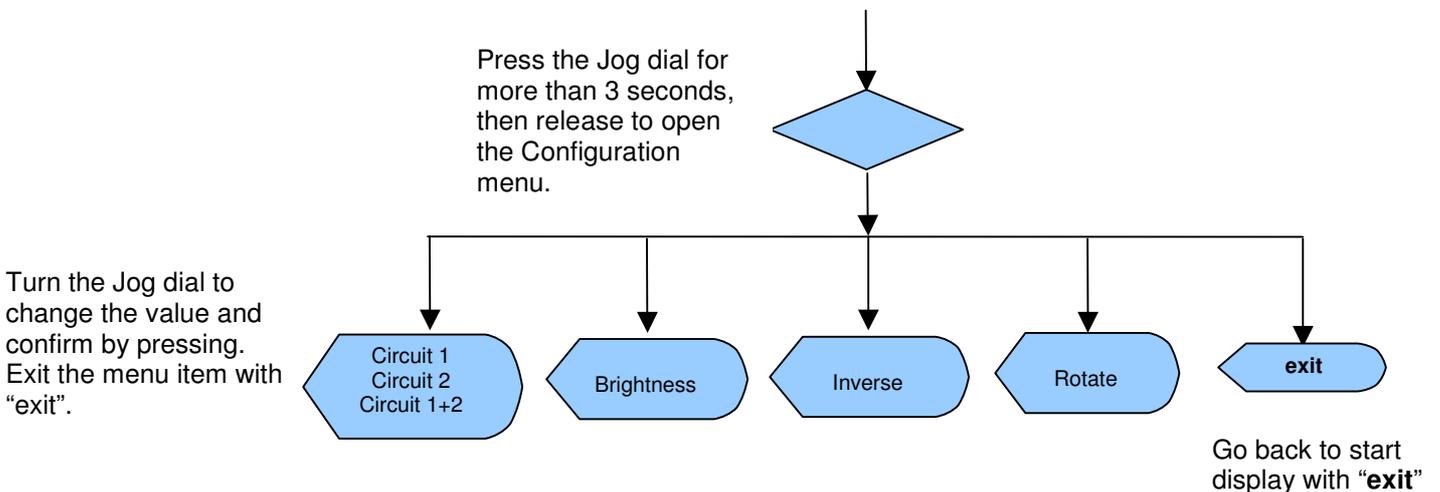


The offset connector allows you to route the connection cables in parallel to the Metered PSM rail.

5. Configuring the Metered PSM



Configuration of the display



6. Connection to the CMC-TC

Applicable documents

In addition to this manual, the CMC-TC PU II manual and the safety instructions it contains are also applicable, among other manuals.

You can download the German version of this manual at

http://www.rittal.de/downloads/Software/de/CMC_TC/12_CMC_TC_Processing_unit/7320100V21d.pdf

and the English version at

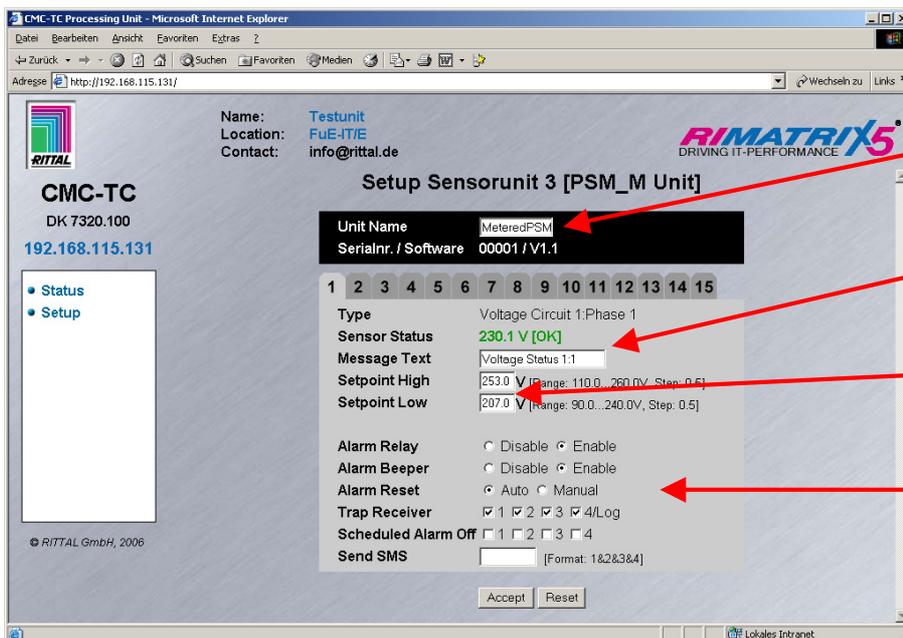
http://www.rittal.de/downloads/Software/de/CMC_TC/12_CMC_TC_Processing_unit/7320100V21d.pdf

You will need the Acrobat Reader program to view the documents. This program can be downloaded at www.adobe.de.

Initial operation

The Metered PSM rail can be managed completely using the CMC-TC PU. The Metered PSM rail is directly connected to the sensor unit input of the PU. The rail is detected automatically and is immediately ready for operation.

The layout of tab windows 1 to 12 is identical. Tabs 1 to 3 show the voltages L1, L2, and L3 of Infeed 1. Tabs 4 to 6 show the current of Infeed 1. Tabs 7 to 12 display the values for Infeed 2.



Name of the Metered PSM rail; is also used when sending SNMP traps

Message text

Upper and lower thresholds

Alarm management, see also DK7320.100

Tab window 13 displays the power and output values for Infeed 1. Tab window 14 displays the same information for Infeed 2.

CMC-TC Processing Unit - Microsoft Internet Explorer

Name: Testunit
Location: FuE-IT/E
Contact: info@rittal.de

CMC-TC
DK 7320.100
192.168.115.131

• Status
• Setup

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Setup Sensorunit 3 [PSM_M Unit]

Unit Name: MeteredFSM
Serialnr. / Software: 00001 / V1.1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Circuit 1

Total kWh: 1234.5 kWh
Total kW: 60.0 kW
Frequency: 50.0 Hz

Values per Phase, Circuit 1

Power 1:1: 30.0 kW
Power 1:2: 30.1 kW
Power 1:3: 30.2 kW

Energy 1:1: 120.0 kWh
Energy 1:2: 120.1 kWh
Energy 1:3: 120.2 kWh

Accept Reset

Tab window 15 provides an overview of the voltage and current values of both infeeds for all phases.

CMC-TC Processing Unit - Microsoft Internet Explorer

Name: Testunit
Location: FuE-IT/E
Contact: info@rittal.de

CMC-TC
DK 7320.100
192.168.115.131

• Status
• Setup

© RITTAL GmbH, 2006

Setup Sensorunit 3 [PSM_M Unit]

Unit Name: MeteredFSM
Serialnr. / Software: 00001 / V1.1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Actual Values

Circuit:Phase	Voltage	Current
1:1	230.1 V	10.1 A
1:2	230.2 V	10.2 A
1:3	230.3 V	10.3 A
2:1	231.1 V	11.2 A
2:2	231.2 V	11.3 A
2:3	231.3 V	31.0 A

Accept Reset

7. Design

The vertical busbar is an H-shaped aluminum section. The power distribution for the individual plug-in modules is realised in the rear, concealed section. The busbar can be clipped directly into the vertical enclosure frame members of Rittal flexRack(i), or else retrofitted to other existing racks. For retrofitting, a separate mounting kit (DK7856.011) is required.

Once the busbar is fitted in the enclosure, a voltage supply must be provided in a suitable form. This can be done either by way of a three-phase connector, e.g. IEC309 16A, or with wiring. Connecting lines are available as Rittal accessories.

Observe the correct fuse values!! Refer to the notes on the rating plate.

The plug-in modules can now be clipped onto the busbar in the desired positions. They are locked into place by way of the lugs on the end faces. A module can only be released from the busbar after it has been unlocked. To unlock a module, the lugs on the end faces must be pressed down **at the same time** at both ends. The module can then be pulled off the busbar.

Condition: Both infeeds must be connected by the customer.

8. Functions

The focus of the functionality of the Rittal Metered PSM is to distribute electrical power over the enclosure height and measure the electrical parameters for the current, voltage, power, output, and frequency. The slots can be realised where they are needed.

- Two infeeds
- Plug-in modules IEC 60320 C13, IEC 6030 C19, and earthing contact
- Max. 36 sockets over an enclosure height of 2 metres
- Optimised cable management
- Measurement of electrical parameters

Optional:

- Connection cable DK7856.025 or DK7856.026
- 3~ overvoltage protection
- Various plug-in modules
- Connection to CMC-TC

9. Installation

The Rittal Metered PSM system is to be installed either in an enclosure or case system to provide additional protection against external influences. The length of lines should not exceed the lengths specified in the technical data for preventing losses caused by unnecessary line lengths. In addition, the allowed ambient temperature and humidity ranges must be complied with, just as the IP protection category as required for the specific application. Compliance with a higher required IP protection category can be achieved by installation into an enclosure or case system having the required protection category.

In addition, the following points must be observed:

- **When using accessories in connection with the Rittal Metered PSM, the installation and operating instructions for the accessories and for the Rittal Metered PSM must be observed.**

10. Mechanical Components

Note: Rittal Metered PSM can either be clipped into the vertical enclosure frame members of Rittal flexRack(i), or else retrofitted to other enclosures using the corresponding Rittal mounting kit.

11. Electrical Components

Note: During installation the existing national and regional regulations of the country, in which the Rittal Metered PSM is to be installed and operated, must be observed.

- **Warning: Danger for life! Always observe strictly:**
No objects must be inserted into the socket receptacles of the plug-in modules, nor into the connectors on the busbar, as high electrical voltages may be present and may even result in the death of the persons involved.
Warning! Dangerous voltage! Risk of death!
- It is imperative to disconnect any device operated via the plug-in modules of Rittal Metered PSM from the power supply, e.g. by pulling the mains connection cable, before commencing any maintenance or repair work.
- In the case of plug-in modules with built-in circuit-breakers, it must be ensured that the module concerned is disconnected from the power supply before resetting the circuit-breaker. This is achieved, for example, by pulling the mains connection cable.

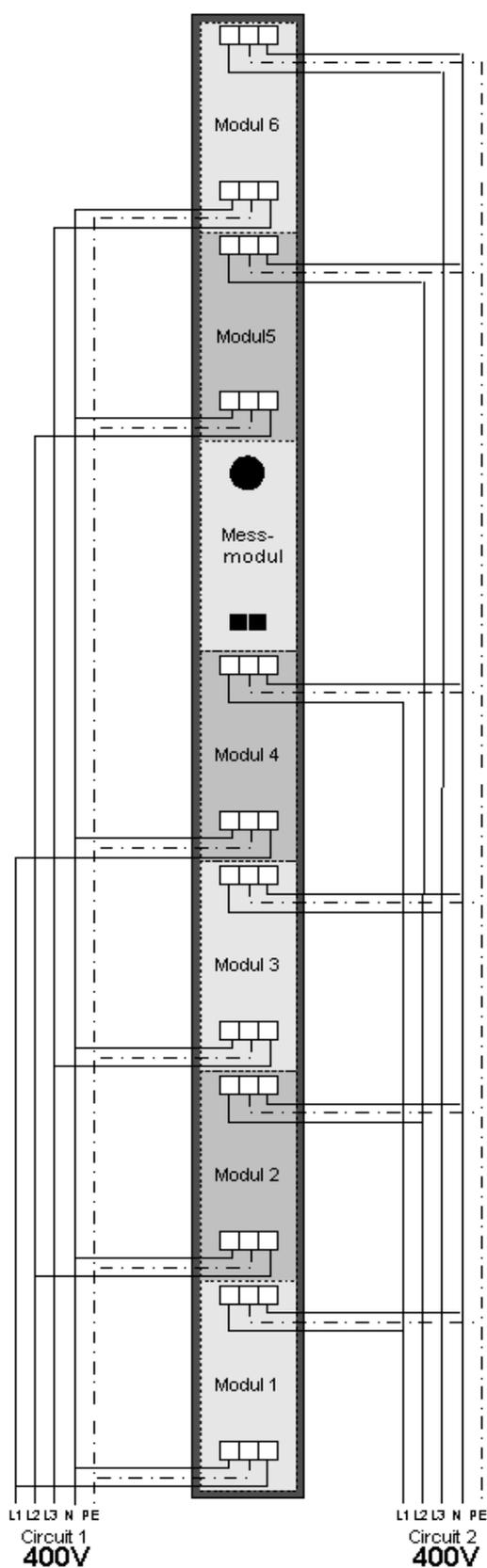
In addition the following points must be observed:

- Existing safety devices must not be made ineffective.
- You must make sure that the “N” and “L” cables of the infeed are not swapped because otherwise the Rittal Metered PSM will be damaged.

- The Rittal Metered PSM must only be operated with a PE connection. The PE connection is made at the terminal strip. The prerequisite here is that the connecting cable is connected with a PE terminal on the mains side.
- The voltage of the electrical connection must correspond to the nominal values specified on the rating plate.
- Before commencing any work on the Rittal Metered PSM, it must always be disconnected from the power supply and secured to prevent inadvertent reconnection.
- The Rittal Metered PSM must not be modified in any way. The internal wiring and connections made by the manufacturer must not be altered!
- Cables are gathered and secured by fitting the enclosed cable brackets in the case or enclosure.

12. Wiring Diagram

The diagram shows infeeds on a 2-metre strip.



13. Commissioning

Note:

Follow the steps described in Chapter 19. Assembly Instructions and 20. Electrical Connection of the Busbar.

14. Maintenance

The Rittal Metered PSM is a maintenance-free system which does not need to be opened for the purposes of installation or operation. If the housing or any accessory components are opened, all warranty and liability claims will be rendered null and void.

15. Cleaning

The Rittal Metered PSM system can be cleaned using a dry cloth. The use of any aggressive substances, e.g. cleaning solvents, acids, etc., will lead to destruction of the system.

16. Disposal

As the Rittal Metered PSM comprises predominantly aluminium and plastic materials, it should be sent for proper disposal and recycling if it is no longer needed. The infeed cables should be removed before disposal. The boards must be disposed of separately.

17. Scope of Delivery / Accessories

- 1 busbar
- 1 set of operating instructions
- 1 cable bracket, incl. mounting accessories

18. Technical Data

Busbar	Aluminum, anodised
Height	for enclosure height 2.00m
Width	approx. 6 cm
Depth	approx. 5.5 cm
Weight	approx. 4 kg without packing, without modules
Potential equalisation	yes
Grounding	yes
IP protection category	IP 20 to EN 60529
Temperature range	+5 °C to 45 °C/+41 °F to 113 °F
Humidity range	5% to 95% relative humidity, non-condensing
Storage temperature range	-20 °C to 60 °C/ -4 °F to 140 °F
Power connection:	
Power supply	Circuit I: 3/N 400VAC/230 VAC, max. current 3x16A Circuit II: 3/N 400VAC/230 VAC, max. current 3x16A
Fusing	Back-up fuse, customer side, 16A per phase. Observe data on the busbar rating plate!
Infeed connecting cable:	2x Wago X-Com connector 3-phase design with neutral conductor and PE Separate neutral conductor Common PE Max. current 3x16A per infeed Sep. housing earthing point min. cross-section 2.5mm ²

19. Assembly Instructions

General notes to be observed when mounting the PSM:

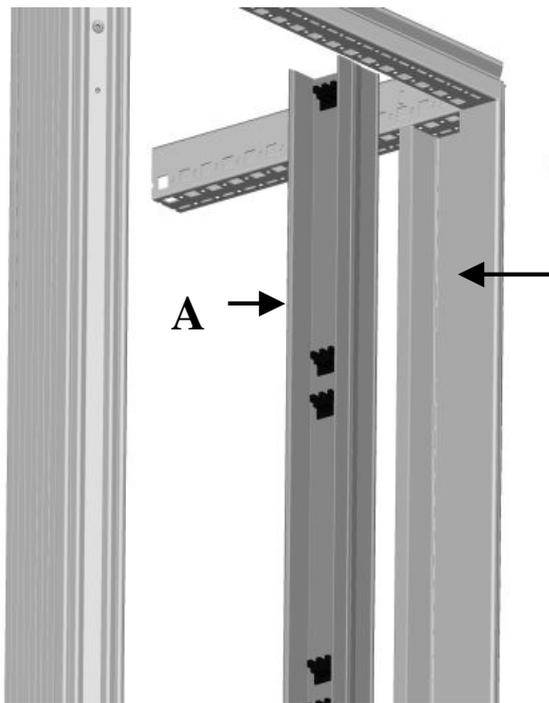
Mounting in **flexRack(i)**

- In the case of enclosures with a swing frame, mounting is only possible on the side of the enclosure where the swing frame hinges are fitted. Otherwise, the swing radius of the swing frame will be impaired.
- In 600 mm wide enclosures, the rear 19-inch level may be slightly obstructed by the Metered PSM. This must be taken into account in overall configuration.

Mounting in **TS enclosures**

- A separate mounting kit (DK7856.011) is required. The two mounting brackets are screwed to the end covers of the Metered PSM. The fastening holes in the brackets permit mounting at various depths. It must be ensured, however, that the Metered PSM remains readily accessible when the punched sections with mounting flanges are installed.
- In the case of enclosures with a swing frame, mounting is only possible on the side of the enclosure where the swing frame hinges are fitted. Otherwise, the swing radius of the swing frame will be impaired.
- In 600 mm wide enclosures, the rear 19-inch level may be slightly obstructed by the Metered PSM. This must be taken into account when installing devices and equipment in the enclosure.

Mounting in Rittal flexRack(i)



With Rittal flexRack(i), the Rittal Metered PSM can be clipped into the vertical frame members of the enclosure.

To this end, the busbar (A) is placed up against the side of the vertical section (B). Ensure that the busbar sits in the side groove over the whole length. The two parts are then clipped together by pressing the other side of the busbar to overcome the resistance of the mounting lugs.

This requires a certain amount of force.

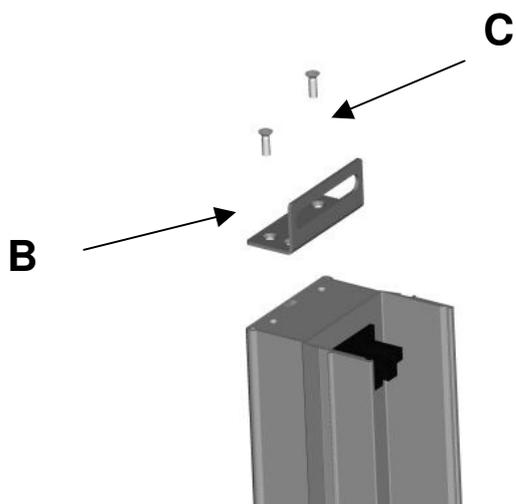
Once the two parts are locked together, they cannot be separated again without causing damage to one or both parts.



Busbar locked into place against the vertical frame member.

Mounting in Rittal TS enclosures

To enable mounting in other Rittal enclosures, you need the corresponding Rittal mounting kit (static installation 7856.011 or hinged 7856.012) for 1.20 m and 2.00 m enclosure height.

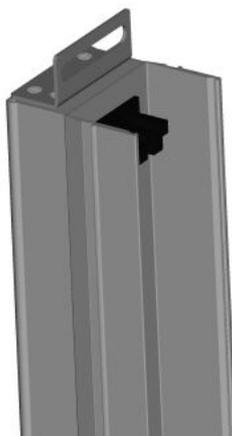


PLOS_ZUST-EXP0001

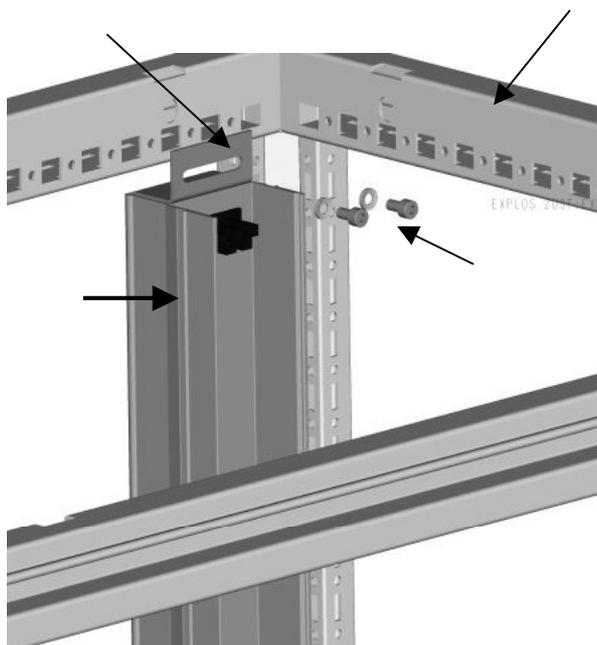
The two mounting brackets (B) from the mounting kit must be used. These brackets are screwed to the plastic end covers of the busbar with the enclosed screws (C).

The depth at which the busbar is mounted in the enclosure can be varied by screwing the mounting brackets to the end covers the other way round.

B →



Mounting in Rittal TS enclosures, base and roof frames

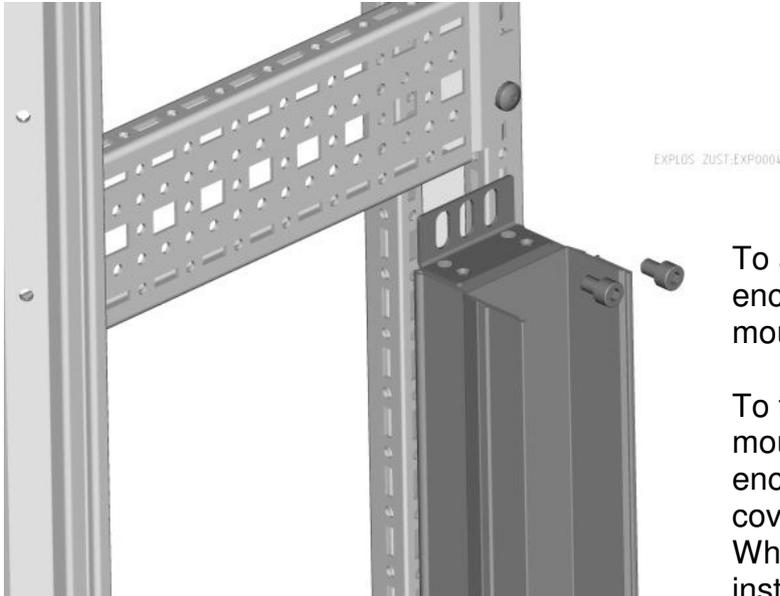


For retrofitting, the Rittal Metered PSM can also be fastened to the base and roof frames (D).

To this end, the two mounting brackets (B) from the mounting kit must be used. The 90°-angled brackets (B) are fastened to the end covers at the top and bottom of the busbar. The busbar (A) with the mounted brackets is then fastened to the appropriate roof and base frame elements using the enclosed screws and washers (C).

Mounting in Rittal TS enclosures, punched mounting sections

If the punched sections with mounting flanges are used, the busbars can also be fitted in enclosures of different heights. It is also possible to realise a combination of punched section and roof or base frame mounting.

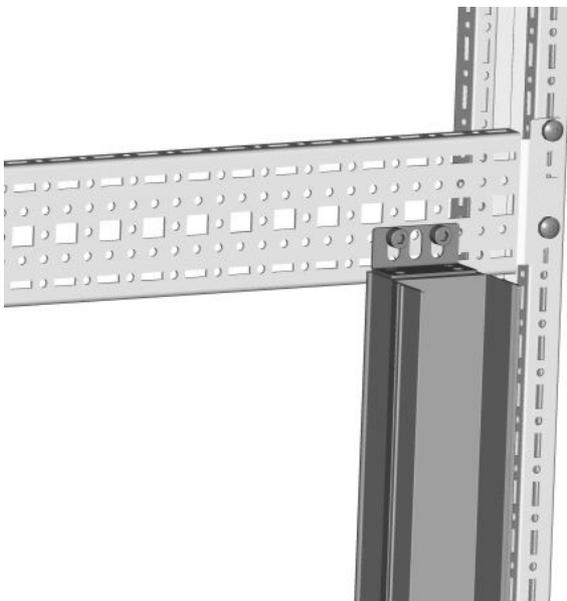


To accommodate varying heights of enclosure or Rittal Metered PSM, another mounting variant is possible:

To this end, the punched section with mounting flange must be fitted in the enclosure at the height of the busbar end covers.

When doing so, observe the assembly instructions of the enclosure type concerned.

Here, too, the mounting brackets are fastened to the two end covers of the busbar.



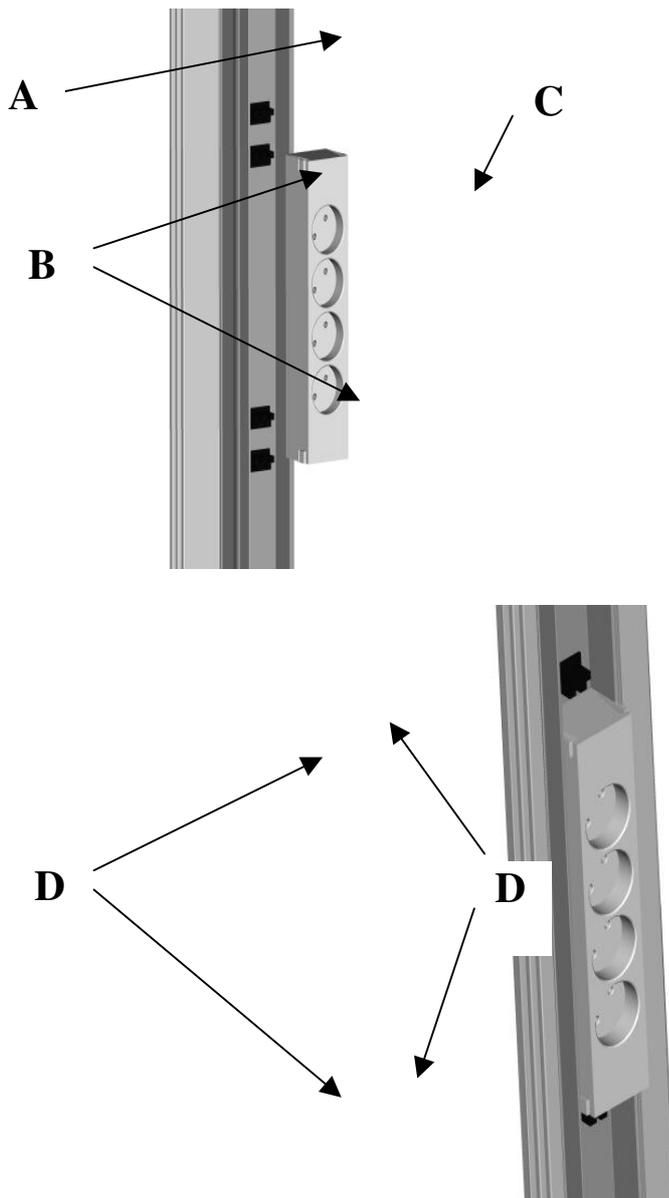
The busbar can then be mounted on the punched sections (not included in the scope of delivery, must be provided separately).

Mounting the plug-in modules

It is only possible to use original Rittal plug-in modules with the Rittal Metered PSM. The use of any other parts will render all warranty claims null and void.

Max. 6 modules can be mounted to a 2-metre busbar. It is not necessary to mount always the full possible number of modules, as the busbar is designed with shock-hazard protection.

It is important that all infeeds are connected to ensure a redundant configuration. See Chapter 20. Electrical Connection of the Busbar:



Mounting the plug-in modules:

The plug-in modules (C) can also be mounted and removed while the busbar (A) is in operation.

When the modules (C) are mounted, there must be no consumers in the power sockets. First, mount the modules on the busbar, and then connect the corresponding consumers.

If consumers are connected at a module, it must be remembered that power to all these consumers will be lost if the module is removed from the busbar.

The plug-in module (C) is placed centered on the two connectors (B) and locked into place with a gentle push.

The module (C) is mounted correctly, if all four retaining lugs (D) at the end faces have locked into the busbar.

To remove a plug-in module (C), you should first remove all consumers connected to the module concerned. Then release all four retaining lugs (D) at the same time and carefully withdraw the module.

When doing so, ensure that the module is not tilted.

Use only fuses with the fuse value printed on the original fuse.

Caution, you may need to eliminate a short circuit first!

Orientation of the plug-in modules

The plug-in modules can only be mounted at the points provided for these modules.

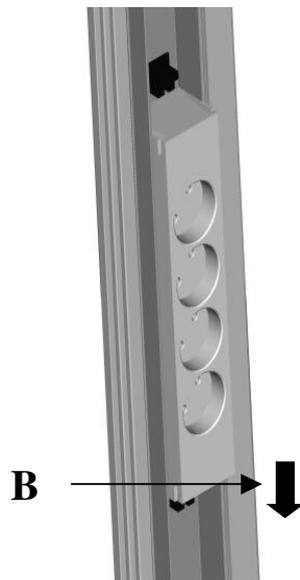
Orientation of the modules:

Black marking (A) to the top



⇒ **Infeed I**
is used

Black marking (B) to the bottom



⇒ **Infeed II**
is used

**When wiring, refer to Chapter
12. Wiring Diagram**

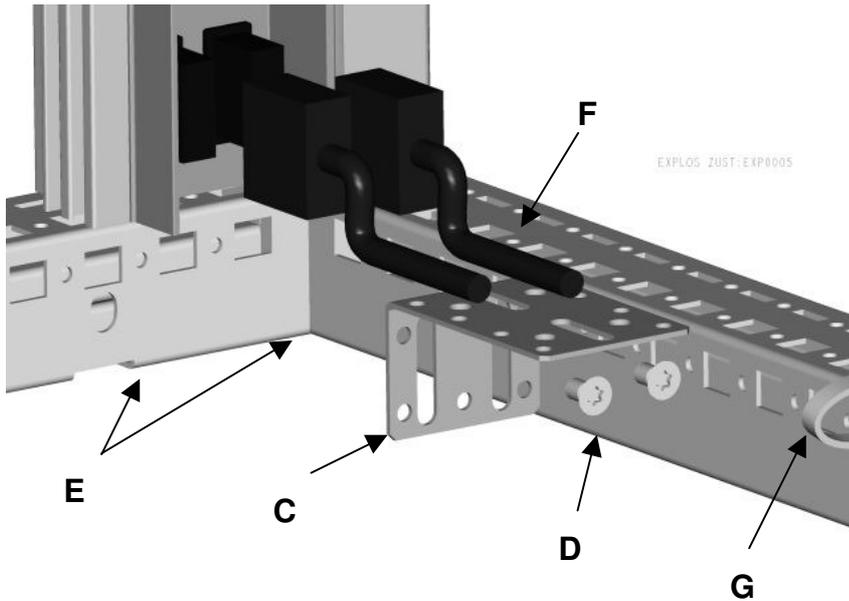
Observe also the technical notes given on the instruction sheet enclosed in the package with the plug-in modules!

Infeed strain relief (proposal)

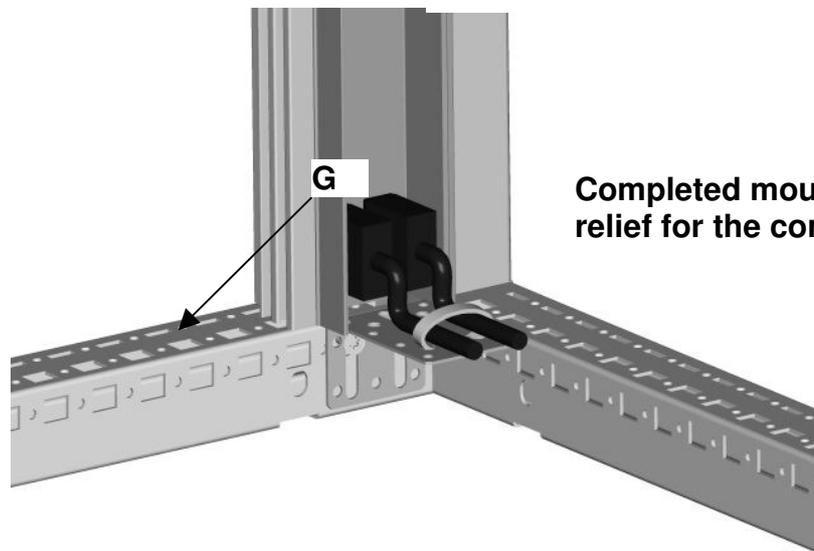
The screw connections provide for strain relief at the connecting cables. Alternatively, an additional strain relief can be realised as described here.

The connecting cable can be routed using the cable bracket (C) provided. Fasten the cable bracket (C) to the base frame (E) using the screws (D) supplied.

The connecting cable (F) is then fastened to the cable bracket (C) with the enclosed cable ties (G). This configuration provides for adequate strain relief.

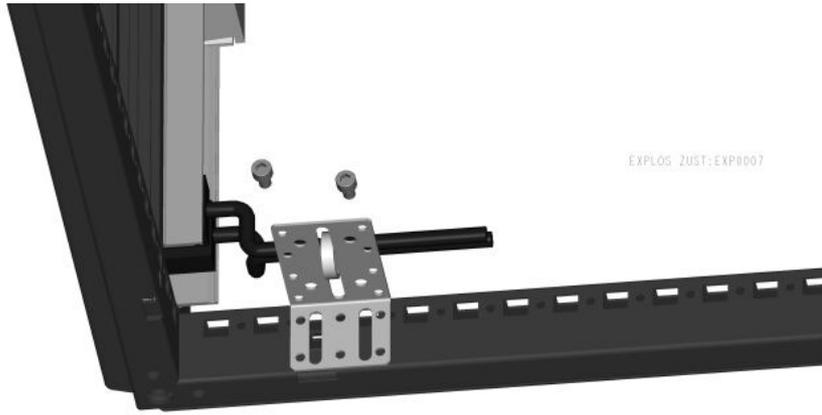


- The mounting of the strain relief may vary according to the specific installation situation in the enclosure.
- Where gland plates are fitted, the cable can also be tied directly to the base frame.

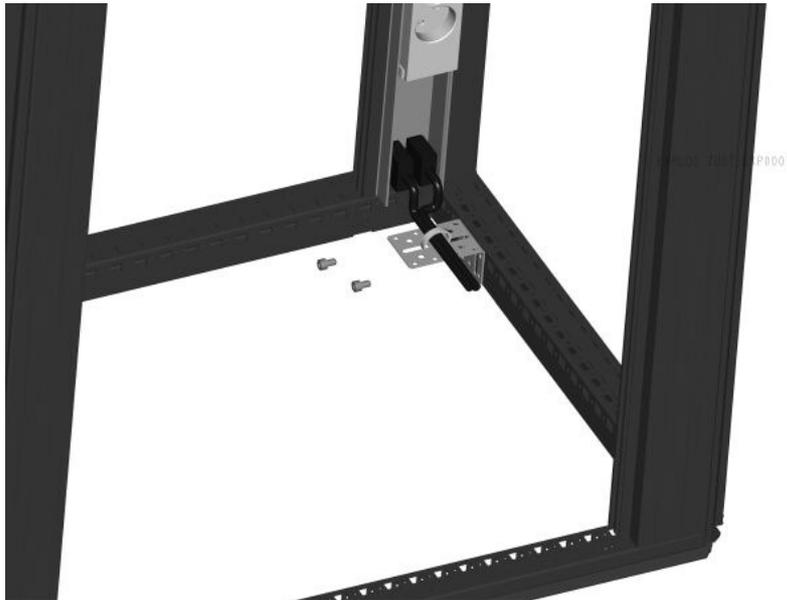


Completed mounting of strain relief for the connecting cables

Options for mounting of the cable bracket

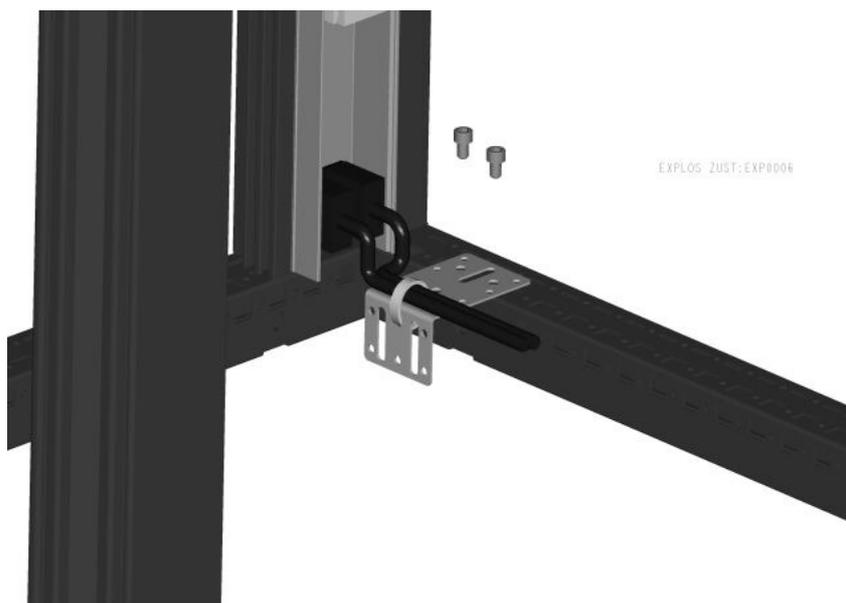


Side view, inside from below

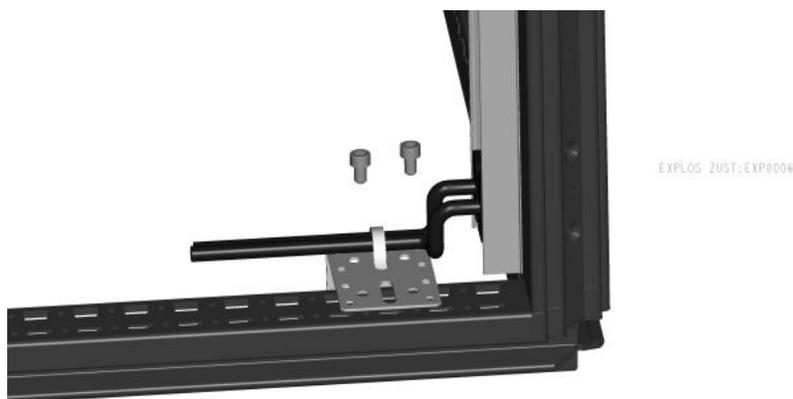


Top view, outside from above

Options for mounting of the cable bracket

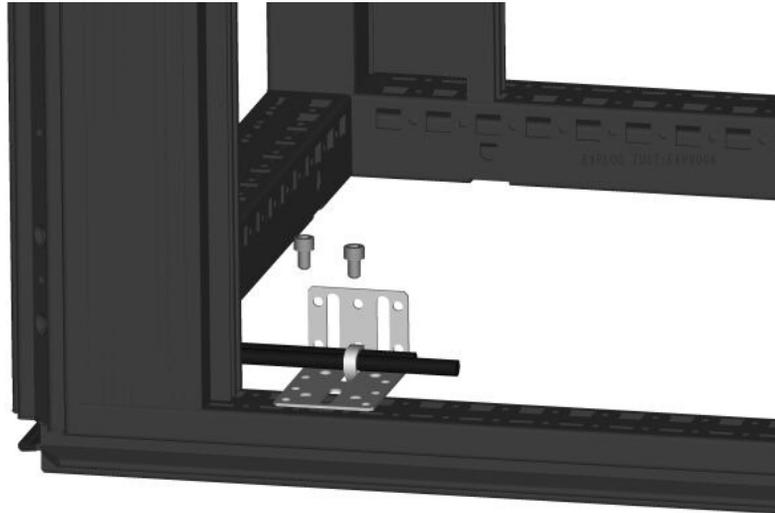


Side view, from inside

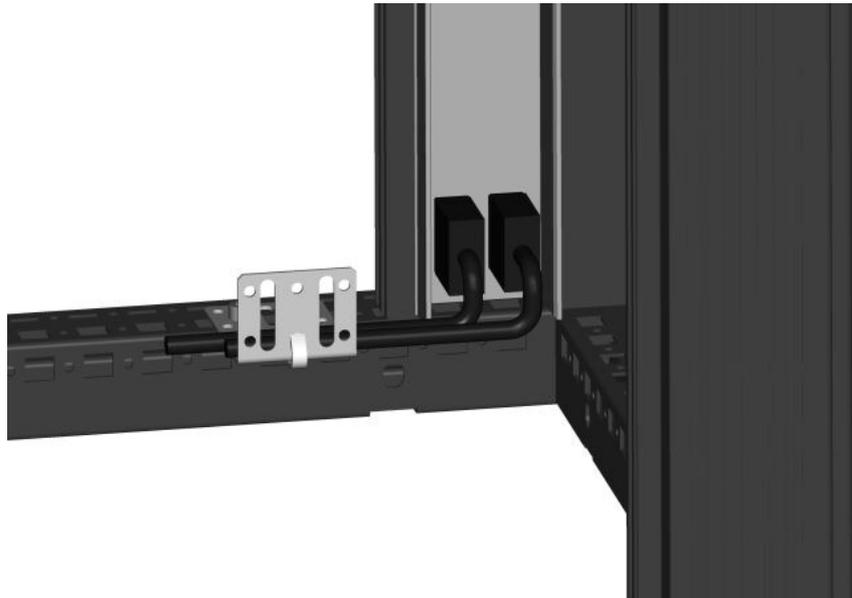


Side view, from outside

Options for mounting of the cable bracket



Side view, from outside



Side view, from inside

20. Electrical Connection of the Busbar

The busbar permits infeeds of two different power supply systems for IT enclosures. The Rittal Metered PSM has two Wago X-Com connectors for this purpose:

Infeed I and II: 3/N ~ 400V/240V

Within the busbar, the two three-phase circuits are completely independent of each other, i.e. they each make available L1, L2, L3, N and PE.

The protective conductors of the two circuits are placed together in the busbar and connected to the busbar housing.

Technical data of the infeeds

2x Wago X-Com connectors

3-phase circuit with neutral and PE
separate neutral conductors
common PE

max. current 3x16A per infeed

separate housing earthing point min. cross-section 2.5 mm²

Safety notes!!

- **Note at all times that this product is a busbar with multiple infeeds.**
- **If the busbar is connected via the CEEKon connecting cable, the corresponding CEEKon supply socket must be as close as possible to the busbar.**
- **If the busbar is not connected via a CEEKon connector, but is instead installed permanently, a suitable mains power disconnection device must be provided.**
- **The chassis of the busbars and plug-in modules must not be opened. Danger for life!!**
- **If, for whatever reason, it becomes necessary to perform work on the busbar, both circuits must be disconnected from the mains supply.**
- **A clear label must be provided at the disconnecting device of both power circuits, describing how the equipment is to be properly disconnected from the power supply.**
- **The cable strain relief bracket enclosed in the package should be used at the infeed.**
- **Observe all warnings and rating plates attached to the busbar!!!**
- **When connecting the busbar, ensure that an appropriate fuse is provided. Observe the regulations of the local power supply company, as well as the rating plate on the busbar.**

Earthing

Attention: The busbar possesses a housing earthing point in the area of the infeed. This earthing point is labeled with the \oplus symbol. A conductive connection must be made from this earthing point to the enclosure frame.

sep. housing earthing point

min. cross section 2.5 mm²

The PE conductor of both power circuits is brought to a common housing potential in the busbar.

On the supply side, the connecting cable can be taken to a 16A three-phase connector, or to an appropriate splice box or distribution panel.

Connectors and pin layout for the infeed and data cables

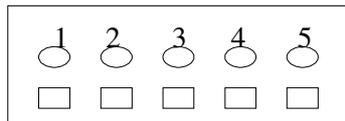
5-pin 1-conductor female multi-point connector, with lock on side, for insertion into the base terminal block

The connector plug does **not** fulfil the function of an on-load isolator.

The following conductors can be used:

- Single wire
- Multiple wire
- Fine-wire
with each wire tin-plated
Braided cable
with wire end ferrule¹⁾ or pin cable terminal lug (crimped to be gastight)

¹⁾ When wire end ferrules are used, the next smallest wire cross-section should be used.

Terminal assignments:

PE N L1 L2 L3

Technical Data:

Number of poles: 5
Cross-section from [mm²] 0.08mm²
Cross-section to [mm²] 4mm²
Cross-section from [AWG] 28AWG
Cross-section to [AWG] 12AWG
Rated voltage EN 500V
Rated surge voltage 6KV
Contamination level 3
Rated current 16A
Stripped wire length [mm] 8mm
Stripped wire length [inch] 0.33in