

# Rittal – The System.

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## PSM metering bar for CMC III



DK 7859.050  
DK 7859.053

**Montage-, Installations- und Bedienungsanleitung**  
**Assembly and operating instructions**

ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL

IT INFRASTRUCTURE

SOFTWARE & SERVICES

FRIEDHELM LOH GROUP



# Foreword

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## Foreword

Dear Customer!

We thank you for choosing our PSM metering bar for CMC III (subsequently called "PSM metering bar")!

We wish you every success!

Your,  
Rittal GmbH & Co. KG

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We are always happy to answer any technical questions regarding our entire range of products.

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# 1 Notes on documentation

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## 1 Notes on documentation

### 1.1 CE labelling

Rittal GmbH & Co. KG hereby confirms that the PSM metering bar is compliant with the EC EMC Directive 2004/108/EC. An appropriate declaration of conformity has been prepared. It can be provided on request.



### 1.2 Storing the documents

The operating, installation and maintenance instructions as well as all applicable documents are an integral part of the product. They must be handed out to those persons who work with the unit and must always be available and on hand for the operating and maintenance personnel.

### 1.3 Symbols in these operating instructions

The following symbols are found in this documentation:



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**Danger!**

**A dangerous situation for which the failure to comply with this note causes death or severe injury.**

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**Warning!**

**Hazardous situation which may lead to death or serious injury if the instructions are not followed.**

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**Caution!**

**Hazardous situation which may lead to (minor) injuries if the instructions are not followed.**

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**Note:**

Identification of the situations that can lead to material damage.

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- This symbol indicates an "Action Point" and shows that you should perform an operation/procedure.

### 1.4 Other applicable documents

- Installation and Short User's Guide
- CMC III Processing Unit Assembly, Installation and User's Guide

## 2 Safety instructions

### 2.1 General safety instructions

Please observe the subsequent general safety instructions for the installation and operation of the system:

- Assembly and installation of the PSM metering bar, in particular for wiring with mains power, may be performed only by a trained electrician.
- Please observe the valid regulations for the electrical installation of the country in which the PSM metering bar is installed and operated, and the national regulations for accident prevention. Please also observe any company-internal regulations, such as work, operating and safety regulations.
- Use only original Rittal products or products recommended by Rittal in conjunction with the PSM metering bar.
- Please do not make any changes to the PSM metering bar that are not described in this manual or in the associated manuals.
- The operating safety of the PSM metering bar is guaranteed only for the intended use. The technical data and limit values stated in the technical specifications may not be exceeded under any circumstances. In particular, this applies to the specified ambient temperature range and IP degree of protection.
- The PSM metering bar must not be opened. The unit does not contain any parts that need servicing.
- The operation of the system in direct contact with water, aggressive materials or inflammable gases and vapours is prohibited.
- Other than these general safety instructions, ensure you also observe the specific safety instructions when the tasks described in the following chapters are performed.

### 2.2 Operating and technical staff

- The assembly, commissioning, maintenance and repair of this unit may be performed only by qualified mechanically and electro-technically trained personnel.
- Only properly instructed personnel may perform service on a unit while in operation.

# 3 Product description

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## 3 Product description

### 3.1 Function description and components

#### 3.1.1 Function

The PSM metering bar is a busbar with integrated power measurement. Together with a PSM installation kit, it can be installed vertically in various Rittal enclosure types. The PSM metering bar can be connected to a CMC III Processing Unit using a CAN bus interface.

The PSM metering bar can be equipped with a maximum of six PSM plug-in modules. Thanks to the touch-protected construction, a partial equipping is possible.

To use the metering function of the PSM metering bar, the unit must be connected to a CMC III Processing Unit. An advanced configuration from a web site is also then possible.

#### 3.1.2 Components

The busbar of the PSM metering bar consists of an extruded aluminium section.

### 3.2 Proper use, foreseeable misuse

The PSM metering bar is used primarily for the power distribution and for the measurement of various electrical quantities of the connected consumers (section 11 "Technical specifications"). It is designed for operation in data centres (IT environment).

The unit is state of the art and built according to recognised safety regulations. Nevertheless, improper use can present a hazard to life and limb of the user or third parties, or result in possible damage to the system and other property.

Consequently, the unit must only be used properly and in a technically sound condition. Any malfunctions which impair safety should be rectified immediately. Follow the operating instructions!

The intended use also includes following the accompanying documentation as well as fulfilling the inspection and maintenance conditions.

Rittal GmbH & Co. KG is not responsible for any damage which may result from failure to comply with the accompanying documentation. This also applies to failure to comply with the valid documentation for the accessories used.

Inappropriate use may result in danger. Inappropriate use may include:

- Use of impermissible tools.
- Improper use.
- Improper rectification of malfunctions.

- Use of accessories not authorised by Rittal GmbH & Co. KG.

### 3.3 Scope of supply

- PSM metering bar
- Accessories provided (see figs. 1 and 2)
- Installation and Short User's Guide

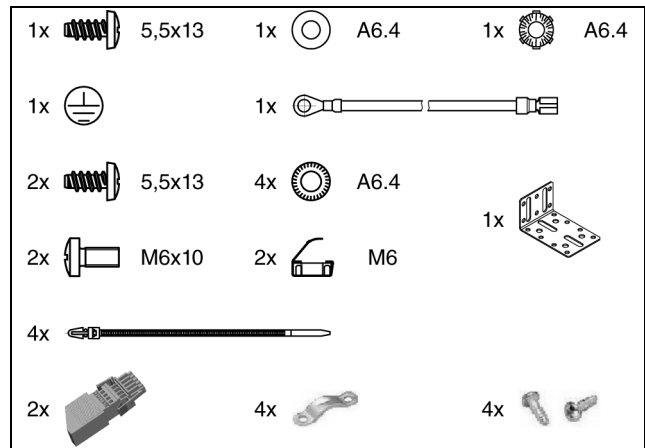


Fig. 1: Accessories provided, 16 A variant

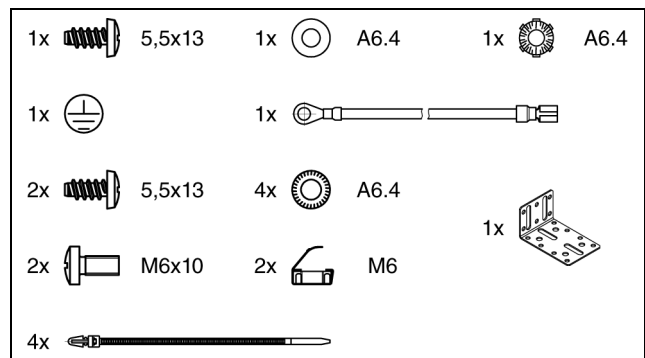


Fig. 2: Accessories provided, 32 A variant

## 4 Transportation and handling

### 4.1 Transportation

The device is supplied in a carton.

### 4.2 Unpacking

- Remove the unit's packaging materials.



Note:

After unpacking, the packaging materials must be disposed of in an environmentally friendly way. They can consist of the following materials:

Polyethylene film (PE film), cardboard.

- Check the unit for any damage that may have occurred during transport.



Note:

Damage and other faults, e.g. incomplete delivery, should immediately be reported to the shipping company and to Rittal GmbH & Co. KG in writing.

- Remove the device from the packaging.
- Remove the protective film from the front cover of the device.

# 5 Assembly and siting

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## 5 Assembly and siting

### 5.1 Installation site requirements

To ensure the correct function of the unit, the conditions for the installation site of the unit specified in section 11 "Technical specifications" must be observed.

#### Electromagnetic interference

- Interfering electrical installations (high frequency) should be avoided.

### 5.2 Assembly procedure



Note:

Ensure good access to the front of the unit so that the display is easy to read.

The PSM metering bar can be installed in the following enclosure systems:

- Rittal DK-TS enclosure
- Rittal TS IT enclosure
- Rittal TE 7000 enclosure

The unit is installed in these enclosure systems using the following installation kits:

#### Rittal DK-TS

- DK 7856.011: PSM mounting kit for permanent installation
- DK 7856.022: PSM mounting kit for permanent installation with additional cable routing
- DK 7856.023: Adjustable PSM mounting kit for attachment on the vertical section of the enclosure

#### Rittal TS IT

- DK 7856.029: PSM assembly kit for fast installation on the horizontal section of the TS IT rack

#### Rittal TE 7000

- DK 7000.684: PSM mounting kit for permanent installation



Note:

One of the above-mentioned installation kits is required per rack.

An installation in racks made by other manufacturers is not always possible with these installation kits.



## 6 Installation

### 6.1 Safety instructions



#### Warning!

Work on electrical systems or equipment may only be carried out by an electrician or by trained personnel guided and supervised by an electrician. All work must be carried out in accordance with electrical engineering regulations.

The unit may only be connected after the above-mentioned personnel have read this information!

Use insulated tools.

The connection regulations of the appropriate power company must be followed.

- Please observe the valid regulations for the electrical installation of the country in which the PSM metering bar is installed and operated, and the national regulations for accident prevention. Please also observe any company-internal regulations, such as work, operating and safety regulations.
- The technical data and limit values stated in the technical specifications must not be exceeded under any circumstances. In particular, this applies to the specified ambient temperature range and IP degree of protection.
- If a higher IP degree of protection is required for a special application, the PSM metering bar must be installed in an appropriate housing or in an appropriate enclosure with the required IP degree of protection.

### 6.2 Requirements for the connection

- The electrical connection may be made only on a TN-S network in accordance with the the specifications prescribed in the technical specifications (see section 11 "Technical specifications").
- Depending on the PSM metering bar variant, a back-up fuse of 3 x 16 A for each infeed (for model number DK 7859.050) or 1 x 32 A (for model number DK 7859.053) should be provided.
- Connect the housing earthing point (fig. 3, item 1) of the PSM metering bar in the infeed conducting with the enclosure frame.

### 6.3 PSM metering bar 16 A (DK 7859.050) installation procedure



#### Warning!

Rittal recommends the use of the pre-assembled connection cables available as accessory.

Ensure the correct positioning of the cable for the connection.

An incorrect connection can cause an electrical shock and damage the connected consumers.

The connection plug with the supplied accessories must only be installed by an experienced electrician!

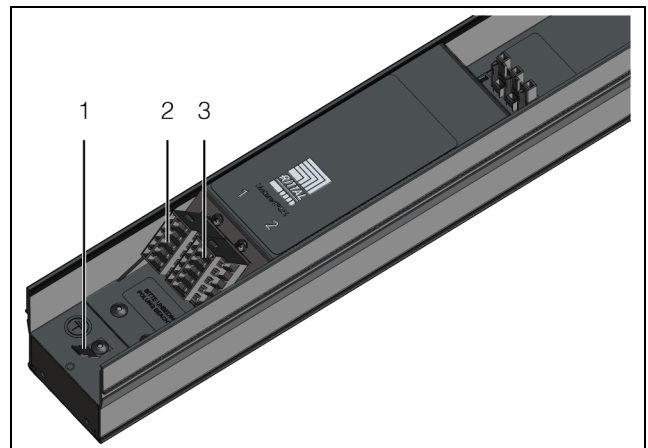


Fig. 3: Connections

#### Legend

- 1 Housing earthing point
- 2 "Infeed 1" connection
- 3 "Infeed 2" connection

#### 6.3.1 Connection with pre-assembled connection cable

The PSM metering bar is connected to the power supply for both infeeds using a DK 7856.025 connection cable from the Rittal accessories.

- Connect a connection cable to the "Infeed 1" connection (fig. 3, item 2) or to the "Infeed 2" connection (fig. 3, item 3) of the PSM metering bar and to the power supply.
- If required, connect similarly a second connection cable to the unused infeed connection of the PSM metering bar and to the power supply.

# 6 Installation

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## 6.3.2 Connection using the connection plug from the scope of supply

As alternative to the connection using the pre-assembled connection cable, the connection plug provided in the scope of supply can also be used.



### Warning!

**The connection plug with the supplied accessories must only be installed by an experienced electrician!**

**The connection plug does not serve as fuse-switch disconnecter!**

The following conductors can be used:

- Single-wire
- Multi-wire
- Thin wire
  - with tinned single cores
  - Compacted strands
  - with wire end ferrule, crimped gas-tight
  - with pin-type cable socket, crimped gas-tight
- Max. cross-section 4 mm<sup>2</sup> or 12 AWG
- Bared length 8 mm (0.33 inch)



### Note:

When wire end ferrules are used, the next-smallest cross-section must be chosen.

- Note the terminal assignment when you assemble the connection plug.
- Connect similarly the connection cable at the connection of a pre-assembled cable to the PSM metering bar and to the power supply (section 6.3.1 "Connection with pre-assembled connection cable").

## 6.3.3 Independent of the connection type

- Install a PSM plug-in module on the PSM metering bar (see section 6.6.1 "Installation of a PSM plug-in module").
- Connect a consumer to the connections of the PSM plug-in module.

## 6.4 PSM metering bar 32 A (DK 7859.053) installation procedure

The PSM metering bar is connected to the power supply using the permanently attached connection cable with CEE plug (32 A, single-phase IEC 60 309). In the device itself, the infeed is divided into two circuits, each of which supplies three PSM plug-in modules and is protected with two 16 A circuit-breakers.

- Connect the connection cable to the power supply.
- Install a PSM plug-in module on the PSM metering bar (see section 6.6.1 "Installation of a PSM plug-in module").

- Connect a consumer to the connections of the PSM plug-in module.

## 6.5 Connection to a CMC III Processing Unit

To use the metering function of the PSM metering bar, the unit must be connected to a CMC III Processing Unit. An advanced configuration from a web site is then also possible.

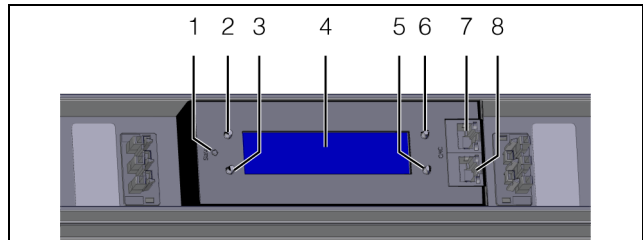


Fig. 4: Display and operating elements

### Legend

- 1 Multi-LED for the status display
- 2 "Esc" key
- 3 "Return" key
- 4 Display
- 5 "Down" key
- 6 "Up" key
- 7 CAN bus connection
- 8 CAN bus connection



### Note:

The key assignment changes depending on the installation direction of the PSM metering bar (section 7.1 "Operating and display elements")

- Connect the PSM metering bar using a CAN bus connection cable with a CAN bus interface of the CMC III Processing Unit or of the neighbouring component in the CAN bus (fig. 4, item 7). After a short delay time, the status screen appears on the display of the PSM metering bar and the unit is operational.

The following CAN bus connection cables from the CMC III accessories can be used:

- DK 7030.090 (length 0.5 m)
- DK 7030.091 (length 1 m)
- DK 7030.092 (length 1.5 m)
- DK 7030.093 (length 2 m)
- DK 7030.094 (length 5 m)
- DK 7030.095 (length 10 m)

Further components are connected as daisy chain.

- If necessary, connect another component to the second free CAN bus interface of the PSM metering bar (fig. 4, item 8), such as a sensor from the range of CMC III accessories.

## 6.6 Installation and uninstallation of PSM plug-in modules



Note:

Only Rittal PSM plug-in modules may be used for the PSM metering bar. The use of other plug-in modules is not permitted and voids the warranty.



Note:

Because the busbar is designed with shock-hazard protection, it is not necessary to always mount the maximum possible number of PSM metering bars.

The installation and uninstallation of the PSM plug-in modules in the PSM metering bar is possible during running operation.

### 6.6.1 Installation of a PSM plug-in module

- Ensure that no consumers are connected to the PSM plug-in module that you want to install.
- Place the PSM plug-in module centred on the two plug connectors.
- Observe the following notes for the 16 A variant (DK 7859.050):
  - If **both** infeeds are connected, the orientation of the PSM plug-in module allows infeed 1 or infeed 2 to be selected (see section 6.3 "PSM metering bar 16 A (DK 7859.050) installation procedure").
  - Ensure for the connection of only **one** infeed that the PSM plug-in module is oriented appropriately for the selected infeed and is supplied with power.

**The red arrow points away from the power connection of the PSM metering bar:** Infeed 1

**The black arrow points away from the power connection of the PSM metering bar:** Infeed 2

- Observe the following notes for the 32 A variant (DK 7859.053):
  - The first three slots above the power connection of the PSM metering bar are supplied with power from circuit-breaker 1. The following three slots 4 to 6 are supplied with power from circuit-breaker 2.
  - The orientation of a PSM plug-in module that occupies just one slot does not have any affect on which circuit-breaker supplies it with power.
  - Active PSM plug-in modules occupy two slots in the busbar. The turning of such an active PSM plug-in module located directly below the display in both slots (slots 3 and 4) selects the orientation used to determine the circuit-breaker that supplies it with power.
  - The orientation of active PSM plug-in modules located in slots 1 and 2 or 5 and 6 also does not

have any affect on which circuit-breaker supplies it with power.

- Snap the PSM plug-in module into the PSM metering bar by applying light pressure.
  - The PSM plug-in module is mounted correctly when all four retaining lugs at the end faces have locked into the PSM metering bar.

### 6.6.2 Uninstallation of a PSM plug-in module

- First disconnect all connected consumers from the PSM plug-in module that you want to uninstall.
- Press all four retaining lugs located on the end faces of the PSM plug-in module.
- Carefully remove the PSM plug-in module from the PSM metering bar without it slewing.

## 7 Operation

### 7.1 Operating and display elements

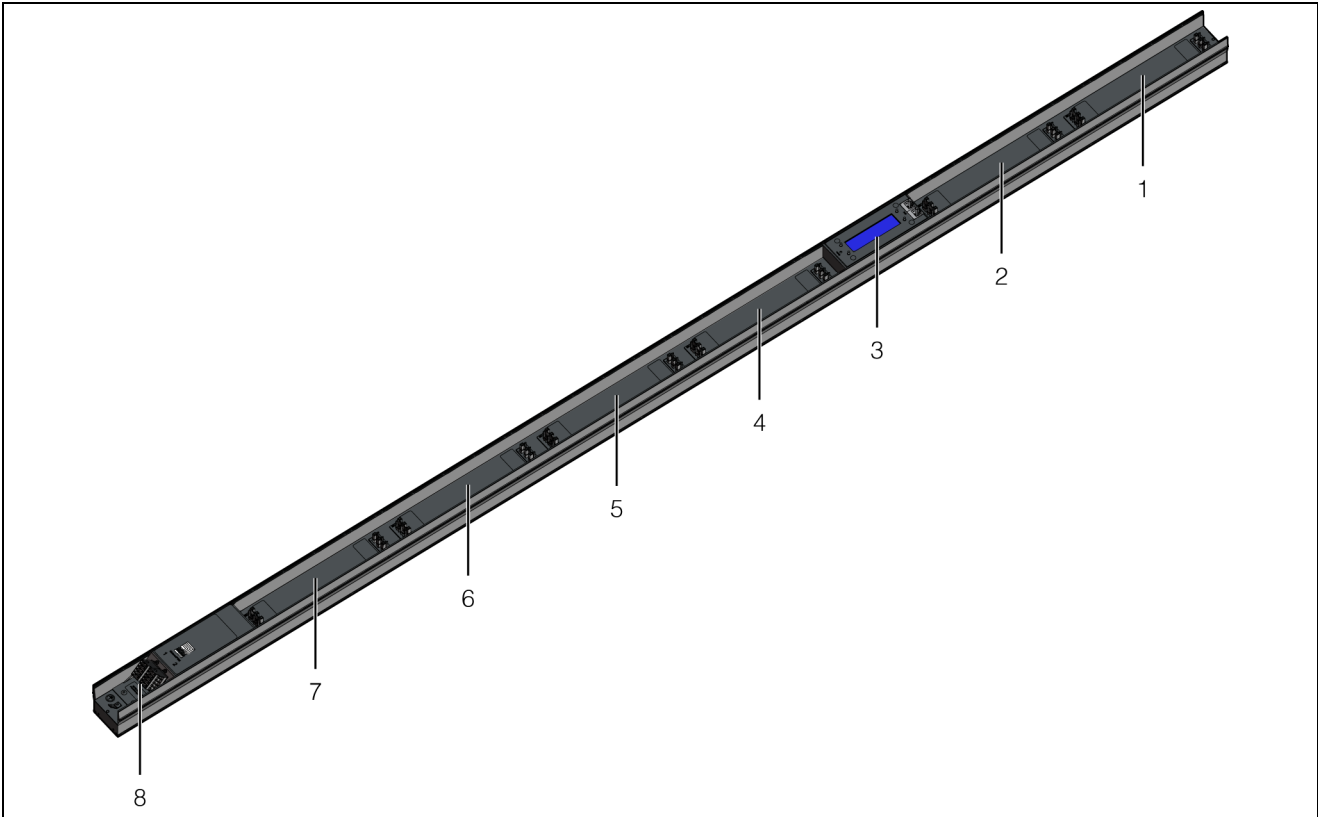


Fig. 5: Operating and display elements, 16 A variant (DK 7859.050)

**Legend**

- 1 Slot 6
- 2 Slot 5
- 3 Display
- 4 Slot 4
- 5 Slot 3
- 6 Slot 2
- 7 Slot 1
- 8 Infeeds connection (only 16 A variant DK 7859.050)

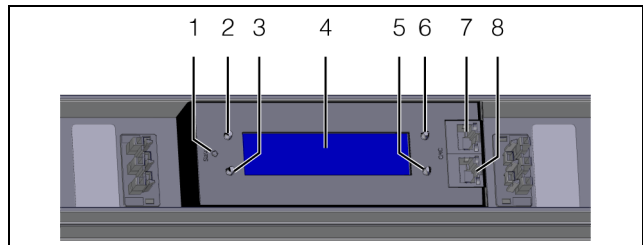


Fig. 6: Display and operating elements

**Legend**

- 1 Multi-LED for the status display
- 2 "Esc" key
- 3 "Return" key
- 4 Display
- 5 "Down" key
- 6 "Up" key
- 7 CAN bus connection
- 8 CAN bus connection

The 32 A variant (DK 7859.053) is supplied with a permanently attached connection cable rather than with two separate infeeds (section 6.4 "PSM metering bar 32 A (DK 7859.053) installation procedure"). In addition, this variant has two 16 A circuit-breakers installed, each of which protects one (internal) circuit.

The display direction and the assignment of the four keys at the side next to the display depends on the installation direction of the PSM metering bar. The legend for fig. 6 shows the key assignment for the installation case when the electrical connection of the PSM metering bar is at the bottom. If the PSM metering bar is installed so that the electrical connection is at the top, the assignment of keys 2 and 5 as well as 3 and

6 is reversed. The actual assignment of the keys is displayed appropriately on the display.

## 7.2 LED displays

A multi-LED for the status display (fig. 6, item 1) is located on the front of the PSM metering bar to the left of the centre main display. Further LEDs are located on the CAN bus connection (fig. 6, items 7 and 8). All LEDs flash briefly once when connection is established to the CMC III Processing Unit.

### 7.2.1 Multi-LED displays

The status of the PSM metering bar can be read on the multi-LED.

#### Continuous illumination

Colour	Status
Red	The PSM metering bar is initialised or one of the active sensors (energy measurement chip) is defect (see section 10 "Testing and rectification").

Tab. 1: Continuous illumination of the multi-LED



Note:

When the device is started, the red LED can illuminate continuously for as long as 20 seconds.

#### Flashing codes

Colour	Status
Green	Brief flashing: data has been sent.
Orange	The PSM metering bar has "warning" status. Fast flashing: upper limit value overshoot. Slow flashing: lower limit value undershoot.
Red	The PSM metering bar has "alarm" status. Fast flashing: upper limit value overshoot. Slow flashing: lower limit value undershoot. Brief flashing: data could not be sent.
Blue	Asymmetric flashing: The PSM metering bar is searching for the master. Fast flashing: The PSM metering bar has lost the master. Brief flashing: The PSM metering bar has received a synchronisation message from the master.

Tab. 2: Multi-LED flashing codes

### 7.2.2 Displays of the LEDs on the CAN bus connection

A red and a green LED are located on the CAN bus connection. They display the status of the CAN bus.

Colour	Status
Green (continuous light)	Communication over the CAN bus possible.
Red (flashing)	Transmission fault.

Tab. 3: LEDs for the CAN bus connection

## 7.3 Description of operation

The unit can be configured using the operating elements on the front of the unit (see section 7.4 "Operation from the operating elements on the front"). A further configuration is possible from a web site when the unit is connected to a CMC III Processing Unit (see section 7.5 "Operation of the CMC III Processing Unit from the web site").



Note:

Further notes for the general operation of the web site can be found in the documentation for the CMC III Processing Unit.

## 7.4 Operation from the operating elements on the front

### 7.4.1 Settings using the configuration menu

You make the basic settings for the PSM metering bar in the configuration menu.

- For switched-off display, press the "Return" key (fig. 6, item 3).  
The start screen appears.
- Select with the "down" key on the main screen the **Circuit 1** or **Circuit 2** menu for the PSM metering bar 16 A (DK 7859.050) or **Fuse 1** or **Fuse 2** for the PSM metering bar 32 A (DK 7859.053) (fig. 6, item 5).
- Press the "Return" key for approx. 3 seconds.  
The configuration menu appears: You can change the following parameters

Parameter	Explanation
Disp. Circuit	Source 1: Display of the messages, measured values and setting values for infeed 1 or circuit 1. Source 2: Display of the messages, measured values and setting values for infeed 2 or circuit 2. Source 1 + 2: Display of the messages, measured values and setting values for both infeeds or circuits

Parameter	Explanation
Brightness Display	Brightness of the display (5 = dark, 15 = bright).
Inverse View	On: bright font on dark background Off: dark font on bright background
Init Screen Timeout	Duration after which the display switches to the standby mode in the event of inactivity (10 s – 300 s).
Menu Timeout	Duration after which the display switches to the start screen in the event of inactivity (10 s – 60 s).

Tab. 4: Settings in the configuration menu



**Note:**  
If the second infeed is activated subsequently on the 16 A variant (DK 7859.050), the settings must be checked and possibly changed. The same is true for the 32 A variant when PSM plug-in modules installed subsequently are protected using the circuit-breakers of the second circuit.

### 7.4.2 Resetting the values to the factory defaults

If necessary, the following settings of the PSM metering bar can be reset to the factory default.

- All setpoints and hysteresis values (hysteresis values can be set only via the CMC III Processing Unit)
- All designations that can be changed (Device-Name, DeviceLocation, etc.)
- All settings for the configuration of the unit that can be set from the configuration menu (see section 7.4.1 "Settings using the configuration menu")
- All categories (can be set only via the CMC III Processing Unit)
- All energy values that the customer can reset (but not the permanent energy values)

- Keep the "Esc" key pressed (fig. 6, item 2).
- Also press the "Down" key for approx. 3 seconds (fig. 6, item 5).  
The "Reset to Factory Default" prompt appears in the display.
- Use the "Down" key to select the "Yes" row and press the "Return" key to confirm the selection (fig. 6, item 3).  
All setting values of the PSM metering bar are then reset to the factory default and the start screen appears.
- Alternatively, use the "Down" key to select the "No" row and press the "Return" key to confirm your selection.  
In this case, no changes are performed and the "Circuit 1" or "Fuse 1" menu appears.



**Note:**  
After the setting values have been reset to the factory default, the most recently installed firmware and the permanent energy values of the infeeds and phases as well as the PSM plug-in modules are retained. These values are then available again on the web site after approx. one minute.

### 7.4.3 Settings 16 A variant (DK 7859.050)

The basic settings for the two infeeds can be made from the following menu structure:

Start screen
Circuit 1
Actual Energy Custom
Circuit 1 Menu
Circuit Information
Neutral Current
Active Energy
Active Energy Custom
Active Power
Phase 1 Information
Current
Voltage
Frequency
Power Factor
Active Power
Reactive Power
Apparent Power
Active Energy
Active Energy Custom
App. Energy
Phase 2 Information
Phase 3 Information
Circuit 2

**32 A variant (DK 7859.053)**

The basic settings for the two circuits can be made from the following menu structure:

Start screen
Fuse 1
Actual Energy Custom
Fuse 1 Menu
Fuse Information
Active Energy
Active Energy Custom
Active Power
Module 1 Information
Current
Voltage
Frequency
Power Factor
Active Power
Reactive Power
Apparent Power
Active Energy
Active Energy Custom
App. Energy
Module 2 Information
Module 3 Information
Fuse 2

The following parameters can be set or viewed in detail.

- SetPtHighAlarm: upper alarm limit value [A] or [V]
- SetPtHighWarning: upper warning limit value [A] or [V]
- SetPtLowWarning: lower warning limit value [A] or [V]
- SetPtLowAlarm: lower alarm limit value [A] or [V]

The limit values are set for the 16 A variant of the PSM metering bar for infeed 1 and infeed 2 separately for the three phases and for the current and voltage values. In addition, limit values can be set separately for the neutral conductor current for the two infeeds as well as additional measured values, such as apparent power and reactive power.

For the 32 A variant of the PSM metering bar, the limit values for circuit 1 and circuit 2 are set separately for

the three assigned PSM plug-in modules for the current and voltage values.

In the menu, the ">\*" and "\*<" symbols are prefixed or suffixed, respectively, to all parameters whose values can be changed or after selection lead to lower-level menus.

To change limit values and to select lower-level menus, the "Up" (fig. 6, item 6) and "Down" (fig. 6, item 5) keys can be used to select the desired value or menu. After pressing the "Return" key (fig. 6, item 3), you can change this value or switch to the appropriate menu. Once a parameter to change the value has been selected, the "->" or "<-" symbols are prefixed or suffixed, respectively, in the display. The "Up" and "Down" keys can be used to change the value.

Example for the PSM metering bar 16 A (DK 7859.050)

- Use the "Down" key on the main screen to select the **Circuit 1**.
- Press the "Return" key.  
The "Circuit 1 Menu" menu appears.
- Use the "Down" key to select the "Phase 1 Information" entry.
- Press the "Return" key.  
The "Circuit 1 Phase 1" menu appears.
- Use the "Down" key to select the "Voltage" entry.
- Press the "Return" key.  
The "Configuration Circuit 1 Phase 1 Voltage" menu appears.
- Use the "Down" key to select the "SetPt. Low Warn." entry.
- Press the "Return" key.  
The ">\*" and "\*<" symbols prefixed or suffixed to the entry, respectively, change to the "->" or "<-" symbols. The value can now be changed.
- Press the "Up" and "Down" keys to increase or decrease, respectively, the lower limit value for the voltage messages.  
The value is changed in 1 V steps.
- Press the "Return" key to confirm your input.  
The symbols change again to ">\*" before or "\*<" after the entry.



Note:

When the "Esc" key is pressed, the change is **not** accepted.

**7.4.4 Messages on the display**

Not only the fault messages (see section 5 "Testing and rectification") but for over- or undershooting the set limit values, also the associated messages are output in the display (fig. 10, item 3)



**Note:**

The designation "P'X'" in the following listing applies to the PSM metering bar 16 A (DK 7859.050) and is replaced with "P1", "P2" or "P3", depending on which infeed phase the message is displayed.

The designation "M'X'" in the following listing applies to the PSM metering bar 32 A (DK 7859.053) and is replaced with "M1", "M2" or "M3", depending on which PSM plug-in module the message is displayed.

- Sensor not ready: The energy measurement chip could not be initialised, was not detected or is not available.
- Voltage(P'X') High Alarm or Voltage(M'X') High Alarm: upper alarm limit value for voltage is overshoot
- Voltage(P'X') High Warning or Voltage(M'X') High Warning: upper warning limit value for voltage is overshoot
- Voltage(P'X') Low Warning or Voltage(M'X') Low Warning: lower warning limit value for voltage is undershoot
- Voltage(P'X') Low Alarm or Voltage(M'X') Low Alarm: lower alarm limit value for voltage is undershoot
- Current(P'X') High Alarm or Current(M'X') High Alarm: upper alarm limit value for current is overshoot
- Current(P'X') High Warning or Current(M'X') High Warning: upper warning limit value for current is overshoot
- Current(P'X') Low Warning or Current(M'X') Low Warning: lower warning limit value for current is undershoot
- Current(P'X') Low Alarm or Current(M'X') Low Alarm: lower alarm limit value for current is undershoot

The following error messages are also displayed on the PSM metering bar 16 A (DK 7859.050):

- Neutral Current High Alarm: upper alarm limit value for neutral-conductor current is overshoot
- Neutral Current High Warning: upper warning limit value for neutral-conductor current is overshoot
- Neutral Current Low Warning: lower warning limit value for neutral-conductor current is undershoot
- Neutral Current Low Alarm: lower alarm limit value for neutral-conductor current is undershoot

## 7.5 Operation of the CMC III Processing Unit from the web site

The **Observation** tab is used to make all settings for the PSM metering bar, such as limit values for warning and alarm messages.

- To do this, in the left-hand tree structure, first select the "PSM-M16" entry for the PSM metering bar 16 A (DK 7859.050) or "PSM-M32" for the PSM metering bar 32 A (DK 7859.053).

In the following sections 7.5.1 "Device" to 7.5.5 "Fuse 2 – 32 A variant DK 7859.053", only those parameters for which you can make changes are described in detail. There are also display values used only for information purposes.

### 7.5.1 Device

General settings for the PSM metering bar are made at the "Device" level.

Parameter	Explanation
Description	Individual description of the PSM metering bar.
Location	Location of the PSM metering bar.

Tab. 5: Settings in the "Device" level

Parameters that provide detailed information about the PSM metering bar, such as the version of the deployed software and hardware, are also displayed. You should have such information available, in particular to permit a fast troubleshooting of queries with Rittal.

### 7.5.2 Circuit 1 – 16 A variant DK 7859.050

Settings for infeed 1 are performed at the "Circuit 1" level. You can choose between two display possibilities:

- Tree representation: This allows targeted and fast access to individual parameters.
- Tabular representation: This provides a fast overview of all actual measured values of the selected infeed.

If after selection of the "Circuit 1" level, the lower-level "Unit", "Phase 1", etc. entries are displayed (fig. 7, item 1), switch to the tabular representation as follows:

- Click the coloured "graphic" symbol suffixed to the "Circuit 1" entry in the form of a stylised diagram (fig. 7, item 2).



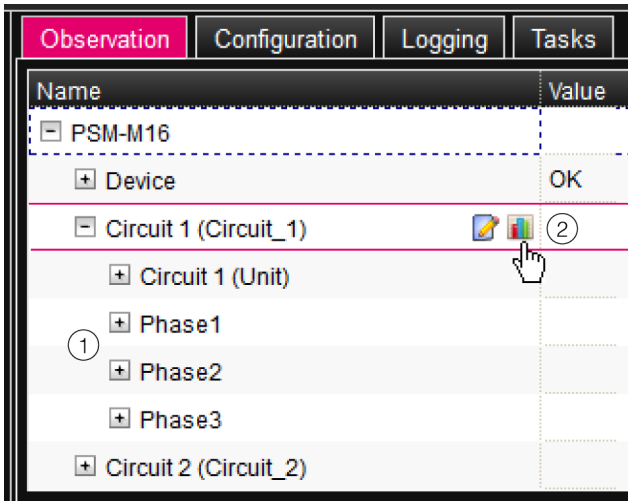


Fig. 7: Tree representation:

The display changes to the tabular representation (fig. 8) and all actual measured values for infeed 1 can be viewed at a glance.

**Note:**  
The "Current" row and the "Σ" symbol of the neutral-conductor current are displayed in the tabular representation.

If after selection of the "Circuit 1" level, the tabular representation is preselected, switch to the tree representation as follows:

- Click the "graphic" symbol shown in various grey levels suffixed to the "Circuit 1" entry (fig. 8, item 1).

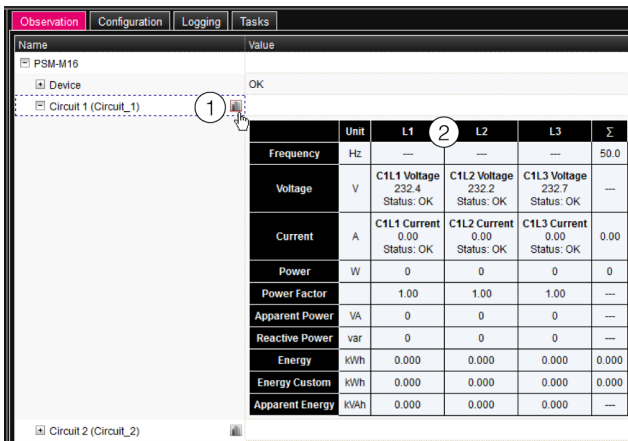


Fig. 8: Tabular representation:

The display changes to the tree representation (fig. 7) and you can access the individual measured and setting values for infeed 1.

To change the setting values for the three phases L1, L2 and L3 in the selected tabular representation, proceed as follows:

- Set the mouse cursor in the table on the column header for which you want to change the setting values (fig. 8, item 2).

An "edit" symbol appears and the mouse cursor changes to a "hand" symbol.

- Click the "edit" symbol.  
The "Write Values" dialogue with the parameters of the selected phase appears.

**Note:**  
You cannot make any changes to the higher-level parameters for the "Infeed 1" unit in the tabular representation.

The following descriptions assume that you have selected the tree representation.

### "Unit" main level

You can set the following parameters for infeed 1 in the "Unit" main level of infeed 1.

Parameter	Explanation
DescName	Individual description of infeed 1.

Tab. 6: Settings in the "Unit" main level

The following parameters are also displayed for infeed 1:

Parameter	Explanation
Mounting Position	Mounting position of the PSM metering bar.

Tab. 7: Displays in the "Unit" main level

The following parameters are also displayed in the associated sublevels for infeed 1:

Parameter	Explanation
Energy	Total energy value of infeed 1.
Energy Custom	Total energy value based on the user-defined counters for the three phases L1, L2 and L3.
Power	Total power of infeed 1.
Frequency	Frequency of infeed 1.

Tab. 8: Displays in the associated sublevels

### "Neutral Current" sublevel

You can set the following parameters for the neutral-conductor current in the "Neutral Current" sublevel:

Parameter	Explanation
DescName	Individual description of the neutral-conductor current for infeed 1.
SetPtHigh-Alarm	Upper limit of the current value for which an alarm message is issued.
SetPtHigh-Warning	Upper limit of the current value for which a warning message is issued.

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Parameter	Explanation
SetPtLow-Warning	Lower limit of the current value for which a warning message is issued.
SetPtLow-Alarm	Lower limit of the current value for which an alarm message is issued.
Hysteresis	If one of the upper limit values is overshoot (SetPtHigh) or one of the lower limit values is undershot (SetPtLow), a warning or an alarm is issued immediately. For a hysteresis of x%, the warning or the alarm clears for undershooting an upper limit value or for overshooting a lower limit value only after a difference of $x / 100 * \text{limit value}$ to the limit value.

Tab. 9: Settings in the "Neutral Current" sublevel

The following parameters are also displayed for the neutral-conductor current:

Parameter	Explanation
Value	Actual value of the neutral-conductor current.
Status	Actual status of the neutral-conductor current.

Tab. 10: Displays in the "Neutral Current" sublevel

## "Phase 1" main level

You can make changes for the voltage, the current and a user-defined energy counter ("Active Custom Energy") of the phase L1 in the "Phase 1" main level of infeed 1.

## "Voltage" sublevel

Parameter	Explanation
DescName	Individual description of the phase L1 voltage value.
SetPtHigh-Alarm	Upper limit of the voltage value of phase L1 for which an alarm message is issued.
SetPtHigh-Warning	Upper limit of the voltage value of phase L1 for which a warning message is issued.
SetPtLow-Warning	Lower limit of the voltage value of phase L1 for which a warning message is issued.
SetPtLow-Alarm	Lower limit of the voltage value of phase L1 for which an alarm message is issued.

Parameter	Explanation
Hysteresis	If one of the upper limit values is overshoot (SetPtHigh) or one of the lower limit values is undershot (SetPtLow), a warning or an alarm is issued immediately. For a hysteresis of x%, the warning or the alarm clears for undershooting an upper limit value or for overshooting a lower limit value only after a difference of $x / 100 * \text{limit value}$ to the limit value.

Tab. 11: Settings in the "Voltage" level

The following parameters are also displayed for the voltage value of phase L1:

Parameter	Explanation
Value	Actual voltage value of phase L1.
Status	Actual status of the voltage value

Tab. 12: Displays in the "Voltage" level

## "Current" sublevel

Parameter	Explanation
DescName	Individual description of the current value for infeed 1.
SetPtHigh-Alarm	Upper limit of the current value of phase L1 for which an alarm message is issued.
SetPtHigh-Warning	Upper limit of the current value of phase L1 for which a warning message is issued.
SetPtLow-Warning	Lower limit of the current value of phase L1 for which a warning message is issued.
SetPtLow-Alarm	Lower limit of the current value of phase L1 for which an alarm message is issued.
Hysteresis	If one of the upper limit values is overshoot (SetPtHigh) or one of the lower limit values is undershot (SetPtLow), a warning or an alarm is issued immediately. For a hysteresis of x%, the warning or the alarm clears for undershooting an upper limit value or for overshooting a lower limit value only after a difference of $x / 100 * \text{limit value}$ to the limit value.

Tab. 13: Settings in the "Current" level

The following parameters are also displayed for the current value of phase L1:

Parameter	Explanation
Value	Actual current value of phase L1.
Status	Actual status of the current value.

Tab. 14: Displays in the "Current" level

**"Active Custom Energy" sublevel**

Parameter	Explanation
Value	User-defined energy counter. The operator can reset this counter to the value "0".

Tab. 15: Settings of the "Active Custom Energy" level

The following parameters are also displayed for phase L1 in the associated sublevels:

Parameter	Explanation
Power Factor	Actual power factor
Active Power	Actual active power
Apparent Power	Actual apparent power
Reactive Power	Actual reactive power
Active Energy	Actual active energy
Apparent Energy	Actual apparent energy

Tab. 16: Displays in the "Phase 1" level

**Note:**

You can make the same settings for phases L2 and L3 in the appropriate levels as for phase L1.

**7.5.3 Circuit 2 – 16 A variant DK 7859.050**

For the 16 A variant of the PSM metering bar, settings for infeed 2 are performed at the "Circuit 2" level. The representations match fully those for infeed 1 (see section 7.5.2 "Circuit 1 – 16 A variant DK 7859.050").

**7.5.4 Fuse 1 – 32 A variant DK 7859.053**

Settings for the circuit protected by circuit-breaker 1 are performed at the "Fuse 1" level. Only the tree representation is available for the 32 A variant of the PSM metering bar.

Name	Value
PSM-M32	
+ Device	OK
- Fuse_1	
+ Unit	
- Module1	
+ Voltage	OK
+ Current	OK
+ PowerFactor	
+ ActivePower	
+ ApparentPower	
+ ReactivePower	
+ ActiveEnergy	
+ ActiveCustomEnergy	
+ ApparentEnergy	
+ Module2	
+ Module3	
+ Fuse_2	

Fig. 9: Tree representation:

**"Unit" main level**

You can set the following parameters in the "Unit" main level of circuit 1:

Parameter	Explanation
DescName	Specific description of the circuit 1.

Tab. 17: Settings in the "Unit" main level

The following parameters are also displayed for circuit 1:

Parameter	Explanation
Mounting Position	Mounting position of the PSM metering bar.

Tab. 18: Displays in the "Unit" main level

The following parameters are also displayed in the associated sublevels for circuit 1:

Parameter	Explanation
Energy	Total energy value of circuit 1.
Energy Custom	Total energy value based on the user-defined counters for the three assigned PSM plug-in modules 1, 2 and 3.
Power	Total power of circuit 1.
Frequency	Frequency of circuit 1.

Tab. 19: Displays in the associated sublevels

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## "Module 1" main level

You can make changes for the voltage, the current and a user-defined energy counter ("Active Custom Energy") of the PSM slot 1 in the "Module 1" main level of circuit 1.

### "Voltage" sublevel

Parameter	Explanation
DescName	Individual description of the PSM slot 1 voltage value.
SetPtHigh-Alarm	Upper limit of the PSM slot 1 voltage value for which an alarm message is issued.
SetPtHigh-Warning	Upper limit of the PSM slot 1 voltage value for which a warning message is issued.
SetPtLow-Warning	Lower limit of the PSM slot 1 voltage value for which a warning message is issued.
SetPtLow-Alarm	Lower limit of the PSM slot 1 voltage value for which an alarm message is issued.
Hysteresis	If one of the upper limit values is overshoot (SetPtHigh) or one of the lower limit values is undershot (SetPtLow), a warning or an alarm is issued immediately. For a hysteresis of x%, the warning or the alarm clears for undershooting an upper limit value or for overshooting a lower limit value only after a difference of $x / 100 * \text{limit value}$ to the limit value.

Tab. 20: Settings in the "Voltage" level

The following parameters are also displayed for the voltage value of PSM slot 1:

Parameter	Explanation
Value	Actual voltage value of PSM slot 1.
Status	Actual status of the voltage value

Tab. 21: Displays in the "Voltage" level

### "Current" sublevel

Parameter	Explanation
DescName	Individual description of the PSM slot 1 current value.
SetPtHigh-Alarm	Upper limit of the PSM slot 1 current value for which an alarm message is issued.
SetPtHigh-Warning	Upper limit of the PSM slot 1 current value for which a warning message is issued.
SetPtLow-Warning	Lower limit of the PSM slot 1 current value for which a warning message is issued.

Parameter	Explanation
SetPtLow-Alarm	Lower limit of the PSM slot 1 current value for which an alarm message is issued.
Hysteresis	If one of the upper limit values is overshoot (SetPtHigh) or one of the lower limit values is undershot (SetPtLow), a warning or an alarm is issued immediately. For a hysteresis of x%, the warning or the alarm clears for undershooting an upper limit value or for overshooting a lower limit value only after a difference of $x / 100 * \text{limit value}$ to the limit value.

Tab. 22: Settings in the "Current" level

The following parameters are also displayed for the PSM slot 1 current value:

Parameter	Explanation
Value	Actual current value of PSM slot 1.
Status	Actual status of the current value

Tab. 23: Displays in the "Current" level

### "Active Custom Energy" sublevel

Parameter	Explanation
Value	User-defined energy counter. The operator can reset this counter to the value "0".

Tab. 24: Settings of the "Active Custom Energy" level

The following parameters are also displayed in the associated sublevels for PSM slot 1:

Parameter	Explanation
Power Factor	Actual power factor
Active Power	Actual active power
Apparent Power	Actual apparent power
Reactive Power	Actual reactive power
Active Energy	Actual active energy
Apparent Energy	Actual apparent energy

Tab. 25: Displays in the "Module 1" level



Note:

You can make the same settings for PSM slots 2 and 3 in the appropriate levels as for PSM slot 1.

## **7.5.5 Fuse 2 – 32 A variant DK 7859.053**

For the 32 A variant of the PSM metering bar, settings for the circuit protected by circuit-breaker 2 are performed at the "Fuse 2" level. The representations match fully those for the circuit protected by circuit-breaker 1 (see section 7.5.4 "Fuse 1 – 32 A variant DK 7859.053").

## 8 Inspection and maintenance

### 8.1 Safety instructions

- Prior to performing any work on the PSM metering bar, the unit must be disconnected from the power supply and protected against being switched on again.
- The unit does not need to be opened and is therefore prohibited.

### 8.2 Work to be performed

#### 8.2.1 Inspection

The system must be checked regularly for its complete correct functioning. Rittal recommends a regular function test when required. The intervals between the tests should be no longer than one year.

#### 8.2.2 Cleaning



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**Note: Risk of damage!**

**Do not use aggressive substances such as cleaner's naphtha, acids, etc., for cleaning as they may cause damage to the plastic surface.**

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- Clean the unit in regular intervals using a lightly moistened cloth.

#### 8.2.3 Maintenance

Because the unit is largely maintenance-free, the maintenance of the unit is largely limited to the "inspection" and "cleaning" tasks.

## **9 Storage and disposal**

### **9.1 Storage**

If the device is not used for a longer period, Rittal recommends that it is disconnected from the mains power supply and protected from dampness and dust.

### **9.2 Disposal**

Because the PSM metering bar consists mainly of the "housing" and "circuit board" parts, the device must be given to the electronic waste recycling system for disposal.

## 10 Testing and rectification

### 10.1 Sensor not ready

This error message is displayed when the energy measurement chip is not initialised, not detected or not available.

If the error message is displayed for more than 20 seconds after activation of the device or during running operation this indicates a device defect.

### 10.2 Triggering a circuit-breaker

Some of the installed PSM plug-in modules have an integrated circuit-breaker. This circuit-breaker can trigger in the event of an error.

- First rectify the cause for triggering the circuit-breaker.
- Then reset the circuit-breaker by pressing the yellow pin on the PSM plug-in module.



## 11 Technical specifications

Technical specifications	PSM metering bar for CMC III	
Model No. DK	7859.050	7859.053
W x H x D mm	60 x for 2000 mm enclosure height x 55	
Mounting position	Vertical	
Operating voltage	Input 1: 400 VAC / N + PE Input 2: 400 VAC / N + PE	230 VAC
Frequency	50 Hz / 60 Hz	
Input current for each phase and circuit!	16 A	32 A
Number of phases per circuit	3	1
Number of circuits	2	1
Connector	Tension spring terminal, plug-type	CEE connector, 32 A
Collateral	Back-up fuse provided by the customer: 16 A per phase	Back-up fuse provided by the customer: 32 A
Measurement functions	Measurement of each phase and infeed	Measurement of each circuit-breaker and PSM slot
Acquired values (each phase and each PSM slot)	Voltage (V), current (A), frequency (Hz), active power (kW), active energy (kWh), apparent power (VA), apparent energy (VAh), reactive power (Var), power factor (cosPhi), neutral-conductor measurement / determination of load unbalance (only for 7859.050)	
Voltage (V) measurement range	180 V to 260 V	
Voltage (V) resolution	0.1 V	
Voltage (V) accuracy	2%	
Current (A) measurement range	0 A to 18 A	0 A to 35 A
Current (A) resolution	0.1 A	
Current (A) accuracy	2%	
Frequency (Hz) accuracy	2%	
Active power (kW) accuracy	2%	
Apparent power (VA) accuracy	2%	
Active energy (kWh) accuracy	1%	
Apparent power (kW) accuracy	2%	
Power factor (cosPhi) accuracy	2%	
Freely settable limit values for warning/alarm	Yes	
Display	OLED monochrome (5 lines)	

# 11 Technical specifications

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<b>Technical specifications</b>	<b>PSM metering bar for CMC III</b>
Interfaces	2 x RJ 45, CAN bus
MTBF (at 40 °C)	200,000 hours
Protection class	Class 3
Level of contamination	2
Protection category	IP 20 according to EN 60 529
Storage temperature	-25 °C to +55 °C
Ambient operating temperature	0 °C to +45 °C
Operating humidity range	20% to 90% relative humidity, non-condensing

Tab. 26: Technical specifications

## 12 Accessories

The accessories program contains, among other things, a connection cable for connecting the PSM metering bar 16 A to the power supply.

A detailed listing of the complete accessories programme is available at the Internet address specified in section 13, "Customer service addresses".

<b>PSM metering bar 16 A (DK 7859.050)</b>	<b>Model No. DK</b>
3-phase connection cable with CEE connectors (IEC 60 309), length 3 m (2 x required when both infeeds are used)	7856.025

Tab. 27: PSM metering bar accessories, 16 A

# 13 Customer service addresses

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## **13 Customer service addresses**

For technical questions, please contact:

Tel.: +49 (0)2772 / 505-9052

E-mail: [info@rittal.com](mailto:info@rittal.com)

Homepage: [www.rittal.com](http://www.rittal.com)

For complaints or service requests, please contact:

Tel.: +49 (0)2772 / 505-1855

E-mail: [service@rittal.de](mailto:service@rittal.de)



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