DataCenter Rack
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There you will also find the addresses of the relevant User Documentation Department

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www.cognitas.de
German

English
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1 Introduction

1.1 The DataCenter Rack

The DataCenter Rack is a cabinet for system components of the PRIMERGY server series of Fujitsu Siemens Computers using space-saving 19-inch technology. Offering high expansion capability within a small area, the DataCenter Rack provides a compact and flexible platform for creating complex configurations.

Figure 1: The DataCenter Rack variants

24 HU 38 HU 46 HU
Introduction

The 38 HU and 46 HU DataCenter Rack can be extended easily using one or more add-on racks.

The lockable doors and side panels provide security against unauthorized access and manipulation.

The 38 HU DataCenter Rack is dimensioned so that it will pass through a normal, 2 m high door in an upright position, complete with its transport palette. The rack can accommodate devices with a total of 38 height units.

For the three rack variants there is the option of vertical mounting frames which allow additional installation of one device with 2 HU and/or three devices with 2 HU each and a installation depth of 300 mm.

Dummy covers are available for closing off empty height units.

1.2 Target group

This manual is intended for those responsible for installing the hardware and ensuring that the system runs smoothly (service personnel, technicians and technical specialists).

The manual is designed so that you can put the DataCenter Rack into operation without previous special knowledge. Knowledge of the hardware to be integrated is helpful for understanding the various connection options. The 3-phase power connection is an exception and must only be installed by an authorized electrician.

The manual does not include technical descriptions of services which only the service department of Fujitsu Siemens Computers GmbH or appropriately trained specialist staff are allowed to carry out.
1.3 Summary of contents

This manual describes how to set up the DataCenter Rack, how to connect and route the cables, and provides an introduction to the philosophy behind the DataCenter Rack.

The installation of components such as the server and storage expansion units, for example, are described in the manuals for those devices.

Further information is provided:
- in the “Security, Guarantee and Ergonomics” manual
- in the documentation for the individual components installed in the rack
- in the documentation for the operating systems used

1.4 Notational conventions

<table>
<thead>
<tr>
<th><strong>bold type</strong></th>
<th>Used for emphasis in the body of the text</th>
</tr>
</thead>
<tbody>
<tr>
<td>“quotation marks”</td>
<td>Used for references to other chapters, sections or manuals</td>
</tr>
<tr>
<td>▶</td>
<td>Identifies an action that you need to take</td>
</tr>
<tr>
<td>![i]</td>
<td>Alerts you to important information, notes and tips</td>
</tr>
<tr>
<td>![CAUTION!]</td>
<td>Warning sign indicating that your health, the correct functioning of your system or the security of your data may be at risk if you ignore the information given at this point.</td>
</tr>
</tbody>
</table>
1.5 User-friendly documentation – verified quality

As part of its efforts to further improve the information provided for users, the editorial department responsible for this manual has been independently audited to verify its high standards of quality of the documentation.

This audit was carried out by TÜV PRODUCT SERVICE GmbH. The following aspects were investigated:

- General comprehensibility
- User-friendliness
- Occupational hygiene and safety for the users
- Safety of the application and observance of the relevant regulations, standards and guidelines
- Environmental protection
- Layout, realization, readability
- Conformity with the product
- Accuracy and completeness of the contents

The criteria for the audit were developed in a joint project between TÜV PRODUCT SERVICE GmbH and tekom, Gesellschaft für technische Kommunikation e.V.

The DOCcert seal provides visible evidence of the successful completion of the audit.
## 1.6 Technical data

### Dimensions

<table>
<thead>
<tr>
<th>DataCenter Rack</th>
<th>24 HU</th>
<th>38 HU</th>
<th>46 HU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height:</td>
<td>1086 mm</td>
<td>1691 mm</td>
<td>2091 mm</td>
</tr>
<tr>
<td>Width:</td>
<td>19 inches (approx. 48 cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height:</td>
<td>1215 mm</td>
<td>1820 mm</td>
<td>2220 mm</td>
</tr>
<tr>
<td>Width:</td>
<td>700 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth:</td>
<td></td>
<td></td>
<td>900 mm</td>
</tr>
</tbody>
</table>

(1 HU = height unit = 4.45 cm or 1 3/4 inches)

### Rack variants
- Rack with 2 side panels (basic rack)
- Add-on rack with separator panel and cable apertures

### Weight

<table>
<thead>
<tr>
<th>DataCenter Rack (empty)</th>
<th>24 HU</th>
<th>38 HU</th>
<th>46 HU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>960 N</td>
<td>ca. 1220 N</td>
<td>ca. 1600 N</td>
</tr>
</tbody>
</table>

### Environmental conditions (according to IEC 721)

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<thead>
<tr>
<th>Operation:</th>
<th>Relative humidity:</th>
<th>5 % - 85 %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mechanically active materials:</td>
<td>Class 3S2</td>
</tr>
<tr>
<td></td>
<td>Mechanical environmental conditions:</td>
<td>Class 3M2</td>
</tr>
<tr>
<td>Transport:</td>
<td>Ambient temperature:</td>
<td>-25 °C ... 60 °C</td>
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<tr>
<td></td>
<td>Relative humidity:</td>
<td>15 % - 98 %</td>
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<tr>
<td></td>
<td>Mechanical environmental conditions:</td>
<td>Class 2M1</td>
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</table>

### Ventilation

The air supply required to cool the slide-in modules is provided by an integral horizontal cooling system (stream of air moving from the front to the back).

**CAUTION!**

Ensure that no warm air can move from the front to the back using dummy covers if necessary.
Technical data

Introduction

Standards

| Electromagnetic safety: | EN 60950, UL 1950, CSA 950 |

Protection class (according to DIN 40050 and IEC 529)

IP00 (no special protection from dust or sprayed water)
2 Important notes

This chapter provides you with important information on setting up and operating the DataCenter Rack.

2.1 Rack philosophy

The DataCenter Rack combines features in such a way as to make it unique in the world of 19-inch rack technology. The DataCenter Rack is designed to provide the user with the highest possible level of service offering unparalleled flexibility at an acceptable price. The well-balance concept is reflected in the following points among other things.

Transport concept

The height of the 38 HU DataCenter Rack allows it to fit through a normal, 2-meter high door without having to be tipped, even if it is still on the delivery palette. This not only makes the rack easier to transport but also allows the rack to be delivered with components such as server or storage expansion units already installed and configured as specified by the customer. It also makes it easy to move the DataCenter Rack to a new location on its rollers. The same specifications apply to the 24 HU DataCenter Rack.

The 46 HU DataCenter Rack and the appertaining add-on rack are not delivered with rack components already installed. The components are mounted into the fully cabled rack after it has reached its location. The rack can easily be moved to a new location on its rollers. The transport concept for the 46 HU DataCenter Rack is due to the supposition that the customer does not know about individual local conditions like the height of the doorframe or the existence of elevators.

Installation concept

The DataCenter Rack is based on internationally standardized 19-inch rack technology and makes optimum use of the space provided. In addition to mounting rack components horizontally at the front and at the back, an optional expansion area is also available. This expansion area can accommodate an additional three 19-inch rack components, each with a maximum height of 2 HU and a maximum depth of 300 mm, which are mounted vertically. Rack components can be mounted horizontally using sliding rails or telescopic rails.
Mounting components using telescopic rails and the corresponding cable management system allows maintenance and repair work to be carried out more easily and cost-effectively and supports hot-replace solutions.

**Cable management**

The DataCenter Rack provides an efficient cable management system. Because the cables are routed along the side of the rack components using articulated cable guides or cable guides with cable clips, the connection side of the components remains tidy and making it is easy to see where each cable leads. A distinction is made between two types of connection: a connection via an articulated cable guide and a direct connection.

An articulated cable guide is used together with rack components that are mounted in the DataCenter Rack using telescopic rails. This combination allows rack components to be pulled from the rack without having to disconnect the cables first and therefore allows boards to be replaced during operation in hot-replace solutions.

If rack components are mounted on sliding rails, cables are connected directly. This means that the cables can be short but does not allow for hot-replace solutions.

Excess lengths of cable can be fastened at certain locations within the DataCenter Rack using one or more cable guides with cable clips.

**Ventilation concept**

If the DataCenter Rack is to function reliably, adequate ventilation of all the rack components must be provided. To ensure that this is always the case, the ventilation concept applied to all PRIMERGY rack components has been coordinated with the DataCenter Rack to provide a uniform overall solution. The basic ventilation concept is designed so that fresh air is drawn in through the front and warm air is expelled from the back. In addition to the air vents at the front and the back of the DataCenter Rack, the rack has no floor, which increases air circulation.

The ventilation concept of PRIMERGY rack components has been coordinated between the components themselves and with the DataCenter Rack. However, although this holds true for PRIMERGY rack components, it does not necessarily hold true for rack components from other manufacturers. Therefore, before you install a rack component from a different manufacturer in the rack, check whether it matches the above-mentioned ventilation concept. Otherwise, damage may occur.
2.2 Notes on safety

CAUTION!

Observe the safety instructions in the documentation for the individual components mounted in the rack and the following notes on safety.

- The activities described in this manual may only be performed by technicians, service personnel or technical specialists. Ignoring the instructions in this manual can result in personal injury or damage to equipment (tipping over etc.).
- Pay attention to the carrying capacity of the floor on the final place of installation.
- Route the cables in such a way that they do not form a potential hazard (make sure no one can trip over them) and that they cannot suffer damage.
- When connecting or disconnecting cables, refer to the relevant notes in the section “Connecting and disconnecting cables” on page 34.
- Ensure that the anti-tilt bracket is correctly mounted when you set up the DataCenter Rack.
- When mounting a server, pull the telescope rails out all the way until they click into position.
- Before you mount a server in the DataCenter Rack, remove all heavy and easily removed server components such as hot-plug disk drives and power supply modules for redundant power supplies since this makes the server lighter and easier to mount.
- Before pushing extended telescopic rails back into the rack, pull the ball cage of the telescopic rail forward as far as it will go.
- For safety reasons, no more than one unit may be withdrawn from the rack at any one time during installation and maintenance work. If more than one unit is withdrawn from the rack at any one time, there is a danger that the rack will tilt forward.
- If necessary, have other people help you mount the individual components in the rack because of the weight involved.
Notes on mounting the rack components

CAUTION!

- Install only system expansions that satisfy the requirements and rules governing safety and electromagnetic compatibility and relating to telecommunications terminal equipment. If you install other expansions, you may damage the system or violate the safety regulations and regulations governing RFI suppression. Information can be obtained from customer service or your sales office.
- If you cause a defect on the device by installing or exchanging system expansions, the warranty is invalidated.
- The configurations available in the DataCenter Rack can carry a leakage current > 3.5 mA. Therefore, a ground connection must be established before connecting to the mains (see chapter “Power supply” on page 41).
- The power connection of the DataCenter Rack must be installed by an authorized electrician.

2.3 Notes on mounting the rack components

Before you start mounting components in the rack, you should identify the positions for the individual components in the DataCenter Rack according to the configuration generated using the system architect (see section “The system architect” on page 19) and mark the positions using the assembly aid supplied with the rack.

The maximum mounting height for the DataCenter Rack is 24/38/46 height units (HU). One height unit corresponds to 4.45 cm (see section “The height unit” on page 16). The total mounting height of the components to be mounted in the rack should therefore not exceed 24/38/46 HU.

Observe the following rules when mounting the components:
- Mount the components in the rack from bottom to top.
- Mount heavy parts at the bottom, e.g. the uninterruptible power supply.
- Mount the keyboard or RC21 console so that it is easy to operate.
- Position the dummy covers so that later extensions can be mounted without having to rearrange components.
Important notes

Environmental protection

- To accommodate the ventilation concept and ensure proper ventilation of all the components in the rack, any unused areas must be closed using dummy covers.
- Mark and mount the unit in accordance with the technical manual and assembly aid supplied with the rack.

2.4 Environmental protection

Environmentally friendly product design and development

This product has been designed in accordance with the FSC standard for “environmentally friendly product design and development”.

This means that the designers have taken into account crucial criteria such as durability, selection of materials and coding, emissions, packaging, the ease with which the product can be dismantled and the extent to which it can be recycled.

This saves resources and thus reduces the harm done to the environment.

Notes on saving energy

Devices that do not have to be on permanently should not be switched on until they are needed and should be switched off during long breaks and when work is finished.

Notes on packaging

We recommend that you do not throw away the original packaging in case you need it later for transportation. If possible, devices should be transported in their original packaging.

Notes on dealing with consumables

Please dispose of printer consumables and batteries in accordance with local regulations.

Notes on labeling plastic housing parts

Please avoid attaching your own labels to plastic housing parts wherever possible, since this makes it difficult to recycle them.
Environmental protection

Take-back, recycling and disposal

For details on take-back and reuse of devices and consumables within Europe, contact your FSC branch office/subsidiary or our recycling center in Paderborn:

Fujitsu Siemens Computers GmbH
Recycling Center
D-33106 Paderborn

Tel. ++49 5251 8180-10
Fax ++49 5251 8180-15

Further information on environmental protection

The Fujitsu Siemens Computers GmbH representative for environmental protection will be happy to answer any further questions you may have concerning environmental protection.

Fujitsu Siemens Computers GmbH
Environmental Protection
Werner-von-Siemens-Straße 6
D-86159 Augsburg

Tel. ++49 821 599-2999
Fax ++49 821 599-3440
3 Preparations

This chapter describes the preparations for installation and all the tasks involved in setting up and operating the DataCenter Rack.

3.1 Unpacking and checking the delivery unit

Delivery unit

– DataCenter Rack
– Anti-tilt bracket
– Keys
  You receive two pairs of keys, one for the front and rear doors and one for the side panels. Keep the keys in a safe place.
– Tools for adjusting the leveling feet
– Additional assembly materials in a bag
– Technical manual

Depending on the order placed, assembly units and cables may already be preassembled in the DataCenter Rack.

 ► Unpack all the individual parts.
 ► Check the delivery for damage incurred during transport.
 ► Check whether the delivery matches the specifications in the delivery note.
 ► Check whether all the necessary details have been entered on the first page of the guarantee booklet.

⚠️ CAUTION!

Make sure that the bag attached to back door contains the keys for the rack.

Should you discover that damage has occurred during transport or that the delivery does not match the delivery note, notify your supplier immediately!

The DataCenter Rack is shipped on a palette to which it is attached with metal brackets.
Unpacking and checking the delivery unit

Preparations

The palette has an integrated ramp function that allows you to remove the DataCenter Rack from the palette without any additional aids.

**CAUTION!**

Pay attention to the carrying capacity of the floor on the final place of installation!

- First of all, remove the metal brackets attached to the four leveling feet.

![Figure 2: Removing the rack from the transport palette](image)

- Reassemble the palette to create a ramp (1) - (4).

**CAUTION!**

If necessary, ask other people for help.

- Use the open-ended wrench supplied to retract the leveling feet (5). The DataCenter Rack is now standing on four rollers.

- Roll the DataCenter Rack from the palette and push it to its final position (6). Please note that the DataCenter Rack can weigh up to 360 kg.
3.2 Opening the DataCenter Rack

The doors can only be opened using a key or the optional chipcard reader.

Opening the door with a key

- Turn the key clockwise (1).
  The door handle pivots forward (2).
- Turn the door handle about 90 degrees anticlockwise (3).

Opening the door with a chipcard

The chipcard reader is located to the right of the door handle in the space between the metal door and the piece of glass and is marked with a chipcard symbol.

- Insert a valid chipcard into the chipcard reader.
### 3.3 The height unit

The unit of measurement used in the DataCenter Rack is the height unit (HU). One height unit comprises one 3-hole section for cage nuts in the area at the front (starts and ends with a narrow metal bar) or one hole/elongated hole/hole combination in the mounting area and corresponds to 4.45 cm or 1 ¾ inches.

![Figure 4: One height unit (HU)](image)

The height unit

Preparations
3.4 Inserting cage and spring nuts

When mounting rack components you often have to insert cage nuts or spring nuts in the support uprights. Proceed as follows:

- Mark the position of the components to be fitted on the four support uprights.

In order to facilitate the positioning, assembly aids are shipped with the components.

Inserting cage nuts

![Figure 5: Inserting cage nuts](image)

- Insert the cage nut as shown in the figure with the bottom part of the cage in the appropriate mounting hole of the support upright (1).

- Use the tool supplied to lever the upper part of the cage nut into the mounting hole as shown (2).

The cage nut should lock into the mounting hole as shown (3).
Inserting spring nuts

Insert the spring nut into the appropriate groove of the support upright at the marked location (1) - (4).

If necessary, slide the spring nut within the groove until it locks in the correct position (5).
3.5 The system architect

The system architect configuration tool is used as an aid for configuring the DataCenter Rack.

Before you start mounting components in the DataCenter Rack, you should identify the positions for the individual components in the DataCenter Rack according to the configuration generated using the system architect and, if available, the assembly aid supplied with the rack.

The maximum mounting height for the DataCenter Rack is 24/38/46 height units. One height unit corresponds to 4.45 cm. The total mounting height of the components to be mounted in the DataCenter Rack must not exceed 24/38/46 HU.

Figure 7: Configuration example
3.6 Installation procedure

CAUTION!
Observe the safety and installation notes in the chapter “Important notes” on page 7.

Perform the steps in the installation procedure in the specified order. The individual steps are described in detail in the following chapters.

- Setting up the DataCenter Rack (adjust using spirit level)
  
  CAUTION!
  Pay attention to the carrying capacity of the floor on the final place of installation!

- Mounting the anti-tilt bracket
- Mounting the rack components
- Mounting the components for the cable management system and connecting and routing the cables
- Connecting to the power supply
4 Setting up the DataCenter Rack

This chapter describes how to mount the anti-tilt bracket on the DataCenter Rack and set up add-on racks.

**CAUTION!**
Pay attention to the carrying capacity of the floor on the final place of installation!

- Roll the DataCenter Rack to its final position.

![Figure 8: Adjusting the DataCenter Rack](image)

- Adjust the rack horizontally by unscrewing the four leveling feet (1) at the front and the back of the base using the tool supplied. Make sure the rollers no longer have contact with the floor.
4.1 Mounting the anti-tilt bracket

Push the anti-tilt bracket under the rack from the front.

CAUTION!

The anti-tilt bracket must make firm contact with the ground and will be fastened on the rear of the rack.

Attach the anti-tilt bracket left and right on the rear of the rack by fastening the screws (1).
4.2 Setting up an add-on rack

A picture illustrating how to set up the add-on rack is included in the package. The steps for mounting and setting up the add-on rack are described below.

**CAUTION!**

Pay attention to the carrying capacity of the floor on the final place of installation!

- Set up the basic rack as described earlier in this chapter.
- Remove the side panel from the basic rack to which you want to attach the add-on rack.
- Mount the add-on connectors to the basic rack and add-on rack.
- Mount the add-on separator panel. Pay attention to the mounting tab on the separator panel. The panel should be assembled with the cable aperture to the back.
- Place the add-on rack next to the basic rack and align the two racks by adjusting the leveling feet.
- Screw the two racks together with the add-on connectors.
- Mount the side panel you removed earlier to the add-on rack.
5 Mounting rack components

This chapter describes how to prepare the DataCenter Rack for the installation of rack components. Refer to the appropriate operating manuals for information on how to mount the components themselves.

The rack has three areas in which components can be mounted:

- the 19-inch area with 24/38/46 HU, which is accessible from the front and is used for mounting the rack components horizontally.

- the optional expansion area with 1 x 2 HU resp. 3 x 2 HU, which is accessible from the front and is used for vertically mounting up to 6 rack components, each with a maximum depth of 300 mm.

- the 19-inch area that is accessible from the back and which is used for mounting components horizontally if not already occupied by other components.

Before you prepare the DataCenter Rack and start mounting components, you should use the system architect to help you determine the mounting position and the mounting height. Also observe the information in the section “Notes on mounting the rack components” on page 10.

**CAUTION!**

Pay attention to the carrying capacity of the floor on the final place of installation!
5.1 Mounting in the front 19-inch area

Components are mounted in the front 19-inch area of the DataCenter Rack using either telescopic or sliding rails. Light components can also be mounted with the front panel.

If components are mounted using telescopic rails, all the cables leading to the components are routed via an articulated cable guide. If maintenance work needs to be performed, the cables can remain connected when the components are withdrawn from the DataCenter Rack. This makes maintenance much easier and also allows boards in hot-replace slots to be replaced during operation.

If components are mounted using sliding rails, all the cables are routed directly to the components and are connected without any special aids, i.e. without using an articulated cable guide. If maintenance work needs to be performed, all connected cables must be disconnected before the components can be withdrawn from the DataCenter Rack.

A support bracket is required for mounting components regardless of whether telescopic rails or sliding rails are used.

![Support brackets](image)

Figure 11: Support brackets with a load capacity of 50 kg and 150 kg respectively

Support brackets with a load capacity of 50 kg (1 HU) and 150 kg (2 HU) are available. A cable clip can be mounted on each support bracket for vertical cable routing.
Mounting rack components

Mounting in the front 19-inch area

Mounting the support bracket

The support bracket is mounted on the rear left support upright at the appropriate height and is used to fasten the left sliding or telescopic rail at the back. The support bracket is mounted level with the lower edge of the PRIMERGY server. The PRIMERGY N70 server is an exception: in this case, the support bracket is mounted level with the upper edge of the server.

![Figure 12: Mounting a support bracket with a load capacity of 150 kg (2 HU)](image)

- Mount the support bracket as shown and screw it to the rear left support upright at the appropriate height using one or two screws and cage nuts, depending on which variant you are mounting.
- If necessary, you can mount one additional cable clip to each support bracket for vertical cable routing.
5.2 Mounting in the expansion area

Three to six 19-inch rack components with a maximum of 2 HU each can be mounted vertically in the optional expansion area of the DataCenter Rack to the left of the 19-inch area. The depth of the components cannot exceed 300 mm. Gaps that occur when you mount 1 HU components must be covered. Components are mounted using their front panel only.

5.2.1 Mounting the frame holder

The frame holder for the optional expansion area can be mounted in the rack at a later time.

Figure 13: Removing the cover

- Remove the left side panel.
- Remove the two screws fastening the cover to the support upright (1).
- Remove the four screws on the front of the cover (2) and remove the cover from the expansion area.
- Mount the frame holder for the expansion area in reverse order.
5.2.2 Mounting rack components

Figure 14: Mounting a rack component in the expansion area

- Remove the cover from the appropriate slot (1).
- Insert the cage nuts as required for the component to be installed (2).
- Install the rack component (3) and cover any resulting gap with an appropriate cover.
5.3 Mounting in the rear 19-inch area

In the rear 19-inch area, you can mount additional rack components if:

- the front area is either unoccupied with rack components
- the rack components mounted in the front area leave enough space for additional components to be mounted at the back (in the rear area)

An appropriate support bracket is required for mounting rack components on the lefthand side. If you cannot use an existing bracket, you will have to mount a new support bracket at the appropriate position.

Figure 15: Example of how to mount a rack component in the 19-inch area at the back

- If there is no support bracket at the appropriate position on the left rear support upright, mount a support upright with the appropriate load capacity (1).
- Use the support upright (2) for mounting rack components on the righthand side.
6  Cable management

This chapter describes how to mount the components of the cable management system and how to connect cables and route them in the DataCenter Rack.

1. Mounting components of the cable management system
2. Connecting cables
3. Routing cables

6.1  Mounting components of the cable management

The cable management system comprises the following parts:

- articulated cable guides
- cable guides with cable clips
- cable guides
- support bracket with raster for cable guides

The cable guides can be used in a flexible manner. Depending on what is needed, an articulated cable guide can be changed into a cable guide with cable clips or vice versa. If necessary, small devices can be mounted onto an empty cable guide. The cable tray includes a grid to attach cage nuts.
6.1.1   **Articulated cable guides**

Articulated cable guides are used for rack components that are mounted in the rack using telescopic rails.

The mounting height of the articulated cable guide depends on the rack component to be installed and must not interfere with the telescopic rails.

![Figure 16: Mounting an articulated cable guide](image)

- Insert the articulated cable guide into the support upright for the cable guide at the appropriate height as shown (1).
- Fasten the articulated cable guide to the rear support upright using a spring nut and a screw (2).
6.1.2  Cable guide with cable clips

You can use one or more cable guides with cable clips to store excess lengths of cable in an orderly fashion at appropriate locations in the rack.

The other cable clips supplied can be distributed over the support brackets as needed.

Figure 17: Mounting cable guides with cable clips

1  Cable guide
2  Grid for cage nuts

- Insert the cable guide with cable clips into the support upright for the cable guide at the appropriate height as shown in the figure 16 on page 32 for the articulated cable guide.

- Fasten the cable guide with cable clips to the rear support upright using a spring nut and a screw.
6.2 Connecting and disconnecting cables

CAUTION!
The power plug must be pulled out!
Read the documentation for the device before you connect it.
Never connect or disconnect cables during thunderstorms.
When disconnecting a cable, always grasp the plug. Never pull on the cable.
Connect or disconnect cables in the sequence shown below.

6.2.1 Connecting cables

- Switch off all affected devices.
- The power plug of all affected devices must be pulled out of the socket strip in the DataCenter Rack.
- Attach all cables to the devices. Mark the cables and note what function each cable serves. Above all, observe the safety notes in the chapter “Important notes”.
- Plug all data transmission cables into the sockets provided for the data transmission or telephone networks.
- Plug the mains power plugs of all devices into the sockets of the socket strip(s) in the rack. Make sure that the power cables of the devices are plugged in so that an even distribution of power to the three phases (L1, L2, L3) is achieved (see chapter “Power supply” on page 41).

6.2.2 Disconnecting cables

- Switch off all affected devices.
- Pull the power plugs of all affected devices out of the sockets on the socket strip in the DataCenter Rack.
- Pull all data transmission cables out of the sockets provided for the data transmission or telephone networks.
- Disconnect all cables on the devices.
6.3 Routing cables

This section contains several examples of how to route cables in the DataCenter Rack.

6.3.1 Articulated cable guide

Figure 18: Routing cables using an articulated cable guide

- Route the cables as shown in the figure.
- Secure the cables on the articulated cable guide using the cable ties.
6.3.2 Cable routing and strain relief for the built-in rack component

The rack component is inserted in the DataCenter Rack and secured. The cables are attached to the relevant connectors and should be routed in the cable management with a reserve length by making a loop over the center axis of the rack component (see figure 19).

![Figure 19: Rack top view: rack component inserted and secured](image-url)
Routing cables

When the rack components are extracted the cables fixed in the articulated guide are pulled out too. The articulated guide stabilises the cables at the corresponding rack component height and thus ensure a trouble-free insertion and removal (see figure 20 below and figure 21 on page 38). Mechanical attachment is via the strain relief of the connectors.

Figure 20: Rack top view: rack component carried out by 50%
Routing cables

Cable management

Figure 21: Rack top view: rack component carried out by 100%
6.3.3 Cable guide with cable clips

The example below shows you how to route excess lengths of cable in the DataCenter Rack using a cable guide with cable clips. Please note that in the case of fiber optic cables, a certain bending radius must not be exceeded.

Figure 22: Routing cables using a cable guide with cable clips

- Route the cables as shown in the figure.
6.3.4 Direct connection

The example below shows the direct connection of cables to a rack component.

Figure 23: Routing cables when rack component is mounted vertically

- Route the cables as shown in the figure.
7 Power supply

There are circumstances under which the power supply of the DataCenter Rack is a component of a redundancy concept. The DataCenter Rack concept normally provides a 3-phase ac mains connection and thus offers a uniform power distribution on the supply network.

Servers with redundant power supply units can then be connected to different phases and are thus given additional phase redundancy for high availability configurations. If a phase fails, the systems which are connected to another phase remain operational.

By using a number of 3-phase mains connections it is even possible to create redundancy of the supply systems. This option is becoming increasingly important with regard to the server farms aspect.

The power supply complies with the requirements of the EN60950 regulations. This allows a DataCenter Rack to be connected with a flexible (5-wire) cable of 5 x 1.5 mm² up to a rated current up to 16 A per phase for example.

If the DataCenter Rack is connected to the mains by a 1- or 3-phase socket strip, the configuration can carry leakage currents >3.5 mA. In this case, the connection of the DataCenter Rack to the inhouse supply network must be performed using a rigid connection or an IEC309-compliant connector.

7.1 Connecting to the mains using 1-phase socket strip

For a 1-phase mains connection, a socket strip is available, with ten insulated sockets (10 A), a power cord with a length of 5 m, and an IEC309-compliant connector (see figure 25 on page 43).

- Screw the socket strip to the left rear support upright of the DataCenter Rack.

Power is supplied to the individual rack components within the DataCenter Rack via the socket strip.
7.2 Connecting to the mains using 3-phase socket strip

For a 3-phase mains connection, a socket strip with 3 x 5 sockets is available (see figure 25 on page 43). The three phases are divided in the socket strip between one protective contact socket (16 A) and four insulated sockets (10 A) per phase.

Depending on the device configuration, the socket strip can be connected to the inhouse supply network via a power cord with a length of 7 m using a rigid connection or an IEC309-compliant connector.

A 5-pole terminal strip for connecting the five leads (L1, L2, L3, N and PE) is available and is located on the socket strip of the rack.

⚠️ CAUTION!

The connection must be made by an authorized electrician only. The power connection cable must be voltage free.

Figure 24: Mains power connection

- Route the external 5-pole connection cable into the rack (1).
- Connect the external 5-pole connection cable to the 5-pole terminal strip (2) of the socket strip in DataCenter Rack.
### 7.3 Power distribution

Power is supplied to the individual rack components within the DataCenter Rack via the socket strip.

If the number of sockets available on the socket strip is not enough, you can use a supplementary socket strip as an extension.

The following supplementary socket strips are available:

- socket strip with 5 sockets (one 16 A protective contact socket and four 10 A insulated sockets) and 3 m connection cable with protective contact utility connector.

- socket strip with 3 sockets (three 10 A protective contact sockets) and 1.5 m connection cable with insulated connector (max. 10 A).

- If necessary, screw additional socket strips to the (left or right) rear support upright of the DataCenter Rack. Only one supplementary socket strip per phase is permitted.

- Connect the socket strips as shown.
7.4 Power supply via UPS

When uninterruptible power supply (UPS) units are involved in supplying energy to the rack and its components there are many possible combinations:

- The rack is supplied completely via the UPS:
  
  In this case the UPS should be connected directly to the mains. In the rack the systems are connected directly or optionally via a 3-way socket strip to the UPS.

- The rack is partly supplied via a UPS:
  
  This gives a choice of connecting the UPS via the socket strip in the rack or directly to the power supply network. This process also applies if a number of UPSs are used in the rack.

- High-power UPSs:
  
  UPSs above 3000 VA need their own mains connection because of the large amount of current that they draw. Here both rigid connections and connections using IEC 309-complaint connectors can be used. The technical requirements can be taken from EN60950 and from the specifications of the local power utility.

The power supply can be configured freely depending on the UPS used. The input power connector of the respective UPS can be connected either directly to the mains or to the protective contact socket of the main socket strip in the rack by using the connection cable supplied with the respective UPS. The rack components should be connected to the output power receptacles of the corresponding UPS.
7.5 Connecting to the potential compensating system

If necessary, the DataCenter Rack can be connected to the indoor potential-compensating system via the grounding screw located at the rear of the rack chassis.

Figure 26: Grounding screw
Related publications

The CD-ROM delivered with each server system also contains the PDF file for the DataCenter Rack manual.

The PDF files for the manuals listed below can also be downloaded free of charge from the Internet. The overview page showing the online documentation available in the Internet can be found via the URL: http://manuals.fujitsu-siemens.com

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