19-Inch Rack

U41043-J-Z146-2-74
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1 Introduction

1.1 The 19-Inch Rack for PRIMERGY and RM systems

The 19-Inch Rack for PRIMERGY and RM systems is a cabinet for system components of the PRIMERGY and RM server series of Siemens AG, using space-saving 19-inch technology. Because of the high expansion capabilities within a small area, the 19-Inch Rack provides a compact and flexible platform for creating complex configurations.

Figure 1: The 19-Inch Rack for PRIMERGY and RM systems
Target group

The 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 rack is available in two height variants:
- 120 cm external height (can incorporate 23 HU)
- 216 cm external height (can incorporate 42 HU)

One height unit (HU) comprises a hole/elongated hole/hole combination (figure 2) and corresponds to 4.45 cm or 1 ¾ inches.

Figure 2: One height unit (HU)

Blank panels are available for closing the 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 19-Inch Rack into operation without previous special knowledge. Knowledge of the hardware is helpful for understanding the various connection options. The 3-phase power connection of the 19-Inch Rack (42 HU) is an exception and must only be installed by an authorized electrician.
Introduction

The manual does not include technical descriptions of services which only the service department of Siemens AG or appropriately trained specialist staff are allowed to carry out.

1.3 Summary of contents

This manual describes how to set up the rack and how to mount the rack components in the rack and connect them.

The mounting of basic components such as the keyboard and monitor trays is described in this manual. The mounting of other components such as the server units is described in the manuals for those devices.

Further information is provided

- in the “Safety and Ergonomics” manual and in the “Safety Information - RM Systems”
- 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>Notational convention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bold type</strong></td>
<td>Used for emphasis in the body of the text</td>
</tr>
<tr>
<td>&quot;quotation marks&quot;</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 additional information, notes and tips</td>
</tr>
<tr>
<td>![!]</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>

Table 1: Notational conventions
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.
2 Important notes

This chapter provides you with important information on setting up and operating the 19-Inch Rack for PRIMERGY and RM systems.

2.1 Notes on safety

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.).
- 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 chapter “Connecting and cabling devices” on page 31.
- Ensure that the anti-tilt bracket is correctly mounted when you set up the rack.
- Configurations with only a PRIMERGY 870 or a RM 400 are not permitted. There is a danger that the rack will tilt forward when pulling out these units.
- For mounting the servers pull the telescopic bars completely out. They must click into place so that you can longer push them back.
- Remove all hot-plug server components before mounting a server at the top of the rack (weight, danger that the rack will tilt forward).
- Pull out the ball cage of the telescopic bar up to the stop before inserting the telescopic bar again.
- 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.
Transporting the rack

Important notes

- 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 and Siemens AG assumes no liability.

- The 3-phase power connection of the 19-Inch Rack must be installed by an authorized electrician only.

2.2 Transporting the rack

The rack is shipped on a palette to which it is attached with metal brackets.

- Unscrew the metal brackets.

- The palette has an integrated ramp function. Reassemble the palette to create a ramp using the manufacturer’s notes as a guide (figure 4 on page 7).

- Adjust the two front levelling feet using the open-ended wrench supplied.

Figure 3: Unlocking the transport rollers

- Press the levers (1) for the transport rollers upwards.

  This unlocks the rollers, and you can move the rack to the desired position.

- Move the rack from the palette on its rollers. Warning: the rack has a total weight of 120 kg.
Transporting the rack

The rack can be moved to the exact installation site on its rollers.

⚠️ Lock the rack transport rollers again when the rack is at the desired location (see chapter “Setting up the 19-Inch Rack” on page 13).

Figure 4: Transporting the rack from the palette
2.3 Notes on mounting slide-in modules

Before you start mounting slide-in modules in the rack, you should identify the positions for the individual slide-in modules according to the configuration generated using the rack architect (see section “Rack architect” on page 9) and mark the positions by using the assembly aid supplied with the rack.

The maximum mounting height for the 19-Inch Rack is 23 or 42 height units (HU). One height unit corresponds to 4.45 cm or 1 ¾ inches. The total mounting height of the slide-in modules to be mounted in the rack should therefore not exceed 42 HU.

Observe the following rules when mounting slide-in modules:

- Mount the components in the rack from bottom to top.
- Mount heavy parts at the bottom, e.g. the uninterruptible power supply.
- The monitor must be mounted at the top of the rack to ensure sufficient ventilation.
- Mount the keyboard so that it is easy to operate (approximately in the middle of the 42 HU rack).
- Mount the console switch above the keyboard, otherwise it will be difficult to operate when the keyboard is pulled out.
- Place the blank panels so that later extensions can be mounted without having to rearrange components.
- Mark and mount the unit in accordance with the technical manual and assembly aid supplied with the rack.
Important notes

Notes on mounting slide-in modules

2.3.1 Rack architect

You configure a 19-Inch Rack system with the aid of an electronic configuration tool, the rack architect.

If you do not yet have a configuration generated using the rack architect (example see figure 3), you will find the rack architect in the Internet under "www.primergy.de" or "www.primergy.com" (available from December 1998).

Figure 5: Configuration example (PRIMERGY system)

(1) MCM 1508 NTD light basic
TCO'95 (UPS secured)

(2) Modem assy + 2 modems

(3) PRIMERGY 070

(4) Console switch 4 port, OSD
(UPS secured)

(3a) PRIMERGY 070 with patchfield

(5) PRIMERGY 470

(6) Keyboard with integrated
trackball

(7) PRIMERGY 870

(8) UPS
2.4 Technical data

Dimensions

| Internal   | Height  | 23 HU = 102.35 cm or 42 HU = 186.90 cm  |
|           | Width   | (1 HU (height unit) = 4.45 cm or 1 3/4 inch) |
| External  | Height  | for 23 HU: 120 cm or for 42 HU: 216 cm |
|           | Width   | 60 cm                                      |
|           | Depth   | 90 cm                                      |

Weight

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>23 HU Rack (empty)</td>
<td>approx. 80 kg</td>
</tr>
<tr>
<td>42 HU Rack (empty)</td>
<td>approx. 120 kg</td>
</tr>
</tbody>
</table>

Environmental conditions (according to IEC 721)

- operation 15 °C ... 32 °C
- transport -25 °C ... 60 °C

Ventilation

A fully configured system (max. 2 kW) can be operated at a temperature up to 32 °C. The air supply required to cool the slide-in modules is provided by horizontal self-ventilation (air flow from the front to the back).

Ensure that no warm air can flow from the back to the front. For it blank panels are to be used if necessary.

Electrical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage range</td>
<td>100 V - 125 V / 200 V - 240 V</td>
</tr>
<tr>
<td>Nominal current</td>
<td>depending on the units fitted, max. 16 A</td>
</tr>
<tr>
<td>Nominal frequency</td>
<td>50 Hz through 60 Hz</td>
</tr>
</tbody>
</table>
Important notes

Environmental protection

The 23 HU rack requires a 16 A CEE utility socket (single-phase), the 42 HU rack requires a 16 A permanent connection (3-phase).

### Standards

Protection class IP00 (no special protection from dust or sprayed water)

DIN 40050, IEC 529

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### 2.5 Environmental protection

#### Environmentally friendly product design and development

This product has been designed in accordance with the Siemens 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.

#### Note 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.

#### Note on dealing with consumables

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

#### Note 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 Siemens branch office/subsidiary or our recycling center in Paderborn:
Siemens AG
Recycling Center
D-33106 Paderborn

Phone +49 5251 8180-10
Fax +49 5251 8180-15

Further information on environmental protection
The Siemens AG representative for environmental protection will be happy to answer any further questions you may have concerning environmental protection.
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Environmental Protection
Werner von Siemens Straße 6
86159 Augsburg

Phone +49 821 599-2999
Fax +49 821 599-3440
3 Setting up the 19-Inch Rack

This chapter describes how to set up the 19-Inch Rack and prepare it for mounting the slide-in modules.

3.1 Installation procedure

Observe the safety and installation notes in the chapter “Important notes” on page 5.

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

- Unpack the rack.
- Set up the rack.
- Mount the assembly units (monitor, keyboard, etc.).
- Connect the devices in the rack.
- Connect the power supply to the rack.

3.2 Unpacking and checking the delivery unit

Rack delivery unit (depending on the order)
- Rack with main connector and internal system cabling
- Keys (1)

You receive two pairs of keys, one for the front and rear doors of the 19-Inch Rack and one for the side panels. Keep the keys in a safe place.

- 13 mm open-ended wrench (2)
- Further assembly materials in a bag
- Anti-tilt bracket (3)
- Technical manual
Unpacking and checking the delivery unit

Depending on the order, assembly units and cables may already be preassembled in the rack.

You are advised not to throw away the original packaging material. You may need it again later for transportation purposes.

- 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.

⚠️ Make sure that the bag attached to the outside of the plastic packaging contains the keys for the rack and that you not discard these along with the packaging.

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

Figure 7: Setting up the rack

- Push the rack to its final position. Lock the transport rollers by pushing the levers down (1).
- Adjust the rack horizontally by unscrewing the four leveling feet on the base as needed using the 13 mm open-ended wrench (2).

Figure 8: Fitting the anti-tilt bracket

- Attach the anti-tilt bracket to the rack with the four screws supplied.

The anti-tilt bracket must make firm contact with the ground.
3.4 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.

- Set up the basic rack as described in “section “Setting up the rack” on page 15”.
- 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 and add-on racks.
- 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.

3.5 Opening the rack

The doors can only be opened using a key.

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

To fit the assembly kits, you must often insert 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.

- 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).
4 Mounting the keyboard assembly kit

Before you start, you should determine the correct location of the keyboard slide-in module. Observe the notes in the section “Notes on mounting slide-in modules” on page 8. The mounting height of the keyboard is one HU.

Figure 11: Installing the carrier rail and the guide rail for the keyboard

- Screw the two carrier rails (1) to the left and the right of the rack using the supplied No. 5 Allen wrench. Note that the left and right carrier rails differ in the arrangement of the threaded holes (the figure shows the left carrier rail).
- Remove the guide rails from the telescopic rails attached to the keyboard.
- Screw the two guide rails (2) to the carrier rails (1). Note that the left and the right guide rails are different (the figure shows the left guide rail).
Mounting the keyboard assembly kit

Push the slide forwards to the stop (1).

Push the keyboard tray into the guide rail as far as the stop (2). The securing springs to the left and the right of the keyboard tray (3) lock into the guide rail, and prevent the keyboard tray from being pulled out accidentally.

Place the keyboard onto the tray (4). The keyboard cable must be pushed through the two apertures in the back of the tray (5).

Pull out the ball cage of the telescop bar up to the stop before inserting the telescop bar again.

One arm of the articulated cable guide is fixed to the U-bracket (6) on the back of the keyboard tray (see section “Mounting the articulated cable guide” on page 31).
5 Mounting the monitor assembly kit

This chapter describes how to mount the monitor tray and the monitor filler panel for the console monitor in the 19-Inch Rack.

A 14-inch or 15-inch color monitor can be used as the console monitor.

Before you start, you should determine the correct location of the monitor.

Observe the notes in the section “Notes on mounting slide-in modules” on page 8.

The mounting height of a monitor is 9 HU. If the monitor is mounted in the top position of the 19-Inch Rack, it can jut out into the cover of the rack, meaning that only 8HU are used.
Mounting the monitor assembly kit

Figure 14: Preparing the monitor tray for mounting

- Screw the two extension angle brackets to the monitor tray so that the gap between the support point (a) and the support point (b) is 650 mm (rack installation measurement).
- Mark the position of the monitor tray in the rack.

Figure 15: Attaching the securing bolts for the monitor tray

- Insert the securing bolts into the four support uprights (1) and turn them 90 degrees (2).
Mounting the monitor assembly kit

Figure 16: Mounting the monitor tray

- Place the monitor tray on the fitted securing bolts at the front (1) and the back (2).
- Secure the monitor tray at the back left and back right with one screw each (3). A spring nut must be inserted in the appropriate locations (see section “Inserting spring nuts” on page 17).
- Mark the position of the spring nuts for the monitor filler panel at the front using the monitor filler itself. Ensure that the lower edge of the monitor filler panel cutout is at the height of the upper edge of the monitor tray.
- Insert the spring nuts for the monitor filler panel.

Figure 17: Attaching the monitor filler panel

- Screw on the monitor filler panel using the supplied knurled screws (1).
- Place the monitor on the monitor tray from the back and align it with the monitor filler panel.
6 Mounting further components

This chapter describes how to mount additional components in the 19-Inch Rack. Information on operating the devices is provided in the manuals for those devices.

Before you start, you should determine the correct location and the mounting height of the component involved. Observe the notes in the section “Notes on mounting slide-in modules” on page 8.

The bottom plate set for incorporating additional components such as modems has a mounting height of one plus x height units. The number of the units required in addition (x) depends on the size of the component to be incorporated. One height unit is needed for every 44 mm.

6.1 Mounting the UPS

Two carrier rails are supplied for mounting the UPS. The carrier rails are identical for both sides.

 ► Determine the location for the UPS.

  Because of its weight, the UPS must be mounted at the very bottom of the rack.

  ► Insert spring nuts at the attachment points (see section “Inserting spring nuts” on page 17).
Mounting the UPS

Mounting further components

Figure 18: Attaching the carrier rail

1. Screw the carrier rail to the rack at the left and the right using the supplied Allen wrench.

Figure 19: Mounting the UPS

2. Insert the UPS into the rack on the carrier rails (1).
3. Screw the UPS with the front panel to the rack (2).
6.2 Mounting the console switch

The console switch can be ordered separately or together with a Remote Controller RC+ (PRIMERGY systems only). The console switch does not require any carrier rails. It is simply screwed with the front panel to the front support uprights of the rack.

- The console switch should be mounted above the keyboard because otherwise it is difficult to operate when the keyboard is pulled out.

- Determine the location for the console switch.
- Insert spring nuts at the attachment points (see section “Inserting spring nuts” on page 17).
- Screw the UPS with the front panel to the front support uprights of the rack.

6.3 Mounting the SCSI switch
(PRIMERGY systems only)

The SCSI switch does not require any carrier rails. It is simply screwed with the front panel to the front support uprights of the rack.

- Determine the location for the SCSI switch.
- Insert spring nuts at the attachment points (see section “Inserting spring nuts” on page 17).
- Screw the SCSI switch with the front panel to the front support uprights of the rack.
6.4 Mounting the ServerNet switch

Two carrier rails are supplied for mounting the ServerNet switch (PRIMERGY systems only).

► Determine the location for the ServerNet switch.

► Insert spring nuts at the attachment points (see section “Inserting spring nuts” on page 17).

► Screw the carrier rail to the rack at the left and the right, using the supplied Allen wrench.

► Insert the ServerNet switch into the rack on the carrier rails.

► Screw the ServerNet switch with the front panel to the rack.

6.5 Mounting the modem bracket assembly kit

The modem bracket offers space for up to four modems. Only those modems can be installed which can be ordered via the configuring firm or the Rack Architect.

In the basic version, the scope of delivery consists of the modem bracket, three cover frames and one angle bracket.

► Determine the location for the modem bracket.

► Insert spring nuts at the attachment points (see section “Inserting spring nuts” on page 17).
Mounting further components **Mounting the modem bracket assembly kit**

**Figure 20: Preparing the modem bracket**

- Loosen the screw (1) on the angle bracket of the installation slot and remove the angle bracket.
- Remove the existing cover frame if necessary.

* A cover frame must be installed wherever no modem is installed.

**Figure 21: Installing the modem**

- Lay the modem in the selected installation slot (1) and secure it with the angle bracket and the screw loosened beforehand (2).

* Each angle bracket secures two modems.
Mounting the modem bracket assembly kit  
Mounting further components

Figure 22: Attaching the modem bracket

- Secure the modem bracket in the rack using the four knurled screws (1).
- Connect the modem to the server via the serial interface. Route the cable via the articulated cable guide on the server.
- Connect the plug-in power supply unit of the modem with the connector strip assembly in the rack.
- Connect the modem to the telephone connection. Route the cable to the outside via the cable aperture in the bottom of the rack.

Please see the modem documentation for further information on the modem and its installation.
7 Connecting and cabling devices

This chapter describes how to attach the cable guides to the rack and how to route the cables.

To cable the devices, proceed as follow:

1. Attach the articulated cable guides to the devices and to the rack.
2. Attach the cable guides.
3. Connect the cables to the devices.
4. Fix the cables to the articulated cable guides.

7.1 Mounting the articulated cable guide

Cable guide without supplementary articulation

Remove the U-brackets (4) from the articulated cable guide: (1), (2), (3).

Screw one of the U-brackets to the back of the device. Two screw threads are provided there for this purpose. In some assembly kits (e.g. the keyboard tray), the U-bracket is supplied already mounted.
Mounting the articulated cable guide

Connecting and cabling devices

Figure 24: Attaching the angle bracket (mounting position depends on the component)

- Screw the second U-bracket to the angle bracket (1).
- Insert two spring nuts for the angle bracket into the groove of the rear right support upright (see section “Inserting spring nuts” on page 17), and screw the angle bracket to the prepared position (2). The mounting height must match that of the device. The mounting position depends on the component being installed.
- Fix the shorter arm of the articulated cable guide to the U-bracket at the back of the device (1) and the longer arm to the U-bracket on the support upright of the rack (2).

Figure 25: Mounting the articulated cable guide

The next illustration shows how you attach the articulated cable guides.
Mounting the articulated cable guide

Cable guide with supplementary articulation

Figure 26: Attaching the articulated cable guide to the U-bracket

Figure 27: Removing the installation clamp from the articulated cable guide

- Remove the installation clamp from the articulated cable guide by pulling out the bolt in the arrow direction (1).
- Screw one of the installation clamp to the back of the device. Two screw threads are provided there for this purpose. In some assembly kits (e.g. the keyboard tray), the installation clamp is supplied already mounted.
Mounting the articulated cable guide

Insert two spring nuts for the installation clamp into the groove of the rear right support upright (see section “Inserting spring nuts” on page 17), and screw the installation clamp to the prepared position (1). The mounting height must match that of the device. The mounting position depends on the component being installed.

Fix the longer arm of the articulated cable guide to the installation clamp on the support upright of the rack (1) and fix him with the bolt (2). The shorter arm of the articulated cable guide is fixed at the back of the device.
Connecting and cabling devices

7.2 Mounting cable guides

The supplied cable guides are mounted as required, distributed over the full height of the rack.

- Insert spring nuts at the attachment points for the cable guides on the rear left support upright (see section “Inserting spring nuts” on page 17).

![Figure 30: Mounting cable guides](image)

- Mount the cable guides in the appropriate position using the supplied screws.

7.3 Connecting devices

⚠️ The power plug must be pulled out!
Read the documentation for the external 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.
7.3.1 Connecting power supply cables

- All affected devices must be switched off.
- The power plug of all affected devices must be pulled out of the connector strip in the rack.
- Attach all cables to the server and the peripheral devices. Mark the cables and note what function each cable serves. Above all, observe the safety notes in the chapter “Important notes” on page 5.
- 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 connector 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 section “3-phase mains power connection (42 HU rack)” on page 46).
- Route the cables according to figure 32.
- Secure the cables to the articulated cable guide with the cable ties (1).
7.3.2 Routing the signal cables

- Route the cables as shown in the figure 32 on page 38.
- Secure the cables on the articulated cable guide using the cable ties.

A safety bar is used for the PRIMERGY N70-40 server in place of an articulated cable guide (see figure 31).

![Figure 31: Cables routing for the PRIMERGY N70-40](image)

- Route the cables through the cable guides along the right mounting strut as shown in figure 32.
- Bundle the cables in a loop (1). The loop must be long enough to allow the server to be pulled out.
- Attach the cables to the safety bar of the cable guide using cable ties (2).

In order to prevent damage to the cables in the loop when inserting the server into the rack, proceed as follow:

- Push the server half way into the rack.
- Guide the cables in the loop carefully while pulling the server completely into the rack with the other hand using the safety bar.
Because of the different maximum cable lengths in single-ended and differential-ended SCSI mode, two types of cable routing are possible in the rack: unlimited and limited cable routing.

**Unlimited cable routing**

A maximum cable length of 20 m is allowed for differential-ended SCSI mode operation. The SCSI cables can therefore be fastened to the articulated cable guides and the slide-in modules can simply be pulled out during operation.

![Figure 32: Unlimited cable routing](image)

- Route the cables as shown in the figure.
- Secure the cables on the articulated cable guide using the cable ties (1).
Connecting and cabling devices

Limited cable routing

When operating in the single-ended SCSI mode, the maximum cable length for external SCSI cables of 1.50 m and/or 1.80 m limits the way you can route cables in the rack. This means that the SCSI cables cannot be fixed to the articulated cable guide using their full length.

- Plug the SCSI cables into the system and storage extension unit.

Figure 33: Limited cable routing

- Secure the SCSI cables using the cable tie (1).
- Fasten the bound SCSI cables to the articulated cable guide of the system and the storage extension units using one cable tie per group of bound SCSI cables. You should fasten the cables near the bend (2) in the articulated cable guides.
- Check whether the slide-in modules can be pulled out without pulling the SCSI cables too tight or even severing them.
- Route the SCSI cables through the cable guide (3) after having reinserted the system and storage extension units.

Before you pull out any slide-in modules cabled in this way, you must remove the SCSI cables from the cable guides.

All other cables, such as the CAN bus can be routed as described in the section “Routing the signal cables” on page 37.
If you later wish to pull out a slide-in module for which the cable has been routed as described above, follow these steps:

- Remove the SCSI cables from the cable guides.
- Pull out and push in the slide-in module carefully so that no cables are pulled out or become wedged.
- Place the SCSI cables back into the cable guides.

### 7.3.3 Disconnecting cables

- Switch off all affected devices.
- Pull the power plugs of all affected devices out of the sockets on the connector strip in the rack.
- Pull all data transmission cables out of the sockets provided for the data transmission or telephone networks.
- Disconnect all cables on the server and the peripheral devices.
7.4 Cabling examples

Cabling the server with monitor and keyboard

Figure 34: Cabling the server

(1) Monitor and monitor tray
(2) Keyboard
Cabling examples

Connecting and cabling devices

Cabling the server with monitor and keyboard via the console switch

![Diagram of server cabling](image)

Figure 35: Cabling the server via the console switch

(1) Monitor and monitor tray
(2) Console switch
(3) Keyboard
8 Power supply

The power is supplied to the 19-Inch Rack via a single mains power connection cable. The power is distributed to the individual slide-in modules within the cabinet.

The 19-Inch Rack design provides a 1-phase or 3-phase connection to the mains.

If the number of sockets available on the connector strip is not enough, you can use a supplementary connector strip as an extension (see figure 36 on page 44):

- connector strip with 5 sockets (3) (one 16 A protective contact socket and four 10 A insulated sockets) and 3 m connection cable with protective contact utility connector (10 A and/or 16 A).
- connector strip with 3 sockets (4) (three 10 A protective contact sockets) and 1.5 m connection cable with insulated connector (max. 10 A).

8.1 1-phase mains power connection (23 HU rack)

The 23 HU rack is provided for small and medium-sized configurations for which a 1-phase mains power connection is sufficient.

The rack is fitted with a connector strip (1) (one 16 A protective contact socket and four 10 A insulated sockets). The strip is supplied with power via a connection cable with a protective contact utility connector.
1-phase mains power connection (23 HU rack)  

1. Mains power connection connector strip with 5 sockets  
2. Cable guide and detensioner for the connection cable  
3. Supplementary connector strip with 5 sockets  
4. Supplementary connector strip with 3 sockets

Direct power supply

► Screw an additional connector strip to the left rear support upright of the rack if necessary.
► Connect the connector strips as shown in figure 36.
► Plug the 16 A protective contact connector of the connector strip with 5 sockets to a properly grounded power outlet of the main AC supply circuit.
Power supply

1-phase mains power connection (23 HU rack)

Power supply via UPS

At least one additional connector strip with 3 sockets (1) and an insulated plug (contained in scope of delivery) is required for connecting RM system components via UPS.

If RM components with insulated connectors have to be connected in the rack, a connector strip with 5 sockets (2) can be used in addition to the connector strip with 3 sockets (1) (see figure 37 / RM Systems).

If PRIMERGy system components with protective contact connectors have to be connected in the rack, an additional connector strip with 3 sockets per UPS (1) is required (see figure 37 / PRIMERGY Systems).

Figure 37: Power supply via UPS and supplementary connector strip (1-phase)

- Screw the additional connector strips to the left rear support upright of the rack.
- Connect the input power connector (I) of the respective UPS to the protective contact socket of the main connector strip in the rack using the connection cable supplied with the UPS.
- Connect the insulated plug of the additional connector strip (1) to one of the output power receptacles (O) of the UPS.
- If necessary, expand the connection options with a supplementary connector strip with 5 sockets (2) (see figure 37 / RM Systems).
- Plug the 16 A protective contact connector of the main connector strip with 5 sockets to a properly grounded power outlet of the main AC supply circuit.
8.2 3-phase mains power connection
(42 HU rack)

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

The 42 HU rack is provided for larger configurations (up to five units) for which a 3-phase mains power connection is recommended. The rack is fitted with a connector strip with 9 sockets.

The three phases are divided in the connector strip between one protective contact socket (16 A) and two insulated sockets (10 A) per phase.

The supply network must be fed by three phases in order to ensure even power distribution.

The 3-phase connection also enables phase redundancy for configurations where high availability is required. If a phase fails, the systems which are connected to a different phase remain operational.
Power supply

3-phase mains power connection (42 HU rack)

A 5-pole terminal strip for connecting the three phases L1, L2 and L3 is located on the connector strip.

Direct power supply

- If necessary, screw additional connector strips to the left rear support upright of the rack. Only one supplementary connector strip per phase is permitted.
- Connect the connector strips as shown in figure 38.
- Route the external 5-pole connection cable through the cable aperture in the rack.
- Connect the external 5-pole connection cable to the 5-pole terminal strip of the connector strip in the rack.

The connection must only be installed by an authorized electrician. The power connection cable must be voltage free.
- Secure the connection cable using the detensioner in the 19-Inch Rack (see figure 38).

Power supply via UPS

If RM system components are to be connected via UPS, at least one additional connector strip with 3 sockets (1) and an insulated plug (contained in scope of delivery) is required per UPS.

If RM components with insulated connectors have to be connected in the rack, an additional connector strip with 5 sockets (2) can be fitted in addition to the connector strip with 3 sockets (1) (see figure 39 / RM Systems).

If PRIMERGY system components with protective contact connectors have to be connected in the rack, an additional connector strip with 3 sockets (1) is required per UPS (see figure 39 / PRIMERGY Systems).

A maximum of three UPS can be configured per rack.
3-phase mains power connection (42 HU rack)  

Figure 39: Power supply via UPS and supplementary connector strip (3-phase)

- Screw the additional connector strips to the left rear support upright of the rack.
- Connect the input power connector (I) of the respective UPS to the protective contact socket of the main connector strip in the rack using the connection cable supplied with the respective UPS.
- Connect the insulated plug of the additional connector strip (1) to one of the output power receptacles (O) of the UPS.
- If necessary, expand the connection options with a supplementary connector strip with 5 sockets (2) (see figure 39 / RM Systems).
- Route the external 5-pole connection cable through the cable aperture in the rack.
- Connect the external 5-pole connection cable to the 5-pole terminal strip of the connector strip in the rack.
  
  The connection must only be installed by an authorized electrician.  
  The power connection cable must be voltage free.
- Secure the connection cable using the detensioner in the 19-Inch Rack (see figure 38).
8.3 Ground connection in the 19-Inch Rack

The 19-Inch Rack is provided with a ground connection bolt at the rear right on the aluminum profile. This can be used, for example, to ground the rack via the protective conductor.

Figure 40: Ground connection in the 19-Inch Rack

- If you want to ground the rack, connect the ground cable to the ground connection bolt.
Related publications

Please apply to your local office for ordering the manuals.

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[2] RM200, RM400, RM600
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