

# VIPA System SLIO

IM | 06x-1xA00 | Manual

HB300 | IM | 06x-1xA00 | en | 18-10

Interface module Line extension - IM 06x



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# 1 General

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## 1.2 About this manual

### Objective and contents

This manual describes the Line extension IM 06x-1xA00 of the System SLIO from VIPA. It contains a description of the structure, project engineering and deployment.

Product	Order number	as of state: HW
IM 060	060-1AA00	01
IM 061	061-1BA00	01

### Target audience

The manual is targeted at users who have a background in automation technology.

### Structure of the manual

The manual consists of chapters. Every chapter provides a self-contained description of a specific topic.

### Guide to the document

The following guides are available in the manual:

- An overall table of contents at the beginning of the manual
- References with page numbers

### Availability

The manual is available in:

- printed form, on paper
- in electronic form as PDF-file (Adobe Acrobat Reader)

### Icons Headings

Important passages in the text are highlighted by following icons and headings:



#### **DANGER!**

Immediate or likely danger. Personal injury is possible.

**CAUTION!**

Damages to property is likely if these warnings are not heeded.



*Supplementary information and useful tips.*

### 1.3 Safety information

**Applications conforming with specifications**

The System SLIO is constructed and produced for:

- communication and process control
- general control and automation applications
- industrial applications
- operation within the environmental conditions specified in the technical data
- installation into a cubicle

**DANGER!**

This device is not certified for applications in

- in explosive environments (EX-zone)

**Documentation**

The manual must be available to all personnel in the

- project design department
- installation department
- commissioning
- operation

**CAUTION!**

**The following conditions must be met before using or commissioning the components described in this manual:**

- Hardware modifications to the process control system should only be carried out when the system has been disconnected from power!
- Installation and hardware modifications only by properly trained personnel.
- The national rules and regulations of the respective country must be satisfied (installation, safety, EMC ...)

**Disposal**

**National rules and regulations apply to the disposal of the unit!**

## 2 Basics and mounting

### 2.1 Safety information for users

#### Handling of electrostatic sensitive modules

VIPA modules make use of highly integrated components in MOS-Technology. These components are extremely sensitive to over-voltages that can occur during electrostatic discharges. The following symbol is attached to modules that can be destroyed by electrostatic discharges.



The Symbol is located on the module, the module rack or on packing material and it indicates the presence of electrostatic sensitive equipment. It is possible that electrostatic sensitive equipment is destroyed by energies and voltages that are far less than the human threshold of perception. These voltages can occur where persons do not discharge themselves before handling electrostatic sensitive modules and they can damage components thereby, causing the module to become inoperable or unusable. Modules that have been damaged by electrostatic discharges can fail after a temperature change, mechanical shock or changes in the electrical load. Only the consequent implementation of protection devices and meticulous attention to the applicable rules and regulations for handling the respective equipment can prevent failures of electrostatic sensitive modules.

#### Shipping of modules

Modules must be shipped in the original packing material.

#### Measurements and alterations on electrostatic sensitive modules

When you are conducting measurements on electrostatic sensitive modules you should take the following precautions:

- Floating instruments must be discharged before use.
- Instruments must be grounded.

Modifying electrostatic sensitive modules you should only use soldering irons with grounded tips.



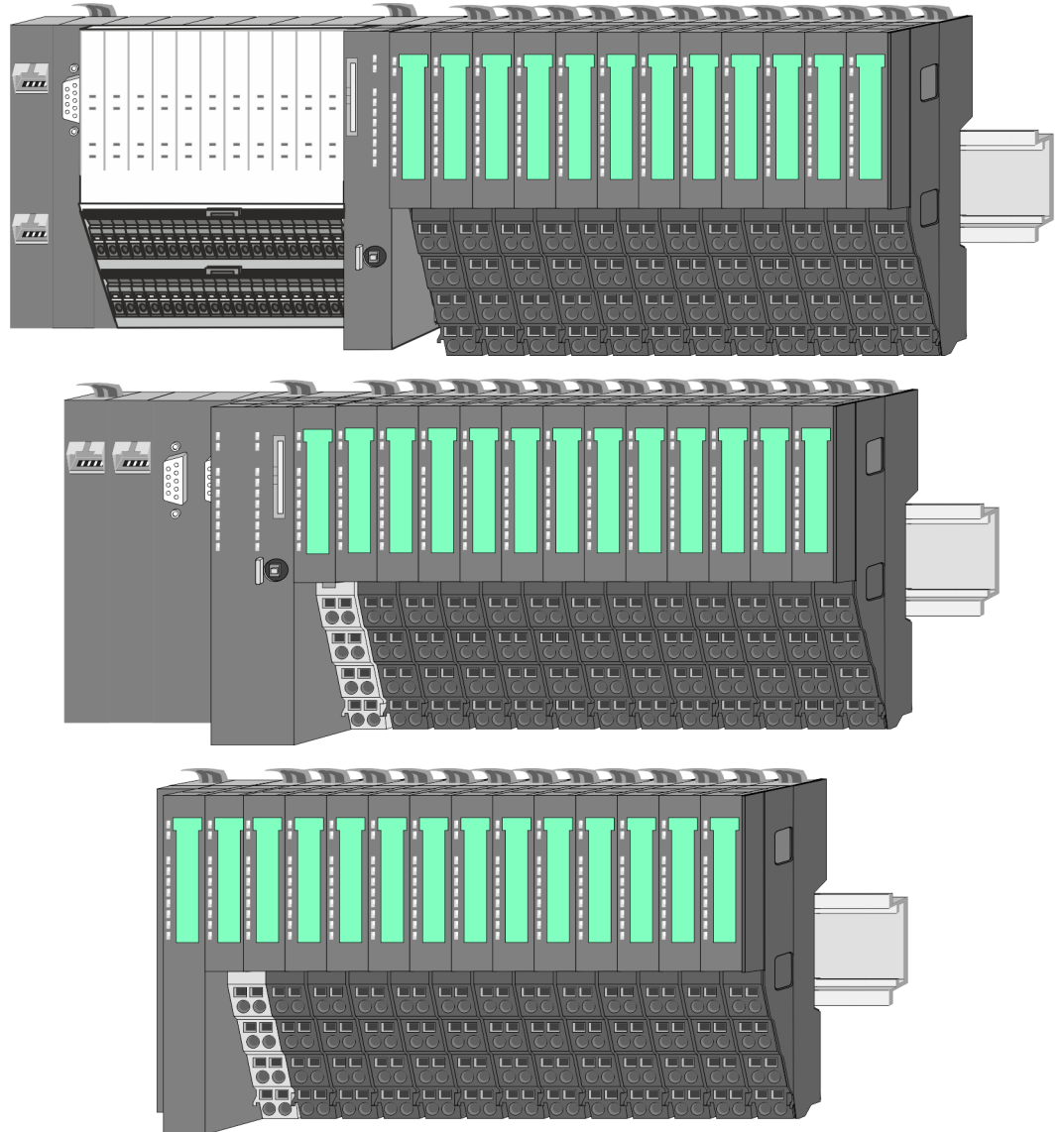
#### CAUTION!

Personnel and instruments should be grounded when working on electrostatic sensitive modules.

## 2.2 System conception

### 2.2.1 Overview

System SLIO is a modular automation system for assembly on a 35mm mounting rail. By means of the peripheral modules with 2, 4 or 8 channels this system may properly be adapted matching to your automation tasks. The wiring complexity is low, because the supply of the DC 24V power section is integrated to the backplane bus and defective modules may be replaced with standing wiring. By deployment of the power modules in contrasting colors within the system, further isolated areas may be defined for the DC 24V power section supply, respectively the electronic power supply may be extended with 2A.





## 2.2.2 Components

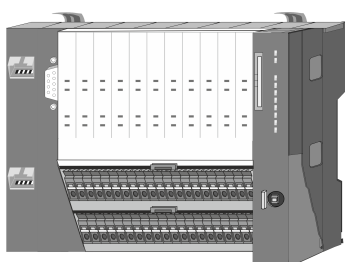
- CPU (head module)
- Bus coupler (head module)
- Line extension
- Periphery modules
- Accessories



### CAUTION!

Only modules of VIPA may be combined. A mixed operation with third-party modules is not allowed!

### CPU 01xC



With this CPU 01xC, the CPU electronic, input/output components and power supply are integrated to one casing. In addition, up to 64 periphery modules of the System SLIO can be connected to the backplane bus. As head module via the integrated power supply CPU electronic and the I/O components are power supplied as well as the electronic of the connected periphery modules. To connect the power supply of the I/O components and for DC 24V power supply of via backplane bus connected peripheral modules, the CPU has removable connectors. By installing of up to 64 periphery modules at the backplane bus, these are electrically connected, this means these are assigned to the backplane bus, the electronic modules are power supplied and each periphery module is connected to the DC 24V power section supply.

### CPU 01x



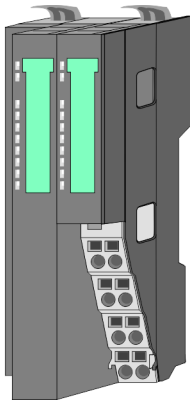
With this CPU 01x, the CPU electronic and power supply are integrated to one casing. As head module, via the integrated power module for power supply, CPU electronic and the electronic of the connected periphery modules are supplied. The DC 24 power section supply for the linked periphery modules is established via a further connection of the power module. By installing of up to 64 periphery modules at the backplane bus, these are electrically connected, this means these are assigned to the backplane bus, the electronic modules are power supplied and each periphery module is connected to the DC 24V power section supply.



### CAUTION!

CPU part and power module may not be separated!  
Here you may only exchange the electronic module!

**Bus coupler**



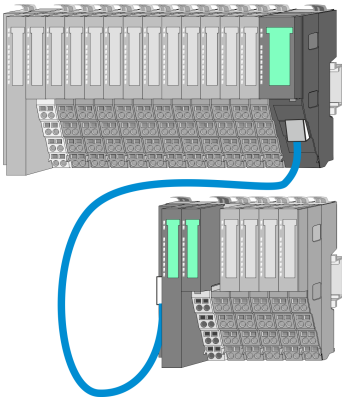
With a bus coupler bus interface and power module is integrated to one casing. With the bus interface you get access to a subordinated bus system. As head module, via the integrated power module for power supply, bus interface and the electronic of the connected periphery modules are supplied. The DC 24 power section supply for the linked periphery modules is established via a further connection of the power module. By installing of up to 64 periphery modules at the bus coupler, these are electrically connected, this means these are assigned to the backplane bus, the electronic modules are power supplied and each periphery module is connected to the DC 24V power section supply.



**CAUTION!**

Bus interface and power module may not be separated!  
Here you may only exchange the electronic module!

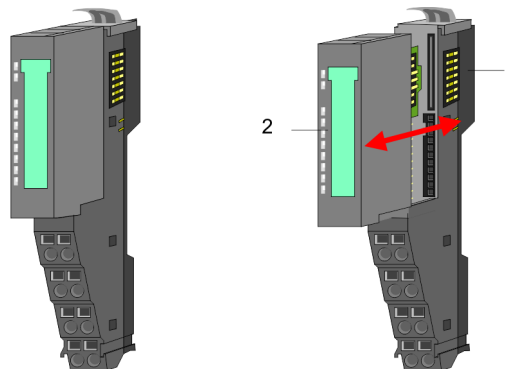
**Line extension**



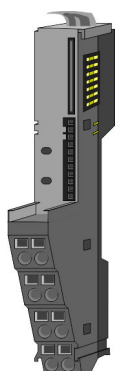
In the System SLIO there is the possibility to place up to 64 modules in on line. By means of the line extension you can divide this line into several lines. Here you have to place a line extension master at each end of a line and the subsequent line has to start with a line extension slave. Master and slave are to be connected via a special connecting cable. In this way, you can divide a line on up to 5 lines. For each line extension the maximum number of pluggable modules at the System SLIO bus is decreased by 1. To use the line extension no special configuration is required.

**Periphery modules**

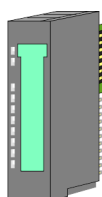
Each periphery module consists of a *terminal* and an *electronic module*.



- 1 Terminal module
- 2 Electronic module

**Terminal module**

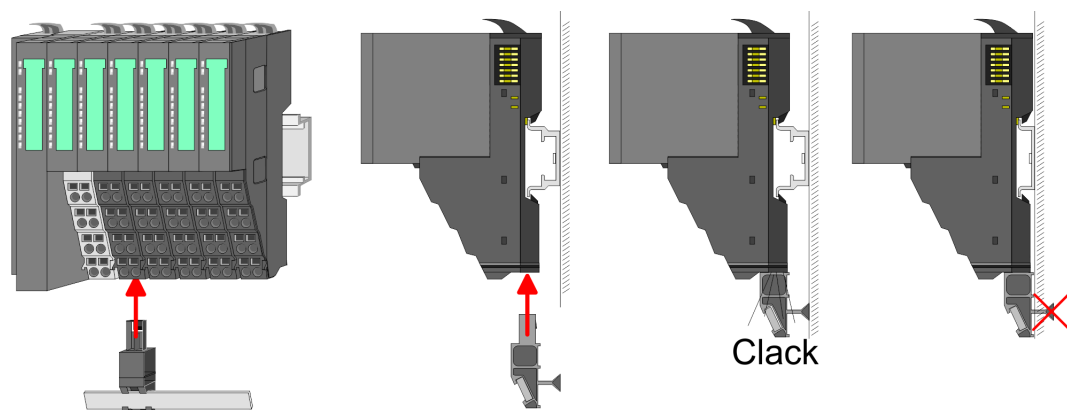
The *terminal* module serves to carry the electronic module, contains the backplane bus with power supply for the electronic, the DC 24V power section supply and the staircase-shaped terminal for wiring. Additionally the terminal module has a locking system for fixing at a mounting rail. By means of this locking system your SLIO system may be assembled outside of your switchgear cabinet to be later mounted there as whole system.

**Electronic module**

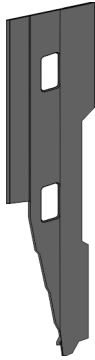
The functionality of a SLIO periphery module is defined by the *electronic* module, which is mounted to the terminal module by a sliding mechanism. With an error the defective module may be exchanged for a functional module with standing installation. At the front side there are LEDs for status indication. For simple wiring each module shows a corresponding connection diagram at the front and at the side.

**2.2.3 Accessories****Shield bus carrier**

The shield bus carrier (order no.: 000-0AB00) serves to carry the shield bus (10mm x 3mm) to connect cable shields. Shield bus carriers, shield bus and shield fixings are not in the scope of delivery. They are only available as accessories. The shield bus carrier is mounted underneath the terminal of the terminal module. With a flat mounting rail for adaptation to a flat mounting rail you may remove the spacer of the shield bus carrier.



**Bus cover**



With each head module, to protect the backplane bus connectors, there is a mounted bus cover in the scope of delivery. You have to remove the bus cover of the head module before mounting a System SLIO module. For the protection of the backplane bus connector you always have to mount the bus cover at the last module of your system again. The bus cover has the order no. 000-0AA00.

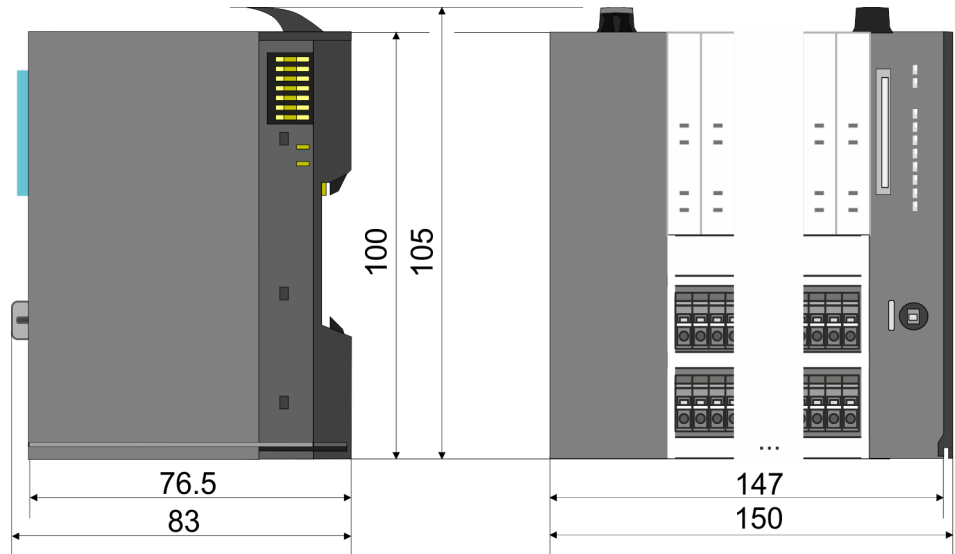
**Coding pins**



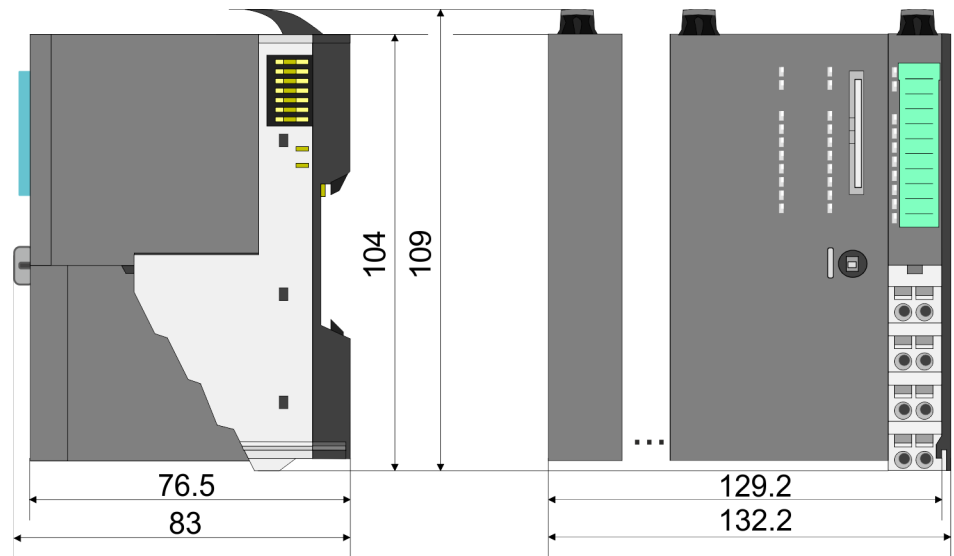
There is the possibility to fix the assignment of electronic and terminal module. Here coding pins (order number 000-0AC00) from VIPA can be used. The coding pin consists of a coding jack and a coding plug. By combining electronic and terminal module with coding pin, the coding jack remains in the electronic module and the coding plug in the terminal module. This ensures that after replacing the electronics module just another electronic module can be plugged with the same encoding.

**2.3 Dimensions**

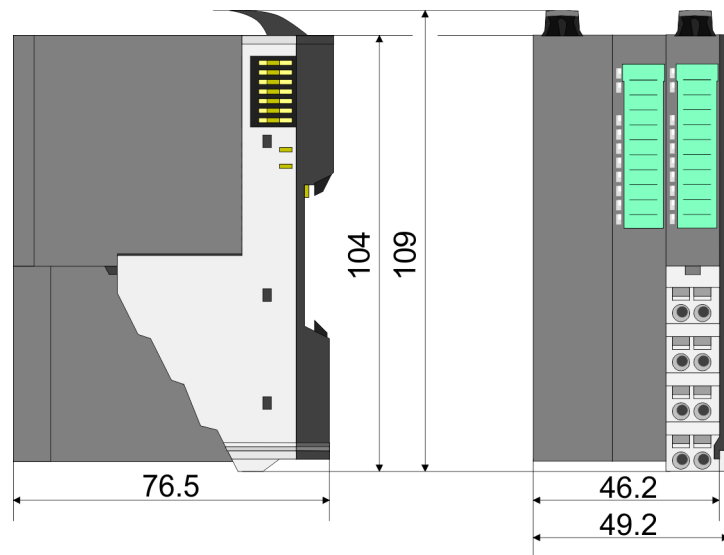
**Dimensions CPU 01xC**



**Dimensions CPU 01x**

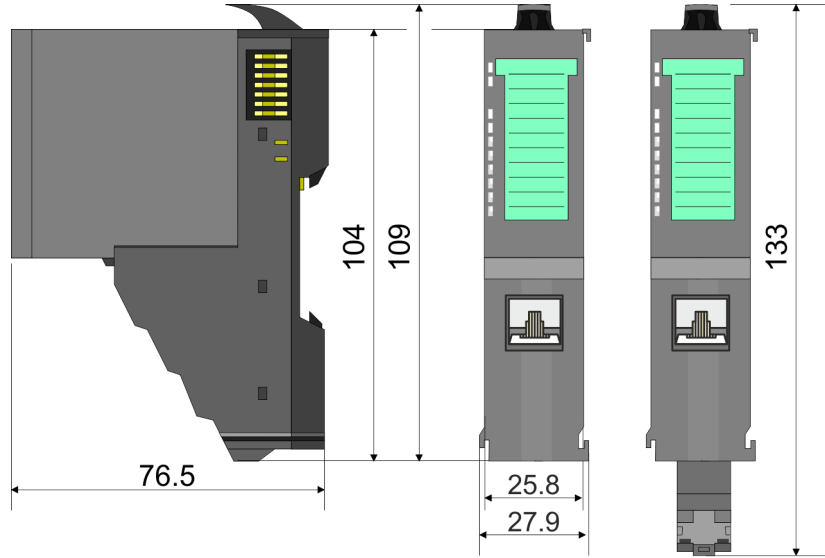


**Dimensions bus coupler and line extension slave**

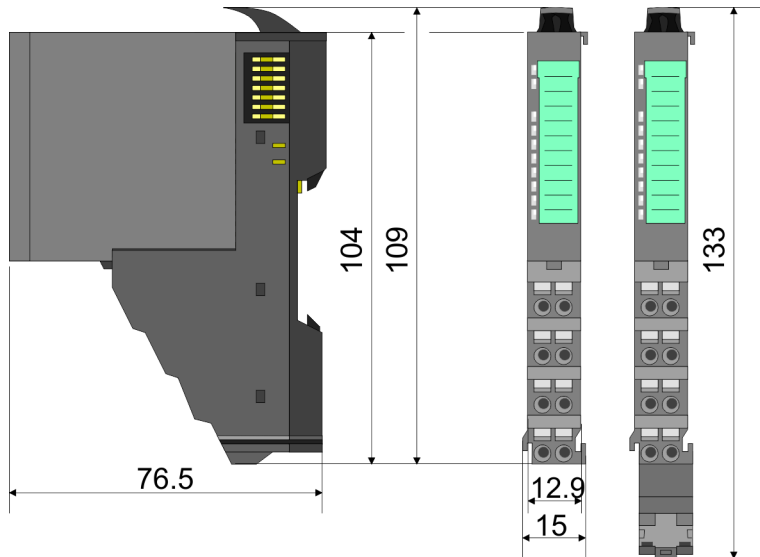


Dimensions

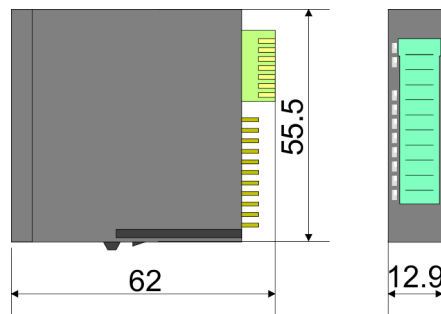
Dimensions line extension master



Dimension periphery module



Dimensions electronic module



Dimensions in mm

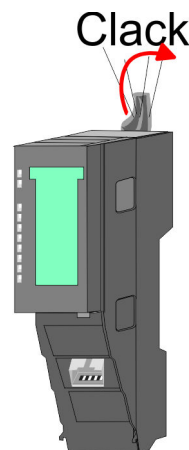
## 2.4 Mounting line extension

### 2.4.1 Mounting line extension master

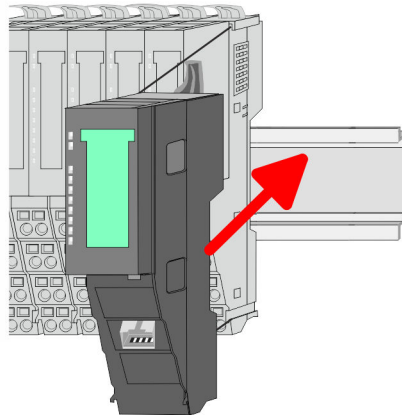
#### Proceeding

During the mounting the following should be observed:

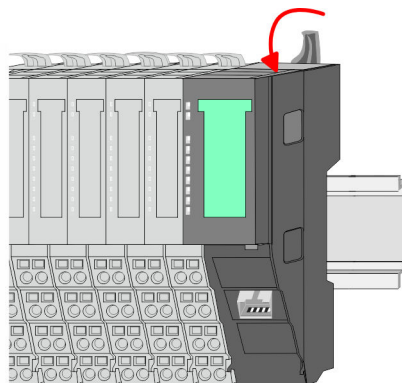
- A maximum of 5 lines are possible.
  - For each line extension the maximum number of pluggable modules at the System SLIO bus is decreased by 1.
  - The line extension master is to be placed at the end of the line.
  - After the master the line has to start with a line extension slave.
- 1.** → There is a locking lever at the top side of the line extension master. For mounting and demounting this locking lever is to be turned upwards until this engages. Turn the locking lever upwards.



- 2.** → For mounting place the line extension master to the module installed before in the line and push the line extension master to the mounting rail guided by the strips at the upper and lower side of the module.



3. Turn the locking lever of the line extension master downward, again.



## 2.4.2 Mounting line extension slave

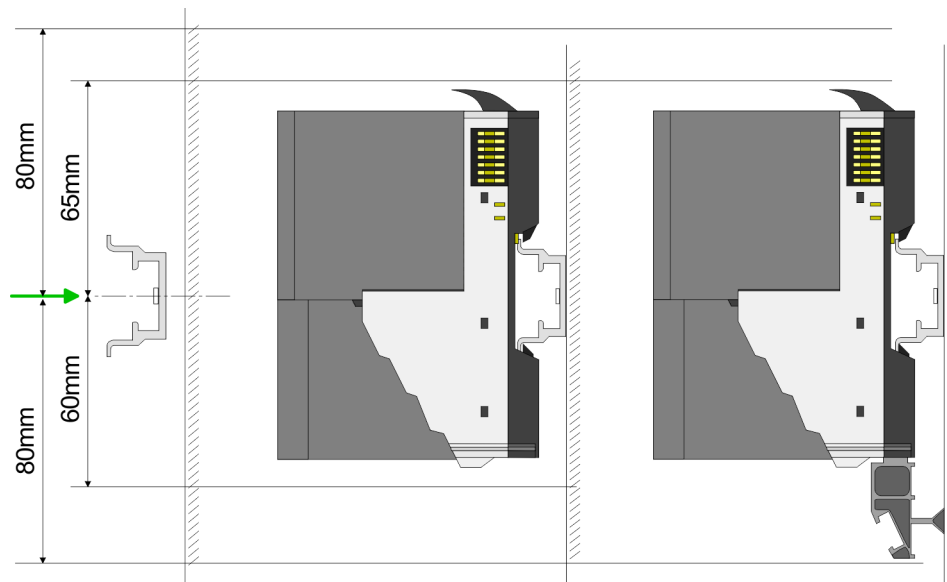
### Proceeding

During the mounting the following should be observed:

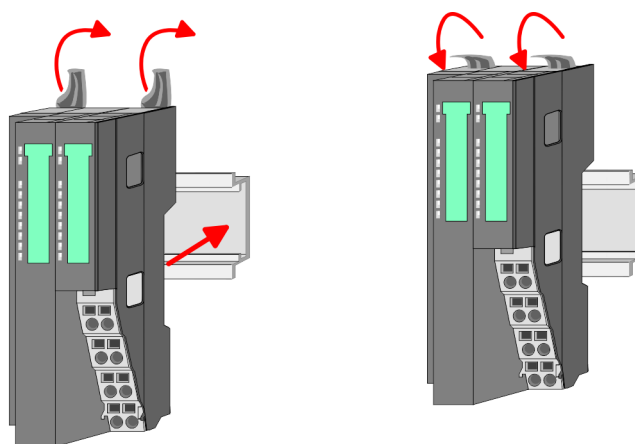
- A maximum of 5 lines are possible.
- For each line extension the maximum number of pluggable modules at the System SLIO bus is decreased by 1.



- After the master the line has to start with a line extension slave.
  - The usage of additional power modules within a line is allowed.
1. ➔ Mount the mounting rail! Please consider that a clearance from the middle of the mounting rail of at least 80mm above and 60mm below, respectively 80mm by deployment of shield bus carriers, exist.

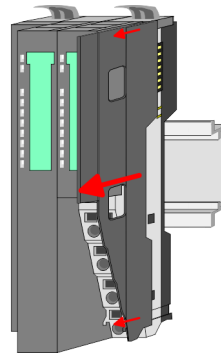


2. ➔ There is a locking lever at the top side of the line extension slave. For mounting and demounting these locking lever are to be turned upwards until these engage. Turn the locking lever upwards, place the line extension slave at the mounting rail and turn the lever downward.



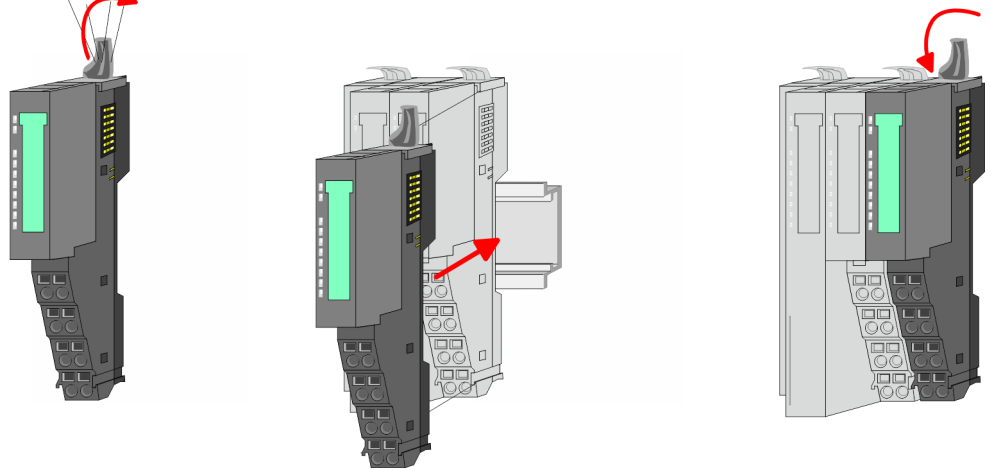
**Mounting of the periphery modules**

1. ➤ Before mounting the periphery modules you have to remove the bus cover at the right side of the line extension slave by pulling it forward. Keep the cover for later mounting.



2. ➤ Mount the periphery modules you want.

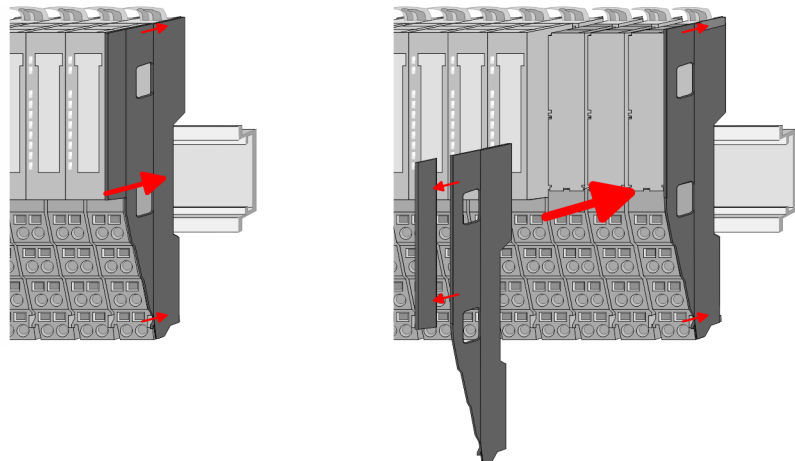
Click



3. ➤ For more line extensions ↪ *Chapter 2.4.1 'Mounting line extension master' on page 15*

⇒ The electronic and power section supply are connected via the backplane bus. Please consider here that the sum current of the electronic power supply does not exceed the maximum value of 3A. By means of the power module 007-1AB10 the current of the electronic power supply may be expanded accordingly.

4. ➤ After mounting the whole system, to protect the backplane bus connectors at the last module you have to mount the bus cover, now. If the last module is a clamp module, for adaptation the upper part of the bus cover is to be removed.



## 2.5 Wiring line extension

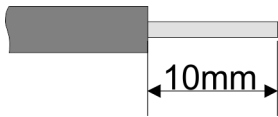
### 2.5.1 Wiring line extension master

Since the line extension master is supplied via the power section supply of the backplane bus, an additional wiring is not required.

### 2.5.2 Wiring line extension slave

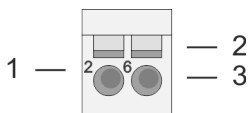
**Terminal module terminals** Der line extension slave has an integrated power module. Terminals with spring clamp technology are used for wiring. The spring clamp technology allows quick and easy connection of your signal and supply lines. In contrast to screw terminal connections this type of connection is vibration proof.

#### Data

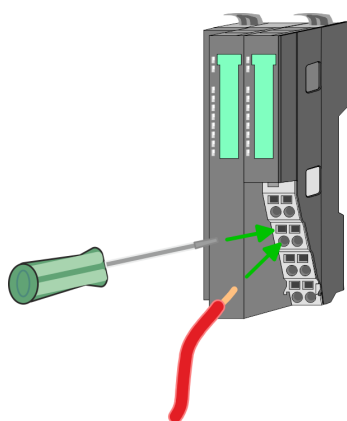
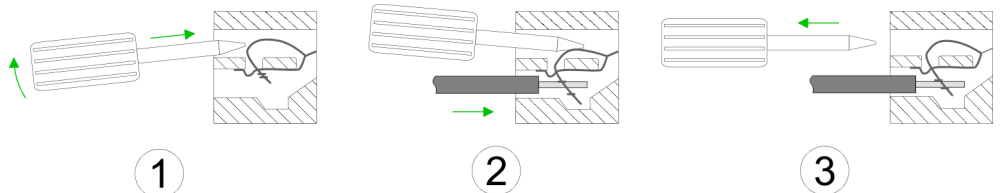


$U_{max}$	30V DC
$I_{max}$	10A
Cross section	0.08 ... 1.5mm <sup>2</sup> (AWG 28 ... 16)
Stripping length	10mm

#### Wiring procedure

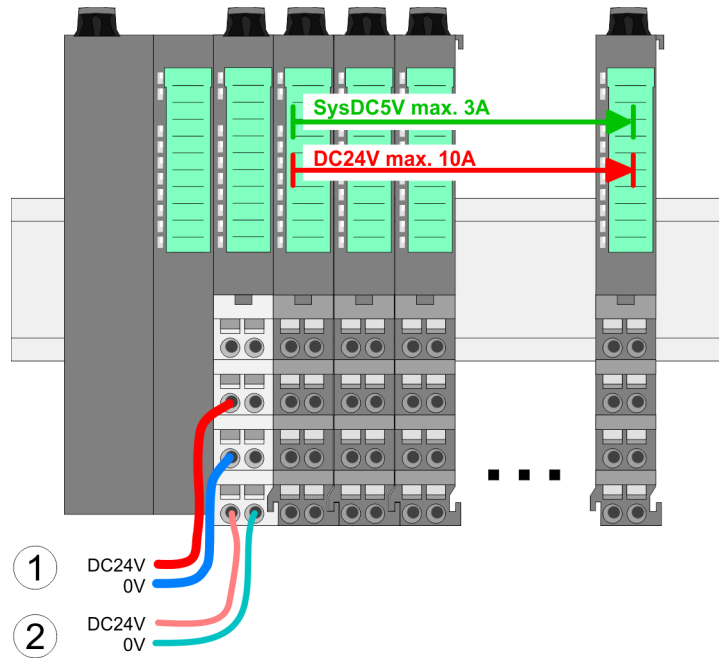


- 1 Pin no. at the connector
- 2 Opening for screwdriver
- 3 Connection hole for wire



1. Insert a suited screwdriver at an angle into the square opening as shown. Press and hold the screwdriver in the opposite direction to open the contact spring.
2. Insert the stripped end of wire into the round opening. You can use wires with a cross section of 0.08mm<sup>2</sup> up to 1.5mm<sup>2</sup>.
3. By removing the screwdriver, the wire is securely fixed via the spring contact to the terminal.

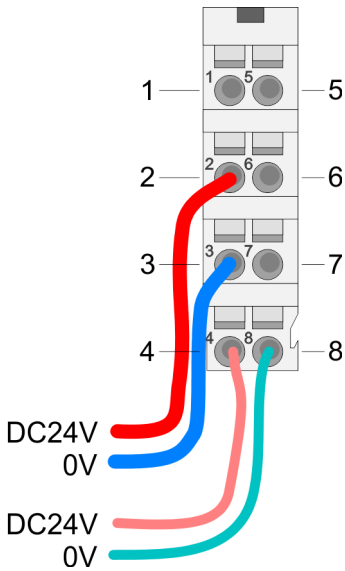
Standard wiring



- (1) DC 24V for power section supply I/O area (max. 10A)
- (2) DC 24V for electronic section supply line extension slave and I/O area.

PM - Power module

For wires with a core cross-section of 0.08mm<sup>2</sup> up to 1.5mm<sup>2</sup>.



Pos.	Function	Type	Description
1	---	---	not connected
2	DC 24V	I	DC 24V for power section supply
3	0V	I	GND for power section supply
4	Sys DC 24V	I	DC 24V for electronic section supply
5	---	---	not connected
6	DC 24V	I	DC 24V for power section supply
7	0V	I	GND for power section supply
8	Sys 0V	I	GND for electronic section supply

I: Input



**CAUTION!**

Since the power section supply is not internally protected, it is to be externally protected with a fuse, which corresponds to the maximum current. This means max. 10A is to be protected by a 10A fuse (fast) respectively by a line circuit breaker 10A characteristics Z!



The electronic power section supply is internally protected against higher voltage by fuse. The fuse is within the power module. If the fuse releases, its electronic module must be exchanged!

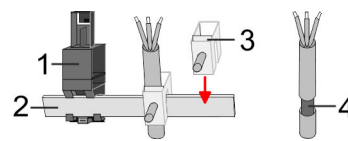
**Fusing**

- The power section supply is to be externally protected with a fuse, which corresponds to the maximum current. This means max. 10A is to be protected with a 10A fuse (fast) respectively by a line circuit breaker 10A characteristics Z!
- It is recommended to externally protect the electronic power supply for line extension slave and I/O area with a 2A fuse (fast) respectively by a line circuit breaker 2A characteristics Z.
- The electronic power supply for the I/O area of the power module 007-1AB10 should also be externally protected with a 1A fuse (fast) respectively by a line circuit breaker 1A characteristics Z.

**State of the electronic power supply via LEDs**

After PowerON of the System SLIO the LEDs RUN respectively MF get on so far as the sum current does not exceed 3A. With a sum current greater than 3A the LEDs may not be activated. Here the power module with the order number 007-1AB10 is to be placed between the peripheral modules.

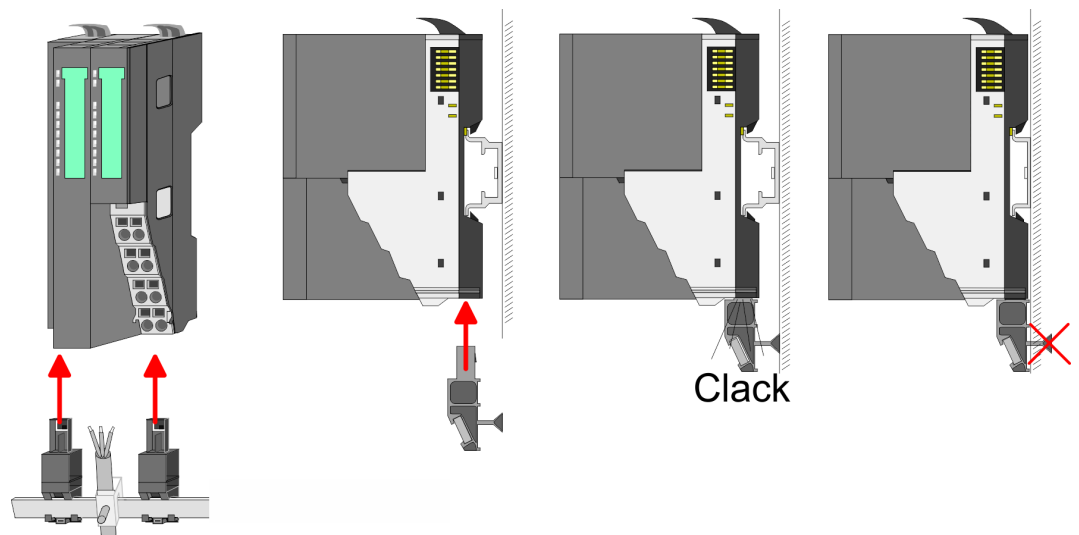
**Shield attachment**



- 1 Shield bus carrier
- 2 Shield bus (10mm x 3mm)
- 3 Shield clamp
- 4 Cable shield

To attach the shield the mounting of shield bus carriers are necessary. The shield bus carrier (available as accessory) serves to carry the shield bus to connect cable shields.

1. ➔ Each System SLIO module has a carrier hole for the shield bus carrier. Push the shield bus carrier, until they engage into the module. With a flat mounting rail for adaptation to a flat mounting rail you may remove the spacer of the shield bus carrier.
2. ➔ Put your shield bus into the shield bus carrier.



3. ➔ Attach the cables with the accordingly stripped cable screen and fix it by the shield clamp with the shield bus.

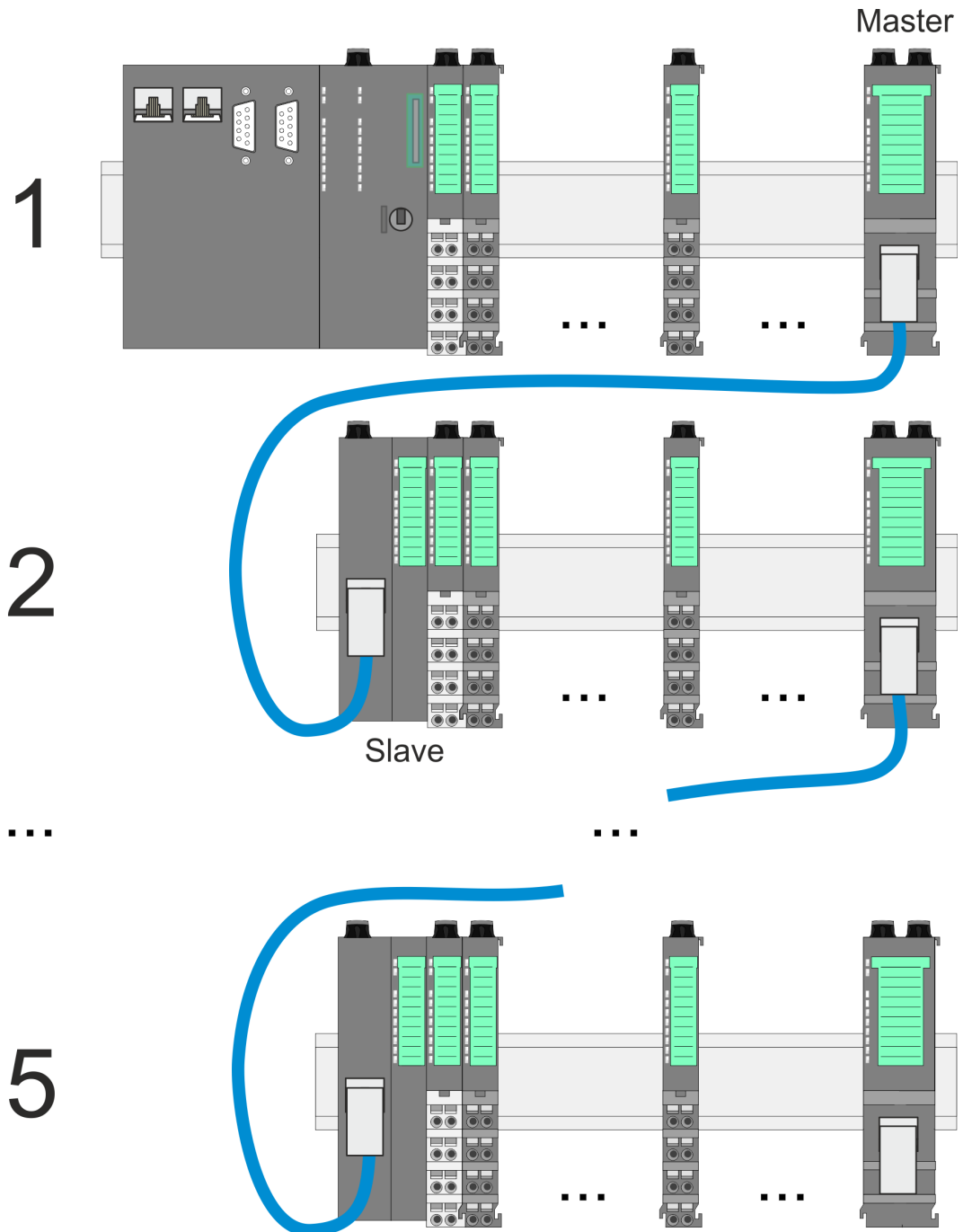
### 2.5.3 Line extension - connection cable

#### Cabling



**CAUTION!**

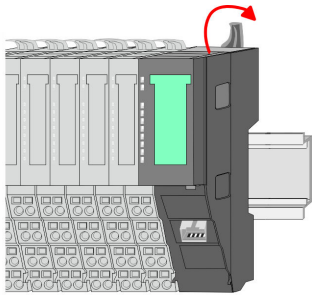
- For connection please use the connection cable 950-0KD30 from VIPA. The use of normal Ethernet cable can cause damage!
- The connection cable between master and slave may be plugged or removed only when the modules are powered off.
- The maximum length of 2m must not be exceeded!



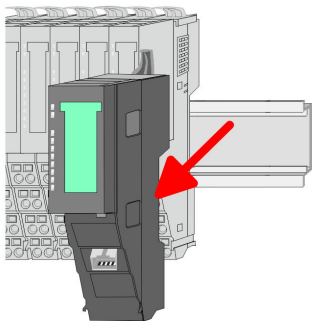
## 2.6 Demounting line extension

### 2.6.1 Demounting line extension master

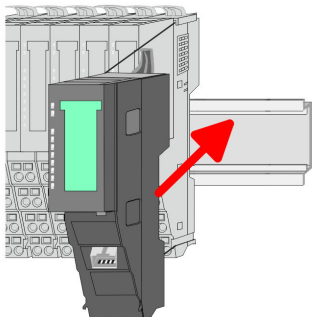
#### Proceeding



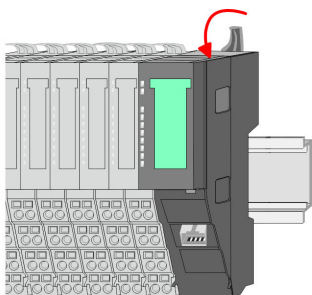
1. ➤ Power-off your system.
2. ➤ Remove if exists the connection cable at line extension master.
3. ➤ Turn the locking lever of the line extension master to be exchanged upwards.



4. ➤ Pull the line extension master forward.



5. ➤ For mounting turn the locking lever of the line extension master upward until it engages.
6. ➤ For mounting place the line extension master to the module installed before in the line and push the line extension master to the mounting rail guided by the strips at the upper and lower side of the module.



7. ➤ Turn the locking lever of the line extension master downward, again.
8. ➤ Plug again the connection cable.
  - ⇒ Now you can bring your system back into operation.

## 2.6.2 Demounting line extension slave

### Proceeding



#### CAUTION!

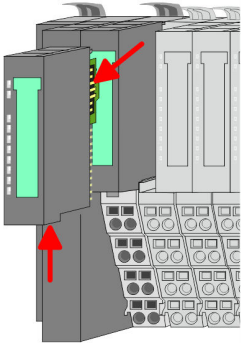
Line extension interface and power module of the line extension slave may not be separated! Here you may only exchange the electronic module!

1. ➤ Power-off your system.
2. ➤ Remove if exists the connection cable at line extension slave.
3. ➤

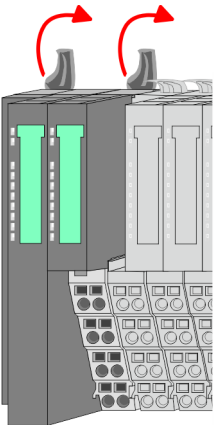


*For demounting and exchange of a (head) module or a group of modules, due to mounting reasons you always have to remove the electronic module right beside. After mounting it may be plugged again.*

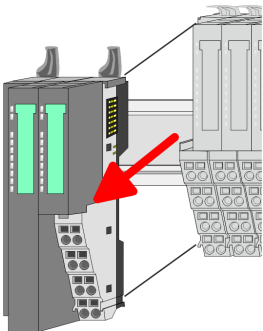
Press the unlocking lever at the lower side of the just mounted right module near the line extension slave and pull it forward.



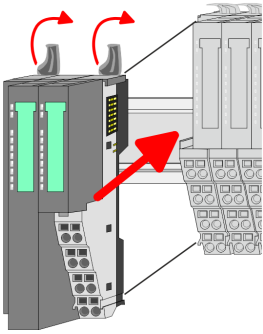
4. ➤ Turn all the locking lever of the line extension slave to be exchanged upwards.



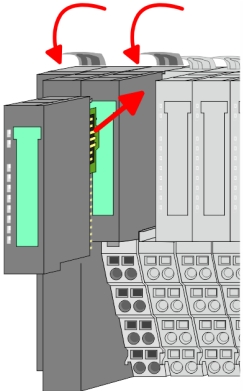
5. ➤ Pull the line extension slave forward.
6. ➤ For mounting turn all the locking lever of the line extension slave to be exchanged upwards.







- 7.** ➤ To mount the line extension slave put it to the left periphery module and push the line extension slave, guided by the stripes, to the mounting rail.
- 8.** ➤ Turn all the locking lever downward, again.



- 9.** ➤ Plug again the electronic module, which you have removed before.
- 10.** ➤ Plug again the connection cable.  
⇒ Now you can bring your system back into operation.

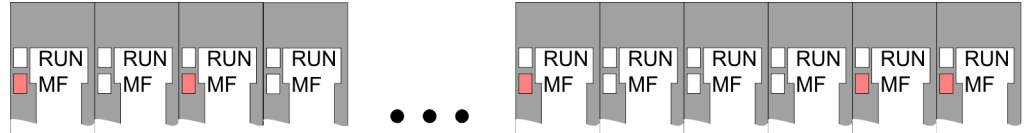
## 2.7 Trouble shooting - LEDs

### General

Each module has the LEDs RUN and MF on its front side. Errors or incorrect modules may be located by means of these LEDs.

In the following illustrations flashing LEDs are marked by ☼.

### Sum current of the electronic power supply exceeded

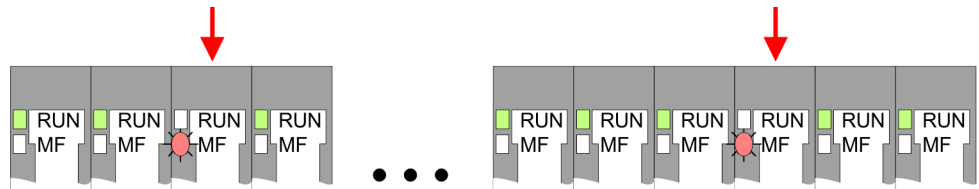


*Behaviour:* After PowerON the RUN LED of each module is off and the MF LED of each module is sporadically on.

*Reason:* The maximum current for the electronic power supply is exceeded.

*Remedy:* As soon as the sum current of the electronic power supply is exceeded, always place the power module 007-1AB10.

### Error in configuration

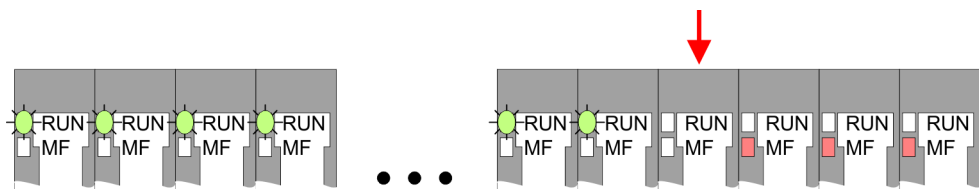


*Behaviour:* After PowerON the MF LED of one module respectively more modules flashes. The RUN LED remains off.

*Reason:* At this position a module is placed, which does not correspond to the configured module.

*Remedy:* Match configuration and hardware structure.

### Module failure



*Behaviour:* After PowerON all of the RUN LEDs up to the defective module are flashing. With all following modules the MF LED is on and the RUN LED is off.

*Reason:* The module on the right of the flashing modules is defective.

*Remedy:* Replace the defective module.

## 2.8 Installation guidelines

<b>General</b>	The installation guidelines contain information about the interference free deployment of a PLC system. There is the description of the ways, interference may occur in your PLC, how you can make sure the electromagnetic compatibility (EMC), and how you manage the isolation.
<b>What does EMC mean?</b>	<p>Electromagnetic compatibility (EMC) means the ability of an electrical device, to function error free in an electromagnetic environment without being interfered respectively without interfering the environment.</p> <p>The components of VIPA are developed for the deployment in industrial environments and meets high demands on the EMC. Nevertheless you should project an EMC planning before installing the components and take conceivable interference causes into account.</p>
<b>Possible interference causes</b>	<p>Electromagnetic interferences may interfere your control via different ways:</p> <ul style="list-style-type: none"><li>■ Electromagnetic fields (RF coupling)</li><li>■ Magnetic fields with power frequency</li><li>■ Bus system</li><li>■ Power supply</li><li>■ Protected earth conductor</li></ul> <p>Depending on the spreading medium (lead bound or lead free) and the distance to the interference cause, interferences to your control occur by means of different coupling mechanisms.</p> <p>There are:</p> <ul style="list-style-type: none"><li>■ galvanic coupling</li><li>■ capacitive coupling</li><li>■ inductive coupling</li><li>■ radiant coupling</li></ul>
<b>Basic rules for EMC</b>	<p>In the most times it is enough to take care of some elementary rules to guarantee the EMC. Please regard the following basic rules when installing your PLC.</p> <ul style="list-style-type: none"><li>■ Take care of a correct area-wide grounding of the inactive metal parts when installing your components.<ul style="list-style-type: none"><li>– Install a central connection between the ground and the protected earth conductor system.</li><li>– Connect all inactive metal extensive and impedance-low.</li><li>– Please try not to use aluminium parts. Aluminium is easily oxidizing and is therefore less suitable for grounding.</li></ul></li><li>■ When cabling, take care of the correct line routing.<ul style="list-style-type: none"><li>– Organize your cabling in line groups (high voltage, current supply, signal and data lines).</li><li>– Always lay your high voltage lines and signal respectively data lines in separate channels or bundles.</li><li>– Route the signal and data lines as near as possible beside ground areas (e.g. suspension bars, metal rails, tin cabinet).</li></ul></li></ul>

- Proof the correct fixing of the lead isolation.
  - Data lines must be laid isolated.
  - Analog lines must be laid isolated. When transmitting signals with small amplitudes the one sided laying of the isolation may be favourable.
  - Lay the line isolation extensively on an isolation/protected earth conductor rail directly after the cabinet entry and fix the isolation with cable clamps.
  - Make sure that the isolation/protected earth conductor rail is connected impedance-low with the cabinet.
  - Use metallic or metallised plug cases for isolated data lines.
- In special use cases you should appoint special EMC actions.
  - Consider to wire all inductivities with erase links.
  - Please consider luminescent lamps can influence signal lines.
- Create a homogeneous reference potential and ground all electrical operating supplies when possible.
  - Please take care for the targeted employment of the grounding actions. The grounding of the PLC serves for protection and functionality activity.
  - Connect installation parts and cabinets with your PLC in star topology with the isolation/protected earth conductor system. So you avoid ground loops.
  - If there are potential differences between installation parts and cabinets, lay sufficiently dimensioned potential compensation lines.

### Isolation of conductors

Electrical, magnetically and electromagnetic interference fields are weakened by means of an isolation, one talks of absorption. Via the isolation rail, that is connected conductive with the rack, interference currents are shunt via cable isolation to the ground. Here you have to make sure, that the connection to the protected earth conductor is impedance-low, because otherwise the interference currents may appear as interference cause.

When isolating cables you have to regard the following:

- If possible, use only cables with isolation tangle.
- The hiding power of the isolation should be higher than 80%.
- Normally you should always lay the isolation of cables on both sides. Only by means of the both-sided connection of the isolation you achieve high quality interference suppression in the higher frequency area. Only as exception you may also lay the isolation one-sided. Then you only achieve the absorption of the lower frequencies. A one-sided isolation connection may be convenient, if:
  - the conduction of a potential compensating line is not possible.
  - analog signals (some mV respectively  $\mu\text{A}$ ) are transferred.
  - foil isolations (static isolations) are used.
- With data lines always use metallic or metallised plugs for serial couplings. Fix the isolation of the data line at the plug rack. Do not lay the isolation on the PIN 1 of the plug bar!
- At stationary operation it is convenient to strip the insulated cable interruption free and lay it on the isolation/protected earth conductor line.
- To fix the isolation tangles use cable clamps out of metal. The clamps must clasp the isolation extensively and have well contact.
- Lay the isolation on an isolation rail directly after the entry of the cable in the cabinet. Lead the isolation further on to your PLC and don't lay it on there again!



#### CAUTION!

#### Please regard at installation!

At potential differences between the grounding points, there may be a compensation current via the isolation connected at both sides.

Remedy: Potential compensation line

## 2.9 General data

### Conformity and approval

Conformity		
CE	2014/35/EU	Low-voltage directive
	2014/30/EU	EMC directive
Approval		
UL	-	Refer to Technical data
others		
RoHS	2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment

### Protection of persons and device protection

Type of protection	-	IP20
Electrical isolation		
to the field bus	-	electrically isolated
to the process level	-	electrically isolated
Insulation resistance	-	-
Insulation voltage to reference earth		
Inputs / outputs	-	AC / DC 50V, test voltage AC 500V
Protective measures	-	against short circuit

### Environmental conditions to EN 61131-2

Climatic		
Storage / transport	EN 60068-2-14	-25...+70°C
Operation		
Horizontal installation hanging	EN 61131-2	0...+60°C
Horizontal installation lying	EN 61131-2	0...+55°C
Vertical installation	EN 61131-2	0...+50°C
Air humidity	EN 60068-2-30	RH1 (without condensation, rel. humidity 10...95%)
Pollution	EN 61131-2	Degree of pollution 2
Installation altitude max.	-	2000m
Mechanical		
Oscillation	EN 60068-2-6	1g, 9Hz ... 150Hz
Shock	EN 60068-2-27	15g, 11ms

General data

**Mounting conditions**

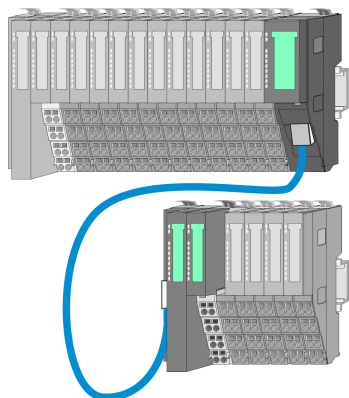
Mounting place	-	In the control cabinet
Mounting position	-	Horizontal and vertical

EMC	Standard	Comment	
Emitted interference	EN 61000-6-4	Class A (Industrial area)	
Noise immunity zone B	EN 61000-6-2	Industrial area	
		EN 61000-4-2	ESD 8kV at air discharge (degree of severity 3), 4kV at contact discharge (degree of severity 2)
		EN 61000-4-3	HF field immunity (casing) 80MHz ... 1000MHz, 10V/m, 80% AM (1kHz) 1.4GHz ... 2.0GHz, 3V/m, 80% AM (1kHz) 2GHz ... 2.7GHz, 1V/m, 80% AM (1kHz)
		EN 61000-4-6	HF conducted 150kHz ... 80MHz, 10V, 80% AM (1kHz)
		EN 61000-4-4	Burst, degree of severity 3
	EN 61000-4-5	Surge, degree of severity 3 *	

\*) Due to the high-energetic single pulses with Surge an appropriate external protective circuit with lightning protection elements like conductors for lightning and overvoltage is necessary.

## 3 Deployment

### 3.1 Overview



Please consider that the following System SLIO bus coupler currently do not support line extensions:

- 053-1EC00 - EtherCAT
- 053-1CA00 - CANopen
- 053-1DN00 - DeviceNET

Currently the line extension is supported by the following System SLIO components:

System SLIO component	Order number	from version
CPU 013C	013-CCF0R00	HW: 01
CPU 014	014-CEF0R00	FW: V1.2.20
	014-CEF0R01	HW: 01
CPU 015	015-CEFPR00	FW: V1.2.20
	015-CEFPR01	HW: 01
	015-CEFN00	HW: 01
CPU 017	017-CEFPR00	HW: 01
PROFIBUS DP slave	053-1DP00	HW: 06
EtherCAT slave	053-1EC01	HW: 01
PROFINET IO slave	053-1PN00	HW: 04
Ethernet/IP slave	053-1IP00	FW: V2.0.12
Modbus/TCP slave	053-1MT00	HW: 03

A line extension consists of the following components:

- Line extension master: 060-1AA00
- Line extension slave: 061-1BA00
- Connection cable from VIPA: 950-0KD30



#### CAUTION!

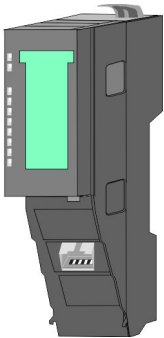
- For connection please use the connection cable 950-0KD30 from VIPA. The use of normal Ethernet cable can cause damage!
- The connection cable between master and slave may be plugged or removed only when the modules are powered off.
- The maximum length of 2m must not be exceeded!



- By means of the line extension 1 line of modules can be divided to maximum 5 lines.
- For each line extension the maximum number of pluggable modules at the System SLIO bus is decreased by 1.
- The line extension master is to be placed at the end of the line.
- After the master the line has to start with a line extension slave.
- Line extension modules are not considered in the listing of the web-site and the allocation of the slots.
- The usage of additional power modules within a line is allowed.
- To use the line extension no special configuration is required.

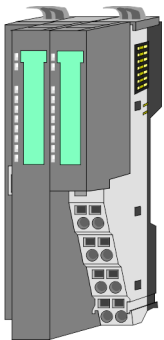
### 3.2 Properties

#### Characteristics line extension master



- Placement at the end of a line
- Possibility to connect a line extension slave
- No additional configuration required
- Status indication via LEDs
- For each line extension master the maximum number of pluggable modules is decreased by 1

#### Characteristics line extension slave



- Placement at the beginning of a line
- Possibility to connect on a line extension master
- Connection via connection cable from VIPA
- Integrated power supply for power and electronic supply
- No additional configuration required
- Status indication via LEDs

#### Ordering data

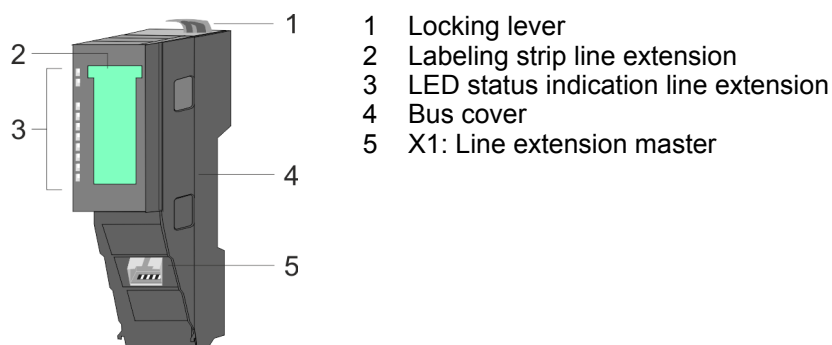
Type	Order number	Description
IM 060	060-1AA00	Line extension master
IM 061	061-1BA00	Line extension slave
Connection cable	950-0KD30	Connection cable 2m length



### 3.3 Structure

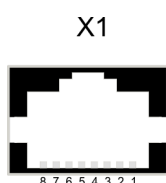
#### 3.3.1 Line extension master

##### 060-1AA00



##### 3.3.1.1 Interface

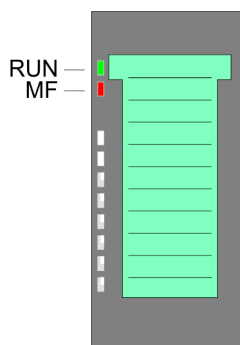
##### X1: Line extension



- The connection of a line extension slave happens via this interface.
- For connection only the connection cable 950-0KD30 from VIPA may be used.

##### 3.3.1.2 LEDs

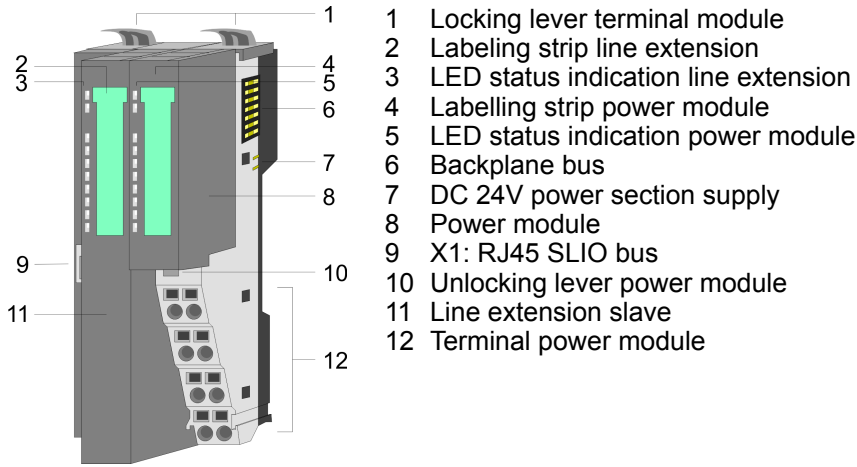
##### Line extension master



RUN	MF	Description
<input checked="" type="checkbox"/> green	<input checked="" type="checkbox"/> red	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Bus communication is OK Module status is OK
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Bus communication is OK Module status reports an error
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bus communication is not possible Module status reports an error
<input type="checkbox"/>	<input type="checkbox"/>	Error at bus power supply
X	<input checked="" type="checkbox"/> 2Hz	Error in configuration ↪ Chapter 2.7 'Trouble shooting - LEDs' on page 26
not relevant: X		

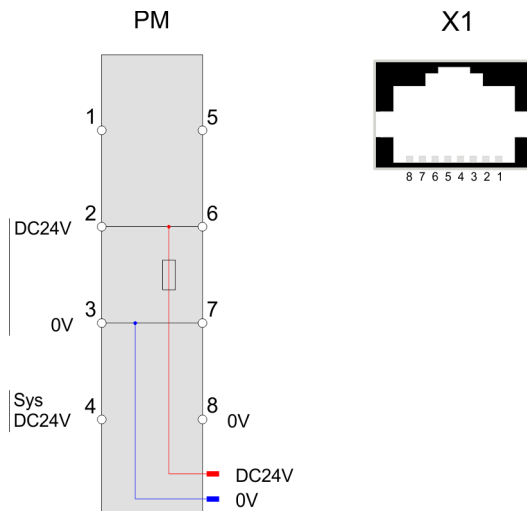
### 3.3.2 Line extension slave

#### 061-1BA00

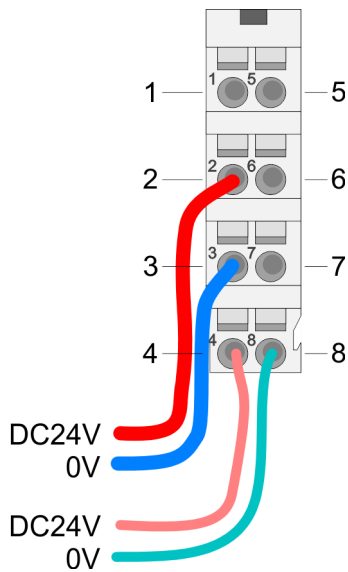


- 1 Locking lever terminal module
- 2 Labeling strip line extension
- 3 LED status indication line extension
- 4 Labelling strip power module
- 5 LED status indication power module
- 6 Backplane bus
- 7 DC 24V power section supply
- 8 Power module
- 9 X1: RJ45 SLIO bus
- 10 Unlocking lever power module
- 11 Line extension slave
- 12 Terminal power module

#### 3.3.2.1 Interfaces



#### PM - Power module



For wires with a core cross-section of 0.08mm<sup>2</sup> up to 1.5mm<sup>2</sup>.

Pos.	Function	Type	Description
1	---	---	not connected
2	DC 24V	I	DC 24V for power section supply
3	0V	I	GND for power section supply
4	Sys DC 24V	I	DC 24V for electronic section supply
5	---	---	not connected
6	DC 24V	I	DC 24V for power section supply
7	0V	I	GND for power section supply
8	Sys 0V	I	GND for electronic section supply

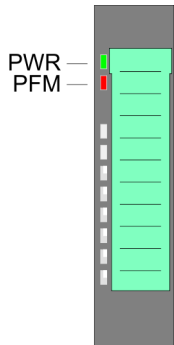
I: Input

**X1: Line extension**

- The connection of a superordinate line extension master happens via this interface.
- For connection only the connection cable 950-0KD30 from VIPA may be used.

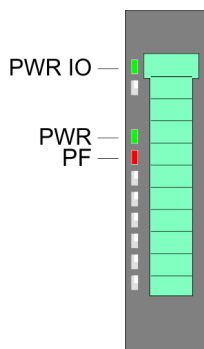
**3.3.2.2 LEDs**

**Line extension slave**



PWR	PF M	Description
<input checked="" type="checkbox"/> green	<input checked="" type="checkbox"/> red	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Power section supply line extension slave is OK
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Power section supply line extension slave is defective

**LEDs power module**



PWR IO	PWR	PF	Description
<input checked="" type="checkbox"/> green	<input checked="" type="checkbox"/> green	<input checked="" type="checkbox"/> red	
<input checked="" type="checkbox"/>	X	<input type="checkbox"/>	Power section supply OK
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Electronic section supply OK
X	X	<input checked="" type="checkbox"/>	Fuse electronic section supply defective
not relevant: X			

## 3.4 Mounting

### Please note here!

For the mounting of a line extension, there are certain rules that must be observed:



#### CAUTION!

- For connection please use the connection cable 950-0KD30 from VIPA. The use of normal Ethernet cable can cause damage!
- The connection cable between master and slave may be plugged or removed only when the modules are powered off.
- The maximum length of 2m must not be exceeded!

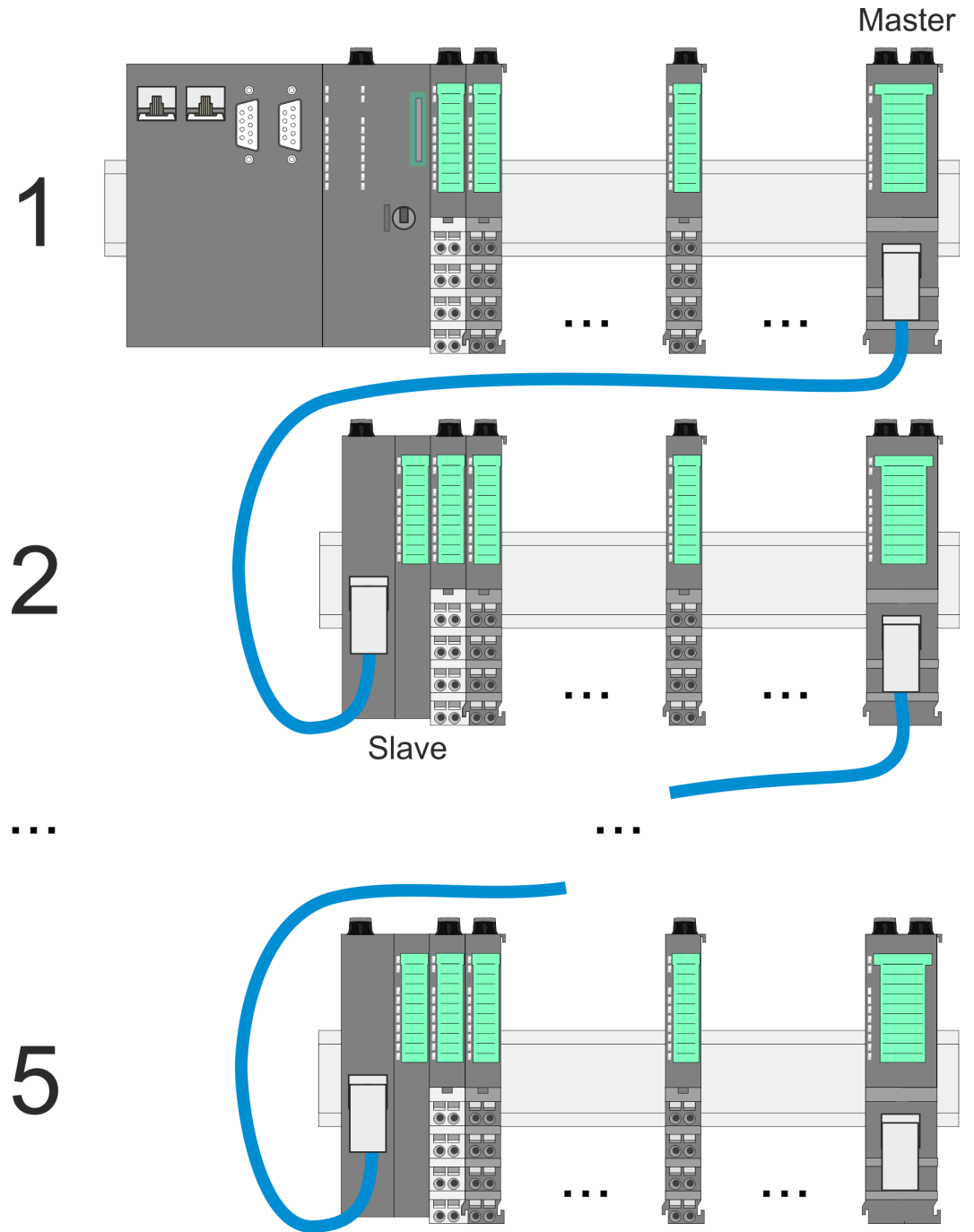


- *By means of the line extension 1 line of modules can be divided to maximum 5 lines.*
- *For each line extension the maximum number of pluggable modules at the System SLIO bus is decreased by 1.*
- *The line extension master is to be placed at the end of the line.*
- *After the master the line has to start with a line extension slave.*
- *Line extension modules are not considered in the listing of the website and the allocation of the slots.*
- *The usage of additional power modules within a line is allowed.*
- *To use the line extension no special configuration is required.*

🔗 [Chapter 2.4 'Mounting line extension' on page 15](#)

🔗 [Chapter 2.5 'Wiring line extension' on page 19](#)

Cabling



Technical data > 060-1AA00 Line extension master

## 3.5 Technical data

### 3.5.1 060-1AA00 Line extension master

Order no.	060-1AA00
Type	IM 060, Line extension master
Module ID	8080 8080
<b>Technical data power supply</b>	
Power supply (rated value)	DC 5 V
Power supply (permitted range)	-
Reverse polarity protection	-
Current consumption (no-load operation)	50 mA
Current consumption (rated value)	-
Inrush current	-
$I^2t$	-
Max. current drain at backplane bus	-
Max. current drain load supply	-
Power loss	0.25 W
<b>Status information, alarms, diagnostics</b>	
Status display	yes
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	yes
Service Indicator	none
Group error display	yes
Channel error display	none
<b>Hardware configuration</b>	
Racks, max.	4
Modules per rack, max.	total max. 64 minus number line extensions
Number of digital modules, max.	-
Number of analog modules, max.	-
<b>Communication</b>	
Fieldbus	SLIO
Type of interface	-
Connector	RJ45
Topology	-

Order no.	060-1AA00
Electrically isolated	-
Number of participants, max.	-
Node addresses	-
Transmission speed, min.	-
Transmission speed, max.	-
Address range inputs, max.	-
Address range outputs, max.	-
Number of TxPDOs, max.	-
Number of RxPDOs, max.	-
<b>Housing</b>	
Material	PPE / PPE GF10
Mounting	Profile rail 35 mm
<b>Mechanical data</b>	
Dimensions (WxHxD)	25.8 mm x 109 mm x 76.5 mm
Net weight	53 g
Weight including accessories	53 g
Gross weight	68 g
<b>Environmental conditions</b>	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
<b>Certifications</b>	
UL certification	yes
KC certification	yes

Technical data > 061-1BA00 Line extension slave

### 3.5.2 061-1BA00 Line extension slave

Order no.	061-1BA00
Type	IM 061, Line extension slave
Module ID	-
<b>Technical data power supply</b>	
Power supply (rated value)	DC 24 V
Power supply (permitted range)	DC 20.4...28.8 V
Reverse polarity protection	✓
Current consumption (no-load operation)	10 mA
Current consumption (rated value)	0.95 A
Inrush current	3.9 A
$I^2t$	0.14 A <sup>2</sup> s
Max. current drain at backplane bus	2 A
Max. current drain load supply	10 A
Power loss	1.4 W
<b>Status information, alarms, diagnostics</b>	
Status display	yes
Interrupts	no
Process alarm	no
Diagnostic interrupt	no
Diagnostic functions	no
Diagnostics information read-out	none
Supply voltage display	yes
Service Indicator	none
Group error display	yes
Channel error display	none
<b>Hardware configuration</b>	
Racks, max.	4
Modules per rack, max.	total max. 64 minus number line extensions
Number of digital modules, max.	-
Number of analog modules, max.	-
<b>Communication</b>	
Fieldbus	SLIO
Type of interface	-
Connector	RJ45
Topology	-
Electrically isolated	-



Order no.	061-1BA00
Number of participants, max.	-
Node addresses	-
Transmission speed, min.	-
Transmission speed, max.	-
Address range inputs, max.	-
Address range outputs, max.	-
Number of TxPDOs, max.	-
Number of RxPDOs, max.	-
<b>Housing</b>	
Material	PPE / PPE GF10
Mounting	Profile rail 35 mm
<b>Mechanical data</b>	
Dimensions (WxHxD)	48.5 mm x 109 mm x 76.5 mm
Net weight	155 g
Weight including accessories	155 g
Gross weight	172.5 g
<b>Environmental conditions</b>	
Operating temperature	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C
<b>Certifications</b>	
UL certification	yes
KC certification	yes