



Desigo TRA

## PL-Link IO Block

## RXM21.1

Use with PXC3 series room automation station

- The PL-Link I/O block contains the inputs and outputs controlled by a room automation station via PL-Link.
- PL-Link communications
- Valve control (3 potential-free relay contacts)
- Thermal valve actuator control (AC 24 V)
- Motor-driven valve and damper actuators (AC 24 V, 2- or 3-point)
- Temperature input LG-Ni 1000
- 2 digital inputs
- Operating voltage AC 230 V
- Pluggable screw terminals

### Use

The RXM21.1 PL-Link I/O-Block allows control of a single fancoil unit by a PXC3 room automation station via the PL-Link peripheral bus. It is optimized for fancoil installation and control in terms of housing, connection terminals and I/O mix. The

PL-Link (PeripheraL-Link) is a two-wire bus system optimized for communication between peripheral devices (sensors, actors) and the modular PXC3 room automation stations in the domains or HVAC, lighting and shading.

## Functions

The application on the room automation station determines the device functionality.

## Type overview and ordering

Product number	Stock number	Name
RXM21.1	S55376-C104	PL-Link IO Block

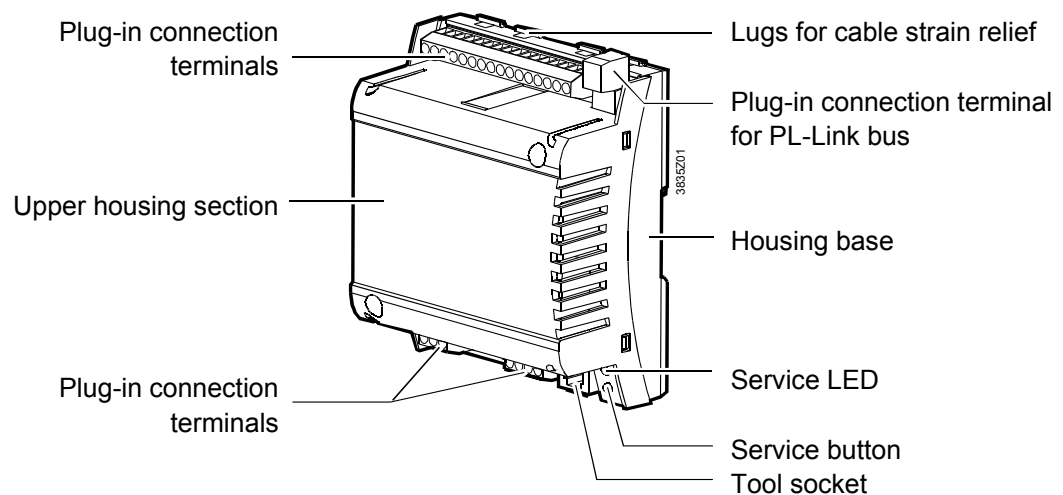
Note The device is supplied without terminal covers.  
Terminal covers (RXZ20.1) can be ordered optionally.

## Equipment combinations

- The PL-Link I/O-Block RXM21.1 only works together with PXC3 series room automation stations.
- LG-Ni 1000 temperature sensors can be connected.
- AC 24 V actors from Siemens or third party can be connected.
- Signaling inputs relay outputs etc. see pages 10, 11.

## Technical design

The PL-Link I/O-Block RXM21.1 consists of a terminal base, upper section of housing, and circuit board with plug-in connection terminals on the side. In addition, the device offers a tool socket, a service LED and button.



## Service LED

The Service LED (3-color) indicates the device's operating status as follows:

Continuously OFF	<ul style="list-style-type: none"> <li>• No power supply</li> <li>• Nothing to indicate.</li> </ul>
Flashing 1 (1/4 s On, 7/4 s Off)	<ul style="list-style-type: none"> <li>• Feedback for medium button pressure (yellow)</li> <li>• Feedback during process (yellow)</li> </ul>
Flashing 2 (1s On, 1 s Off)	No device detection (red)
Continuously ON	<ul style="list-style-type: none"> <li>• Programming mode (red)</li> <li>• Success (green)</li> </ul>

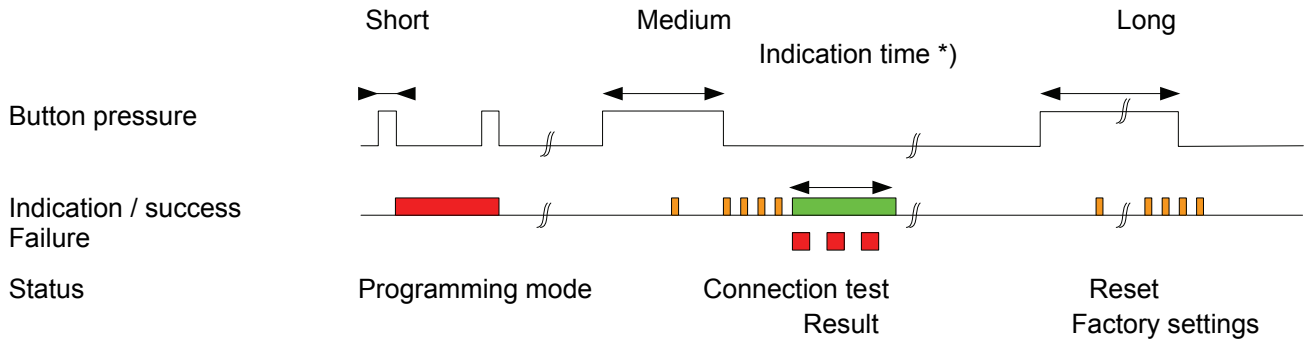
## Service button

The device carries out the following commands from the service button:

Button pressure	Action
Short (< 0.5 s)	<ul style="list-style-type: none"> <li>• Switch on/off programming mode</li> <li>• Do not indicate connection test result</li> </ul>
(0.5...2.s)	<ul style="list-style-type: none"> <li>• No action</li> </ul>
Medium (2...20 s)	<ul style="list-style-type: none"> <li>• Start connection test</li> </ul>
Long (> 20 s)	<ul style="list-style-type: none"> <li>• Start reset to factory settings</li> </ul>

## HMI concept

Operation and display interaction:



\*) Indication time = 60 s; can be ended by briefly pressing the button.

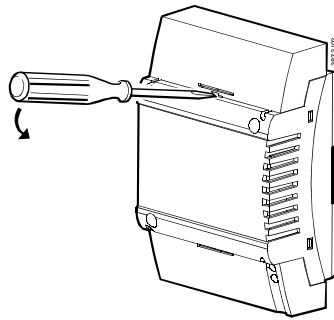


## Warning!

Only trained electrical installation staff may press the service button when the terminal cover is removed!  
Adjacent terminal may be powered.

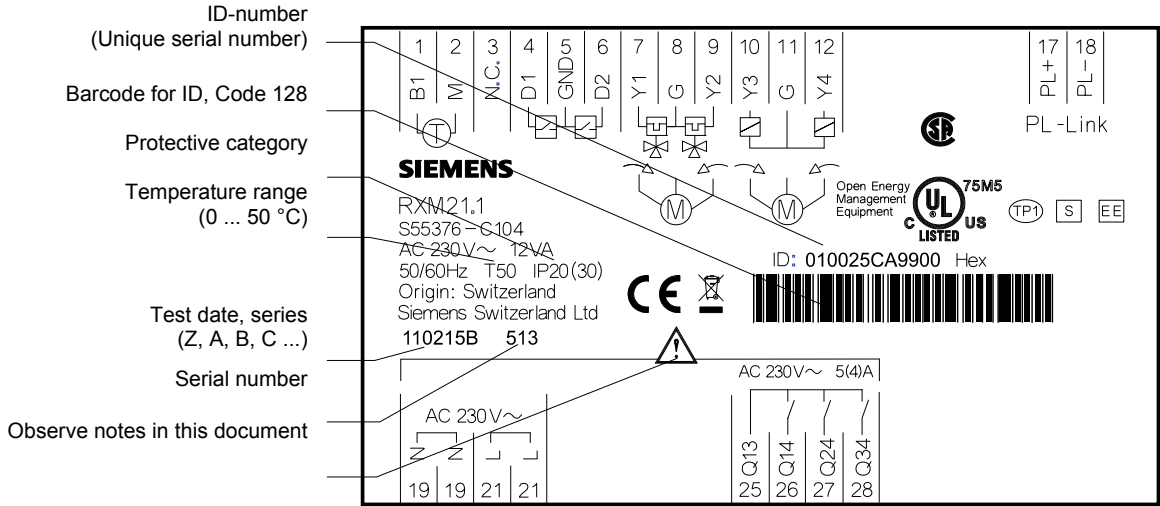
## Terminal cover

The device is supplied without terminal covers protecting the connection terminals against touch and soiling. The service LED is visible also with installed terminal cover. The service button is pressed using a tool. Remove the cable entry glands to connect cables to the room automation station.



Remove terminal cover

**Label**



**Connection terminals**

All connection terminals are plug-in terminals. The terminals are separated to prevent faulty wiring for terminals connected to AC 230 V (supply, relay outputs).



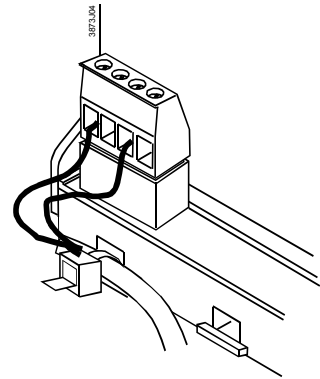
**Note**

Cable strain relief for lines for terminals 19 ... 28 (AC230 V) is mandatory. Attach the lines to the related lugs on the housing base using cable blinders (see picture, right).



**Warning!**

Plug-in terminals connected to power must be removed from power prior to plug-in or plug-out!



**Communication**

The PL-Link I/O-Block RXM21.1 contains the following interfaces:

- PL-Link terminals.
- RJ45 tool plug for FW upgrade (proprietary, a Siemens connection cable is required).



**Warning!**

- Only trained electrical installation staff may connect the tool plug (RJ45)! Adjacent terminal may be powered.
- Do not connect Ethernet to the RJ45 plug! The device at the other end might be destroyed!

**Disposal**



"The device is considered electronics device for disposal in terms of European Directive 2002/96/EG (WEEE) and may not be disposed of as domestic garbage. The device must be disposed of via the proper channels. Follow all local and currently applicable laws and regulations.

Installation manual TRA, CM111043, contains all information required to engineer the PL-Link bus (topology, repeater, etc.)

**Power lines  
AC 230 V**

- The PL-Link I/O-Block is operated on AC 230 V power. The device directly supplies power to actuators (valves, dampers). As a result, no separate AC 24 V supply is required for the field devices.
- The sizing and fusing of the power lines are oriented to overall load and local regulations.
- Supply circuits are interrupted as soon as plug 19/21 is removed from the device. (Bridges 19-19 and 21-21 are located on the print, not the plug; see terminal diagram page 11).
- The power lines must be fused on the device with strain relief.

**Potential-free  
relay outputs  
AC 230 V**

- The potential-free relay outputs allow for switching loads up to AC 250 V, 5 A (4 A).
- The sizing and fusing of the power lines are oriented to overall connected load and local regulations. The switching circuits must be externally fused ( $\leq 10$  A); no internal fusing.
- The cables must be attached to the device with strain relief.



**Caution!**

- **Do not connect fans in parallel.**

**Triac outputs AC 24 V**

Max. load

Outputs Y1 ... Y4 may not exceed 9 VA simultaneous load.

Example: Y1, Y2 (heating)      3-position valve actuator      4.5 VA  
 Y3, Y4 (cooling)      3-position valve actuator      4.5 VA

Max. load for heating and cooling sequence is 9 VA each.

This is allowed because both sequences are not active simultaneously.



**Note**

With small loads ( $< 2$  VA), tolerance may be  $> +20\%$  (see technical data).

Assignment of outputs

Application	Thermal actuators	Motorized actuators	Elktromechanical actuators.
Outout 1	Y1	Y1 Y2	Y1
Outout 2	Y3	Y3 Y4	Y3

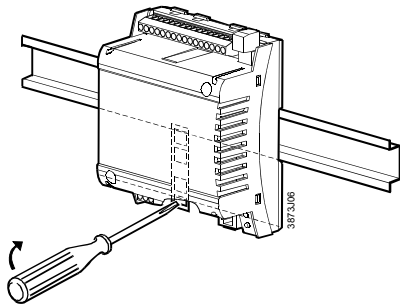
Behavior without a process value (power-on, missing PL-Link communication

- The outputs are inactive
- The device is in Backup mode
- After a timeout (2 x heartbeat time) the outputs go to Backup value

## Mounting notes

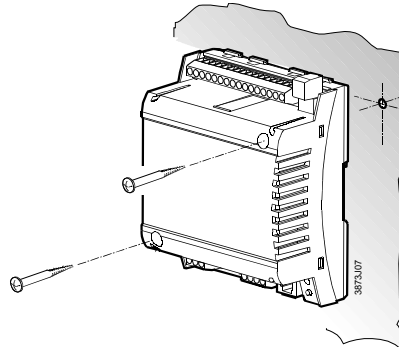
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The PL-Link I/O-Block can be mounted in any position using the following attachment methods:



### Mounting on tophat rail

The housing base contains a snap-on option to mount on tophat DIN rails, type EN50022-35x7,5 (snap off using screwdriver)



### Direct mounting

Two predrilled holes to mount using screws (drilling diagram, see "Dimensions").  
The housing base has higher support surfaces.  
Screws: Max. dia. 3.5 mm, length min. 38 mm



### Note

**Tightening torque for fastening screws: Max. 1.5 Nm**

Observe the following for mounting:

- Heat generated during operation must be removed; make sure the air circulates sufficiently around the device.
- Easy access for service.
- Comply with local installation regulations!

The mounting instructions including drilling template is printed on the device packing.

## Commissioning notes

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### Secure state

Outputs are inactive (relay off, triac off) when an application does not use an output.

### Functional test

The outputs can be controlled and the inputs queried as part of a special test mode (SSA tool).

3-position actuators: No synchronization is executed when the sense of rotation is changed.



### Caution!

- **The thermal fuse in the transformer may be triggered in case of extended overload (ca. 4 minutes) or short circuits. The device must then be replaced.**
- **The AC 24 V side does not have protection against faulty wiring on AC 230 V.**
- **AC 230 V mains power for supply and relay must be switched off prior to plugging in and removing plug-in terminals (risk of electric shock!)**
- **Supply circuits are interrupted as soon as plug 19/21 is removed from the device. (Bridges 19-19 and 21-21 are located on the print, not the plug; see terminal diagram page 11).**

## Operating notes

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- When power is off, all outputs are inactive
- When PL-Link communications fails, all outputs go to the configured backup values (after 2 x Heartbeat time).

## Technical data

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⚠ Power	Rated voltage	AC 230 V
	Frequency	50 / 60 Hz
	Power consumption incl. connected field devices	Max. 12 VA
	Internal fuse	Thermal, irreversible
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⚠ Protection	Protection against faulty wiring on AC 230 V No protection for On / outputs	
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Inputs		
Status inputs (D1, D2) (for potential-free contacts)	Quantity	2
	Contact voltage.	DC 16 V
	Contact current	DC 5 mA
	Contact transfer resistance	Max. 100 Ohm
	Contact insulation resistance	Min. 50 kOhm
	Switching time: Heartbeat	Min. 20 ms "ON", min. 20 ms "OFF" 1 s
	Protection against faulty wiring on AC 24 V	Protected
Measured value input B1	Connectable temperature sensor	LG-Ni 1000
	Quantity	1
	Measuring range	0...50 °C
	Sensor current	0.5 mA
	Resolution	0.1 K
	Measuring error at 25 °C sensor temp. (without line resistance)	Max. 0.5 K
	Heartbeat	10 s
Protection against faulty wiring on AC 24 V	Protected	
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Outputs		
Triac outputs AC 24 V	Quantity	4 (Y1 ... Y4)
	Output voltage	AC 24 V +/- 20% <b>(at &lt;2 VA load: possibly &gt;+20%!)</b>
	Outputs Y1...Y4 are on AC 24 V, the triac closes against contact to G	
	Output current	Max. 0.5 A
	Total rated load (at simultaneous load on 2 outputs)	Max. 9 VA
	Protection against overload	No protection

△ Relay outputs

Quantity	3 (Q14, Q24, Q34)
Relay type	Monostable, NO contact
Contact rating at alternating current	
Switching voltage	Max. AC 250 V, min. AC 19 V
Rated current resistive / inductive	Max. AC 5 A / 4 A (cosφ = 0.6)
Switch-on current (200 ms half-time)	Max. 20 A
Switching current at AC 19 V	Min. AC 10 mA
Contact rating at direct current	
Switching voltage	Max. DC 250 V, min. DC 5 V
Switching current at DC 5 V	Min. DC 100 mA
Switching output	Max. 20 W
Inductive load L/R	Max. 7 ms
Locking (in firmware)	<ul style="list-style-type: none"> <li>• Only 1 relay active at a time</li> <li>• All relays 1 s OFF upon change of stage</li> </ul>

PL-Link bus

Interface type	Galvanically isolated
Transceiver	TP-UART
Bus power	5 mA
Baud rate	9.6 kbps
Protection against faulty wiring AC 24 V	Protected
Bus topology: See installation guide TRA, CM111043	

Line connections

Connection terminals for signals and power supply (plug-in screw terminals)	Solid or stranded 0,25 ... 2.5 mm <sup>2</sup> or 2 x 1.5 mm <sup>2</sup>
Connection terminals for PL-Link bus (plug-in screw terminals)	Solid or stranded wire 2 x max 1.0 mm <sup>2</sup> e.g. YCYM 2x2x0.8
Cable length	See TRA installation manual, CM111043
Tool connection cable	Max. 3 m

Degree of protection of housing

Protection as per EN 60529	IP30 with terminal cover and wall mounting without tophat rail IP20 for all other mounting types
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Protection class

	Suited for use in Protection class I – or Protection class II - Plants
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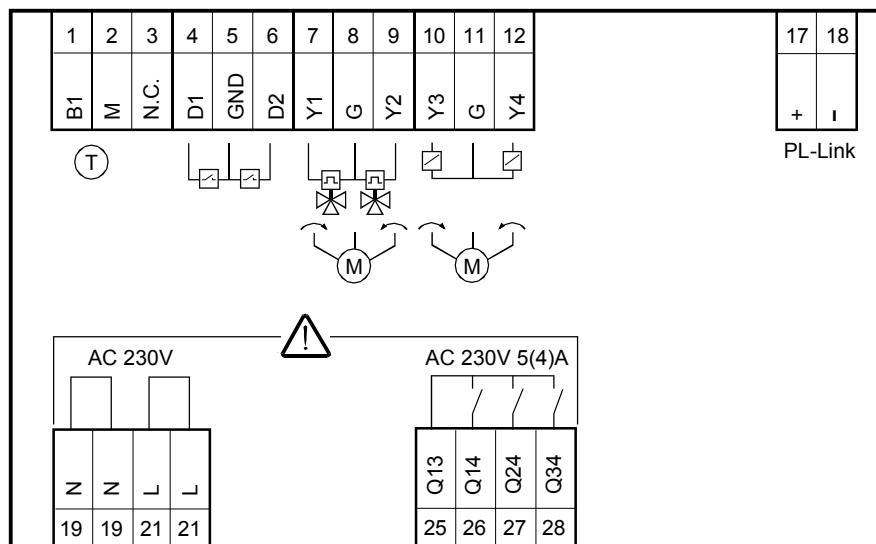
Environmental conditions

Operation	Class 3K5 as per IEC 60721-3-3
Temperature	0 ... 50 °C
Humidity	< 85% r.h.
Transport	Class 2K3 as per IEC 60721-3-2
Temperature	– 25 ... 70 °C
Humidity	< 95% r.h.



Standards and directives	Product safety	EN 60730-1
	Automatic electronic controllers for household use and similar applications	
	Electromagnetic compatibility	
	Immunity (industry & residential)	EN 60730-1
	Emissions (residential)	EN 60730-1
	<b>CE</b> compliance	
	Electromagnetic compatibility as per directive	2004/108/EC
Low voltage directive	2006/95/EC	
<b>UL</b> approbation	UL916	
<b>C-tick</b> conformity (EMC)	AS/NZS 61000-6-3	
Environmental compatibility	The product environmental declaration CA2E3871 contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal)	ISO 14001 (environment) ISO 9001 (quality) SN 36350 (environmentally compatible products) 2002/95/EC (RoHS)
Dimensions	Refer to "Dimensions"	
Weight	With/without packaging	0.640 kg / 0.675 kg

## Connection terminals



3835A01

Measured value input	B1	1	Measured value input for LG-Ni 1000 sensor
	M	2	Ground for measured value input
Status inputs	D1	4	Status input
	GND	5	Ground for status inputs
	D2	6	Status input
Triac outputs	Y1	7	Switching output AC 24 V, 0.5 A
	G	8	Actuator supply AC 24 V
	Y2	9	Switching output AC 24 V, 0.5 A
	Y3	10	Switching output AC 24 V, 0.5 A
	G	11	Actuator supply AC 24 V
	Y4	12	Switching output AC 24 V, 0.5 A
PL-Link	+	17	Data line +
	-	18	Data line -
Power	N	19	Neutral conductor
	L	21	Phase conductor AC 230 V +/- 10%
Relay outputs	Q13	25	Common supply for Q14, Q24 and Q34
	Q14	26	NO contact AC max. 250 V, 5 (4) A (stage 1)
	Q24	27	NO contact AC max. 250 V, 5 (4) A (stage 2)
	Q34	28	NO contact AC max. 250 V, 5 (4) A (stage 3)

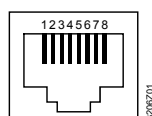
Note M and GND are galvanically connected



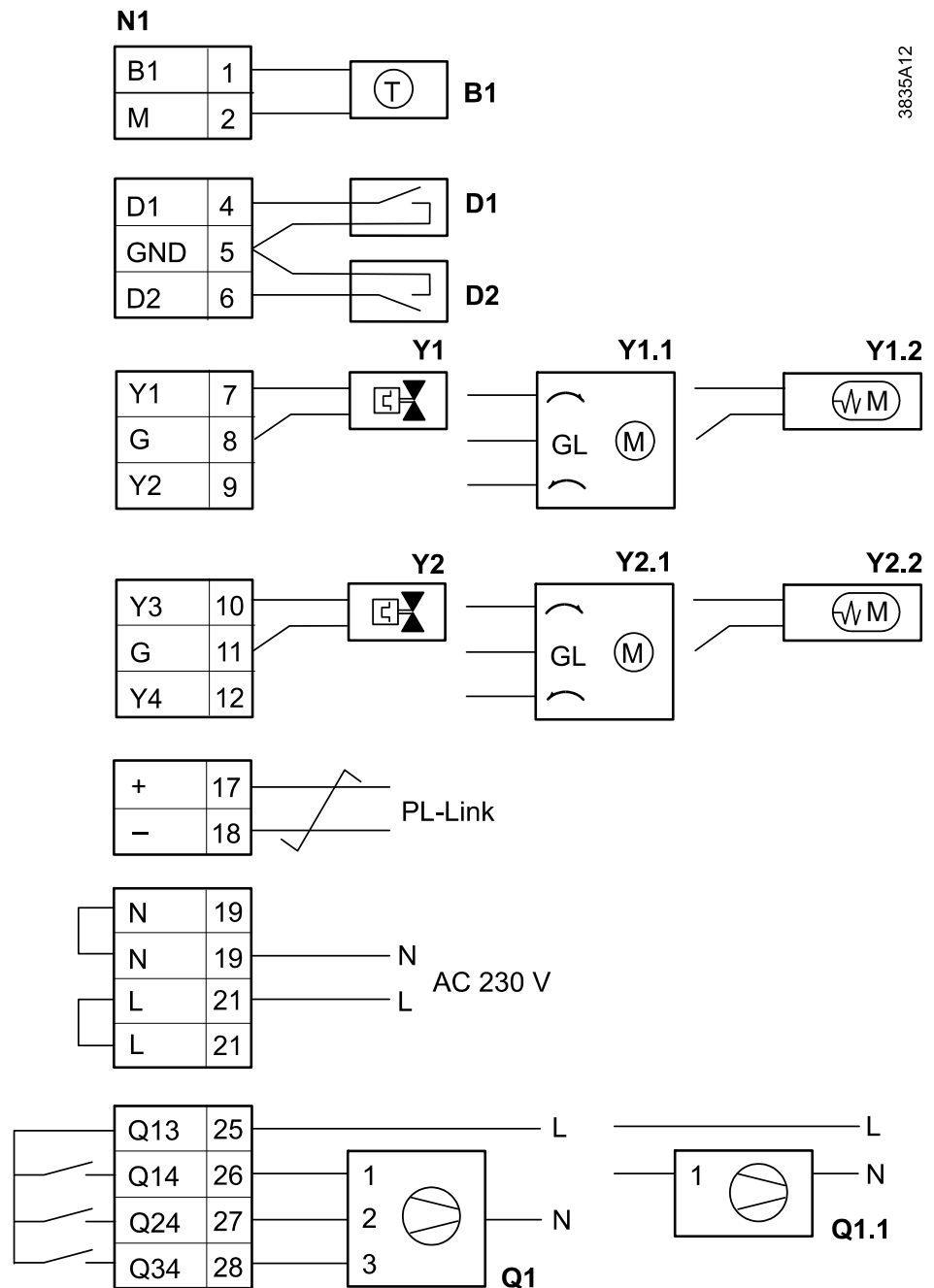
**Caution!**

- Note the technical data for the relay outputs: AC max. 250 V, 5 (4) A
- Comply with local installation regulations!

**Tool connection socket**  
**Proprietary socket,**  
**type RJ45**



1	PL-Link +	5	+12VDC
2	PL-Link -	6	RxD
3	Unused	7	TxD
4	Unused	8	GND



- N1 PL-Link IO Block RXM21.1
- B1 Temperature sensor LG-Ni 1000
- D1, D2 Potential-free contacts (window contact, presence detector, etc.)
- Y1, Y2 Thermal valve actuators AC 24 V
- Y1.1, Y2.1 Motor-driven valve or damper actuators AC 24 V, 3-point
- Y1.2, Y2.2 Electro-mechanic valve actuators AC 24 V, 2-point
- Q1 3-speed fan
- Q1.1 1-speed fan

 Twisted pair

 **Note**

- Fans on relay outputs Q14 ... Q34 may not be switched in parallel. Use isolating relays or separate I/O blocks to run fans parallel.

## Connection of several thermal valve actuators

Up to 2 thermal actuators can be connected directly to a PL-Link I/O-Block. A power amplifier UA1T is needed in the event of parallel connection of thermal actuators.

This example also applies to output Y3.  
Note load of outputs Y1 and Y3 (max. 9 VA).

Power consumption on input X1 of UA1T: 0,5 VA.

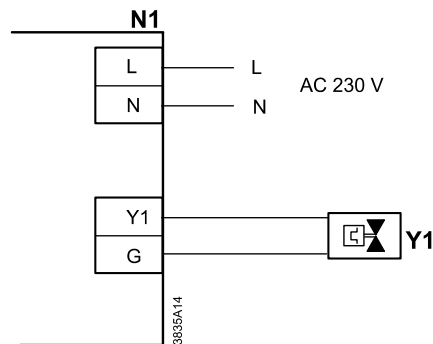


### Note

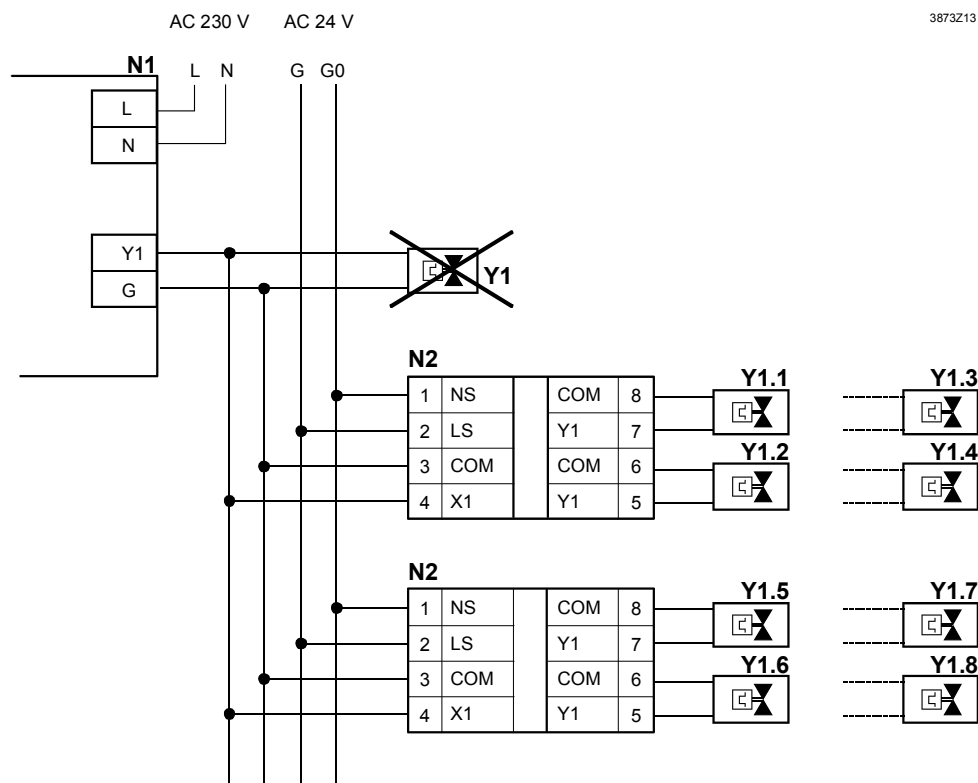
Mixed operation: **Do not connect thermal actuators to both controller and power amplifier.**

The valve position otherwise may deviate considerably due to different voltage on the internal transformer of the controller and on the UA1T power amplifier supply.

### Connection to the PL-Link I/O-Block



### Connection to power amplifier



N1 PL-Link IO Block RXM21.1

N2 Power amplifier UA1T (see data sheet CA2N3591)

Y1 Thermal valve actuators AC 24 V connected to controller

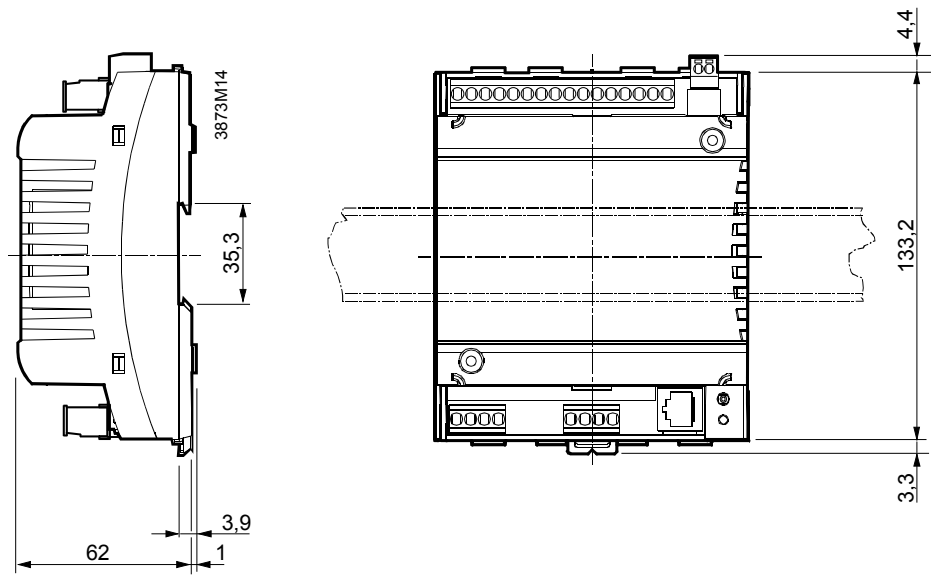
Y1.x Thermal valve actuators AC 24 V (max. 2 actuators STA72E / STP72E per output Y1 of the UA1T)

- Notes
- The UA1T power amplifier requires its own AC 24 V supply!
  - 3-point actuators cannot be connected to the UA1T.

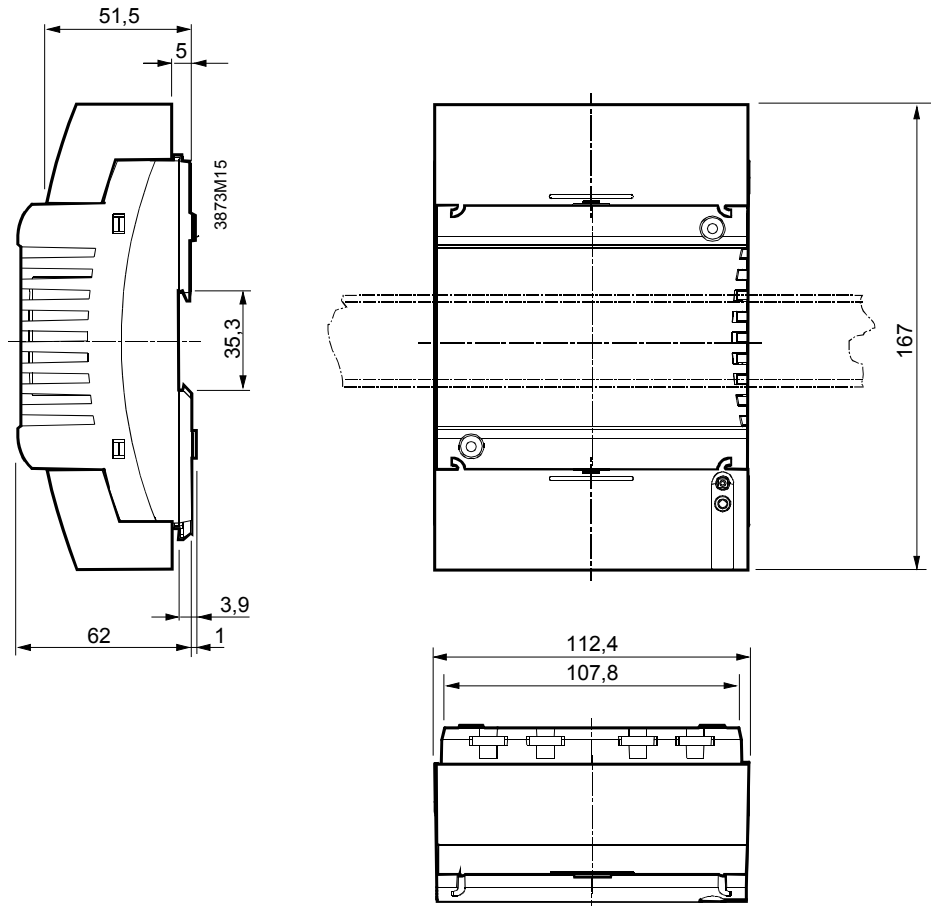
## Dimensions

All dimensions in mm

### Without terminal covers



### With terminal covers RXZ20.1 (to be ordered separately)



Drilling diagram 1:1

