



Desigo TRA

PL-Link I/O 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 KNX PL-Link.
- KNX 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 KNX PL-Link peripheral bus. It is optimized for fancoil installation and control in terms of housing, connection terminals and I/O mix.

The KNX 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 I/O Block

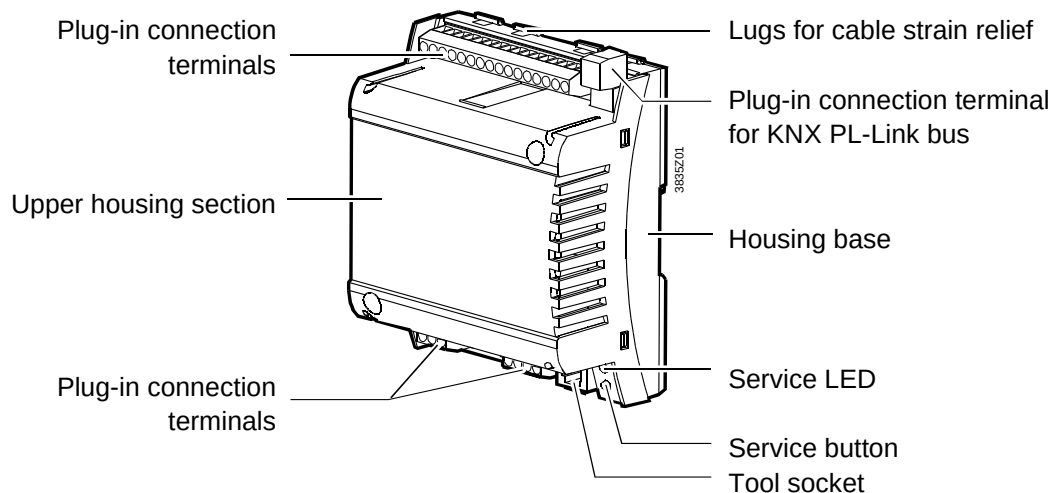
Note The device is supplied without terminal covers.
Terminal covers (RXZ20.1) can be ordered optionally.

Equipment combinations

- The RXM21.1 PL-Link I/O Block 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 RXM21.1 PL-Link I/O Block 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	• No power supply • Nothing to indicate.
Flashing 1 (1/4 s On, 7/4 s Off)	• Feedback for medium button pressure (yellow) • Feedback during process (yellow)
Flashing 2 (1s On, 1 s Off)	No device detection (red)
Continuously ON	• Programming mode (red) • Success (green)

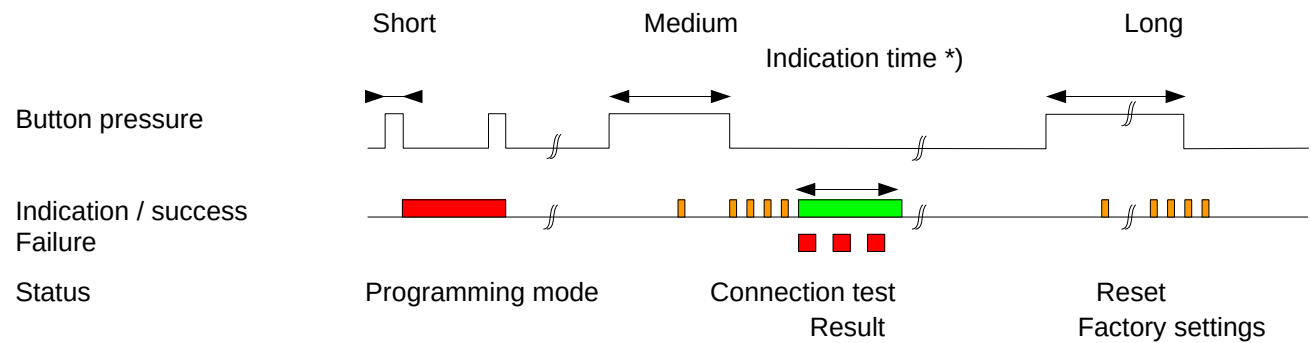
Service button

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

Button pressure	Action
Short (< 0.5 s)	• Switch on/off programming mode • Do not indicate connection test result
(0.5...2.s)	• No action
Medium (2...20 s)	• Start connection test
Long (> 20 s)	• Start reset to factory settings

HMI concept

Operation and display interaction:



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

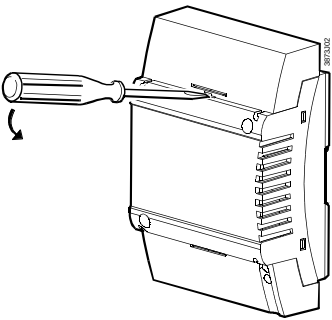


Warning!

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

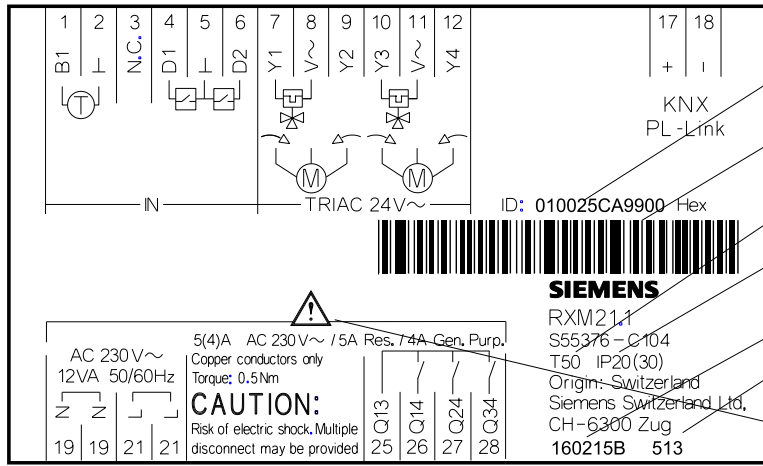
Terminal cover

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



ID-number
(Unique serial number)

Barcode for ID, Code 128

Temperature range
(0 ... 50 °C)

Protective level

Test date, series
(Z, A, B, C ...)

Serial number

Observe notes in this document

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).



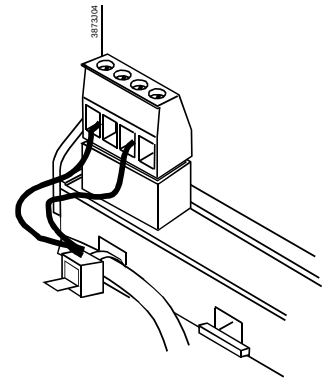
Note

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

- KNX 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 devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic garbage.

- Dispose of the devices through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Installation manual TRA, CM111043, contains all information required to engineer the KNX 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; 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	Elktromechnical actuators.
Outout 1	Y1	Y1 Y2	Y1
Outout 2	Y3	Y3 Y4	Y3

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

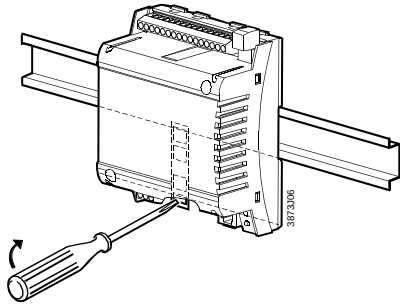
- The outputs are inactive
- The device is in Backup mode
- After a timeout (2 x heartbeat time) the outputs go to Backup value

Digital inputs

For time critical functions as light and blinds, use KNX PL-Link pushbuttons. D1, D2 are not suitable for these purposes because of the low sampling rate.

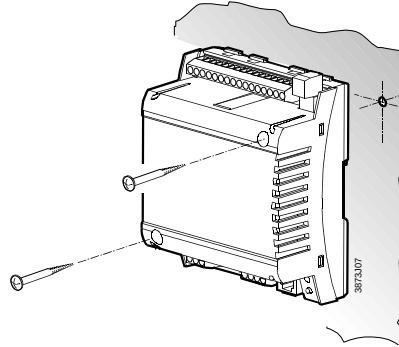
Mounting notes

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

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

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

Technical data

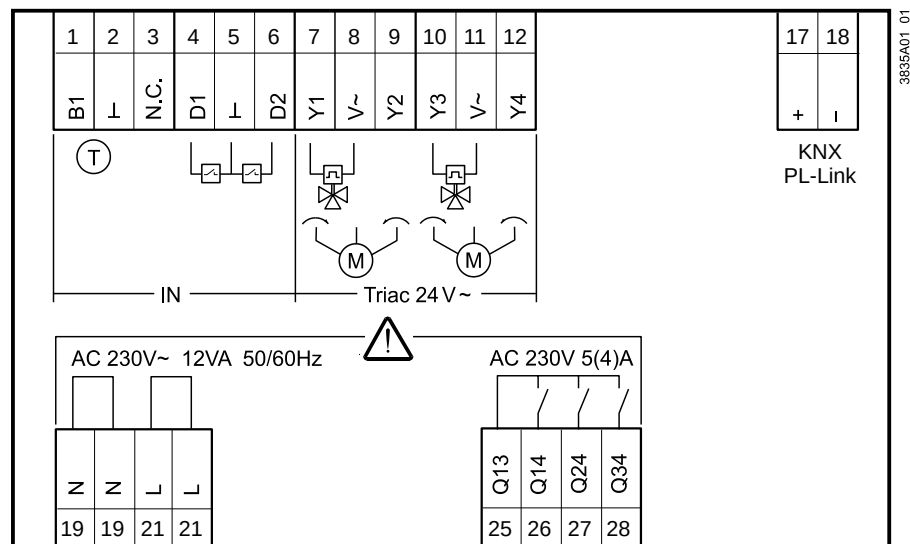
⚠ Power	Rated voltage	AC 230 V
	Frequency	50 / 60 Hz
	Power consumption incl. connected field devices	Max. 12 VA
	Internal fuse	Thermal, irreversible
	External supply line protection (EU)	Slow-blow fuse max. 10 A
		or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898
⚠ Protection	Protection against faulty wiring on AC 230 V No protection for On / outputs	
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:	Min. 20 ms “ON”, min. 20 ms “OFF”
	Heartbeat	1 s
	<i>For time critical functions as light and blinds, use KNX PL-Link pushbuttons. D1, D2 are not suitable for these purposes because of the low sampling rate.</i>	
Measured value input B1	Protection against faulty wiring on AC 24 V	Protected
	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
Outputs	Protection against faulty wiring on AC 24 V Protected	
	Quantity	4 (Y1 ... Y4)
	Output voltage	AC 24 V +/- 20% (at <2 VA load: possibly >+20%!)
	Outputs Y1...Y4 are on AC 24 V, the triac closes against contact to V~/ G	
	Output current	Max. 0.5 A
	Total rated load (at simultaneous load on 2 outputs)	Max. 9 VA
	Protection against overload	No internal limitation

△ 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 ($\cos\phi = 0.6$)
	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)	• Only 1 relay active at a time • All relays 1 s OFF upon change of stage
	Caution △ External supply line protection	See section power supply
KNX 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 ² or 2 x 1.5 mm ²
	Connection terminals for KNX PL-Link bus (plug-in screw terminals)	Solid or stranded wire 2 x max 1.0 mm ² e.g. YCYM 2x2x0.8
	Cable length	See TRA installation manual, CM111043
	Tool connection cable	Max. 3 m
Protection data	Housing protection to EN 60529	IP30 with terminal cover and wall mounting without tophat rail
		IP20 for all other mounting types
Protection class	Suited for use in Protection class I – or Protection class II - Plants	
Ambient 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, directives and approvals	Product standard	EN 60730-1	Automatic electrical controls for household and similar use
	Electromagnetic compatibility (Applications)		For use in residential, commercial and industrial environments
	EU conformity (CE)		See CM2T3877xx *)
	UL certification (US)		UL 916
	RCM conformity (EMC)		CA2T3834en_C1 *)
Environmental compatibility	EAC conformity		Eurasia conformity
	Product environmental declaration (contains data on RoHS compliance, materials composition, packaging, environmental benefit, disposal)		CA2E3871 *)
Dimensions	Refer to "Dimensions"		
Weight	Without/with packaging		0.640 kg / 0.675 kg

*) The documents can be downloaded from <http://siemens.com/bt/download>.

Connection terminals



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

¹⁾ Old / New: Manufacturing date < / ≥ 2015-10-28

²⁾ For time critical functions as light and blinds, use KNX PL-Link pushbuttons.
D1, D2 are not suitable for these purposes because of the low sampling rate.

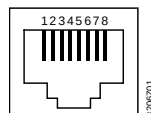
Note ⊥ (M and GND) are galvanically connected



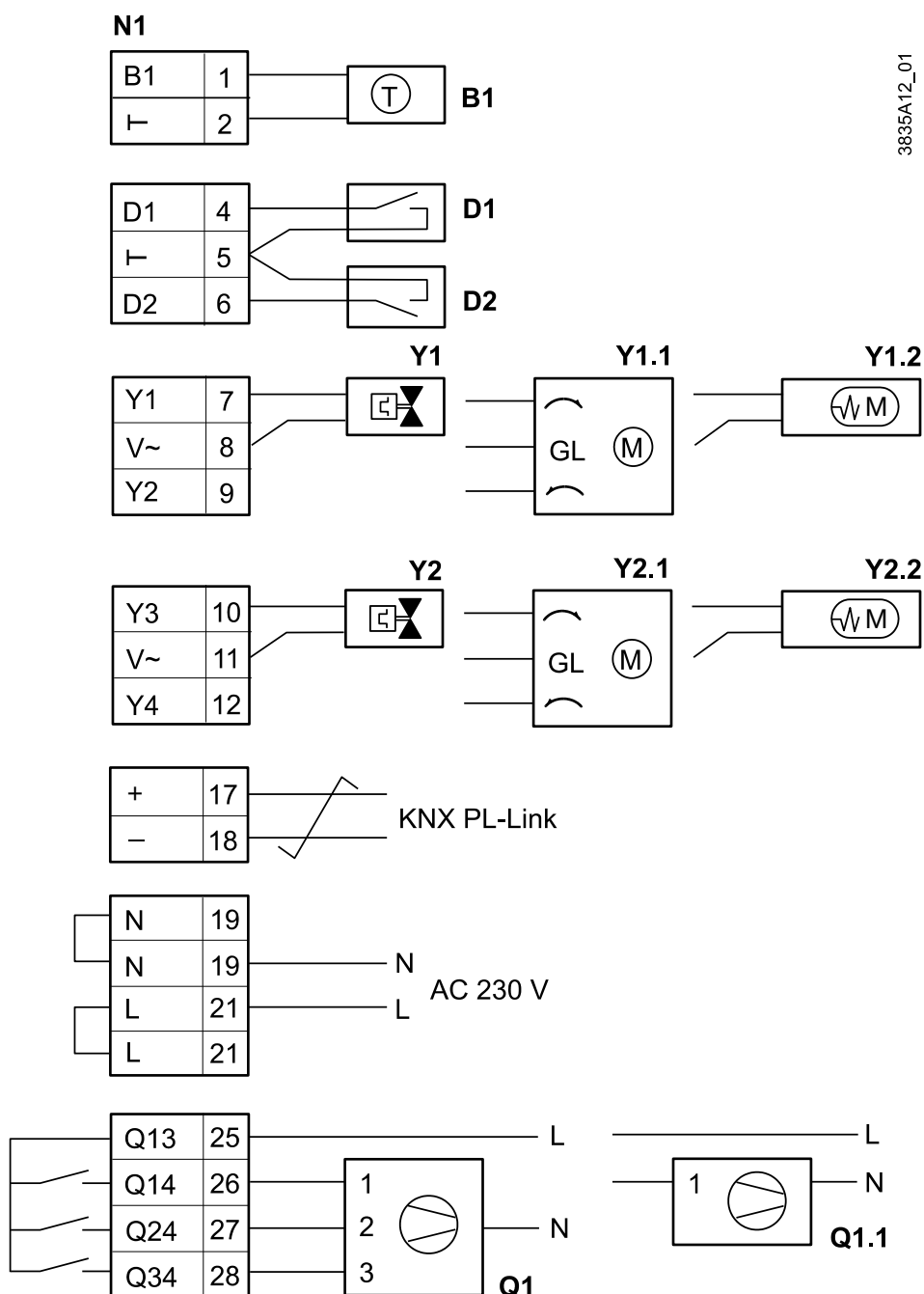
Caution!

- 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

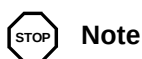


1	KNX PL-Link +	5	+12VDC
2	KNX PL-Link -	6	RxD
3	Unused	7	TxD
4	Unused	8	GND / ⊥



- N1 PL-Link I/O Block RXM21.1
 B1 Temperature sensor LG-Ni 1000
 D1, D2 Potential-free contacts (window contact, presence detector, etc.)
Do not use for operation of light and blinds
 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.

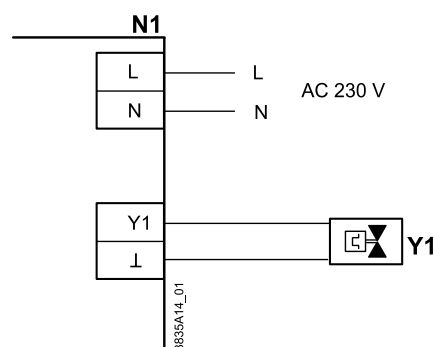


Note

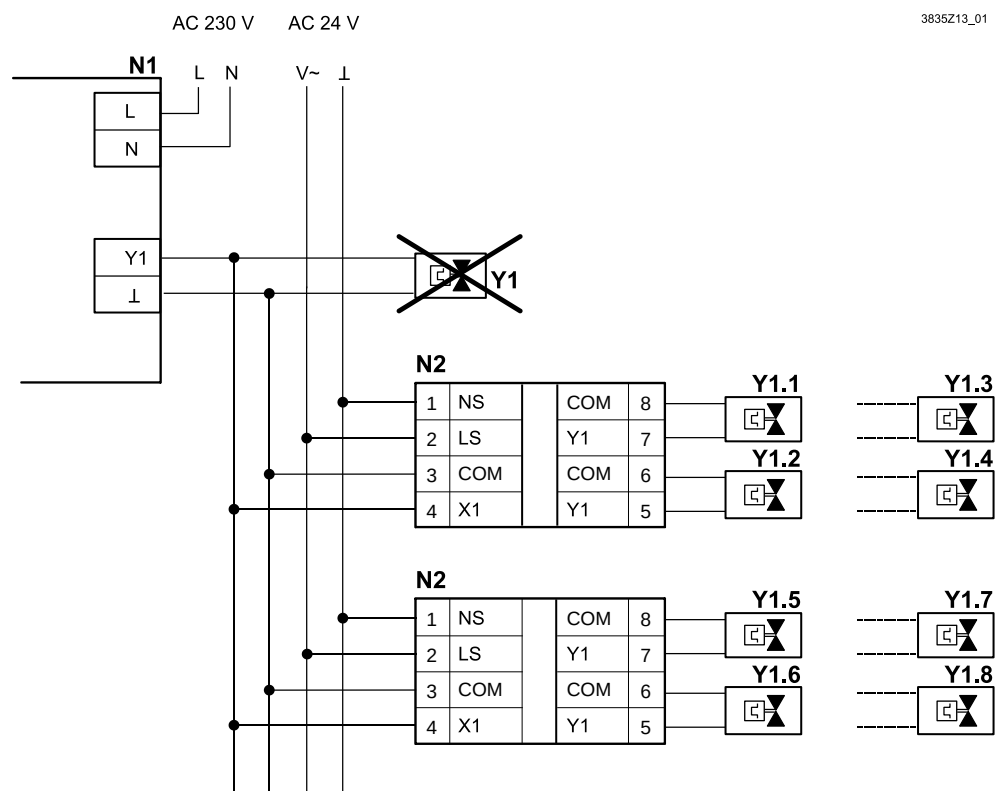
Mixed operation: **Do not connect thermal actuators to both controller and power amplifier.**

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 I/O Block RXM21.1

N2 Power amplifier UA1T (see data sheet CA2N3591)

Y1 Thermal valve actuators AC 24 V connected to controller

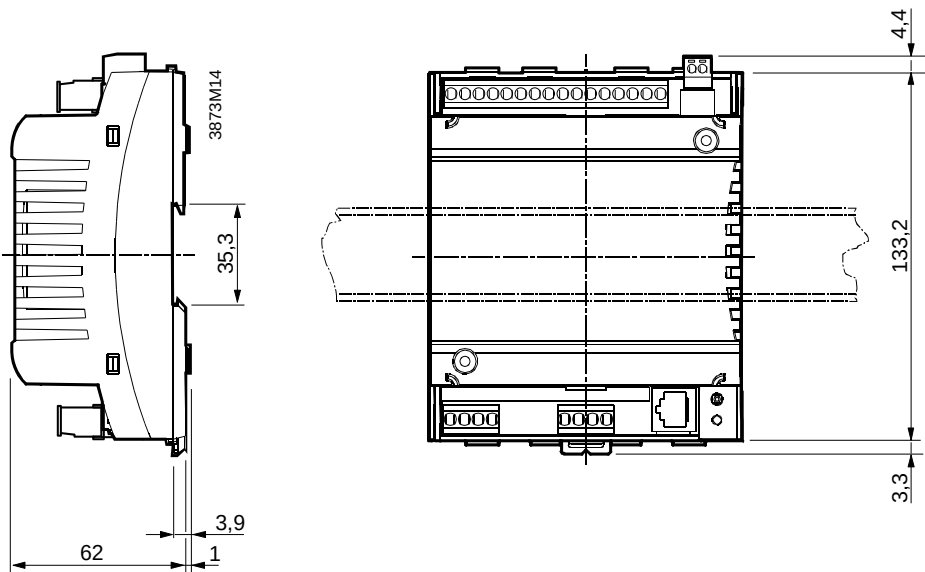
Y1.x Thermal valve actuators AC 24 V (max. 2 actuators STA72E / STP72E per output Y1 of the UA1T)

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

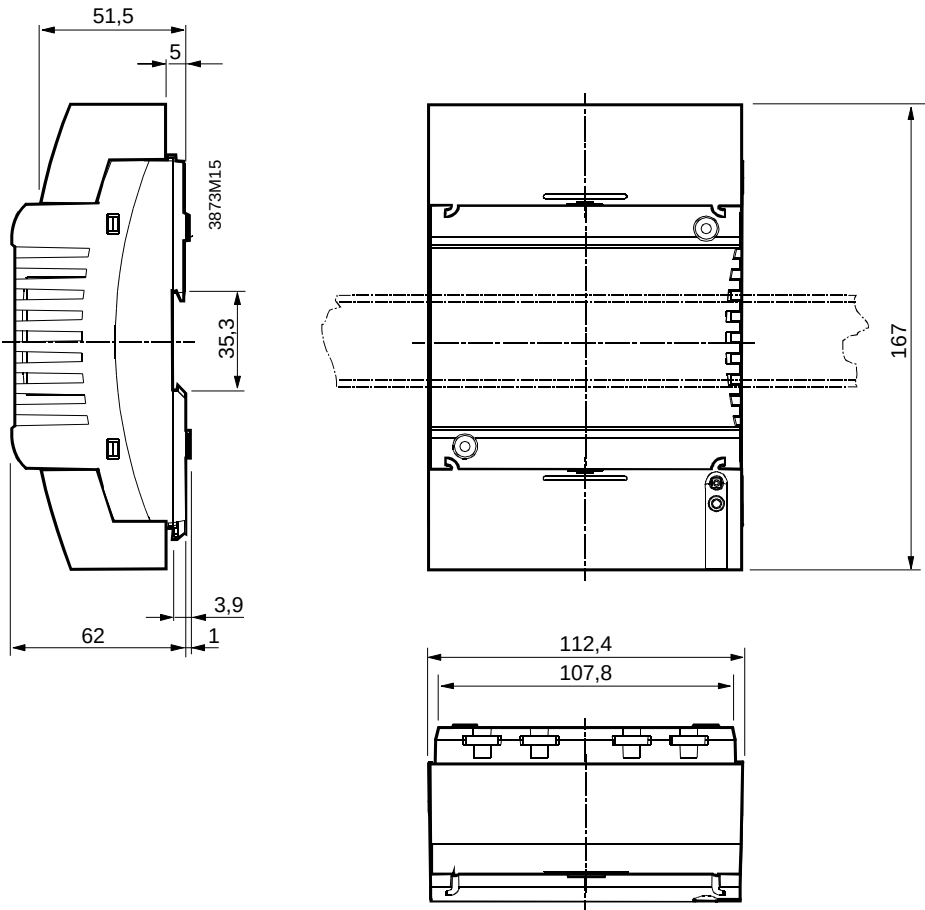
Dimensions

All dimensions in mm

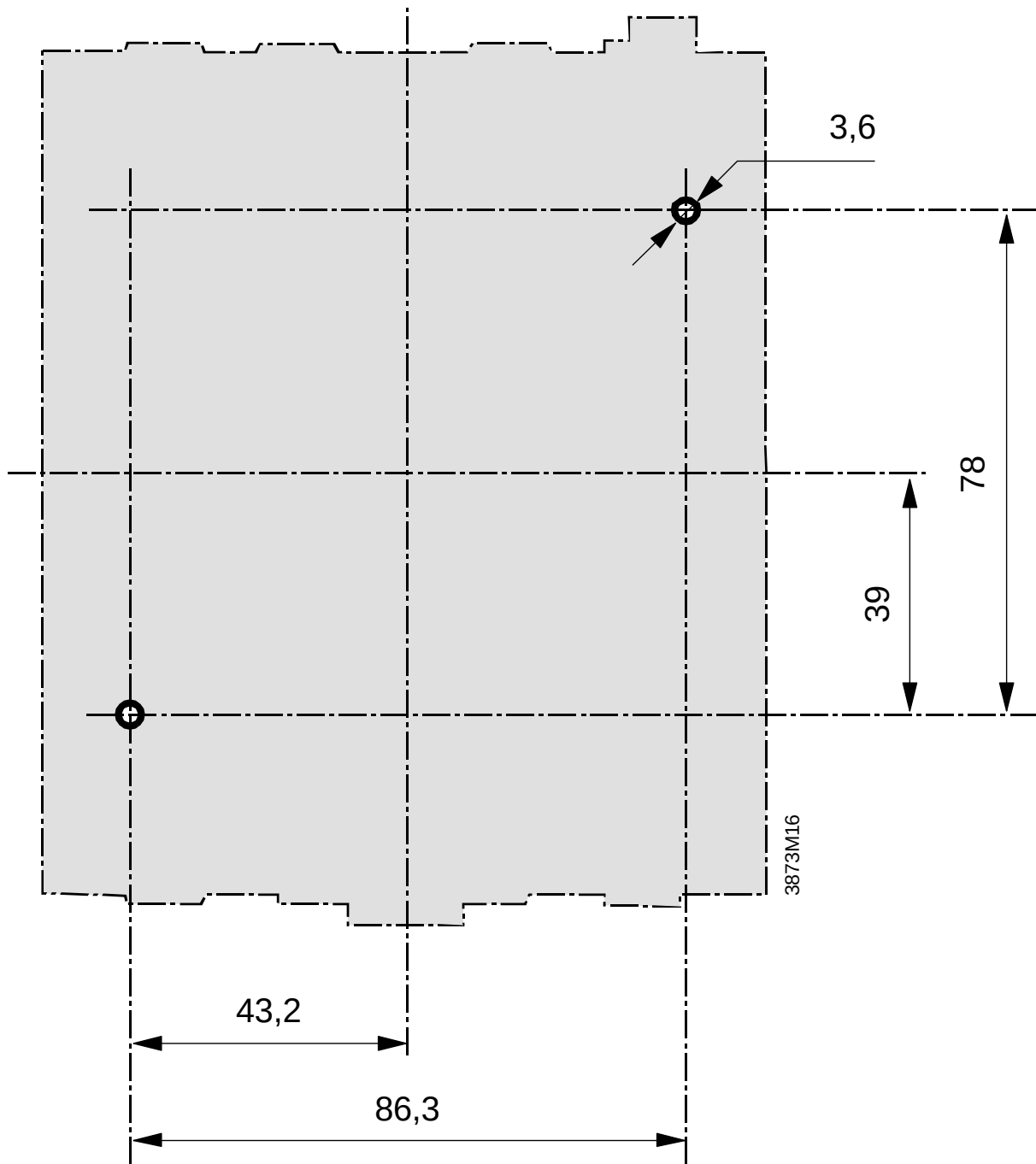
Without terminal covers



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



Drilling diagram 1:1



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