

PCD7.LRxx-P5 Saia PG5[®] programmable room controller

GENERAL

- ▶ Freely programmable using Saia PG5.
- ▶ Mains or 24 VAC supply voltage.
- ▶ Flexible use of relays and Triacs (24 VAC or 230 VAC).
- ▶ 24 VAC supply for field devices.
- ▶ Support of Honeywell Sylk™ wall modules.
- ▶ Smart engineering and commissioning tools reduce the total installation costs.

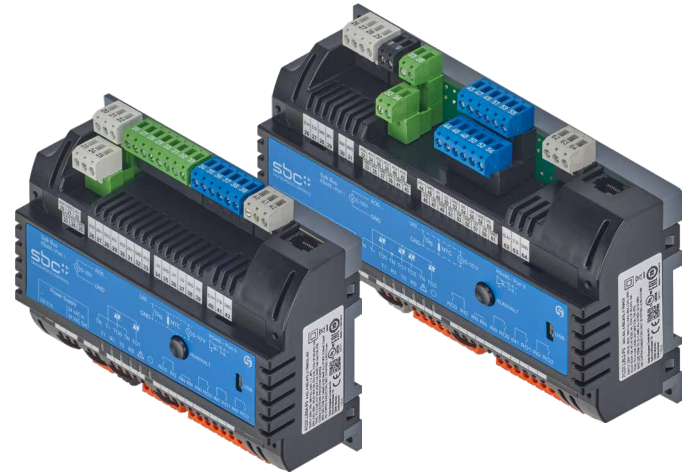


Fig. 1 PCD7.LRxx (without optional covers)

FUNCTIONS

- ▶ Freely programmable using Saia PG5.
- ▶ Two housing dimensions and several different I/O versions for the fulfilment of individual needs.
- ▶ Universal installation options, including connection covers and colour-coded connections.
- ▶ The 230 VAC models offer a 24 VAC auxiliary output voltage, which enables direct connection and feeding of field devices.
- ▶ Two serial S-bus interfaces: S-bus / Modbus RTU
- ▶ Polarity-insensitive two-line bus interface (proprietary record) for the connection of Honeywell Sylk™ wall modules.

SYSTEM OVERVIEW

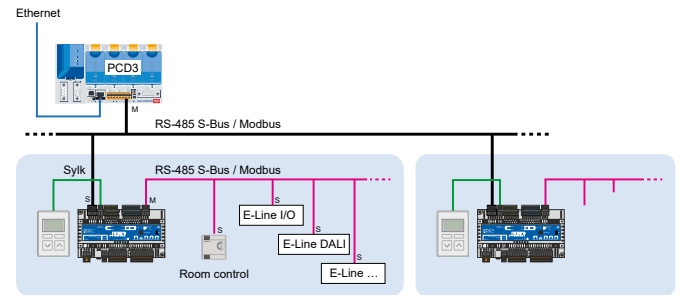


Fig. 2 Example with PCD7.LRL2

Table 1. Model overview

Item number	Housing	Power supply	Analogue outputs (AO)	Universal inputs (UI)	Relay	Triacs (24/230 VAC)	I/O total	Micro USB	2x RS-485	All connections with plug	72 hours data maintenance	24 VAC output for field devices and Triac outputs	Comment
PCD7.LRL2-P5	Large	230 VAC	2	6	4	4	16	x	x	x	x	max. 300 mA	All connections removable
PCD7.LRL4-P5	Large	230 VAC	6	10	4	4	24	x	x	x	x	max. 300 mA	
PCD7.LRL5-P5	Large	24 VAC	6	10	4	4	24	x	x	x	x	max. 600 mA	
PCD7.LRS4-P5	Small	230 VAC	4	4	4	2	14	x	x	x	x	max. 300 mA	
PCD7.LRS5-P5	Small	24 VAC	4	4	4	2	14	x	x	x	x	max. 600 mA	

DIMENSIONS AND INSTALLATION

Housing

The controller is deliverable in two housing sizes in compliance with IP20:

- ▶ **PCD7.LRLx-P5** (large housing):
W × L × H = 110 × 198 × 59 mm
- ▶ **PCD7.LRSx-P5** (small housing):
W × L × H = 110 × 162 × 59 mm

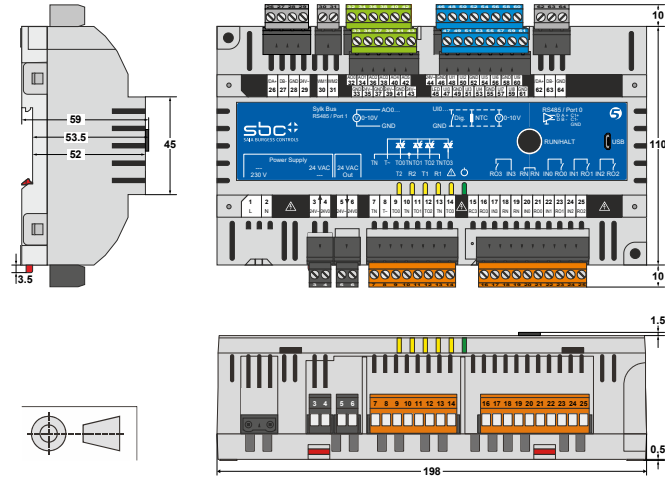


Fig. 3 PCD7.LRLx dimensions (in mm)

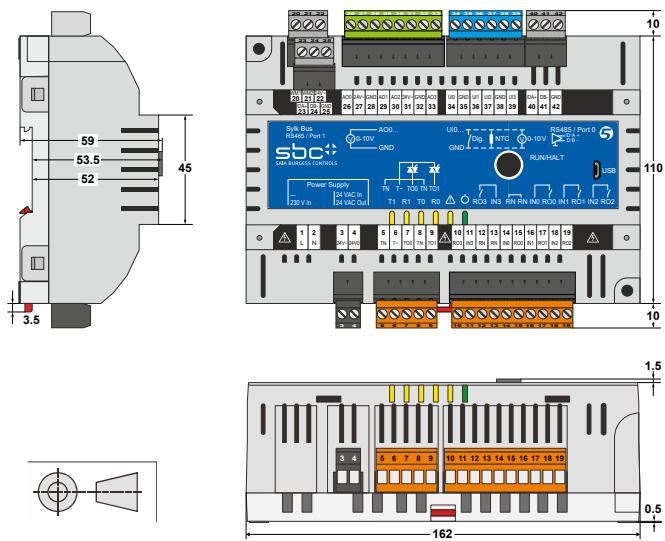


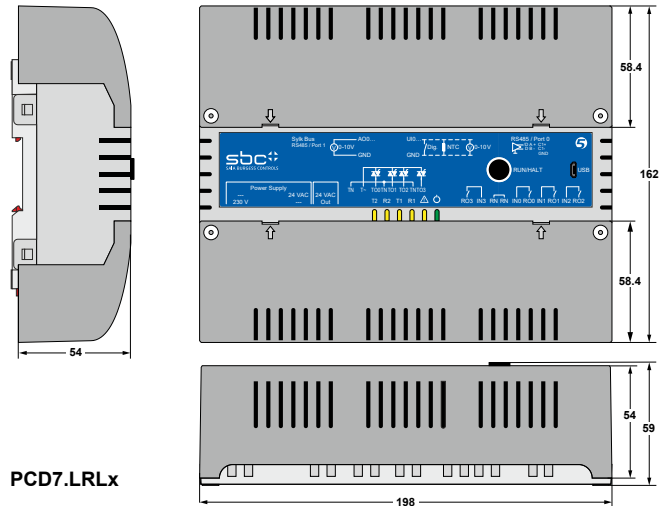
Fig. 4 PCD7.LRSx-P5 dimensions (in mm)

Mounting

The device is suitable for mounting on a standard rail, on walls and in control cabinets or fuse boxes.

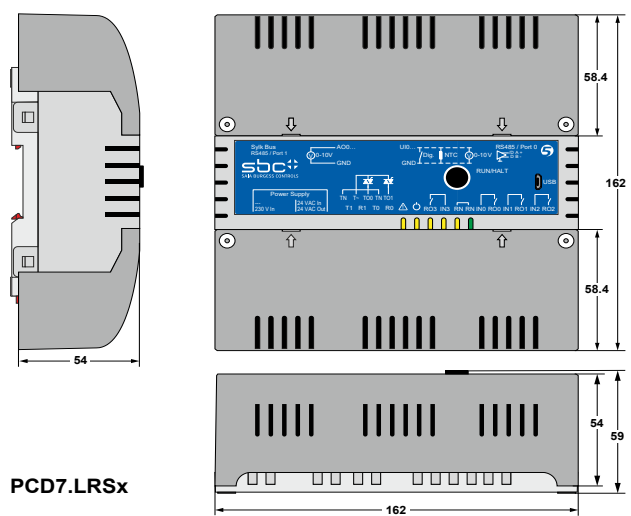
Connection protection covers for IP30

For controllers installed outside a control cabinet, the connection protection covers (bulk packaging with 10 units, order no.: IRM-RLC for large housing and IRM-RSC for small housing) for an IP30 conformity must be installed before connection to the voltage supply of the device.



PCD7.LRLx

Fig. 5 Large housing with connection protection covers, dimensions (in mm)



PCD7.LRSx

Fig. 6 Small housing with connection protection covers, housing (in mm)

CONNECTION OCCUPATION

General

See tables 7 and 8 for a complete list of all connections and their functional descriptions.

Communication interfaces

All the controller models have the following communication interfaces:

- ▶ 1× Sylk™ bus for connection to wall modules
PCD7.LR-TR4x, -TR4x-H, -TR4x-CO2, -TR4x-H-CO2.
- ▶ 2× RS-485 for free use.
- ▶ 1× Micro USB for programming and service.

Table 2. Relay output types and properties

	Type 1 (standard)	Type 2 (high activation current)
According to the relay outputs of RSxx	RO0, RO1, RO2	RO3
Based on the relay outputs of RLxx	RO1, RO2	RO0, RO3
Contact	Closed	Closed
Min. load	5 VAC, 100 mA	24 VAC, 40 mA
Control voltage range	15...253 VAC	15...253 VAC
Permanent load at 250 VAC (cos φ = 1)	4 A	10 A
Permanent load at 250 VAC (cos φ = 0.6)	4 A	10 A
Activation current (20 ms)	---	80 A
Application	Controlling of the light, fan motor	Controlling of the light, fan motor and electric heater

NOTE: The max. sum load of all simultaneous relay flows is 14 A.

Table 3. Triac output types

	Type 3
Designation	TO0 ... TO3
Switching voltage range	15...253 VAC
Max. load	600 mA*
Application	Valve, Light

* To increase the power triac outputs can be connected in parallel.

Table 4. Analog output types and properties

	Type 4	Type 5	Type 6
Output voltage	0...10 V		
Output current	0...1 mA	0...5 mA	0...10 mA
Min. Precision	±150 mV		
Max. ripple	±100 mV		
Precision at zero point	0...200 mV		

Table 5. Universal input types and properties

	Type 7	Type 8	Device-config. *
0...10 V	Yes	Yes	0...10 V
2.5 kΩ	No	Yes	2.5 kΩ
10 kΩ (NTC 10 kΩ)	No	Yes	0...10 kΩ
100 kΩ (NTC 20 kΩ)	Yes	No	0...100 kΩ
PT/Ni 1000	No	Yes	PT/Ni 1000 L&S
Galvanical separated: closed: Resistance < 10 kΩ open: Resistance > 20 kΩ max. 0.2 Hz Pull-up voltage: 10 V	Yes	No	dry contact
Fast binary input (meter) max. 30 Hz: Pulse ON min. 16 ms Pulse OFF min. 16 ms closed: Voltage < 1 V open: Voltage > 5 V	Yes	Yes	digital

* Setting in PG5 (V2.3) Device Configurator

Table 6. Resources

	PCD7.LRLx, PCD7.LRSx
Program memory, DB/text (flash)	128 kB
User memory, DB/text (RAM)	10 kB
Supported RAM and ROM text/DB	100
Flag	0...4049 ^{1), 2)}
Register	0...4049 ^{1), 2)}
Timer/Counter	0...399
Text/DB	100
Interpreted text	No
COB	0 and 1
Available XOBs	10, 12, 13, 16
Number of FBs and PBs per	100
Graftec	No
Flow point arithmetics in accordance with IEEE	Yes
Retrieval of system function (CSF)	few
Real time clock (RTC) with SuperCap	72 hrs

¹⁾ I/O media mapping 4000 ...4049

²⁾ Max. 1000 adjust values can be saved by the FBox Media Backup/Restore.

**Table 7. PCD7.LRSx-P5 room controller:
Overview of connections and functions (by model)**

Connection 2.5mm ²	Imprint	Function	RS4	RS5
1, 2 (4 mm ²)	„L“, „N“	230 V Power supply	×	---
3, 4	„24 V~“, „24V0“	24 V Power supply	---	×
3, 4	„24 V~“, „24V0“	Auxiliary output voltage (24 VAC) for all Triacs	×	---
5, 8	„TN“	Auxiliary connection for a Triac wiring (internally connected)	×	×
6	„T~“	Triac input voltage (24 VAC/230 VAC) for all Triacs	×	×
7	„TO0“	Triac-controlled output	Type 3	Type 3
9	„TO1“	Triac-controlled output	Type 3	Type 3
10, 11	„RO3“, „IN3“	Output to relay 3, input to relay 3	Type 2	Type 2
12, 13	„RN“	Auxiliary connections with a relay wiring (internally connected)	×	×
14, 15	„IN0“, „RO0“	Input of relay 0, output of relay 0	Type 1	Type 1
16, 17	„IN1“, „RO1“	Input of relay 1, output of relay 1	Type 1	Type 1
18, 19	„IN2“, „RO2“	Input of relay 2, output of relay 2	Type 1	Type 1
20, 21	„WM1“, „WM2“	Interface for the Sylk™ bus	×	×
22	„24V~“	24 VAC voltage supply for field devices	×	×
23, 24, 25	„/DA+“, „DB-“, „GND“	RS-485 interface #1, common ground	×	×
26	„AO0“	Analog output 0	Type 5	Type 5
27, 31	„24V~“	24 VAC voltage supply for field devices	×	×
28, 32	„GND“	Common ground	×	×
29	„AO1“	Analog output 1	Type 4	Type 4
30	„AO2“	Analog output 2	Type 4	Type 4
33	„AO3“	Analog output 3	Type 4	Type 4
34	„UI0“	Universal input 0	Type 7	Type 7
35, 38	„GND“	Common ground	×	×
36	„UI1“	Universal input 1	Type 7	Type 7
37	„UI2“	Universal input 2	Type 7	Type 7
39	„UI3“	Universal input 3	Type 7	Type 7
40, 41, 42	„/DA+“, „DB-“, „GND“	RS-485 interface #0, common ground	×	×

Relay output types: See Table 2 | Analog output types: See Table 4 | Universal input types: See Table 5.

Table 8. PCD7.LRLx-P5 room controller: Overview of connections and functions (by model)

Connection 2.5mm ²	Imprint	Function	RL2	RL4	RL5
1, 2 (4 mm ²)	"L", "N"	230 V Power supply	x	x	---
3, 4	"24V~", "24V0"	Removable 24 VAC supply voltage input	---	---	x
5, 6	"24V~", "24V0"	Auxiliary output voltage (24 VAC) for all Triacs	x	x	x
7, 10, 13	"TN"	Auxiliary connection for a Triac wiring (internally connected)	x	x	x
8	"T~"	Triac input voltage (24 VAC/230 VAC) for all Triacs	x	x	x
9	"TO0"	Triac-controlled output	Type 3	Type 3	Type 3
11	"TO1"	Triac-controlled output	Type 3	Type 3	Type 3
12	"TO2"	Triac-controlled output	Type 3	Type 3	Type 3
14	"TO3"	Triac-controlled output	Type 3	Type 3	Type 3
15		not used	---	---	---
16, 17	"RO3", "IN3"	Output to relay 3, input to relay 3	Type 2	Type 2	Type 2
18, 19	"RN"	Auxiliary connection for a relay wiring (internally connected)	x	x	x
20, 21	"IN0", "RO0"	Input of relay 0, output of relay 0	Type 2	Type 2	Type 2
22, 23	"IN1", "RO1"	Input of relay 1, output of relay 1	Type 1	Type 1	Type 1
24, 25	"IN2", "RO2"	Input of relay 2, output of relay 2	Type 1	Type 1	Type 1
26, 27, 28	"/DA+", "DB-", "GND"	RS-485 interface #1, common ground	x	x	x
29	"24V~"	24 VAC voltage supply for field devices	x	x	x
30, 31	"WM1", "WM2"	Interface for the Sylk™ bus	x	x	x
32	"AO0"	Analog output 0	Type 6	Type 6	Type 6
33, 37, 41	"GND"	Common ground	x	x	x
34	"AO1"	Analog output 1	Type 6	Type 6	Type 6
35, 39, 43	"24V~"	24 VAC voltage supply for field devices	x	x	x
36	"AO2"	Analog output 2	---	Type 4	Type 4
38	"AO3"	Analog output 3	---	Type 4	Type 4
40	"AO4"	Analog output 4	---	Type 4	Type 4
42	"AO5"	Analog output 5	---	Type 4	Type 4
44	"24V~"	24 VAC voltage supply for field devices	x	---	---
45	"LED"	Output to LED from PCD7.L632, Q.RCU-A-TSOx and T7460C, E, F	x	---	---
46, 49, 52 55, 58, 61	"GND"	Common ground	x	x	x
47	"UI0"	Universal input 0	Type 7	Type 7	Type 7
48	"UI1"	Universal input 1	Type 7	Type 7	Type 7
50	"UI2"	Universal input 2	Type 7	Type 7	Type 7
51	"UI3"	Universal input 3	Type 7	Type 7	Type 7
53	"UI4"	Universal input 4	Type 7	Type 7	Type 7
54	"UI5"	Universal input 5	Type 7	Type 7	Type 7
56	"UI6"	Universal input 6	---	Type 8	Type 8
57	"UI7"	Universal input 7	---	Type 8	Type 8
59	"UI8"	Universal input 8	---	Type 8	Type 8
60	"UI9"	Universal input 9	---	Type 8	Type 8
62, 63, 64	"/DA+", "DB-", "GND"	RS-485 interface #0, common ground	x	x	x

Relay output types: See Table 2 | Analog output types: See Table 4 | Universal input types: See Table 5.

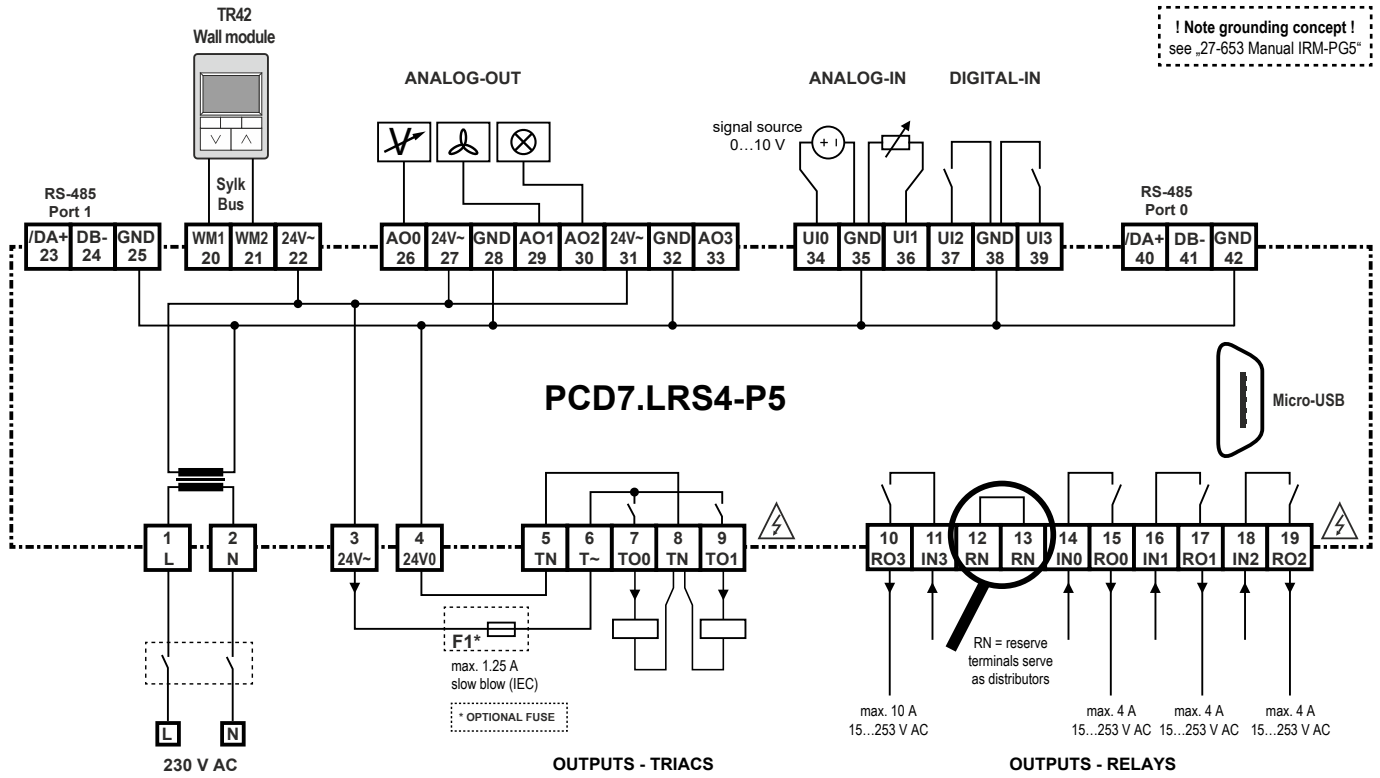


Fig. 7 PCD7.LRSx-P5 example wiring

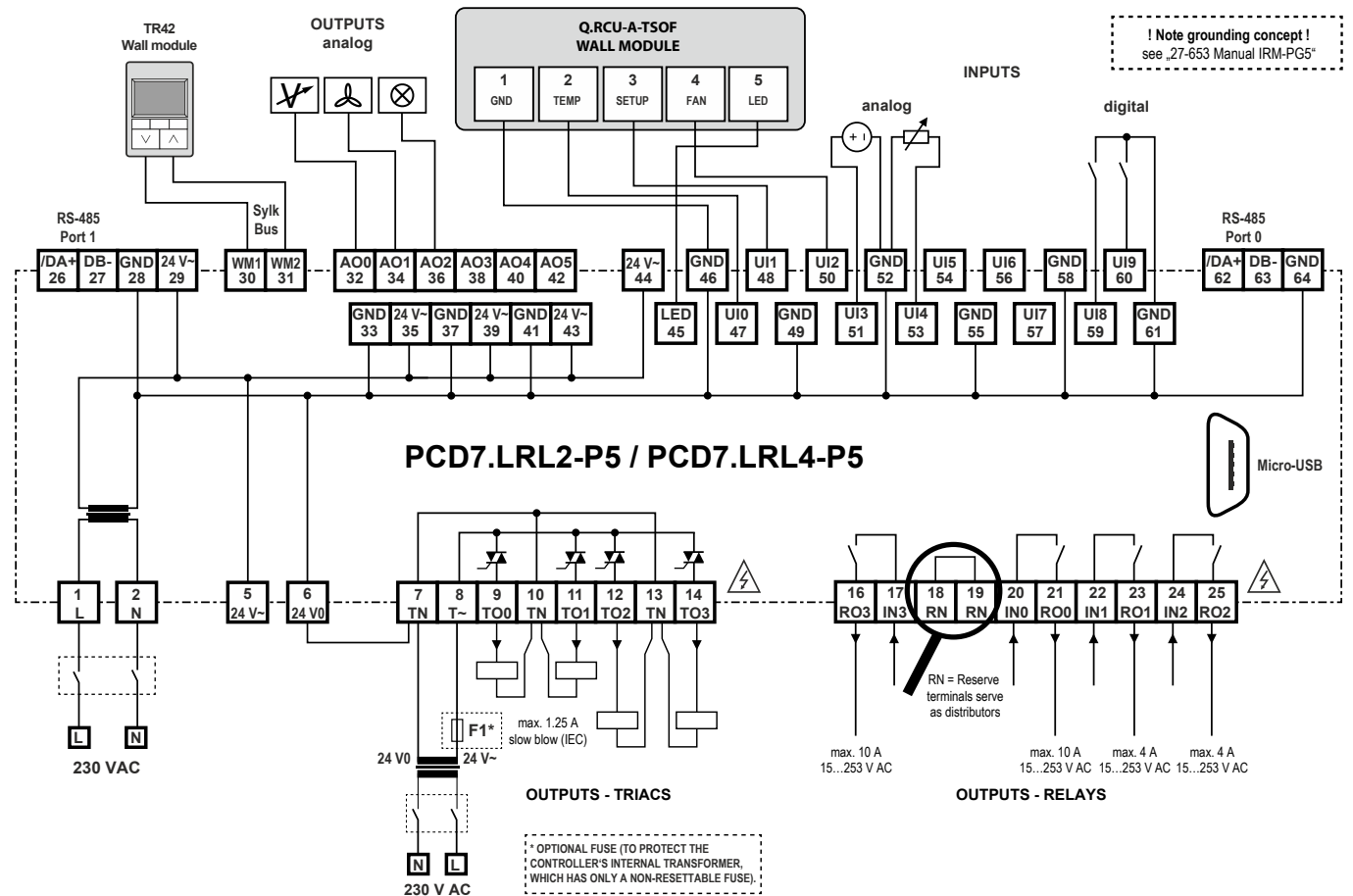


Fig. 8 PCD7.LRL2-P5 / PCD7.LRL4-P5 example wiring

ELECTRICAL DATA

RL2-P5, RL4-P5 and RS4-P5 (230 VAC)

Voltage supply
 via connections 1 + 2:.....230 VAC +10%/–15%, 50/60 Hz.
 Max. Power input (unloaded):.....8 W.
 Max. Power input (loaded):.....18 W.

The controller is “unloaded” when it has no external load. Thus, the only load on the controller is the inherent load (8 W) of the electronics, themselves. The heat dissipation then amounts to 8 W. The controller is “loaded” when – besides the inherent load – an additional sum load of max. 300 mA is applied to the 24 VAC output terminals.

The max. unloaded output voltage at terminals 3 and 4 is 33 VAC (typically 29.5 VAC).

RL5 and RS5 (24 VAC)

Supply voltage
 via connections 3 + 4:.....24 VAC ±20%, 50/60 Hz.
 Max. Power input (unloaded):.....300 mA.
 Max. Power input (loaded):.....900 mA.

The controller is “unloaded” if no external load is active. The heat discharge is 7 W. The controller is “loaded” if an additional sum load of max. **600 mA** is active on the 24 V output connections.

Operation

RUN/STOP button

The controller RUN/STOP button is used to trigger special functions.

→ RUN/HALT

If the RUN/STOP button is pressed during the runtime, the controller switches to STOP. A cold start is carried out when actuating again (fresh program start).

→ Operating system updated

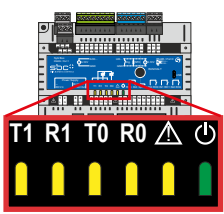
If during start-up of the controller the RUN/STOP button is pressed for under 6 seconds, the controller remains in boot mode (operating system update possible).

→ Controller RESET

If the RUN/STOP button is pressed for between 6 and 10 seconds when starting-up the controller, it is reset into the delivery status (user program and configuration are deleted). Controller switches to RUN mode.

Status display

Table 9. Operating status display by LEDs

#	Function, description	T1	R1	T0	R0	⚠	⏻	
1	Data transmission via the RS-485 interface #1	■/□	–	–	–			
2	Data receipt via the RS-485 interface #1	–	■/□	–	–			
3	Data transmission via the RS-485 interface #0	–	–	■/□	–			
4	Data receipt via the RS-485 interface #0	–	–	–	■/□			
5	Deactivated	–	–	–	–	□	□	
6	RUN (program execution)	–	–	–	–	□	■	
7	STOP (no program execution)	–	–	–	–	■	□	
8	Conditional program execution	–	–	–	–	□	■/□ Flashes = 1Hz	
9	STOP (no program execution)	–	–	–	–	■	■/□ Flashes = 1Hz	
10	FW download	–	–	–	–	□/■ Flashes = 1Hz	■/□ Flashes = 1Hz	
11	RESET / Service key pressed	–	–	–	–	□/■ Flashes = 2Hz	■/□ Flashes = 2Hz	
							□ = LED off ■ = LED on ■/□ = LED flashes	

COMMUNICATION INTERFACES

Table 10. RS-485 interfaces

Design size	Port #0			Port #1		
RLx	/DA+	DB-	GND	/DA+	DB-	GND
Pin	62	63	64	26	27	28
RSx	/DA+	DB-	GND	/DA+	DB-	GND
Pin	40	41	42	23	24	25

The cable length influences the baud rate (Table 11).

Table 11. Baud rate compared to cable length

Baud rate	Max. Cable length (L)
9.6, 19.2, 38.4, 57.6 and 76.8 KBaud/s	1200 m
115.2 KBaud/s	800 m

The standard EIA-485 contains details regarding the max. permissible wire thickness, max. permissible cable length, possible shielding and earthing requirements and the max. number of devices that can be connected to a bus.

Up to 128 PCD7.LRxx-P5 Regler or E-Line modules can be connected on the same RS-485 Bus.

The maximum number of the devices can decrease by other devices. In this case and when there are long cable distances you have to implement a repeater.

At the bus-endings should be attached devices with a termination resistance or a termination box PCD7.T16x.

Wall modules

The Sylk™ bus wall modules PCD7.LR-TR4x, -TR4x-H, -TR4x-CO2, -TR4x-H-CO2 and the conventional PCD7.L63x and Q.RCU-A-Txxx can be used with the controller for room temperature entry, setpoint setting, manual override of the fan speed and occupation.

The Sylk™-Bus is a two-pole bus that is polarity insensitive, he allows communication and supply so that various devices can be used, as for example the mentioned above wall modules, without much of wierinh/-Workingkosto

The length of the Sylk™-Bus can be up to 150m and the connected devices are limited with maximum 4.

I/O CONNECTIONS

Relay outputs



CAUTION

Mixing different voltages (e.g. 24 V and 230 V) within the relay block is not permissible. The colour of the connection blocks for relay outputs of the controller is orange. Relay output types: See Table 2.

NOTE: If inductive components are connected to the relay and if these relays switch more frequently than once every two minutes, these components must be protected against radiation from damaging radio or TV receipt radio disturbances (conformity with EN 45014).

Triac outputs

The colour of the connection blocks for Triac outputs of the controller is orange. These Triac outputs can be configured for a large number of various functions, e. g. for connection with a dimension-free or thermal drive (e.g. with the ROOMUP configuration tool).

NOTE: Recommended fuse (F1): 1.25 A slow blow fuse (IEC): The user must consider the correct voltage and the max. switching power/interruption rate (a mains supply voltage urgently requires a high switching power/interruption rate).

After the configuration of the Triac outputs, the corresponding devices can be connected to them directly.

NOTE: The actuator VC6983 is only intended for use with relay outputs and may not be used in controllers with Triac outputs.

Current restrictions of Triacs

Maximal 0.6 A.

NOTE: A parallel switching of the Triacs is possible.

⚠ CAUTION

The max. permissible output current of all 24 VAC connections is a combined 300 mA! If the Triacs alone are loaded at 300 mA, it is not permitted to connect a load with any of the other 24 VAC output connections.

NOTE: In all other cases, the rule is that if the Triacs are supplied with a current of either 24 VAC or 230 VAC from an external source, 700 mA (peak) and 600 mA (max.), i.e. two to three thermal actuators can be operated in parallel (depending on the power input of the relevant drive).

Universal inputs

The colour of the connection blocks for universal inputs of the controller are blue. Universal input types: See Table 5. The universal inputs are protected against voltages of max. 29 VAC And 30 VDC (e.g. against faulty wiring). Each universal input has a pull-up resistor.

Analog outputs

The colour of the connection blocks for analog outputs of the controller is green. Analog output types: See Table 4. The analog outputs of the controllers RLxx (large housing) are protected against voltages of max. 29 VAC and 30 VDC (e.g. against faulty wiring).

NOTE: The connection of 24 VAC to a random analog output of the controller PCD7.RSxx-P5 (small housing) damages the device.

STANDARDS, CERTIFICATIONS AND APPROVALS

Approvals and certifications

- ▶ CE-certified,
- ▶ FCC part 15 B-conform.
- ▶ EAC

Classification in accordance with EN 60730-1

EN 60730 subsection	EN 60730-2-9	
Ambient conditions	For use in environments in residential buildings (apartment, commercial and light industry)	
Construction	Independently installed electronic controlling unit with pluggable wiring, panel installation on DIN rail	
Action:	Type 1.C	
Pulse rated voltage	230 V circuits:	2500 V
	24 V circuits:	500 V
Pollution degree	2	
Protection against impact loads	Category 0 (without connection cover) category II (with 0)	
Software category	A	

Classification in accordance with EN 60529

(via the protection category provided by the housing) IP20.

For controllers installed outside a control cabinet, the connection protection covers must be installed before connection to the voltage supply of the device. Covers (10 units, bulk packaging, order no.: IRM-RLC for large housings and IRM-RSC for small housings) installed for IP30 conformity.

Ambient conditions

5–95% relative humidity, not condensing

Operating temperature
(floor/ceiling installation):0...40°C
 Operating temperature
(wall/rail installation):0...50°C
 Storage temperature:..... -20...70°C

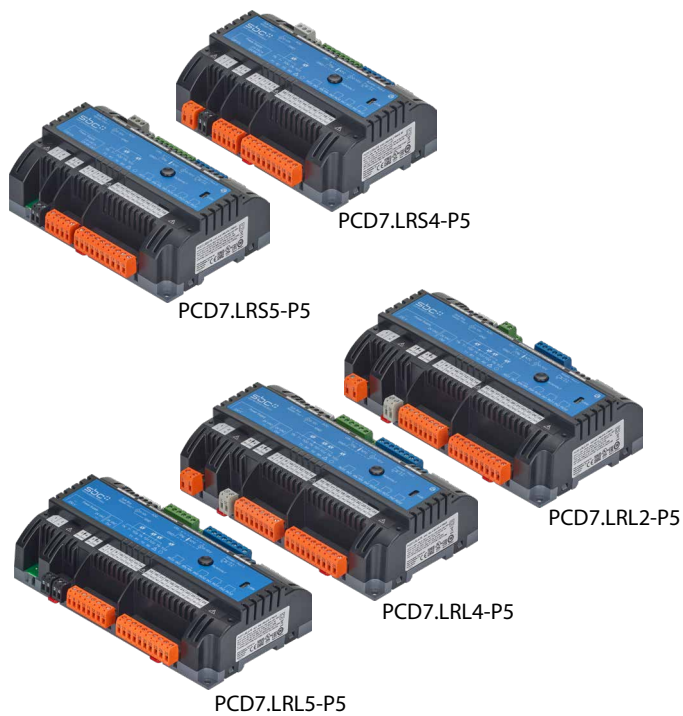
Device variants in the overview

Fig. 9 Deviation variants without connection cover

**WEEE Directive 2012/19/EC Waste Electrical and Electronic Equipment directive**

The product should not be disposed of with other household waste. Check for the nearest authorized collection centers or authorized recyclers. The correct disposal of end-of-life equipment will help prevent potential negative consequences for the environment and human health.

ACCESSORIES**Connection protection cover**

Required for wall installation.

Bulk packaging, set of ten protective packages.

- ▶ For controller PCD7.LRLx-P5, order no.: **IRM-RLC**
- ▶ For controller PCD7.LRSx-P5, order no.: **IRM-RSC**

IRM-RSC (10 covers narrow) to PCD7.LRSx-P5



IRM-RLC (10 covers wide) to PCD7.LRLx-P5



Fig. 10 Two examples with narrow and Wide connection cover

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