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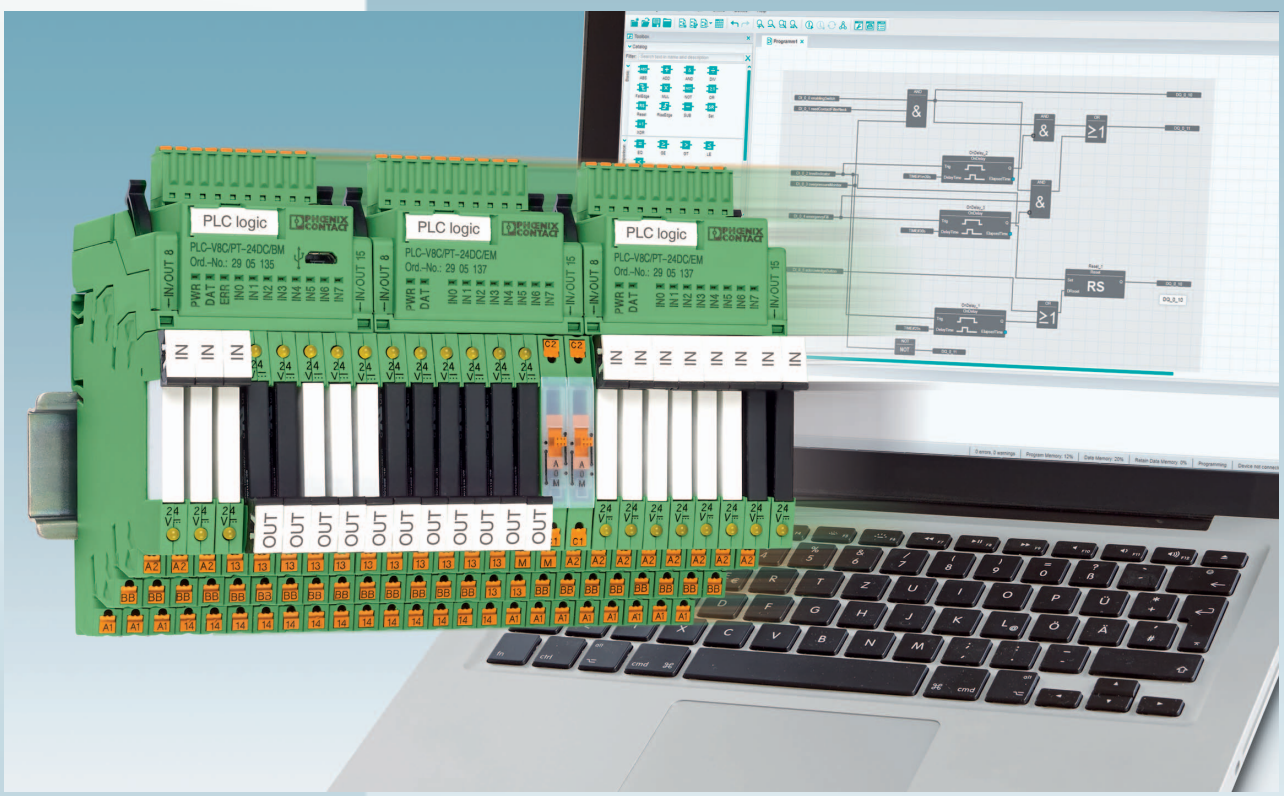

Installing and operating the PLC logic programmable logic relay system

User manual

PHOENIX CONTACT
INSPIRING INNOVATIONS

User manual

Installing and operating the PLC logic programmable logic relay system

2016-12-15

Designation: UM EN PLC logic

Revision: 01

Order No.: —

This user manual is valid for:

Designation	Order No.
PLC-V8C/SC-24DC/BM	2903094
PLC-V8C/PT-24DC/BM	2905135
PLC-V8C/SC-24DC/BM2	2907447
PLC-V8C/PT-24DC/BM2	2907446
PLC-V8C/SC-24DC/EM	2903095
PLC-V8C/PT-24DC/EM	2905137
PLC-V8C/SC-24DC/SAM	2905082
PLC-V8C/PT-24DC/SAM	2905136
PLC-V8C/SC-24DC/SAM2	2907445
PLC-V8C/PT-24DC/SAM2	2907443
LOGIC+ software	
PLC logic app software	

Please observe the following notes

User group of this manual

The use of products described in this manual is oriented exclusively to:

- Qualified electricians or persons instructed by them, who are familiar with applicable standards and other regulations regarding electrical engineering and, in particular, the relevant safety concepts.
- Qualified application programmers and software engineers, who are familiar with the safety concepts of automation technology and applicable standards.

Explanation of symbols used and signal words

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety measures that follow this symbol to avoid possible injury or death.

There are three different categories of personal injury that are indicated with a signal word.

DANGER This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

This symbol together with the signal word **NOTE** and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.

This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

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Table of contents

1 Overview of PLC logic

1.1 Quick finder

Here you will find an overview of frequently used information regarding your PLC logic relay system.

Table 1-1 Frequently used information

Access data	Default access data (see “Login” on page 53) User name: admin Password: admin Change the password during startup.
Initial startup	PWR and ERR LED flash during initial startup: The logic module is in stop mode, as a program has not been downloaded yet.
Call the web server	Connect the device and enter either of the following addresses in a standard browser: http://v8c_usb or 169.254.200.9 The following ports must be enabled by the firewall for the connection to the logic module: TCP 41100 UDP 137, 138, 139
Set the time	Connect the device and access the device via the web server, “Configuration, Realtime clock” menu item (see “Realtime clock” on page 55)
Analog values	All analog values are scaled to the 0 ... 1000 value range in the LOGIC+ software.
Installation of the PLC logic communication driver for the PC	For details regarding installation, see “Connection to the PC” on page 49
Support request via e-mail	plclogic-service@phoenixcontact.com

1.2 What is PLC logic?

The PLC logic programmable logic relay system consists of PLC-V8C logic modules, electromechanical relays, solid-state relays or analog terminal blocks from the PLC-INTERFACE series, and the LOGIC+ programming software.

The PLC-V8C logic modules together with the narrow 6.2 mm PLC-INTERFACE terminal blocks form a microcontroller which performs small automation tasks and replaces conventional switching and control devices, all without any extensive programming knowledge being required.

1.3 How does PLC logic work?

With eight fixed inputs and a further eight freely configurable I/O channels with electromechanical relays, solid-state relays or analog terminal blocks from the PLC-INTERFACE series, the system has a modular design and can process a maximum of 48 I/O signals with two PLC-V8C extension modules. Each of the freely configurable I/O channels can be configured as an input or output.

PLC logic is configured and programmed using the “LOGIC+” software. The software can be downloaded free of charge at phoenixcontact.net/products.

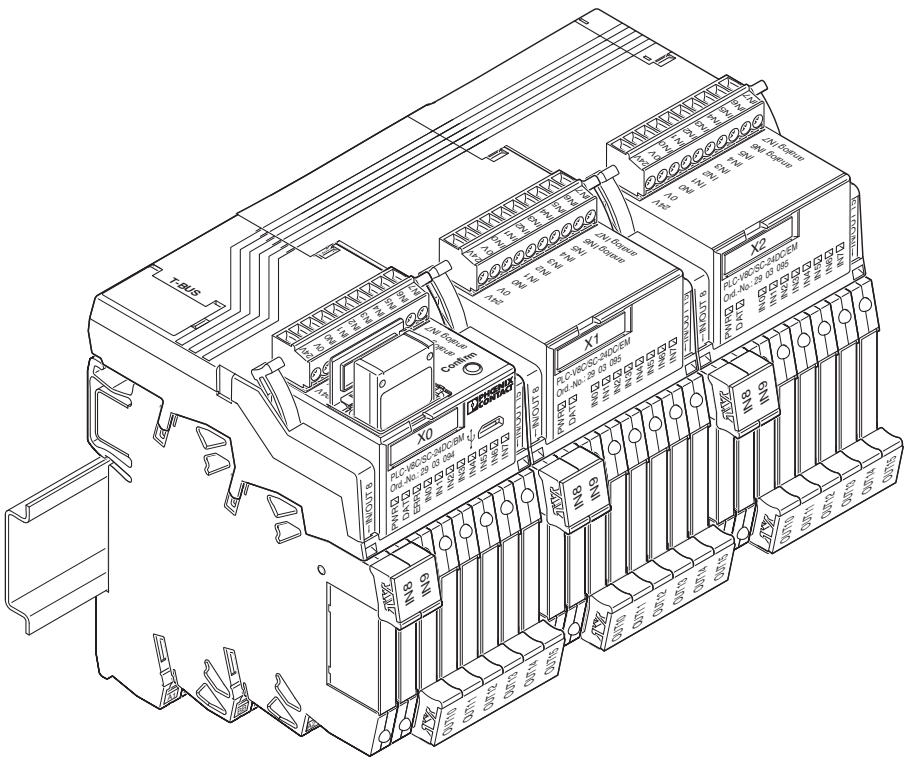

Figure 1-1 Entire system

1.4 What can PLC logic be used for?

PLC logic handles tasks in industrial, system, and installation technology as well as laboratory and training applications. Typical applications are listed in the table below.

Table 1-2 Possible applications

Application	Example
Applications with time functions	Switch-on/switch-off delay, weekly timer, pulse stretching, flashing relay
Small machines	Drives, pumps, valves, compressors, exhaust and filter systems, mixing machines, dosing machines
Handling equipment	Conveyors, lifting tables, freight elevators, silos, feeding systems
Heating, ventilation, air conditioning	Fans, cooling, heating, air conditioning systems
Building automation	Doors, barriers, shutters and blinds, sprinklers, lighting control systems
Other applications	Signaling systems (e.g., construction sites), alarm systems

2 Hardware description

The PLC-V8C logic modules are inserted in the bridge shafts of eight PLC-INTERFACE terminal blocks mounted side by side on a DIN rail. All logic modules feature the following:

– Eight integrated digital inputs: two of which can be configured as analog inputs (0 V ... 10 V)
– Connection via connector with screw or Push-in connection technology
– Programming possible using the LOGIC+ software

The following PLC-V8C types are available:

PLC-V8C stand-alone modules

Order No.	Designation
2905082	PLC-V8C/SC-24DC/SAM with screw connection
2905136	PLC-V8C/PT-24DC/SAM with Push-in connection

– Stand-alone logic module with 16 I/Os, cannot be extended
– Connection to PC via micro USB socket
– Integrated realtime clock
– Accommodates external IFS-CONFSTICK memory module
– A further eight channels can be configured with corresponding PLC-INTERFACE terminal blocks as digital inputs or outputs

PLC-V8C stand-alone modules 2

Order No.	Designation
2907445	PLC-V8C/SC-24DC/SAM2 with screw connection
2907443	PLC-V8C/PT-24DC/SAM2 with Push-in connection

– Stand-alone logic module with 16 I/Os, cannot be extended
– Connection to PC via micro USB socket
– Integrated realtime clock
– Accommodates external IFS-CONFSTICK memory module
– A further eight channels can be configured with corresponding PLC-INTERFACE terminal blocks as digital or analog inputs or outputs

PLC-V8C basic modules

Order No.	Designation
2903094	PLC-V8C/SC-24DC/BM with screw connection
2905135	PLC-V8C/PT-24DC/BM with Push-in connection

- Basic logic module with 16 I/Os, can be extended with a maximum of two extension modules (PLC-V8C.../EM) to 48 I/Os
- Connection to PC via micro USB socket
- Integrated realtime clock
- Accommodates external IFS-CONFSTICK memory module
- A further eight channels can be configured with corresponding PLC-INTERFACE terminal blocks as digital inputs or outputs
- Optional connection to Interface system gateways

PLC-V8C basic modules 2

Order No.	Designation
2907447	PLC-V8C/SC-24DC/BM2 with screw connection
2907446	PLC-V8C/PT-24DC/BM2 with Push-in connection

- Basic logic module with 16 I/Os, can be extended with a maximum of two extension modules (PLC-V8C.../EM) to 48 I/Os
- Connection to PC via micro USB socket
- Integrated realtime clock
- Accommodates external IFS-CONFSTICK memory module
- A further eight channels can be configured with corresponding PLC-INTERFACE terminal blocks as digital or analog inputs or outputs
- Optional connection to Interface system gateways

PLC-V8C extension modules

Order No.	Designation
2903095	PLC-V8C/SC-24DC/EM with screw connection
2905137	PLC-V8C/PT-24DC/EM with Push-in connection

Extension logic module with 16 I/Os, for extending the basic module

The following PLC-INTERFACE terminal blocks can be connected to PLC-V8C.

Each channel can be configured as an input or output using the LOGIC+ software.

Table 2-1 Corresponding PLC-INTERFACE terminal blocks

Type	Order designation	Order No.	Order designation	Order No.
	Push-in connection		**Screw connection**	
Relay output				
1 changeover contact, 6 A, 250 V AC/DC	PLC-RPT-24DC/21	2900299	PLC-RSC-24DC/21	2966171
1 changeover contact, 50 mA, 36 V DC, gold contact	PLC-RPT-24DC/21AU	2900306	PLC-RSC-24DC/21AU	2966265
1 N/O contact, 6 A, 250 V AC/DC, actuator type	PLC-RPT-24DC/1/ACT	2900312	PLC-RSC-24DC/1/ACT	2966210
1 N/O contact with switch, 6 A, 250 V AC/DC	PLC-RPT-24UC/1/S/H	2900328	PLC-RSC-24UC/1/S/H	2982236
Solid-state relay output				
100 mA, 3 V DC ... 48 V DC	PLC-OPT-24DC/48DC/100	2900352	PLC-OSC-24DC/48DC/100	2966728
3 A, 3 V DC ... 33 V DC	PLC-OPT-24DC/24DC/2	2900364	PLC-OSC-24DC/24DC/2	2966634
750 mA, 24 V AC ... 253 V AC	PLC-OPT-24DC/230AC/1	2900369	PLC-OSC-24DC/230AC/1	2967840
3 A, 3 V DC ... 33 V DC, actuator type	PLC-OPT-24DC/24DC/2/ACT	2900376	PLC-OSC-24DC/24DC/2/ACT	2966676
750 mA, 24 V AC ... 253 V AC, actuator type	-	-	PLC-OSC-24DC/230AC/1/ACT	2967947
1 A, 12 V DC ... 300 V DC	PLC-OPT-24DC/300DC/1	2900383	PLC-OSC-24DC/300DC/1	2980678
10 A, 3 V DC ... 33 V DC	PLC-OPT-24DC/24 DC/10/R	2900398	PLC-OSC-24DC/24DC/10/R	2982702
500 mA, 3 V DC ... 48 V DC, electronic changeover contact	PLC-OPT-24DC/48DC/500/W	2900378	PLC-OSC-24DC/48DC/500/W	2980636
TTL, 50 mA, 5 V DC	PLC-OPT-24DC/TTL	2900363	PLC-OSC-24DC/TTL	2982728
Analog input				
0 V … 10 V, 2 V … 10 V, 0 mA … 20 mA, 4 mA … 20 mA	PLC-APT-UI-IN	2906917	PLC-ASC-UI-IN	2906916
-50°C … 200°C	PLC-APT-PT100-IN	2906919	PLC-ASC-PT100-IN	2906918
Relay input				
24 V DC	PLC-RPT-24DC/1AU/SEN	2900313	PLC-RSC-24DC/1AU/SEN	2966317
120 V AC/DC	PLC-RPT-120UC/1AU/SEN	2900314	PLC-RSC-120UC/1AU/SEN	2966320
230 V AC/DC	PLC-RPT-230UC/1AU/SEN	2900315	PLC-RSC-230UC/1AU/SEN	2966333
5 V DC (basic terminal block without relay)	PLC-BSC- 5DC/ 1/SEN	2980267	-	-
Relay for 5 V DC basic terminal block	REL-MR-4,5DC/21AU	2961370	-	-
Solid-state relay input				
24 V DC	PLC-OPT-24DC/V8C/SEN	2908172	PLC-OSC-24DC/V8C/SEN	2908173
120 V AC/DC	PLC-OPT-120UC/V8C/SEN	2908174	PLC-OSC-120UC/V8C/SEN	2908175
230 V AC/DC	PLC-OPT-230UC/V8C/SEN	2908176	PLC-OSC-230UC/V8C/SEN	2908177
Analog output				
0 V … 10 V, 2 V … 10 V, 0 mA … 20 mA, 4 mA … 20 mA	PLC-APT-UI-OUT	2906921	PLC-ASC-UI-OUT	2906920
Dummy or reserve				
Basic terminal blocks output	PLC-BPT-24DC/21	2900445	PLC-BSC-24DC/21	2966016
Basic terminal blocks input	PLC-BPT-24DC/1/SEN	2900262	PLC-BSC-24DC/1/SEN	2966061

2.1 Hardware configuration examples

2.1.1 10 inputs, 6 outputs

Inputs	24 V DC via eight integrated inputs and two PLC-INTERFACE inputs via relays
Outputs	Via six PLC-INTERFACE relays, 1 N/O contact, 250 V AC/6 A
Connection technology	Screw connection
Required components	1x PLC-V8C/SC-24DC/SAM (Order No. 2905082) 2x PLC-RSC-24DC/1AU/SEN (Order No. 2966317) 6x PLC-RSC-24DC/1/ACT (Order No. 2966210)

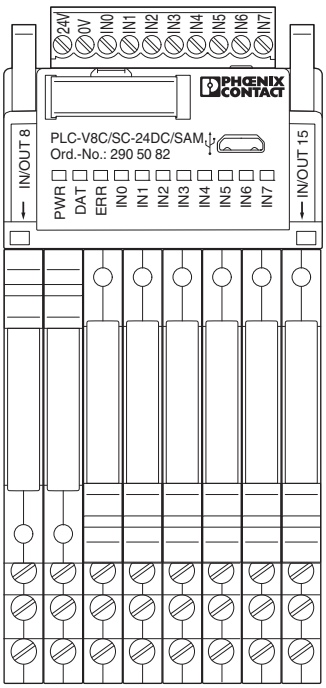

Figure 2-1 Configuration with 10 inputs, 6 outputs

2.1.2 8 inputs, 8 outputs

Inputs	All 24 V DC inputs via eight integrated inputs
Outputs	All outputs via PLC-INTERFACE relays, 1 changeover contact, 250 V AC/6 A
Connection technology	Screw connection
Required components	1x PLC-V8C/SC-24DC/SAM (Order No. 2905082) 8x PLC-RSC-24DC/21 (Order No. 2966171)

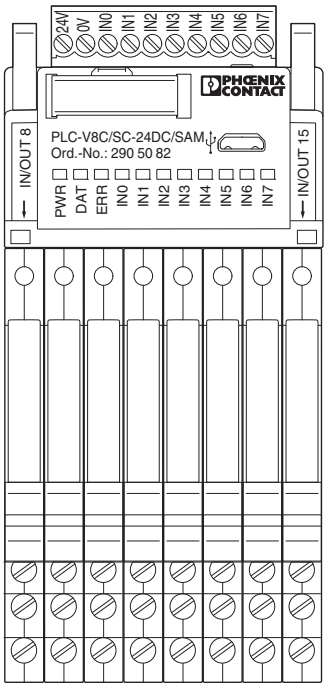

Figure 2-2 Configuration with 8 inputs, 8 outputs

2.1.3 20 inputs, 12 outputs

Inputs	16 24 V DC inputs via 2x eight integrated inputs and four 230 V AC inputs via PLC-INTERFACE relays
Outputs	12 outputs via PLC-INTERFACE solid-state relays, 230 V AC/750 mA
Connection technology	Screw connection
Required components	1x PLC-V8C/SC-24DC/BM (Order No. 2903094) 1x PLC-V8C/SC-24DC/EM (Order No. 2903095) 4x PLC-RSC/230UC/1AU/SEN (Order No. 2966333) 12x PLC-OSC-24DC/230AC/1/ACT (Order No. 2967947)

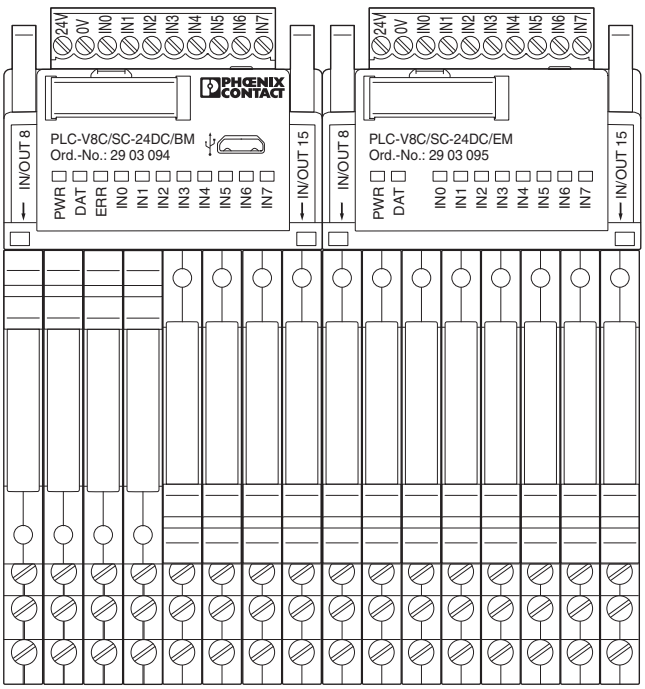

Figure 2-3 Configuration with 20 inputs, 12 outputs

3 Installing PLC logic

The logic module is supplied together with a packing slip with installation instructions. Read the complete packing slip carefully before installing the logic module.

NOTE: Electrostatic discharge

The logic module contains components that can be damaged or destroyed by electrostatic discharge. When handling the logic module, observe the necessary safety precautions against electrostatic discharge (ESD) according to EN 61340-5-1 and IEC 61340-5-1.

NOTE: Risk of damage to equipment

To avoid possible damage to the logic module, unpack and pack the logic module in accordance with the ESD regulations.

3.1 Connection and operating elements

3.1.1 Stand-alone logic modules

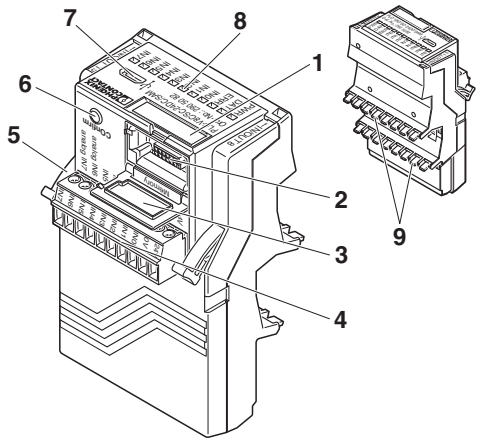

Figure 3-1 Connection and operating elements of stand-alone logic modules

1. Equipment marking label
2. Socket for memory module (Memory)
3. Cover for memory module
4. 10-pos. COMBICON connector
5. Eject lever
6. Confirmation button (Confirm)
7. Micro USB socket
8. Status LEDs
9. Contacts for PLC-INTERFACE terminal blocks

3.1.2 Basic logic modules

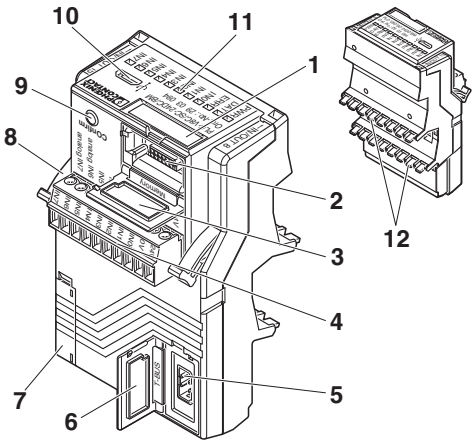

Figure 3-2 Connection and operating elements of basic logic modules

1. Equipment marking label
2. Socket for memory module (Memory)
3. Cover for memory module
4. 10-pos. COMBICON connector
5. DIN rail connector connection
6. DIN rail connector cover (T-BUS)
7. Covering hood and socket contacts for the extension module
8. Eject lever
9. Confirmation button (Confirm)
10. Micro USB socket
11. Status LEDs
12. Contacts for PLC-INTERFACE terminal blocks

3.1.3 Extension logic modules

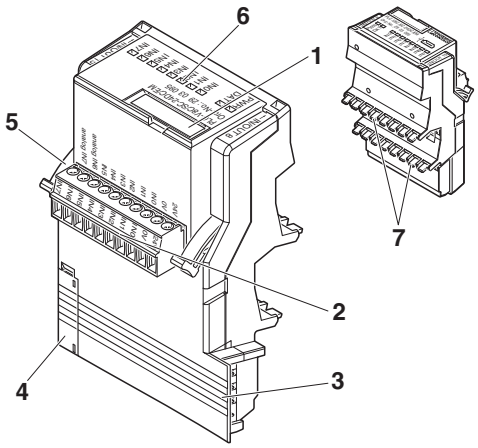

Figure 3-3 Connection and operating elements of extension logic modules

1. Equipment marking label
2. 10-pos. COMBICON connector
3. Knife contacts of extension modules
4. Covering hood and socket contacts for the extension module
5. Eject lever
6. Status LEDs
7. Contacts for PLC-INTERFACE terminal blocks

3.1.4 PLC-INTERFACE terminal blocks

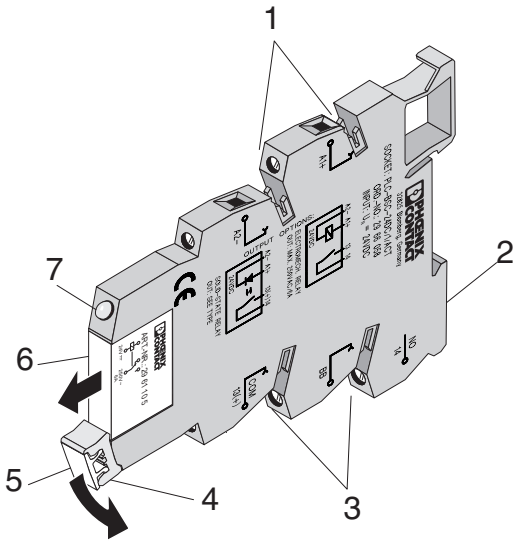

Figure 3-4 Connection and operating elements of PLC-INTERFACE terminal blocks

1. Contacts to accommodate the logic module
2. PLC-B... basic terminal block
3. Contact for plug-in bridge system
4. Snap-in lever for securing and ejecting the function electronics
5. Optional ZB 6 equipment marking label
6. Plug-in function electronics
7. LED status indicator

3.2 Diagnostics and status indicators

The device is equipped with 11 LED status or diagnostics indicators, from which the operating state can be read.

Table 3-1 Diagnostic and status indicators

	Basic module				Extension module		
	Green PWR LED	Green DAT LED	Red ERR LED	Yellow YE LED	Green PWR LED	Green DAT LED	Yellow YE LED
Messages							
Supply voltage not present	●	●	●	●	●	●	●
Supply voltage OK, program running, no data traffic to the extension module	○	●	●	●	○	●	●
Supply voltage OK, program running, data traffic to the extension module	○	●	●	●	○	○	●
Supply voltage OK, controller in stop mode	☼	●	☼	●	○	●	●
Supply voltage OK, connection to the extension module interrupted or error when saving retain variables	☼	●	☼	●	●	●	●
Supply voltage OK, firmware update of basic module running	○	☼	●	●	○	●	●
Supply voltage OK, firmware update of extension module running	○	●	●	●	○	☼	●
Supply voltage OK, internal error at basic module	○	●	○	●	○	●	●
Supply voltage OK, external error	○	●	☼	●	○	●	●
Supply voltage OK, short circuit at PLC outputs or overload error at basic or extension module	○	●	☼	●	○	●	●
Digital inputs							
Supply voltage OK, input at basic module, extension module controlled	○	●	●	○	○	●	○
Supply voltage OK, input at basic module, extension module not controlled	○	●	●	●	○	●	●
Memory stick							
Supply voltage OK, copying new program to the memory stick	○	☼	●	●	○	●	●
Supply voltage OK, finished copying	○	●	●	●	○	●	●
Supply voltage OK, new program on the memory stick	○	☼	☼	●	○	●	●
Supply voltage OK, error when handling the memory stick	○	☼	☼	●	○	●	●
IFS gateway							

Table 3-1 Diagnostic and status indicators [...]

	Basic module				Extension module		
	Green PWR LED	Green DAT LED	Red ERR LED	Yellow YE LED	Green PWR LED	Green DAT LED	Yellow YE LED
Supply voltage OK, data traffic to the IFS gateway	○	○	●	●	○	●	●
Supply voltage OK, data traffic to the IFS gateway, data traffic to the extension module	○	○	●	●	○	○	●
Supply voltage OK, no data traffic to the IFS gateway, no data traffic to the extension module	☼	●	☼	●	○	●	●
Supply voltage OK, data traffic to the IFS gateway, connection to the extension module interrupted	☼	○	☼	●	●	●	●
Supply voltage OK, data traffic to the IFS gateway, controller in stop mode	☼	○	☼	●	○	●	●

Table 3-2 Explanation of the symbols

Symbol	Description
●	LED is off
○	LED is on
☼	LED is flashing
☼	LED is flashing quickly