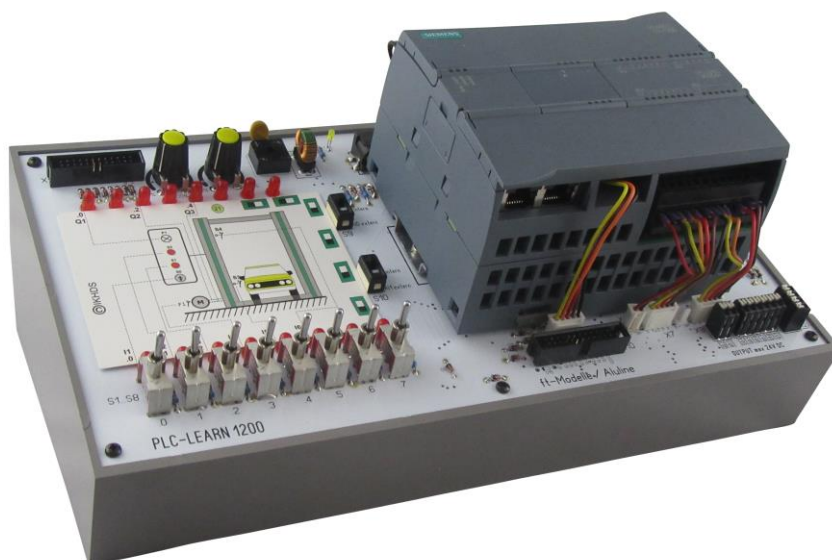


PLC-Learn 1200

Instruction manual



Last update: 15.05.2019

content

1 Foreword	3
2 Safety Instructions	4
3 Scope of delivery	5
4 Description	5
5 Basic equipment Details	7
6 Safety Instructions	8
7 Connections	12
7.1 Connections on the PLC-Trainer 1200	13
8 Plug-in power supply	16
9 Software Installation	16
10 Edit sample project	
11 Teachware	16

1 Foreword

Purpose of the operating instructions

The S7-1200 family comprises various programmable logic controllers (PLCs) with which you can solve a wide range of automation tasks. The S7-1200's compact design, expandability, affordable price and powerful instruction set make it ideal for a wide variety of control applications. The S7-1200 versions and the versatile programming options under Windows offer you extremely high flexibility when implementing your automation solutions.

This manual provides information on how to connect the PLC-Learn 1200 Trainer to a PC and how to install and program S7-1200 controllers and is intended for apprentices, skilled workers, foremen, technicians, engineers, programmers and maintenance personnel with general knowledge of automation systems.

Required basic knowledge

In order to work with this manual, you need general knowledge of automation and programmable logic controllers. Umfang des Handbuchs

This manual applies to the PLC-Learn 1200 in conjunction with

STEP 7 Basic Vxxx and the Siemens product series S7-1200.

Service & Support

In addition to our documentation offer, we offer you our technical know-how on the Internet:

<http://www.kaftan-media.com>

If you have technical questions, need training, or would like to order the PLC-Learn 1200 in conjunction with S7-1200 products, please contact us:

IKH Didactic Systems UG / KAFTAN-media

Heuberg 10

91781 Weissenburg

2 Safety instructions

warning concept

This book contains instructions that you must follow for your personal safety and to avoid damage to property. The information on your personal safety is highlighted by a warning triangle, information on only material damage is without a warning triangle. Depending on the hazard level, the warning notices are displayed in descending order as follows.



DANGER

means that death or serious injury will result if the appropriate precautions are not taken.



DANGER

means that death or serious injury will result if the appropriate precautions are not taken.



CAUTION

with warning triangle means that a slight bodily injury may occur if the appropriate precautions are not taken.

CAUTION

without a warning triangle means that property damage may occur if the appropriate precautions are not taken.

ATTENTION

means that an undesirable result or condition can occur if the corresponding note is not observed.



NOTE

is important information about the product, the handling of the product or the respective part of the documentation to which special attention should be paid.

Qualified personnel

The associated device/system may only be set up and operated in conjunction with this documentation. Commissioning and operation of a device/system may only be carried out by qualified personnel. Qualified personnel within the meaning of the safety information in this documentation are persons who are authorized to commission, ground and label devices, systems and circuits in accordance with the standards of safety engineering.

3 Scope of delivery

1 PLC-Trainer 1200 IKH Didactic Systems / KAFTAN-media

Optionally with/without SIMATIC S7-1200 CPU 1214C DC/DC/DC or 1215C DC DC DC Nominal 24V DC

1 plug-in power supply International 230V AC / 24V DC, 750mA

32 learning cards 110 x 81mm laminated in transparent box

1 DVD-ROM KAFTAN-media Teachware with 32 practical tasks and solutions according to the learning cards

4 Description

Functions of the PLC Trainer 1200

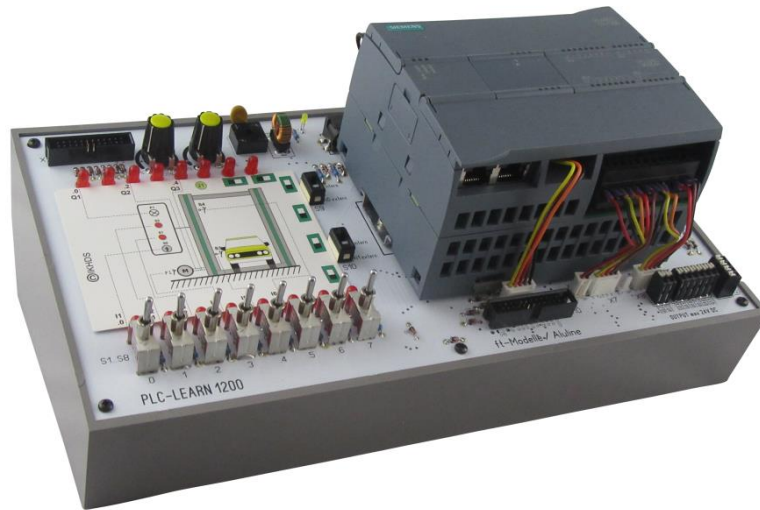


Bild 1: PLC-Learn 1200

The training device PLC-learn 1200 consists of a shapely and compact plastic housing. On the front side there is a support surface for learning cards with a size of 111 x 82 mm. By simply exchanging the laminated flashcards and the associated teachware, up to 32 practical examples (using 32 flashcards) can be tested. Furthermore, it is possible to supply input signals of 24 V DC to the CPU via 2 mm sockets or via push/latch switches.

Basic equipment:

Power supply socket 24 V DC / 0.75 A, voltage indication via 3mm LED green

14 digital inputs: 8 inputs are routed to push/latch switches, status indication via LED red

8 inputs are routed to spring-loaded terminals for external signal input +24V DC

It is possible to connect a frequency generator e.g. up to 10KHz with a pulse output voltage of 15...24V max. for testing fast counter inputs.

The fast counting inputs are required for positioning tasks.

10 inputs are diode-decoupled from the 26-pin "ft models /Aluline" connector.

8 inputs are diodes - decoupled and routed to the 24-pin "Plug-On-Module" tub connector

10 digital outputs 8 outputs, status indication via LED red

8 outputs are connected to spring-loaded terminals for the control of external actuators, e.g. relays, contactors, indicator lights etc.

10 outputs are routed to the 26-pin "ft models" tub connector.

8 outputs are routed to the 24-pin "Plug-On-Module" connector.

Analog input/output 7 spring-loaded terminals for external analog signals

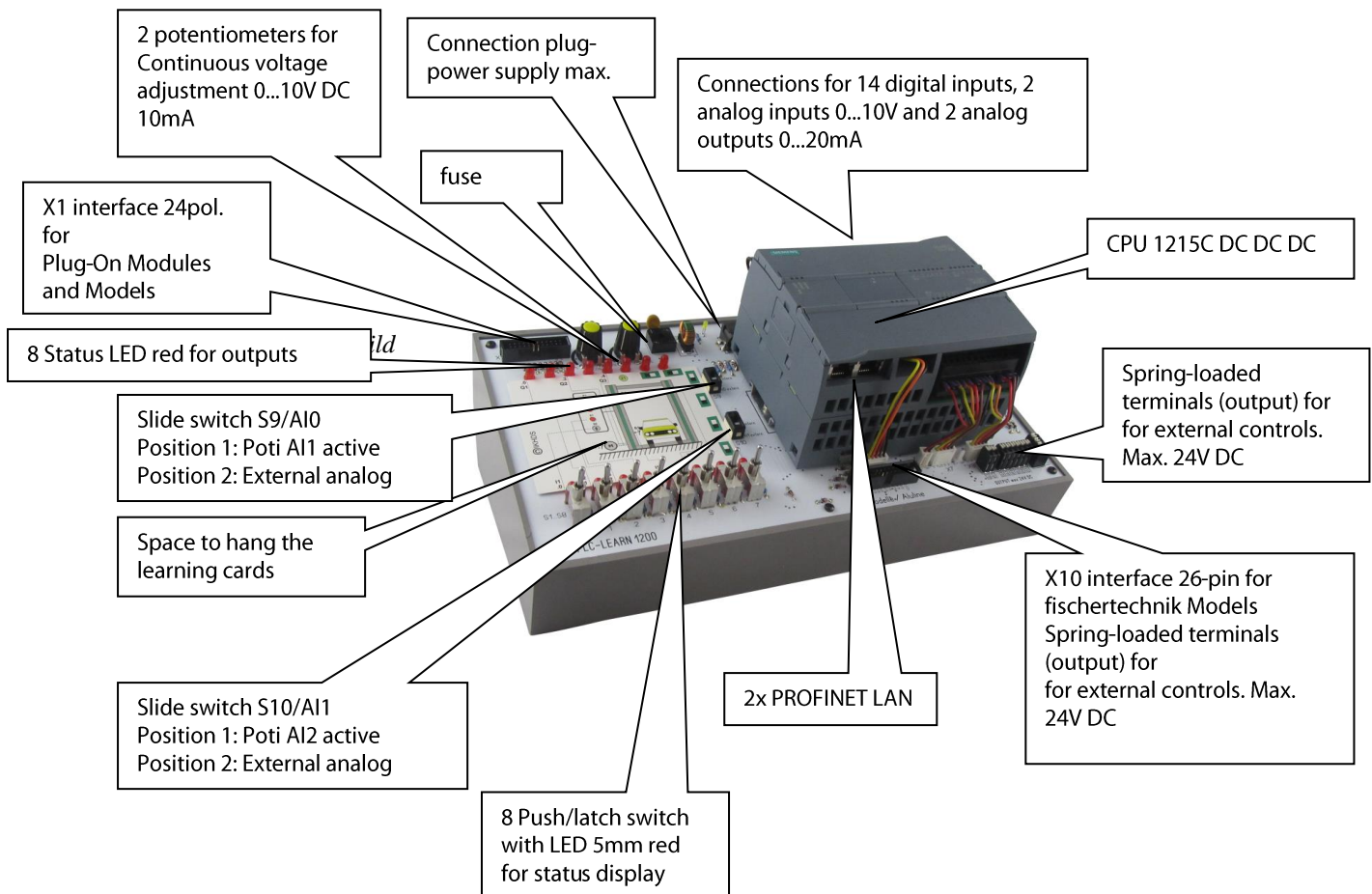
2 potentiometers Analog value setting each 0...10V DC (e.g. ACTUAL SETPOINT value)

3 slide switches 1 slide switch for current output switching (mA) or

Voltage output (V)

2 slide switches for switching int. 0...10V to ext. 0...10V

5 Details des PLC-Learn 1200



**WARNING**

No voltage above 24 V DC may be applied to any of the safety sockets, otherwise there is a danger to life!

**WARNING**

If you install or remove the S7-1200 or any equipment connected to it while it is switched on, you may be exposed to electric shock or unexpected operation.

Failure to turn off the power to the S7-1200 and all connected equipment during installation or removal may result in death, serious injury, or property damage due to electric shock or unexpected operation.

Take all necessary safety precautions and make sure that the S7-1200 CPU's power supply is switched off before installing or removing a device.

Always be sure to use the correct module or device when installing or replacing an S7-1200.

The CPU 1215C DC/DC/DC is used at the PLC-Trainer 1200 / PLC-Rack 1200.

The operating voltage must not exceed 24 V DC!

**WARNING**

Incorrect installation of an S7-1200 module may result in unpredictable operation of the S7-1200 program.

If an S7-1200 is replaced by another variant, incorrectly aligned or installed in the wrong order, this may result in fatal or serious injury and/or property damage due to unexpected operation of the devices.

Always replace an S7-1200 with the same model, align it correctly and install it in the correct place.

6 Installation of the CPU

The CPU can be easily installed on the standard DIN rail mounted on the PLC-Learn 1200

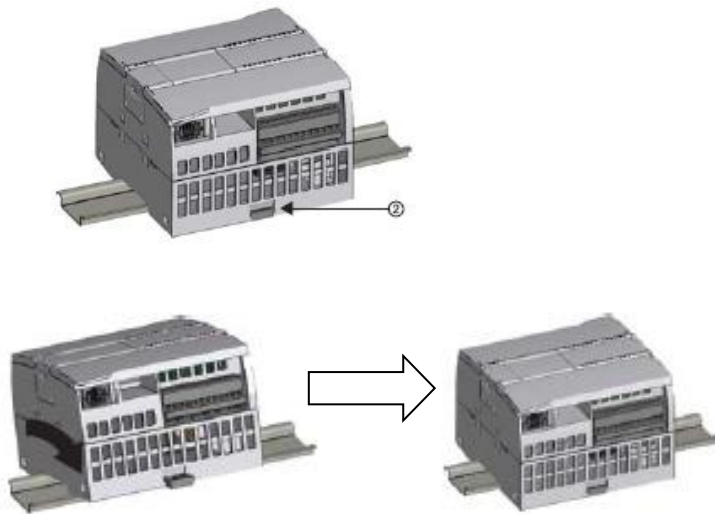


Figure 3: Mounting the CPU on a standard DIN rail

To mount the CPU on the PLC-Trainer 1200 / PLC-Rack 1200, proceed as follows:

Mount the CPU at the top of the top-hat rail.

Pull out the top-hat rail terminal (2) on the underside of the CPU so that the CPU fits over the rail.

Swing the CPU down to its mounting position on the rail.

4. push down the clamps so that the CPU is firmly seated on the rail.

Installation of a communication module

Installation of a communication module

Connect the communication module (CM) to the CPU and install all modules together on the DIN



rail.

Bild 3: Einbau eines Kommunikationsmoduls

Remove the bus cover on the left side of the CPU:

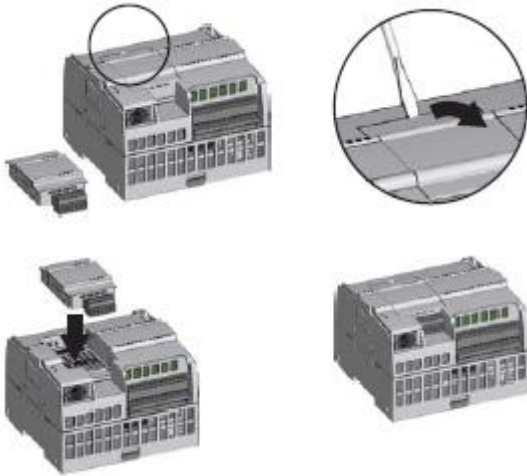
Insert a screwdriver into the slot above the bus cover.

2 Carefully lever the cover out of its holder at the top.

3. remove the bus cover. Keep the cover for later use.

Installation of a signal board

Prepare the CPU for the installation of the signal board by switching off the voltage of the CPU and removing the lower and upper cover of the terminal strip from the



CPU.

Bild 4: Einbau eines Signalboards

Proceed as follows to install the signal board:

Insert a screwdriver into the slot at the top of the CPU at the rear of the cover.

2 Carefully remove the cover from its holder and remove it from the CPU. Keep the cover for later use.

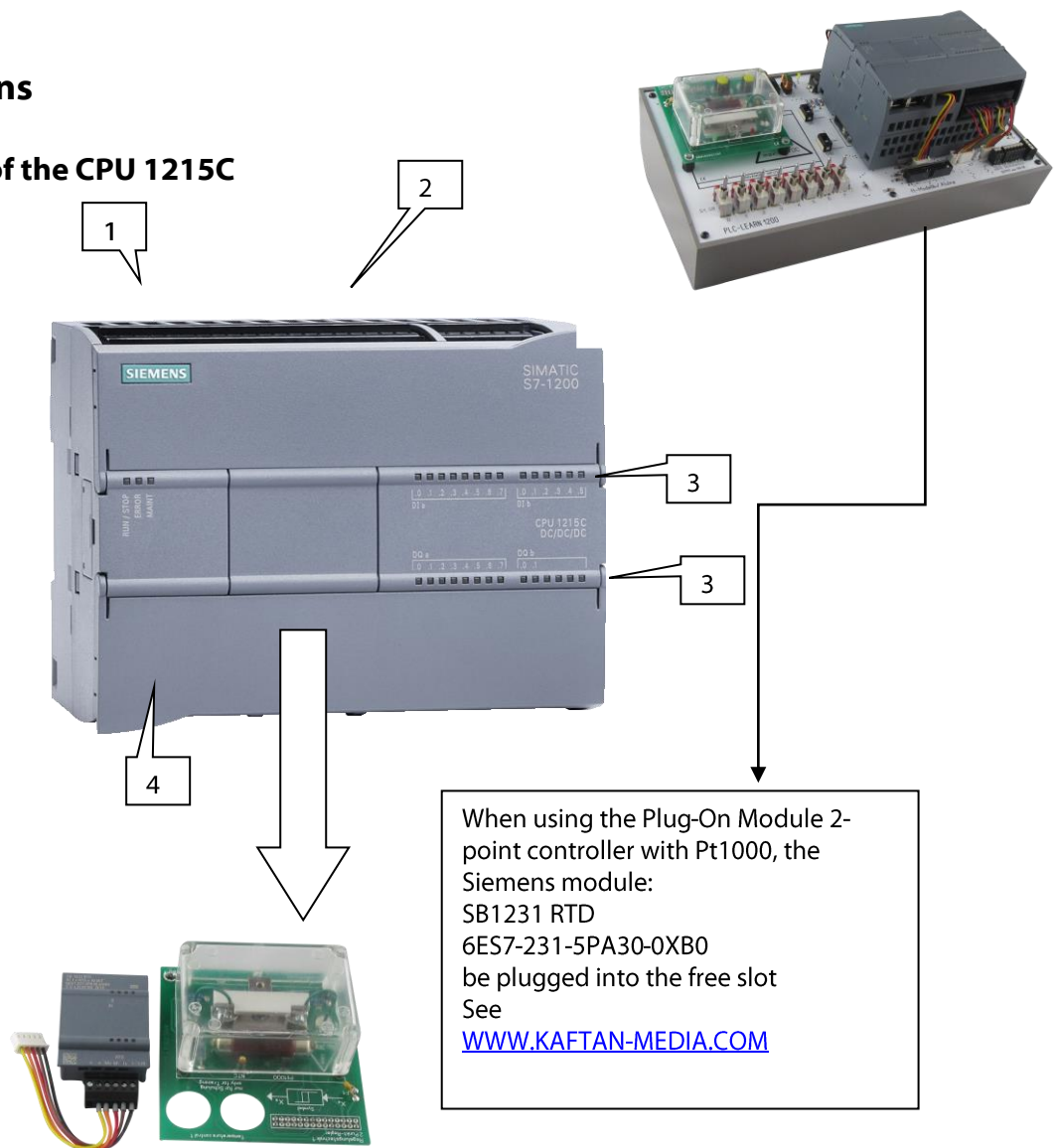
Insert the signal board straight into its mounting position in the CPU from above.

4 Press the signal board down firmly until it clicks into place.

5. replace the terminal covers.

7 Connections

Connection of the CPU 1215C



- 1 power supply
- 2 Pluggable terminal block for user wiring (behind cover flaps)
- 3 status LEDs for the integrated inputs/outputs
- 4 PROFINET connectors (on the bottom side of the CPU)

The CPU has two integrated PROFINET connections for communication with a programming device (PC). The connection can be made with a standard Ethernet cable (lengths: 1 - 10 m).

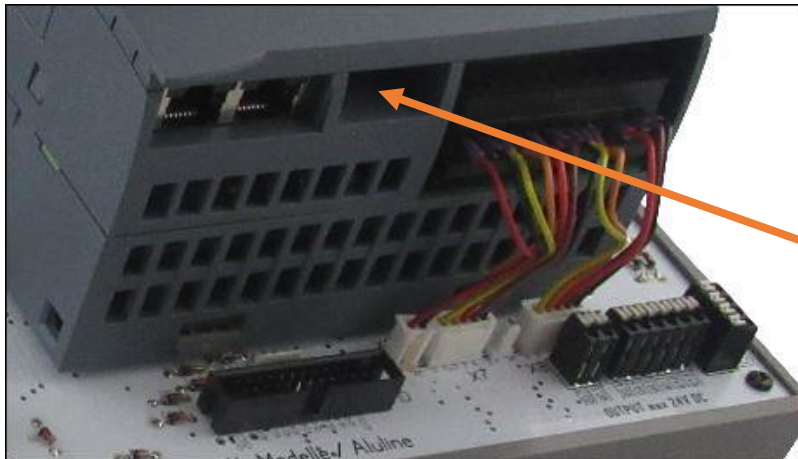
The CPU can communicate with HMI operating devices or other CPUs via a PROFINET network.

7.1 Anschlüsse am PLC-Trainer 1200

Verdrahtung der Anschlussstecker mit der CPU

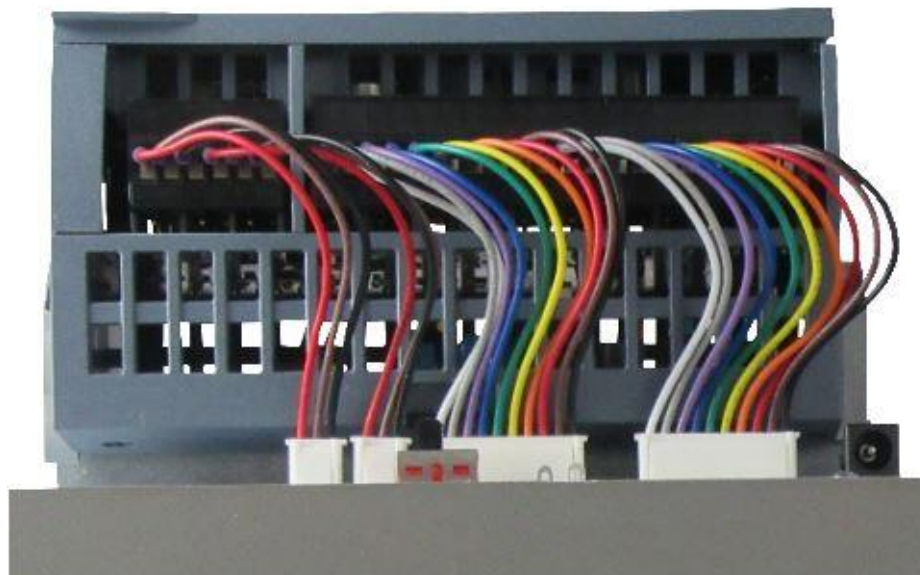
CAUTION

Only one CPU with 24 V DC may be used.



Inputs are only required in conjunction with the Plug-On Module 2-point controller
Siemens assembly:
SB1231 RTD
6ES7-231-5PA30-0XB0

Figure 5: Wiring the S7-1200 CPU 1215C DC DC DC (10 digital outputs)



Wiring the S7-1200 CPU 1215C DC DC DC (14 digital inputs, 2 analog inputs, 2 analog outputs)

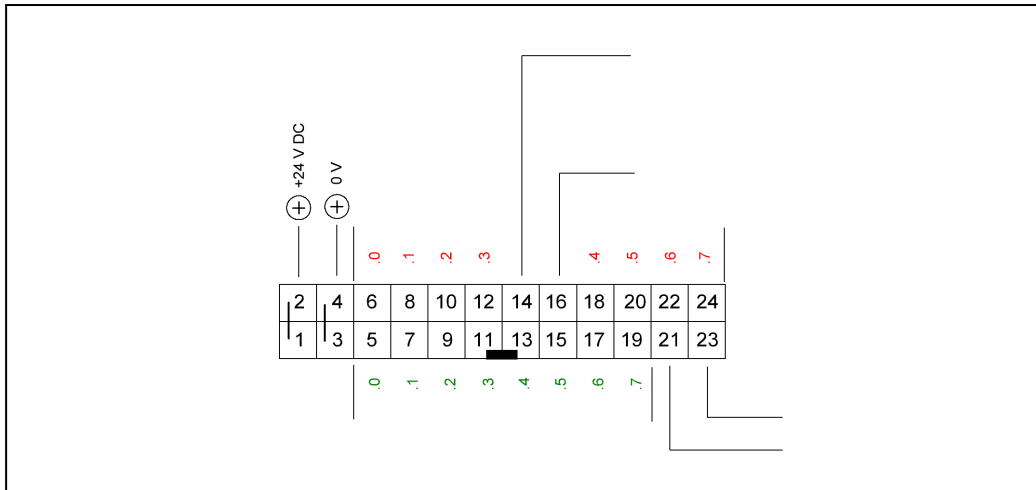
interfaces

Bild 5: X2-Schnittstelle (24-polig)

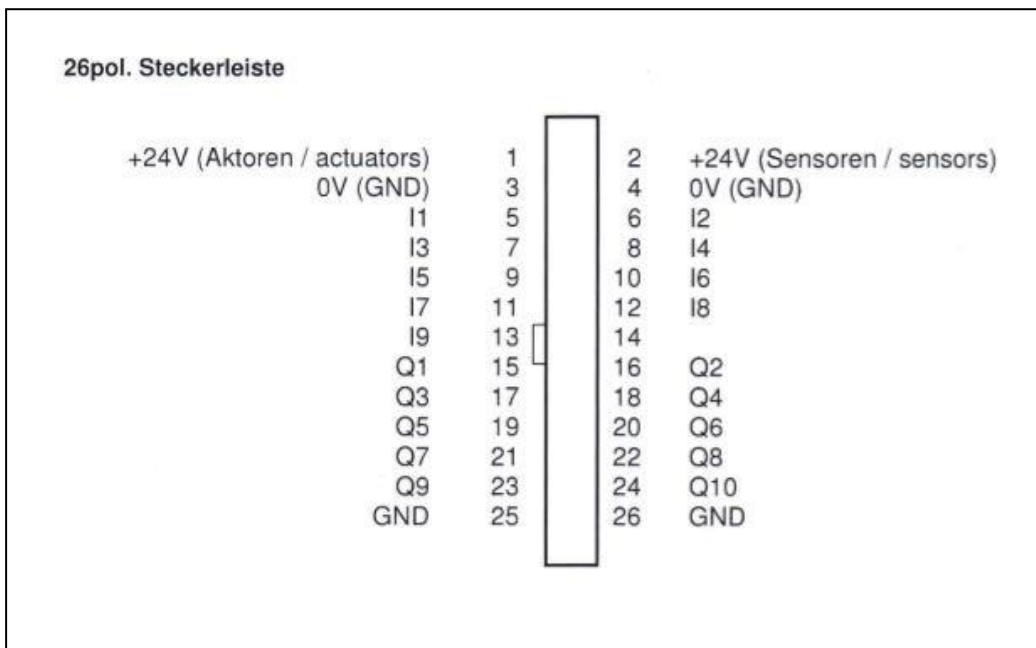
fischertechnik interface 26-pin interfaces

Bild 6: Figure 6: Fischertechnik interface)

Press the plug-on module onto the 24-pole interface manually.

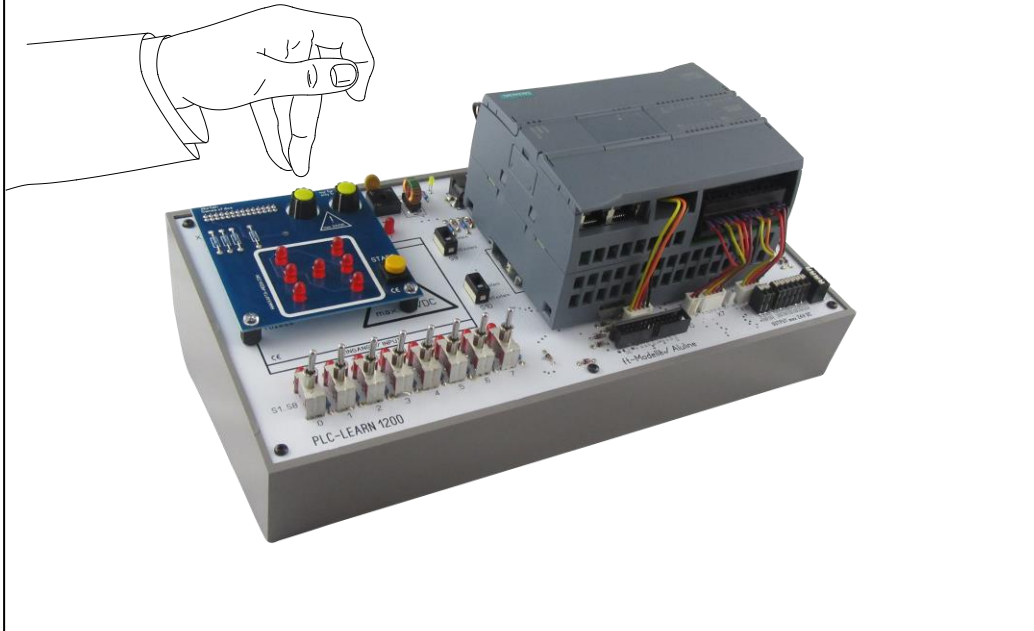
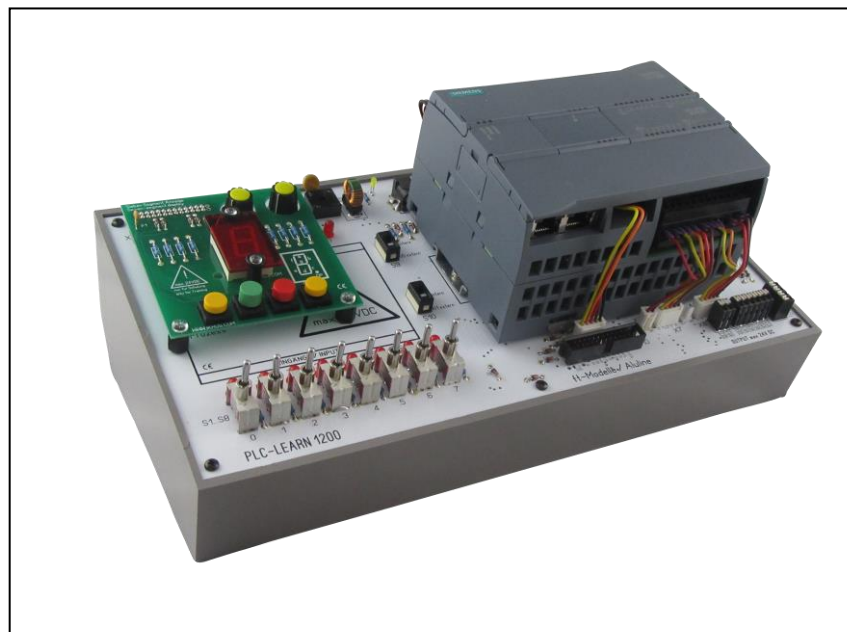


Figure 7: Plug-on modules on the board



8 Plug-in power supply unit

The enclosed plug-in power supply unit can be used for both the PLC-Trainer 1200 and the PLC-Rack 1200. Max. 24V DC 750mA are allowed!

The X1 interface is located on the PLC-Trainer 1200. A corresponding socket (X15 interface) is provided on the PLC-Rack 1200.

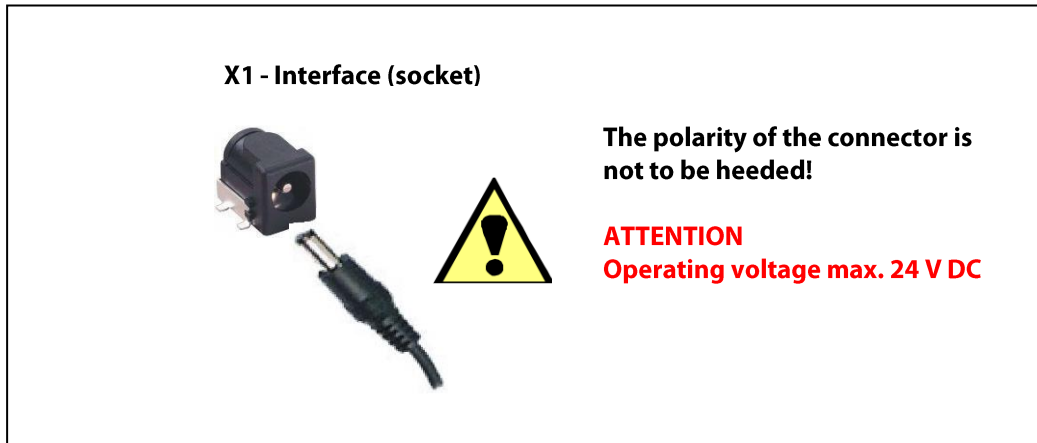


Figure 7: X1 interface (2-pole socket) on the PLC-learn 1200

9 Software Installation

For programming and transferring the data to the PLC-Trainer 1200 /

the software Step7 Basic or Professional must be installed on your work PC.

The software is not part of the trainer PLC-Learn 1200.

10 Teachware

The teachware contains a wide variety of programming tasks that can be tested in the form of learning cards, plug-in modules or Fischertechnik models.

Each programming task (function) consists of:

- o Hardware: Learning card, plug-in module or Fischertechnik model
- o Task sheet
- o Solution sheet
- o Software:

Program in the form of a project for S7-1200 (for testing on PLC-Learn 1200)

11 Learning cards

34 learning cards are available, which are part of the scope of delivery of the PLC-Learn 1200

Lerning card	Funktion
1	AND function
2	OR function
3	NOT function
4	NAND function
5	NOR function
6	XOR function
7	AND before OR
8	alternate switching
9	cross-connection
10	impulse relay
11	staircase light switch
12	switch-on delay
13	switch-off delay
14	Selection circuit 1 out of 3
15	Selection circuit 2 out of 3
16	Impulse circuit with contactor
17	garage lighting
18	mixing plant
19	gear lubrication
20	Press
21	lifting platform
22	Automatic star-delta connection
23	running light
24	Bottle counting
25	windmill
26	Sequential circuit with time-delayed switch-off
27	Parking space monitoring of an underground car park
28	Monitoring of a personnel exit
29	Surveillance of a ship
30	Boiler heating with solar collector
31	Boiler temperature monitoring
32	Temperature display with indicator lights

12 Plug-on modules

The Plug-On modules can be ordered as accessory packages (optional).

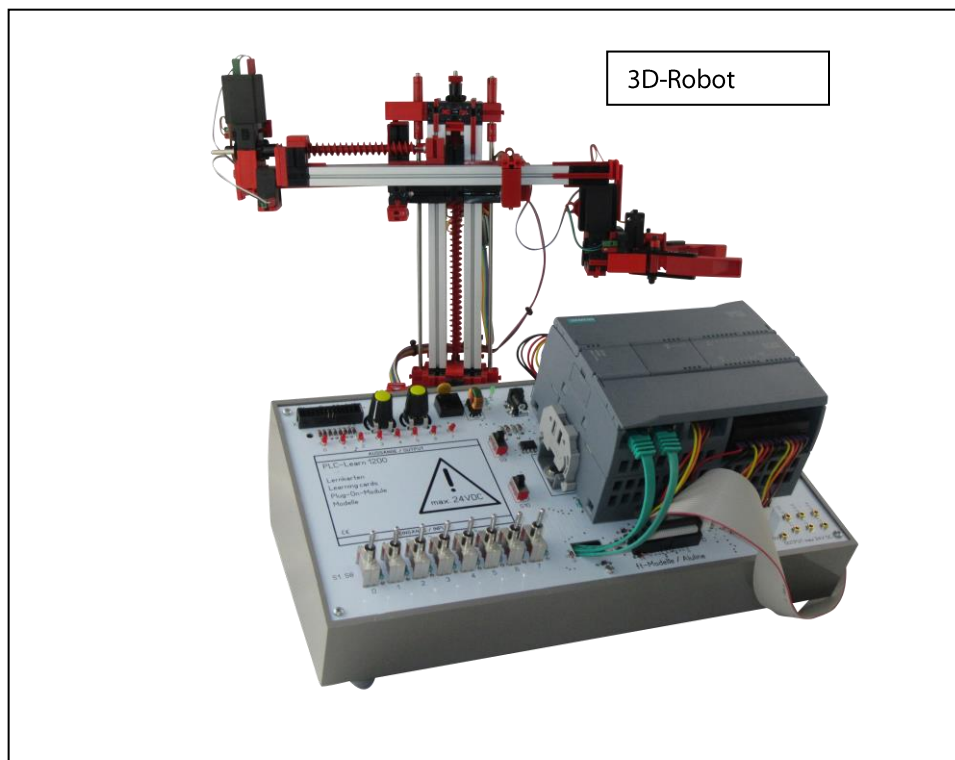
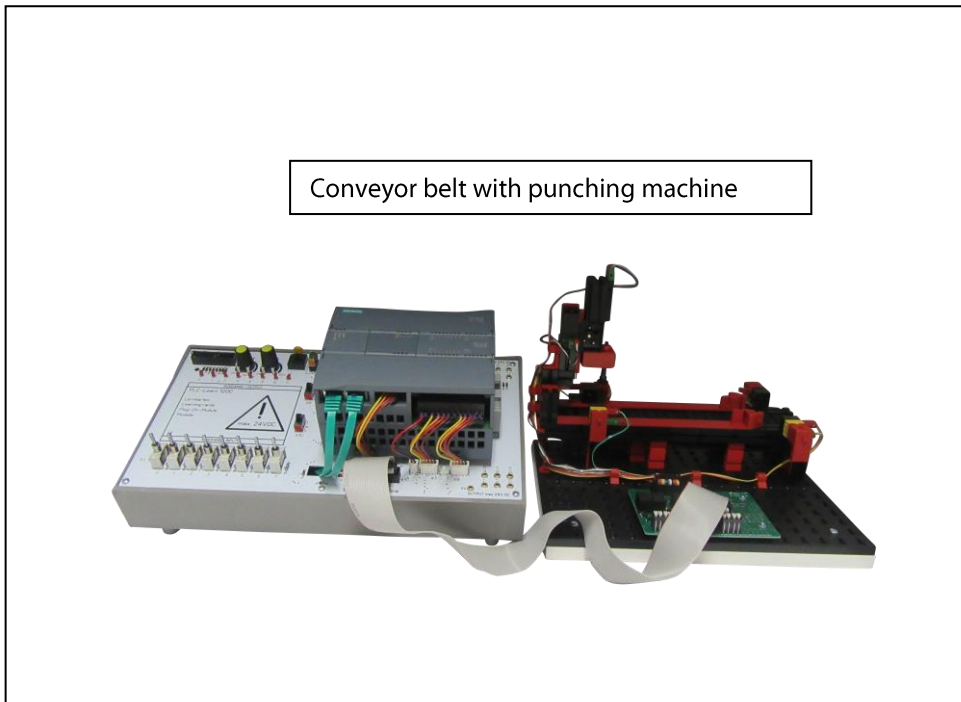
They can only be used in conjunction with the PLC-Learn 1200. (siehe Bild 19).

Modul	Funktion
SM1	Automatic star-delta connection
SM2	LED traffic light
SM3	LED motor
SM4	Slipring starter control
SM5	LED cube
SM6	engine
SM7	roulette

13 Fischertechnik-Modelle

Fischertechnik models can be ordered as accessory packages (optional).

They can be used in conjunction with the PLC-Learn 1200.



Further models are available at www.kaftan-media.com