

# EduTrainer® Compact/Universal

# FESTO

Manual



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# 1 For your safety

## 1.1 Use as intended

The EduTrainer® PLC holder system must only be used:

- for operation as intended in teaching and training,
- when its safety functions are in perfect condition.

The system is constructed in accordance with the current state-of-the-art and recognised safety rules. Nevertheless, improper use can result in danger to life and limb of users or third parties and damage to the system.

The training companies and/or trainers must ensure that all trainees observe the safety precautions described in this manual.

Festo Didactic hereby excludes any and all liability for damages suffered by trainees, the training company and/or any third parties, which occur during use of this equipment in situations which serve any purpose other than training, unless such damages have been caused by Festo Didactic due to malicious intent or gross negligence.

Faults which may impair safety must not be caused during training and must be eliminated immediately.

## 1.2 Pictograms

This manual, and the hardware described herein, contains instructions on the possible dangers which may occur if the system is not used correctly. The following pictograms are used:



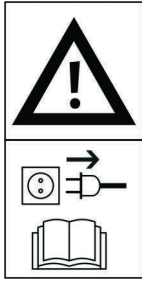
### **Warning**

This pictogram indicates that non-observance may result in serious personal injury or damage to property.



### **Caution**

This pictogram indicates that non-observance may result in personal injury or damage to property.



### Warning

This pictogram indicates that the device must be switched off and its mains plug must be removed from the electric outlet before installation, repair, maintenance, and cleaning work. Observe the user documentation, in particular all safety instructions. Non-observance may result in severe personal injury or damage to property.

## 1.3 Work safely

The power supply unit is constructed to protection class I as per EN 61558-1. It is equipped with a VDE-tested mains cable with protective earth conductor and must only be operated with or connected to 110/230 V alternating voltage networks with protective grounding.



- **Risk of fatal injury from interrupted protective earth conductor**
  - The protective earth conductor (yellow/green) must not be interrupted either outside or inside of the device.
  - The insulation of the protective earth conductor must not be damaged or removed.
- National regulations for operating electrical systems and equipment must be observed in commercial facilities.
- In schools and training facilities, the operation of power supply units must be responsibly monitored by trained personnel.
- **Caution!**  
Capacitors in the device can still be charged even if the device has been disconnected from all power sources.
- When replacing fuses, use only prescribed fuses with the correct nominal current intensities.
- Never switch on your power supply unit immediately if it is moved from a cold room to a warm one. The condensate that forms can, under unfavourable conditions, damage your device. Leave the device switched off until it has reached room temperature.

- **Risk of fatal injury from connecting power supply units in series**  
Contact voltages  $> 25$  V DC are no longer permitted.  
Voltages  $> 120$  V DC can be fatal to the touch.
  - Do not connect power sources in a row.
- The ventilation slits of power supply units must not be covered. The devices must be placed on hard, flame-resistant surfaces so that the air can enter the devices unhindered. The devices are primarily cooled by convection.
- When working under electrical voltage, use only expressly suitable tools.
- Set the device up so that activation of switches and disconnectors is not rendered difficult.
- **Risk of fatal injury from electrical shock**  
Protect the outputs of the power supply units (output sockets/terminals) and cables connected to them from direct contact.
  - Use only cables with adequate insulation and/or electric strength.
  - Use safety sockets with touch-safe contact points.
- Safe operation of the device is no longer possible in the case of
  - visible damage,
  - faulty operation,
  - inappropriate storage or
  - inappropriate transport.
  - Switch off the power immediately.
  - Protect the device from being unintentionally turned on again.
- Disconnect the power before making or breaking electrical connections.
- Use only extra-low voltages (max. 24 V DC).
- Unused slots of the holder system must be covered with 19" blanking plates.
- Unused cable entries of the holder system must be covered with covers included with the holder system.



## 2 Assembly instructions



### Warning

Assembly work must only be carried out when the power supply plug is unplugged.

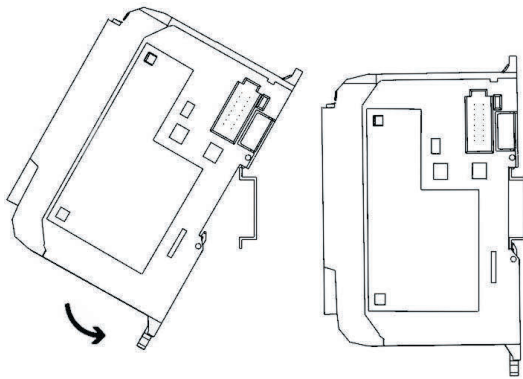
### 2.1 Assembling controllers



### Caution

Controllers or extension modules must not be disassembled from the H-rail in wired condition. Remove all cable connections before disassembling a controller or extension module.

#### 2.1.1 Allen Bradley



– Assembly:

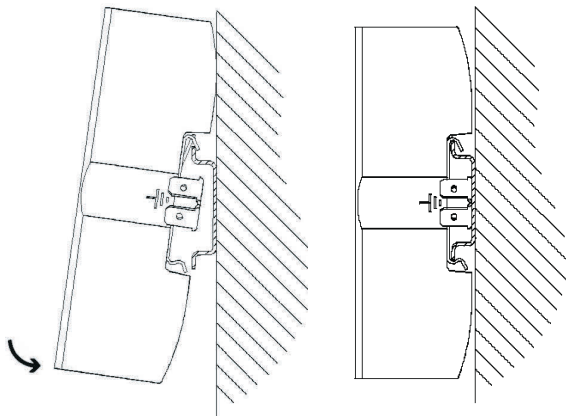
1. Hook the upper groove onto the H-rail.
2. Press the controller downwards and simultaneously against the H-rail until the mounting latch engages. Make sure that the two mounting latches are in the upper (secured) position.

- Disassembly:
  1. Insert a flat-blade screwdriver in the mounting latch on the underside of the controller.
  2. Hold the controller and lever the mounting latch downwards. The latch remains in the open position. Repeat the process for the second mounting latch. You can now remove the controller from the H-rail.

**Note**

Further information on assembling or disassembling the controller or individual extension modules can be found in the manuals of the respective controller manufacturers.

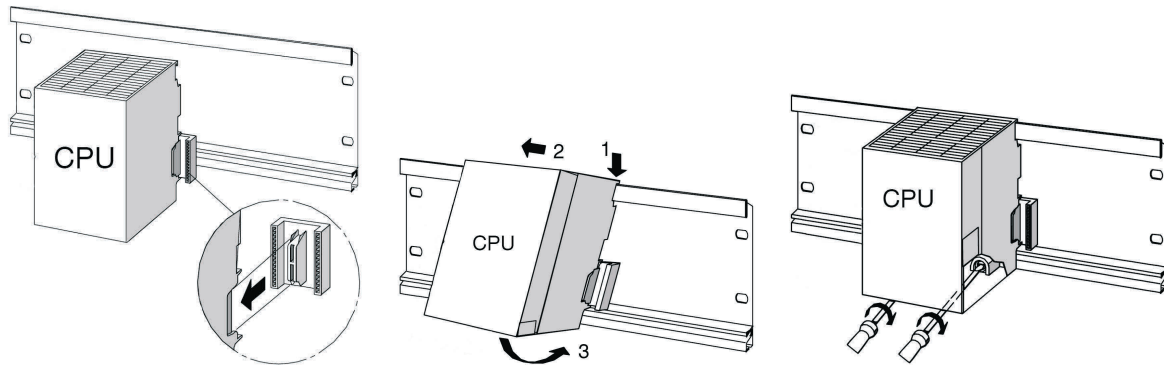
**2.1.2 Festo**



- Assembly:
  1. Tilt the controller and lean it against the wall above the H-rail.
  2. Move the controller downwards until the H-rail clips touch the H-rail.
  3. Press the lower half of the controller against the H-rail.
- Disassembly:
  1. Hold the controller housing by placing your thumb on the underside of the controller and the fingers of the same hand on the top.
  2. Lever the controller away from the H-rail by applying moderate pressure to the underside with your thumb and pulling it towards you. A distinct click lets you know that the device is now unlatched and can be removed from the H-rail.

**Note**

Further information on assembling or disassembling the controller or individual extension modules can be found in the manuals of the respective controller manufacturers.

**2.1.3 Siemens**

## – Assembly:

1. Establish a connection with the other modules by inserting a bus connector into the CPU (see picture detail).
2. Mount the CPU (1).
3. Push the CPU over as far as the left-hand module (2).
4. Now tilt it downwards (not before) (3).
5. Hand-tighten the modules onto the mounting rail.
6. If you are using a CPU with MMC, insert this into the module slot.
7. You must assemble one digital input module and one digital output module on the right beside the CPU. To do this, repeat steps 1 to 6.

**Note**

Only the internal power pack, the ER power pack or the tabletop power pack from Festo Didactic may be used. Any other power packs are impermissible.

**Note**

Further information on assembling or disassembling the controller or individual extension modules can be found in the manuals of the respective controller manufacturers.

### 2.1.4 Mitsubishi

- Assembly:  
The controller is assembled by engaging it on the H-rail (EN 50022).
- Disassembly:  
The controller is disassembled by lifting the quick fastener using a screwdriver and removing the controller from the rail.

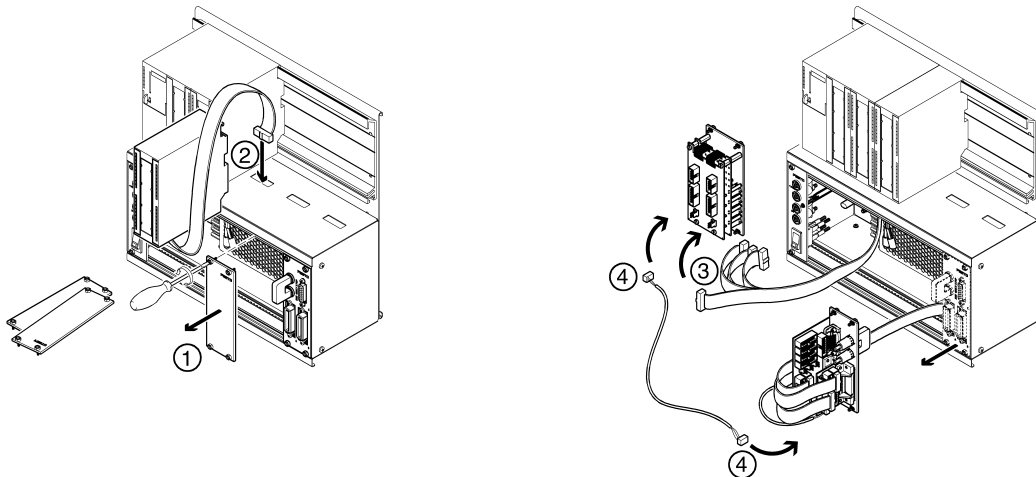
**Note**

Further information on assembling or disassembling the controller or individual extension modules can be found in the manuals of the respective controller manufacturers.

## 2.2 Extension with additional inputs/outputs

The installation process is shown using a Siemens controller as an example. This process is essentially the same for all controllers; the only difference is how the controller is mounted on the holder system.

1. Remove as many blanking plates as necessary.
2. Guide the flat cable of the new I/O module through the cable entry into the housing and assemble the module.
3. Connect the flat cables with the chosen 19-inch module.
4. To do this, connect the new 19-inch module with the last 19-inch module connected (e.g. SysLink system connector module) via the 3-pin 24 V power supply cable.

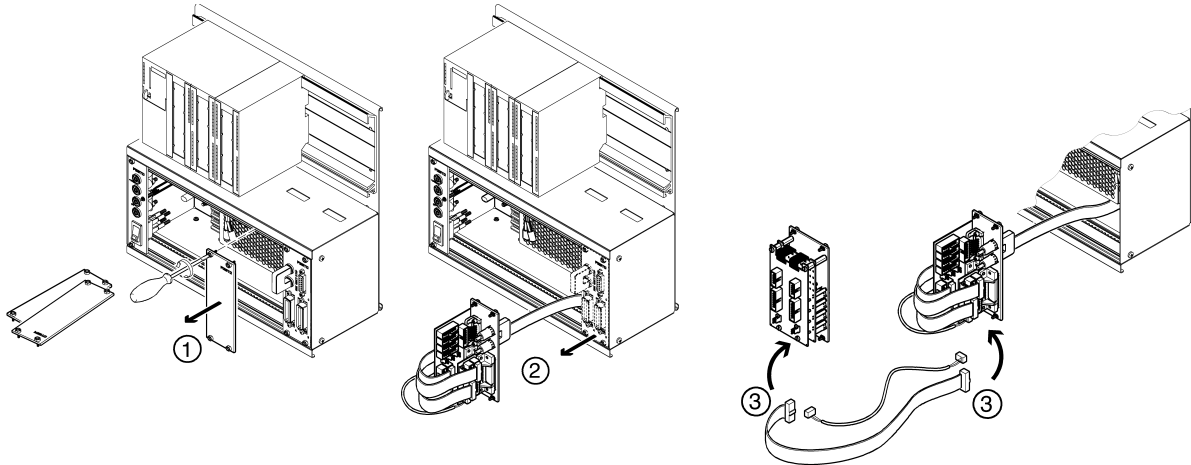


**Note**

Unused slots must be covered with 19" blanking plates. Unused cable entries must be covered with the covers included with the holder system.

### 2.3 Connecting 19-inch modules in parallel

1. Remove as many blanking plates as necessary.
2. Remove the 19-inch module to which you want to connect a new 19-inch module in parallel (e.g. the SysLink system connector module).
3. Connect the extension module with the SysLink module. The specific push-in connector can be found in the description for the respective 19-inch modules in this manual.



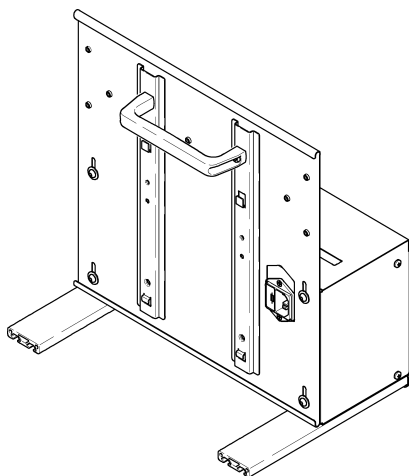
#### Note

Unused slots must be covered with 19" blanking plates. Unused cable entries must be covered with the covers included with the holder system.

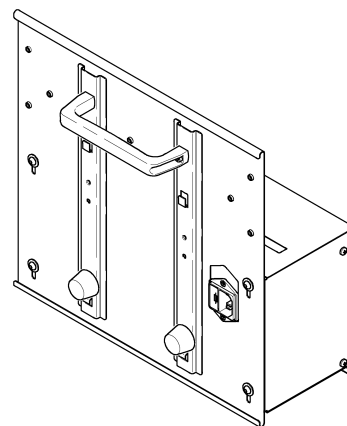
### 2.4 Converting the holder system

The holder system can be easily converted from a rack variant to an A4 variant and vice versa.

Rack variant:



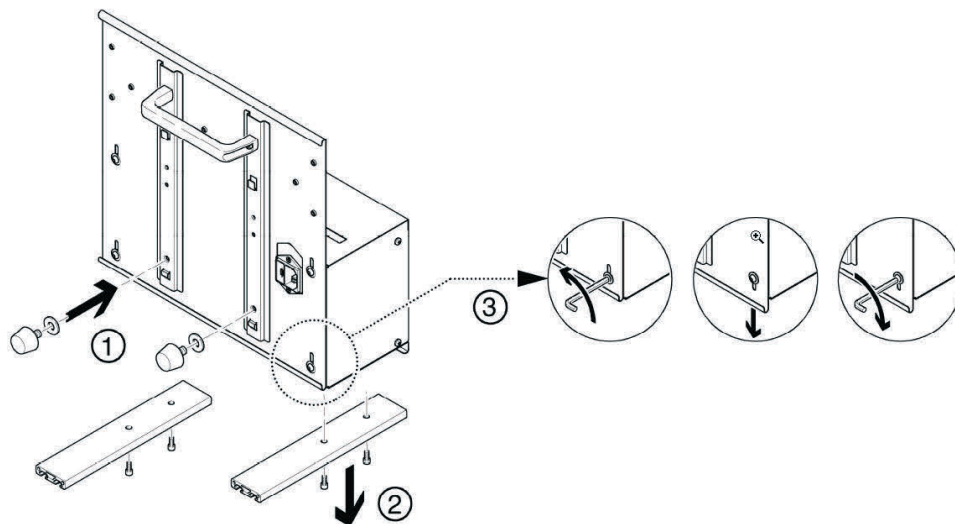
A4 variant:



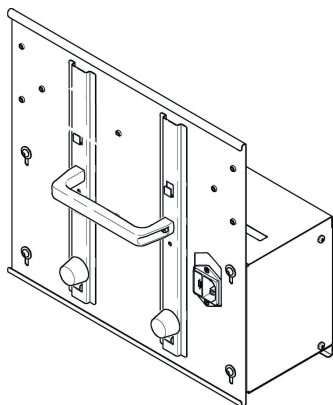
### Converting the rack variant to an A4 variant

The respective conversion kit can be ordered from Festo Didactic.

1. Screw in and tighten the rubber buffers and washers by hand.
2. Loosen the aluminium rails using an Allen key and remove.
3. Loosen the screws on the housing back wall using an Allen key, shift the housing back wall downwards to the stop, and retighten the screws on the housing back wall.



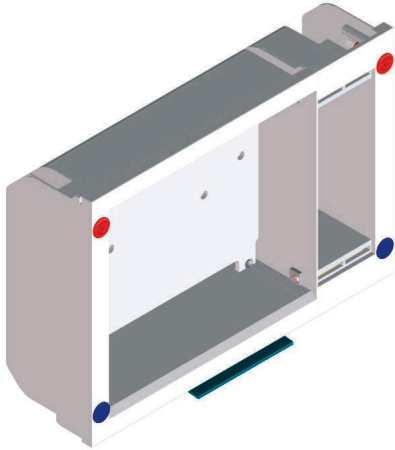
If you want to place the A4 variant at an angle on the table, you must assemble the handle in the position shown below.



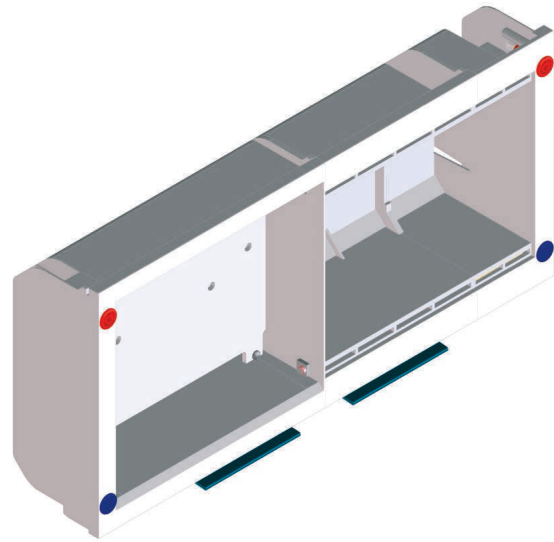
### 3 Holder systems

The holder systems included with the EduTrainer® Compact and EduTrainer® Universal product ranges are described in the following sections.

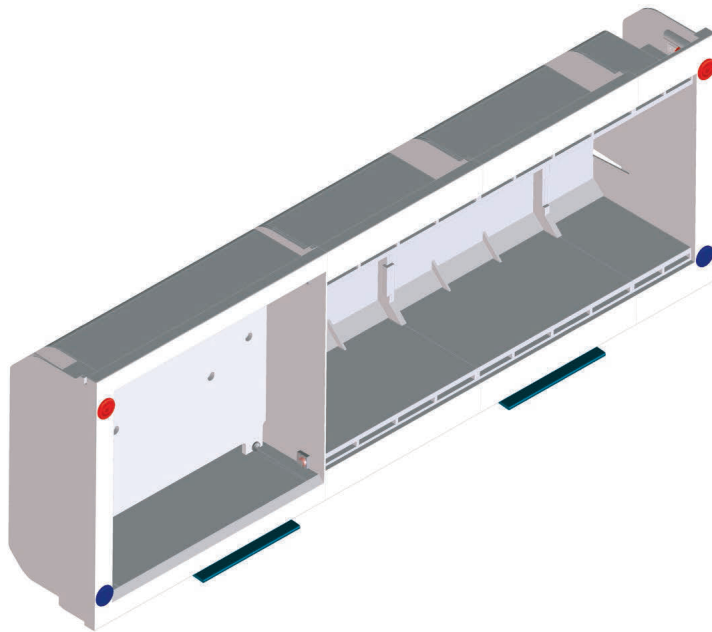
#### 3.1 EduTrainer® Compact holder system



**Size 1:** ER end housing (left) for mounting the controller with various mounting rails and ER end housing (right) for mounting 19" modules with a width of up to 9 HP



**Size 2:** ER end housing (left) for mounting the controller with various mounting rails, ER middle housing and ER end housing (right) for mounting 19" modules with a width of up to 33 HP



**Size 3:** ER end housing (left) for mounting the controller with various mounting rails, two ER middle housings and ER end housing (right) for mounting 19" modules with a width of up to 57 HP

### 3.1.1 Design and function

The EduTrainer® Compact holder system makes it possible to combine controllers from various manufacturers with simulation plates and 4 mm connection plates. Holder systems are available in three different sizes.

### 3.1.2 Commissioning

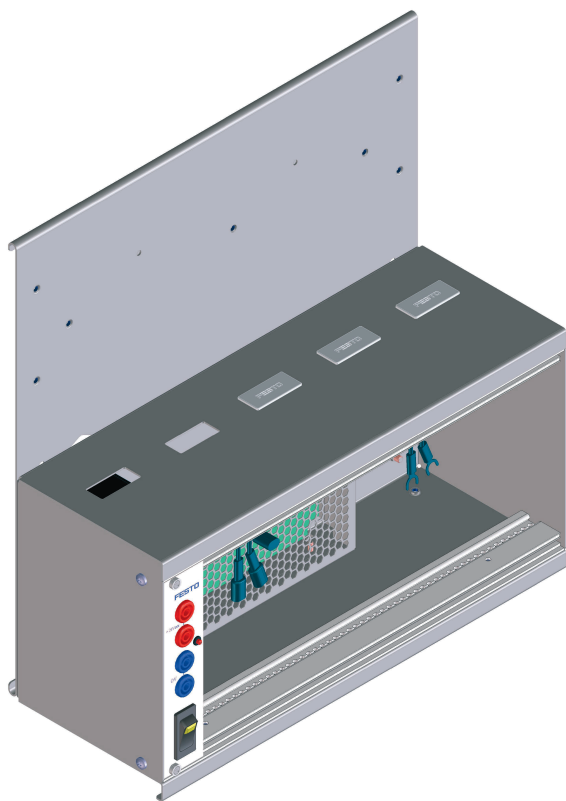
Connect the EduTrainer® Compact to a 24 V DC power supply using laboratory cables with 4 mm safety sockets.

### 3.1.3 Technical data

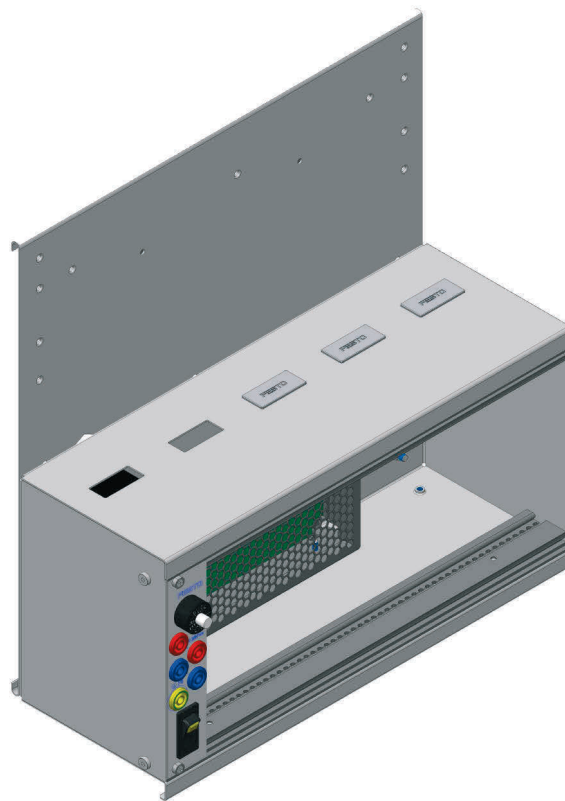
Electrical/mechanical	
Operating voltage	24 V DC
Output voltage	Corresponds to input voltage
Fuse	3.15 A slow-blow
Output current	Max. 4.5 A
Connection	4 mm safety sockets 3-pin plug for internal power supply to the modules
Size 1	171 x 243 x 82 mm (PLC plus 9 HP)
Size 2	171 x 365 x 82 mm (PLC plus 33 HP)
Size 3	171 x 487 x 82 mm (PLC plus 57 HP)
Maximum PLC width/height	160 mm/130 mm
CE marking	in accordance with low voltage directive in accordance with EU-EMC Directive Interference emission tested to EN 61000-6-3 Interference immunity tested to EN 61000-6-1
<b>Subject to change</b>	



### 3.2 EduTrainer® Universal holder system with power supply



EduTrainer® Universal holder system with power supply  
(old version)



EduTrainer® Universal holder system with power supply  
(new version)

#### 3.2.1 Structure and function

The holder system of your EduTrainer® PLC enables controllers from different manufacturers to be combined with simulation plates and 4 mm connection plates. The holder system is available in two sizes and two variants. The integrated simulation plates and 4 mm connection plates are supplied with power using the integrated 19-inch power supply module and switched on and off centrally via a rocker switch.

##### Power supply (left-hand figure)

The mains switch with indicator, a control LED for 24 V and 4 mm safety sockets for 24 V and 0 V are located on the front panel.

##### Limited power voltage supply (right-hand figure)

The mains switch with indicator, a control LED for 24 V, a resettable 4 A fuse, 4 mm safety sockets for 24 V and 0 V and a safety socket for connecting the protective conductor are located on the front panel.

If the fuse is tripped, it can be reset by pressing the white button.

### 3.2.2 Commissioning



#### Warning

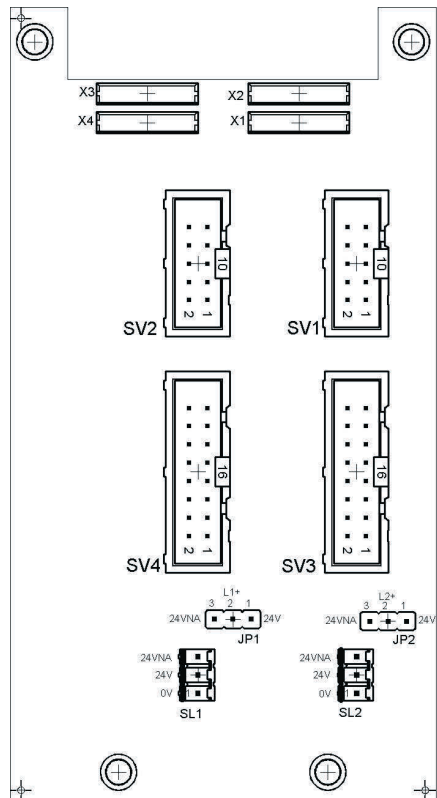
When the mains cable is plugged in, voltage is present at the mains switch as far as the power supply unit (110/230 V AC). Assembly work must only be carried out when the power supply plug is unplugged.

1. Assemble the required simulation plates and 4 mm connection plates if applicable.
2. Connect the EduTrainer® PLC to the laboratory power supply.
3. Switch on the mains switch.

### 3.2.3 Technical data

Electrical/Mechanical	
Operating voltage	110 V – 230 V AC 50 – 60 Hz
Input current	1.3 A – 0.65 A AC
Output voltage	24 V DC ± 3%
Fuse	3.15 A slow-blowing
Output current	Max. 4.5 A
Connection	4 mm safety sockets 3-pin plug for internal supply to modules
Front-plate width, power supply	6 HP (1 HP = 1/5" = 5.08 mm)
Size 1	297 mm x 305 mm x 120 mm (60 HP)
Size 2	297 mm x 458 mm x 120 mm (90 HP)
Maximum PLC width/height, size 1	295 mm/125 mm
Maximum PLC width/height, size 2	448 mm/125 mm
CE marking	in accordance with low voltage directive in accordance with EU-EMC Directive Interference emission tested to EN 61000-6-3 Interference immunity tested to EN 61000-6-1
<b>Subject to change</b>	

## 4 19-inch module 16DIN



- SV1, SV2: 10-pin inputs
- SV3, SV4: 16-pin inputs
- JP1, JP2: Supply via 24 V or 24 V NA
- SL1, SL2: Connections for 24 V DC supply voltage

### 4.1 Structure and function

The 19-inch module for 16DIN extends the functional scope of your EduTrainer® PLC system. It has 16 digital inputs on 4 mm safety sockets and 16 switches/pushbuttons for signal simulation.

The input signals from a PLC are applied to the controller either via the 4 mm safety sockets or in parallel via the pushbuttons. Each pushbutton has a detenting and non-detenting function. This enables them to generate static or pulsed signals.

## 4.2 Commissioning

1. Connect the inputs/outputs to the PLC using a flat cable:
  - SV3/SV4: Siemens S7 (16-pin)
  - SV1/SV2: Other controller types (10-pin)
2. If using modules in parallel, these can be connected via the free insulation-displacement connector SV1/SV2 or SV3/SV4 using flat cables.
3. Connect the 24 V power supply by means of the 3-pin connector SL1 or SL2.
4. The jumpers JP1 and JP2 define that the input module is directly supplied via 24 V.
5. Screw the 19-inch module into the frame.

## 4.3 Technical data

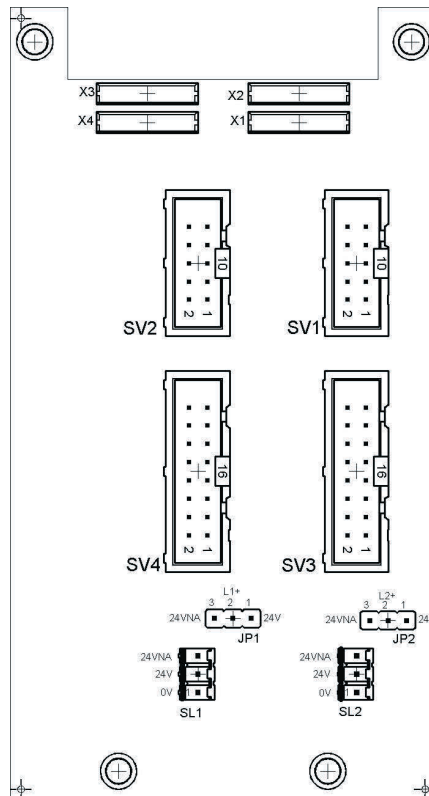
Electrical/Mechanical	
Operating voltage	24 V DC
Input voltage	0 V to operating voltage
Input impedance	See PLC manual
Current rating	Max. 4.0 A
Connection	4 mm safety sockets
Front-plate width	12 HP
<b>Subject to change</b>	

## 4.4 Contact allocation table

Pin	SV1	SV2	SV3	SV4
1	L1+	L2+	0V	0V
2	I0	I10	I7	I17
3	I1	I11	0V	0V
4	I2	I12	I6	I16
5	I3	I13	0V	0V
6	I4	I14	I5	I15
7	I5	I15	0V	0V
8	I6	I16	I4	I14

Pin	SV1	SV2	SV3	SV4
9	I7	I17	L1+	L2+
10	0V	0V	I3	I13
11	–	–	L1+	L2+
12	–	–	I2	I12
13	–	–	L1+	L2+
14	–	–	I1	I11
15	–	–	L1+	L2+
16	–	–	I0	I10

## 5 19-inch module 16DOUT



SV1, SV2: 10-pin outputs

SV3, SV4: 16-pin outputs

JP1, JP2: Supply for output modules via 24 V or 24 V NA

SL1, SL2: Connections for 24 V DC supply voltage

### 5.1 Structure and function

The 19-inch module 16DOUT extends the functional scope of your EduTrainer® PLC system. The module has 16 digital outputs on 4 mm safety sockets. Yellow status LEDs indicates the status of the outputs.

## 5.2 Commissioning

1. Connect the inputs/outputs to the PLC using a flat cable:
  - SV3/SV4: Siemens S7 (16-pin)
  - SV1/SV2: Other controller types (10-pin)
2. If using modules in parallel, these can be connected via the free insulation-displacement connector SV1/SV2 or SV3/SV4 using flat cables.
3. Connect the 24 V power supply by means of the 3-pin connector SL1 or SL2.
4. Use the jumper JP1 or JP2 to define whether the output module is supplied directly via 24 V or via 24 V NA. 24 V NA is switched off in the event of an EMERGENCY-STOP.
  - Jumper between pins 1 and 2: supply via 24 V.
  - Jumper between pins 2 and 3: supply via 24 V NA.
5. Screw the 19-inch module into the frame.

## 5.3 Technical data

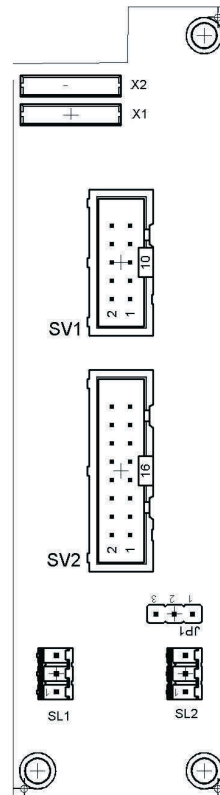
Electrical/Mechanical	
Operating voltage	24 V DC
Output current	Module: max. 0.5 A per output PLC: see PLC manual
Connection	4 mm safety sockets
Front-plate width	12 HP
<b>Subject to change</b>	

## 5.4 Contact allocation table

Pin	SV1	SV2	SV3	SV4
1	L1+	L2+	0V	0V
2	Q0	Q10	Q7	Q17
3	Q1	Q11	0V	0V
4	Q2	Q12	Q6	Q16
5	Q3	Q13	0V	0V
6	Q4	Q14	Q5	Q15
7	Q5	Q15	0V	0V
8	Q6	Q16	Q4	Q14

Pin	SV1	SV2	SV3	SV4
9	Q7	Q17	L1+	L2+
10	0V	0V	Q3	Q13
11	–	–	L1+	L2+
12	–	–	Q2	Q12
13	–	–	L1+	L2+
14	–	–	Q1	Q11
15	–	–	L1+	L2+
16	–	–	Q0	Q10

## 6 19-inch module 8DIN



- SV1: 10-pin inputs
- SV2: 16-pin inputs
- JP1: Supply via 24 V or 24 V NA
- SL1, SL2: Connections for 24 V DC supply voltage

### 6.1 Structure and function

The 19-inch module 8DIN extends the functional scope of your EduTrainer® PLC system. It has 8 digital inputs on 4 mm safety sockets and 8 switches/pushbuttons for signal simulation.

The input signals from a PLC are applied to the controller either via the 4 mm safety sockets or in parallel via the pushbuttons. Each pushbutton has a detenting and non-detenting function. This enables them to generate static or pulsed signals.

## 6.2 Commissioning

1. Connect the inputs/outputs to the PLC using a flat cable:
  - SV2: Siemens S7 (16-pin)
  - SV1: Other controller types (10-pin)
2. If using modules in parallel, these can be connected via the free insulation-displacement connector SV1 or SV2 using flat cables.
3. Connect the 24 V power supply by means of the 3-pin connector SL1 or SL2.
4. The jumper JP1 defines that the input module is directly supplied via 24 V.
5. Screw the 19-inch module into the frame.

## 6.3 Technical data

Electrical/Mechanical	
Operating voltage	24 V DC
Input voltage	0 V – operating voltage
Input impedance	See PLC manual
Current rating	Max. 4.0 A
Connection	4 mm safety sockets
Front-plate width	6 HP
<b>Subject to change</b>	

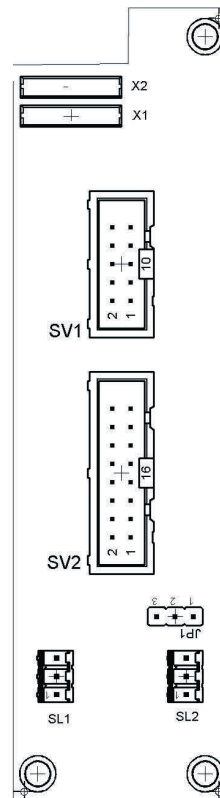
## 6.4 Contact allocation table

Pin	SV1	SV2
1	L1+	0V
2	I0	I7
3	I1	0V
4	I2	I6
5	I3	0V
6	I4	I5
7	I5	0V
8	I6	I4

Pin	SV1	SV2
9	I7	L1+
10	0V	I3
11	–	L1+
12	–	I2
13	–	L1+
14	–	I1
15	–	L1+
16	–	I0



## 7 19-inch module 8DIN, without switch



- SV1: 10-pin inputs
- SV2: 16-pin inputs
- JP1: power supply via 24 V or 24 V NA
- SL1, SL2: 24 V DC supply voltage terminals

### 7.1 Layout and function

The 19-inch module 8DIN extends the scope of functions of your EduTrainer® PLC system. It's equipped with 8 digital inputs laid out as 4 mm safety sockets. Yellow status LEDs indicate the status of the inputs.

The input signals from a PLC are applied to the controller via the 4 mm safety sockets.

## 7.2 Commissioning

1. Connect the inputs/outputs to the PLC using a flat cable:
  - SV2: Siemens S7 (16-pin)
  - SV1: other controller types (10-pin).
2. If modules are utilized in parallel, they can be connected via unoccupied connector SV1 or SV2 with a flat cable.
3. Connect 24 V supply power to 3-pole terminal SL1 or SL2.
4. If jumper JP1 is used, the input module is supplied directly via 24 V.
5. Screw the 19" module into the rack.

## 7.3 Technical data

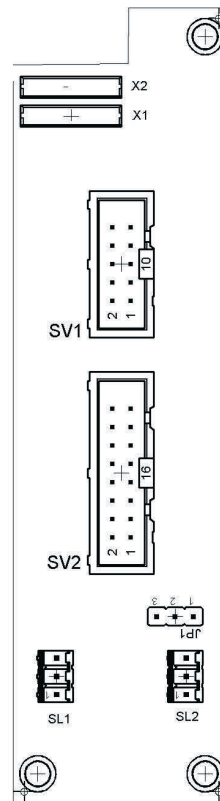
Electrical/mechanical specifications	
Operating voltage	24 V DC $\pm 3\%$
Input voltage	0 V operating voltage
Input impedance	See PLC manual
Current rating	Max. 4.0 A
Connection	4 mm safety sockets
Front panel width	6 standard width units
<b>Subject to change</b>	

## 7.4 Pin allocation table

Pin	SV1	SV2
1	L1+	0 V
2	I0	I7
3	I1	0 V
4	I2	I6
5	I3	0 V
6	I4	I5
7	I5	0 V
8	I6	I4

Pin	SV1	SV2
9	I7	L1+
10	0 V	I3
11	—	L1+
12	—	I2
13	—	L1+
14	—	I1
15	—	L1+
16	—	I0

## 8 19-inch module 8DOU



SV1: 10-pin outputs

SV2: 16-pin outputs

JP1: Supply via 24 V or 24 V NA

SL1, SL2: Connections for 24 V DC supply voltage

### 8.1 Structure and function

The 19-inch module 8DOU extends the functional scope of your EduTrainer® PLC system. The module has 8 digital outputs on 4 mm safety sockets. Yellow status LEDs indicates the status of the outputs.

## 8.2 Commissioning

1. Connect the inputs/outputs to the PLC using a flat cable:
  - SV2: Siemens S7 (16-pin)
  - SV1: Other controller types (10-pin)
2. If using modules in parallel, these can be connected via the free insulation-displacement connector SV1 or SV2 using flat cables.
3. Connect the 24 V power supply by means of the 3-pin connector SL1 or SL2.
4. The jumper JP1 is used to define whether the output module is supplied directly via 24 V or via 24 V NA. 24 V NA is switched off in the event of an EMERGENCY-STOP.
  - Jumper between pins 1 and 2: supply via 24 V.
  - Jumper between pins 2 and 3: supply via 24 V NA.
5. Screw the 19-inch module into the frame.

## 8.3 Technical data

Electrical/Mechanical	
Operating voltage	24 V DC
Output current	Module: max. 0.5 A per output PLC: see PLC manual
Connection	4 mm safety sockets
Front-plate width	6 HP
<b>Subject to change</b>	

## 8.4 Contact allocation table

Pin	SV1	SV2
1	L1+	0V
2	Q0	Q7
3	Q1	0V
4	Q2	Q6
5	Q3	0V
6	Q4	Q4
7	Q5	0V
8	Q6	Q4

Pin	SV1	SV2
9	Q7	L1+
10	0V	Q3
11	–	L1+
12	–	Q2
13	–	L1+
14	–	Q1
15	–	L1+
16	–	Q0

## 9 19-inch module 4DOCTR



### 9.1 Design and function

The 19-inch module 4DOCTR extends the functional scope of your EduTrainer® PLC system. The module connects 4 relay outputs on 4 mm safety sockets.

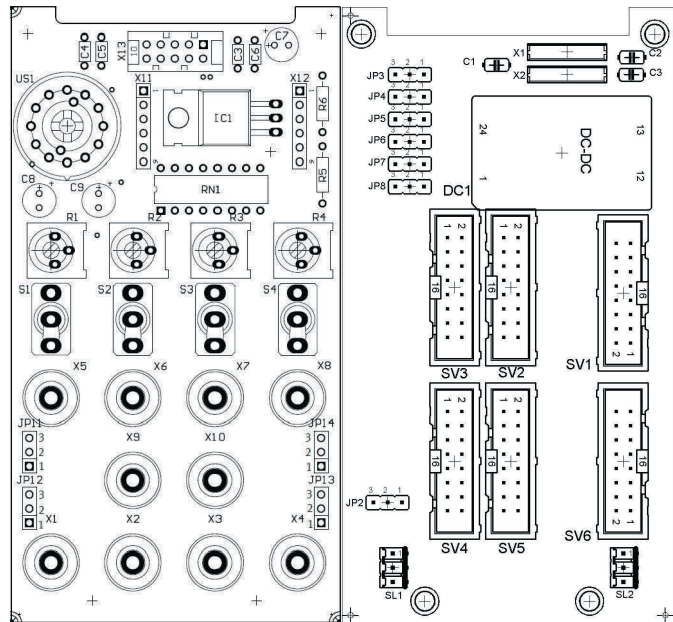
### 9.2 Commissioning

1. Connect the outputs by means of 8 single wires to the PLC/LOGO!
2. Screw the 19-inch module into the frame.

### 9.3 Technical data

<b>Electrical/Mechanical</b>	
Operating voltage	24 V DC $\pm$ 3%
Switching current	10 A bei ohmic load 3 A bei inductive load
Connection	4 mm safety sockets
Front-plate width	6 HP
<b>Subject to change</b>	

## 10 19-inch module 4AIN/2AOUT



- SV3, SV4: analog inputs/outputs, S7 20-pin
- SV2, SV5: analog inputs/outputs, S7 40-pin
- SV1 or SV6: analog inputs/outputs, 16-pin
- JP2: power supply via 24 V or 24 V NA
- SL1, SL2: 24 V DC supply power terminals
- JP11, JP12, JP13, JP14: switching from 0 ... 10 V to  $\pm 10$  V

### 10.1 Layout and function

The 19-inch module 4AIN/2AOUT extends the functional scope of your EduTrainer® PLC system. The module enables the connection of 4 analog voltage inputs and 2 analog voltage outputs of a PLC via 4 mm safety sockets. The voltage values are shown on the integrated display. The displayed voltage is selected via a selector switch.

If the toggle switch points towards the 4 mm safety socket, process signals are recorded. If the toggle switch points towards the potentiometer, an adjustable voltage can be supplied by turning the potentiometer knob.

The voltage range can be selected with jumpers JP11 (UR1), JP12 (UR2), JP13 (UR3) and JP14 (UR4). Voltage can be set to between 0 and 10 V by inserting a jumper between pins 2 and 3. Inserting a jumper between pins 1 and 2 results in a setting range of  $\pm 10$  V.

## 10.2 Commissioning

1. Connect the inputs/outputs to the PLC using a flat cable:
  - SV2/SV5: Siemens S7 integrated analog module with 40-pin plug (2 x 16-pin)
  - SV1/SV6: Other controller types (16-pin)
2. If using modules in parallel, these can be connected via the free insulation-displacement connector SV1 or SV6 using flat cables.
3. Connect the 24 V power supply by means of the 3-pin connector SL1 or SL2.
4. Use the jumper JP2 to define whether the output module is supplied directly via 24 V or via 24 V NA. 24 V NA is switched off in the event of an EMERGENCY-STOP.
  - Jumper between pins 1 and 2: supply via 24 V.
  - Jumper between pins 2 and 3: supply via 24 V NA.
5. Screw the 19-inch module into the frame.

## 10.3 Technical data

Electrical/Mechanical	
Operating voltage	24 V DC $\pm$ 3%
Input/output voltage	0 – 10 V DC and $\pm$ 10 V DC respectively
Input impedance	See PLC manual
Output current	Module: max. 0.5 A per output PLC: see PLC manual
Connection	4 mm safety sockets
Front-plate width	12 HP
<b>Subject to change</b>	

## 10.4 Contact allocation table

Pin	SV1	SV2	SV3	SV4	SV5	SV6
1	UA1	0V	IE3	0V	0V	UA1
2	IA2	IE3	0V	IA2	IA2	IA2
3	UA2	0V	IE3	0V	0V	UA2
4	IA1	UE3	UE3	0V	UA2	IA1
5	0V	0V	IE3	0V	0V	0V
6	—	0V	IE2	UA2	IA1	—
7	IE2	0V	IE3	0V	0V	IE2
8	IE4	IE2	0V	IA1	UA1	IE4
9	IE1	L1	L1	UE4	UE4	IE1
10	IE3	UE2	UE2	0V	—	IE3
11	0V	L1	L1	UE4	UE4	0V
12	UE4	0V	IE1	UA1	—	UE4
13	UE2	L1	L1	UE4	UE4	UE2
14	UE3	IE1	0V	IE4	0V	UE3
15	UE1	L1	L1	UE4	UE4	UE1
16	—	UE1	UE1	0V	IE4	—



## 11 19-inch module 4AIN/2AOUT, without simulation



### 11.1 Layout and function

The 19" module 4AIN/2AOUT extends the scope of functions of your EduTrainer® PLC system. The module permits connection of 4 analog voltage inputs and 2 analog voltage outputs of a PLC via 4 mm safety sockets.

## 11.2 Commissioning

1. Connect the outputs to the PLC/LOGO! with 8 single wires.
2. Screw the 19" module into the rack.

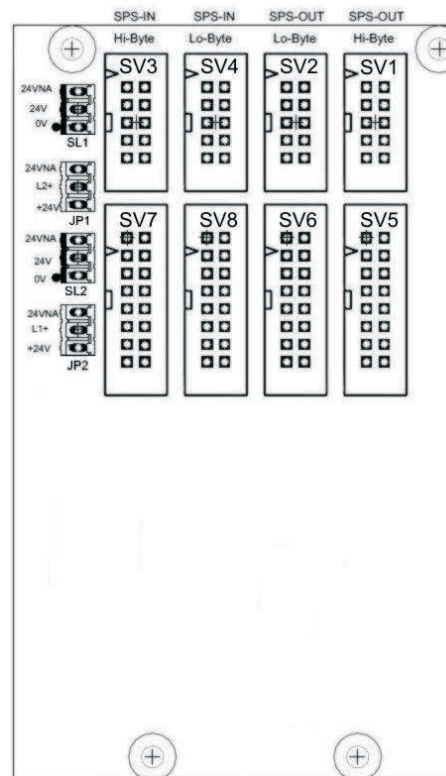
## 11.3 Technical data

Electrical/mechanical specifications	
Operating voltage	24 V DC $\pm 3\%$
Input/output voltage	0 to 10 V DC or $\pm 10$ V DC
Input impedance	See PLC manual
Output current	Module: max. 4.0 A per output PLC: see PLC manual
Connection	4 mm safety sockets
Front panel width	6 standard width units
<b>Subject to change</b>	

## 11.4 Pin allocation table

Pin	SV1	SV2	SV3	SV4	SV5	SV6
1	UA1	0 V	IE3	0 V	0 V	UA1
2	IA2	IE3	0 V	IA2	IA2	IA2
3	UA2	0 V	IE3	0 V	0 V	UA2
4	IA1	UE3	UE3	0 V	UA2	IA1
5	0 V	0 V	IE3	0 V	0 V	0 V
6	—	0 V	IE2	UA2	IA1	—
7	IE2	0 V	IE3	0 V	0 V	IE2
8	IE4	IE2	0 V	IA1	UA1	IE4
9	IE1	L1	L1	UE4	UE4	IE1
10	IE3	UE2	UE2	0 V	—	IE3
11	0 V	L1	L1	UE4	UE4	0 V
12	UE4	0 V	IE1	UA1	—	UE4
13	UE2	L1	L1	UE4	UE4	UE2
14	UE3	IE1	0 V	IE4	0 V	UE3
15	UE1	L1	L1	UE4	UE4	UE1
16	—	UE1	UE1	0 V	IE4	—

## 12 19-inch module for word processing



SV1, SV2: 10-pin outputs (high/low byte)

SV3, SV4: 10-pin inputs (high/low byte)

SV5, SV6: 16-pin outputs (high/low byte)

SV7, SV8: 16-pin inputs (high/low byte)

JP1, JP2: Supply via 24 V or 24 V NA

SL1, SL2: Connections for 24 V DC supply voltage



### Caution

This module is designed for direct connection to a PLC and must not be connected in parallel with other modules. This could damage the module outputs.

### 12.1 Structure and function

The 19-inch module for word processing extends the functional scope of your EduTrainer® PLC system. It has 16 digital inputs and 16 digital outputs, a two-line display and 4 pushbuttons for setting the input and output values.

The input and output signals of the module are connected with the outputs/inputs of the PLC via 10-pin and 16-pin flat connectors. The value of the PLC's input word can be set via a keypad. The PLC's input/output word is shown on a two-line display. The input/output word can be displayed in hexadecimal (HEX), decimal (DEC) or binary-coded decimal (BCD) format.

### 12.2 Commissioning

1. Connect the inputs/outputs to the PLC using a flat cable:
  - SV5/SV6/SV7/SV8: Siemens S7 (16-pin)
  - SV1/SV2/SV3/SV4: Other controller types (10-pin)
2. Connect the 24 V power supply by means of the 3-pin insulation-displacement connector SL1 or SL2.
3. The jumpers JP1 and JP2 define that the input module is directly supplied via 24 V.
4. Screw the 19-inch module into the frame.

### 12.3 Operation

The PLC's output word is shown directly in the second line of the display. To change the format of the display, proceed as follows:

- Keep pressing the → key until the cursor flashes at the end of the second line.
- Change the display format using the ↑↓ keys.
- Save your settings using the ENTER key.

The value of the PLC's input word is shown in the first line of the display. To change the value, proceed as follows.

- Select the element of the input word to be changed using the → key. It is indicated by the flashing cursor.
- Set the required value using the ↑↓ keys.
- Once all elements of the input word are set, confirm the input using the ENTER key. This confirmation outputs the set value to the PLC.

The display format is set as for the output word.

## 12.4 Technical data

Electrical/Mechanical	
Operating voltage	24 V DC
Input voltage	0 V – operating voltage
Input impedance	See PLC manual
Output voltage/output current	Operating voltage/0.3 mA, not short circuit proof
Connection	10/16-pin flat connector
Front-plate width	12 HP
<b>Subject to change</b>	

## 12.5 Contact allocation table

Pin	SV1	SV2	SV3	SV4	SV5	SV6	SV7	SV8
1	L2+	L2+	L1+	L1+	0V	0V	0V	0V
2	Q8	Q0	I8	I0	Q8	Q0	I8	I0
3	Q9	Q1	I9	I1	0V	0V	0V	0V
4	Q10	Q2	I10	I2	Q9	Q1	I9	I1
5	Q11	Q3	I11	I3	0V	0V	0V	0V
6	Q12	Q4	I12	I4	Q10	Q2	I10	I2
7	Q13	Q5	I13	I5	0V	0V	0V	0V
8	Q14	Q6	I14	I6	Q11	Q3	I11	I3
9	Q15	Q7	I15	I7	L2+	L2+	L1+	L1+
10	0V	0V	0V	0V	Q12	Q4	I12	I4
11	–	–	–	–	L2+	L2+	L1+	L1+
12	–	–	–	–	Q13	Q5	I13	I5
13	–	–	–	–	L2+	L2+	L1+	L1+
14	–	–	–	–	Q14	Q6	I14	I6
15	–	–	–	–	L2+	L2+	L1+	L1+
16	–	–	–	–	Q15	Q7	I15	I7



## 13 19-inch module for 37-pin system connector



### 13.1 Structure and function

The 19-inch module for 37-pin system connector extends the functional scope of your EduTrainer® PLC system. It enables the connection of 32 digital inputs via a 37-pin Sub-D plug as well as 32 digital outputs via a 37-pin Sub-D socket.

### 13.2 Commissioning

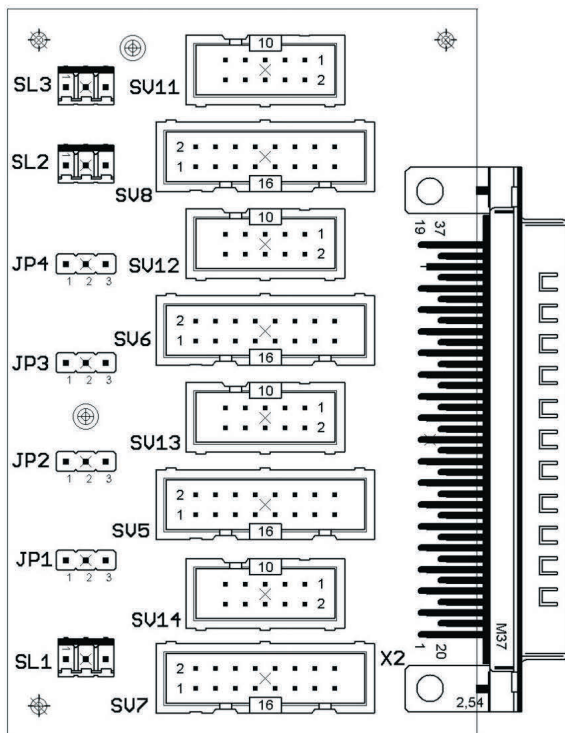
1. Connect the inputs/outputs to the PLC using a flat cable:
  - SV7/SV5/SV6/SV8: Siemens S7 (16-pin)
  - SV14/SV13/SV12/SV11: Other controller types (10-pin)
2. If using modules in parallel, these can be connected via the free insulation-displacement connector SV7/SV5/ SV6/SV8 or SV14/SV13/SV12/SV11 using flat cables.
3. Connect the 24 V power supply by means of the 3-pin connector SL1, SL2 or SL3.
4. The jumpers JP1, JP2, JP3 and JP4 define whether the PLC module is supplied directly via 24 V or via 24 V NA. 24 V NA is switched off in the event of an EMERGENCY-STOP.
  - Jumper between pins 1 and 2: supply via 24 V.
  - Jumper between pins 2 and 3: supply via 24 V NA.
5. Screw the 19-inch module into the frame.

### 13.3 Technical data

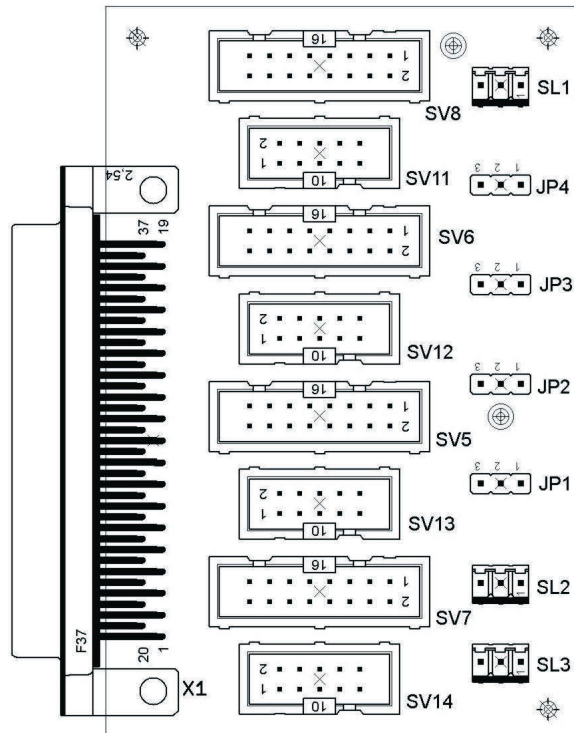
Electrical/Mechanical	
Operating voltage	24 V DC
Input voltage	Max. 24 V DC
Output current	Module: max. 0.5 A per output PLC: see PLC manual
Connection, outputs	37-pin Sub-D socket
Connection, inputs	37-pin Sub-D plug
Front-plate width	9 HP
<b>Subject to change</b>	

### 13.4 Contact allocation table

#### Plugs PLC inputs



#### Sockets PLC outputs



SV14, SV13, SV12, SV11: 10-pin outputs  
 SV7, SV5, SV6, SV8: 16-pin outputs  
 JP1, JP2, JP3, JP4: Supply via 24 V or 24 V NA  
 SL1, SL2, SL3: Connections for 24 V DC supply voltage

SV14, SV13, SV12, SV11: 10-pin inputs  
 SV7, SV5, SV6, SV8: 16-pin inputs  
 JP1, JP2, JP3, JP4: Supply via 24 V or 24 V NA  
 SL1, SL2, SL3: Connections for 24 V DC supply voltage



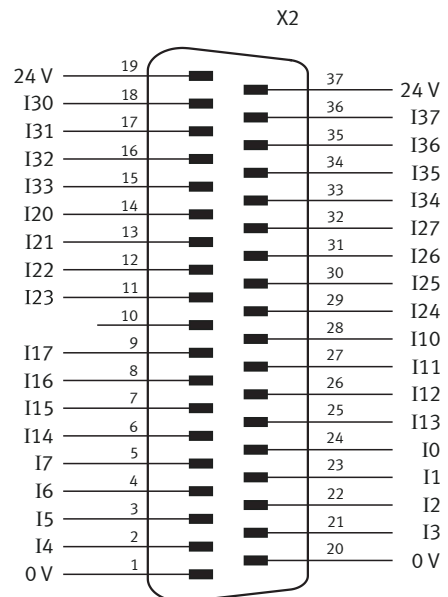
Pin	SV7	SV14	SV5	SV13	SV6	SV12	SV8	SV11
1	0 V	L1+	0 V	L2+	0 V	L1+	0 V	L2+
2	I7	I0	I17	I10	I27	I20	I37	I30
3	0 V	I1	0 V	I11	0 V	I21	0 V	I31
4	I6	I2	I16	I12	I26	I22	I36	I32
5	0 V	I3	0 V	I13	0 V	I23	0 V	I33
6	I5	I4	I15	I14	I25	I24	I35	I34
7	0 V	I5	0 V	I15	0 V	I25	0 V	I35
8	I4	I6	I14	I16	I24	I26	I34	I36
9	L1+	I7	L2+	I17	L1+	I27	L2+	I37
10	I3	0 V	I13	0 V	I23	0 V	I33	0 V
11	L1+	—	L2+	—	L1+	—	L2+	—
12	I2	—	I12	—	I22	—	I32	—
13	L1+	—	L2+	—	L1+	—	L2+	—
14	I1	—	I11	—	I21	—	I31	—
15	L1+	—	L2+	—	L1+	—	L2+	—
16	I0	—	I10	—	I20	—	I30	—

Allocation of the insulation-displacement connectors (PLC inputs)

Pin	X2
1	0 V
2	I4
3	I5
4	I6
5	I7
6	I14
7	I15
8	I16
9	I17
10	—
11	I23
12	I22

Pin	X2
13	I21
14	I20
15	I33
16	I32
17	I31
18	I30
19	24 V
20	0 V
21	I3
22	I2
23	I1
24	I0

Pin	X2
25	I13
26	I12
27	I11
28	I10
29	I24
30	I25
31	I26
32	I27
33	I34
34	I35
35	I36
36	I37
37	24 V



Allocation of the 37-pin plug (PLC inputs)

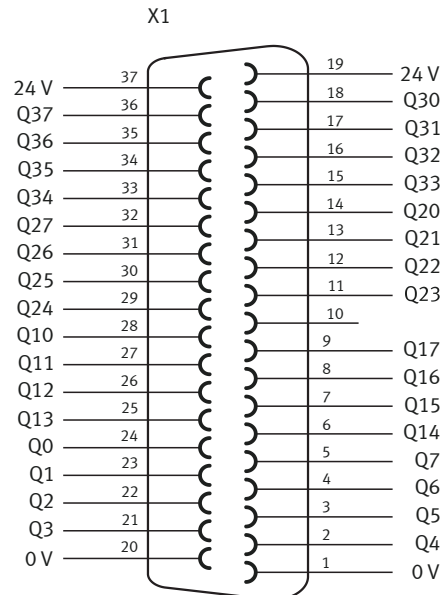
Pin	SV7	SV14	SV5	SV13	SV6	SV12	SV8	SV11
1	0 V	L1+	0 V	L2+	0 V	L3+	0 V	L4+
2	Q7	Q0	Q17	Q10	Q27	Q20	Q37	Q30
3	0 V	Q1	0 V	Q11	0 V	Q21	0 V	Q31
4	Q6	Q2	Q16	Q12	Q26	Q22	Q36	Q32
5	0 V	Q3	0 V	Q13	0 V	Q23	0 V	Q33
6	Q5	Q4	Q15	Q14	Q25	Q24	Q35	Q34
7	0 V	Q5	0 V	Q15	0 V	Q25	0 V	Q35
8	Q4	Q6	Q14	Q16	Q24	Q26	Q34	Q36
9	L1+	Q7	L2+	Q17	L3+	Q27	L4+	Q37
10	Q3	0 V	Q13	0 V	Q23	0 V	Q33	0 V
11	L1+	—	L2+	—	L3+	—	L4+	—
12	Q2	—	Q12	—	Q22	—	Q32	—
13	L1+	—	L2+	—	L3+	—	L4+	—
14	Q1	—	Q11	—	Q21	—	Q31	—
15	L1+	—	L2+	—	L3+	—	L4+	—
16	Q0	—	Q10	—	Q20	—	Q30	—

Allocation of the insulation-displacement connectors (PLC outputs)

Pin	X1
1	0 V
2	Q4
3	Q5
4	Q6
5	Q7
6	Q14
7	Q15
8	Q16
9	Q17
10	—
11	Q23
12	Q22

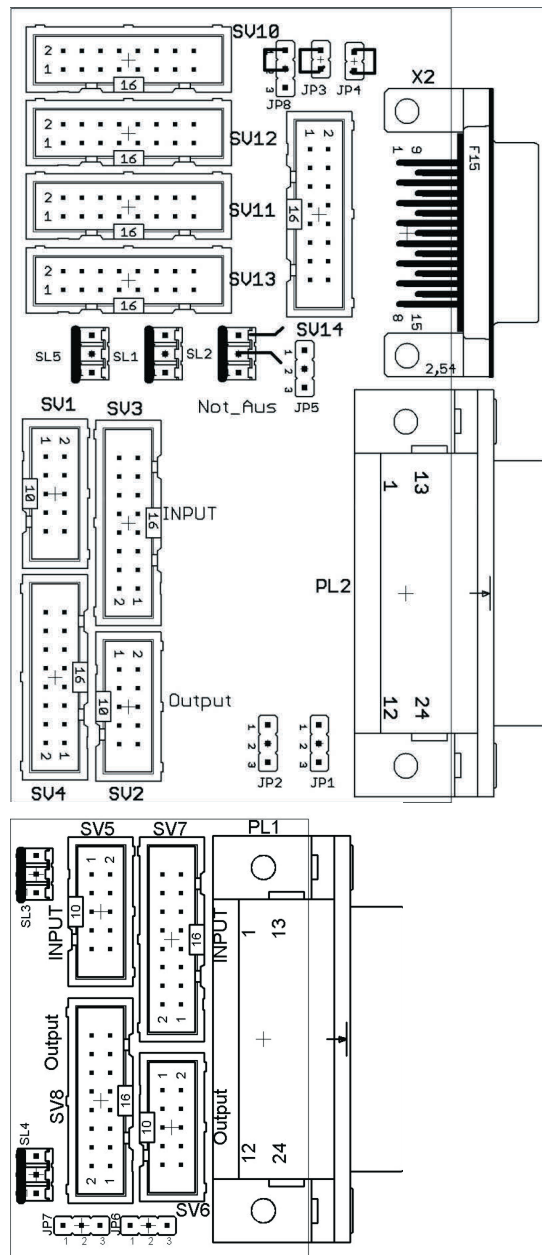
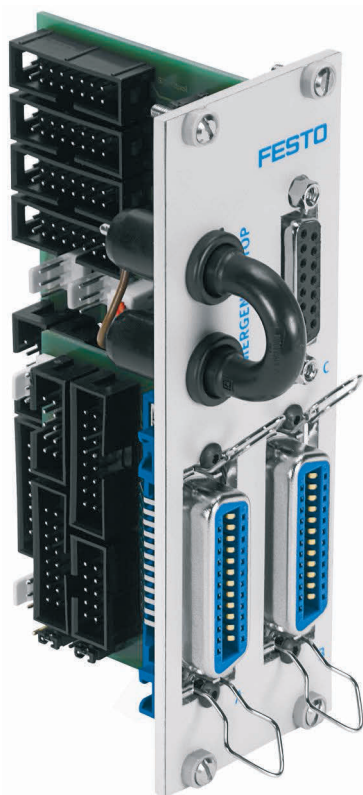
Pin	X1
13	Q21
14	Q20
15	Q33
16	Q32
17	Q31
18	Q30
19	24 V
20	0 V
21	Q3
22	Q2
23	Q1
24	Q0

Pin	X1
25	Q13
26	Q12
27	Q11
28	Q10
29	Q24
30	Q25
31	Q26
32	Q27
33	Q34
34	Q35
35	Q36
36	Q37
37	24 V



Allocation of the 37-pin socket (PLC outputs)

## 14 19-inch module for SysLink system connector



- SV1, SV2, SV5, SV6: 10-pin inputs/outputs
- SV3, SV4, SV7, SV8: 16-pin inputs/outputs
- SV10: Analogue I/Os (S7 40-pin top)
- SV11: Analogue I/Os (S7 40-pin bottom)
- SV12: Analogue I/Os (S7 20-pin top)
- SV13: Analogue I/Os (S7 20-pin bottom)
- SV14: Analogue I/Os
- JP2: Digital outputs byte 1 via 24 V or 24 V NA
- JP8: Connection from EMERGENCY STOP to bit 1.5
- JP5: Analogue outputs via 24 V or 24 V NA
- JP7: Digital outputs byte 0 via 24 V or 24 V NA
- SL1, SL2: Connections for 24 V DC supply voltage
- X2: Analogue inputs/outputs
- PL1, PL2: Digital inputs/outputs

### 14.1 Structure and function

The 19" SysLink module expands the scope of functions of your PLC EduTrainer® system.

Eight digital 24 V I/Os can be connected to your model (e.g. MPS) with appropriate cables via each of the two Centronics plugs (A and B). A jumper plug makes it possible to deactivate outputs in the event of an emergency stop.

Plugs A and B are configured as follows at the factory:

- A: station (24 V via emergency stop jumper)
- B: operation (24 V continuous)

This configuration can be changed with the help of jumpers JP2 and JP7.

Socket C makes it possible to connect 4 analogue inputs and 2 analogue outputs.

### 14.2 Commissioning

1. Connect the digital inputs and outputs to the PLC with a flat cable.
  - SV3/SV4 and SV7/SV8: Siemens S7 (16-pin)
  - SV1/SV2 and SV5/SV6: other types of controllers (10-pin)
2. When using modules in parallel, they can be connected by means of a flat cable via the free insulation-displacement connectors SV1 through SV8.
3. Connect the analogue inputs and outputs to the PLC with a flat cable.
  - SV12/SV13: Siemens S7 analogue additional module with 20-pin plug (2 x 16-pin)
  - SV10/SV11: Siemens S7 integrated analogue module with 40-pin plug (2 x 16-pin)
  - SV14: other types of controllers (16-pin)
4. When using modules in parallel, they can be connected by means of a flat cable via the free insulation-displacement connector SV14.
5. Connect the 24 V supply power via 3-pin connector SL1 or SL2.
6. Jumpers JP2, JP5 and JP7 are used to determine whether PLC output modules will be supplied with power directly via 24 V, or via 24 V NA (emergency stop). 24 V NA is deactivated in the event of an emergency stop.
  - Jumper between pins 1 and 2: power supply via 24 V NA
  - Jumper between pins 2 and 3: power supply via 24 V
7. An emergency stop can be initiated with the short-circuit connector (24 V NA is interrupted).
8. Screw the 19" module to the frame.

#### Note

Jumper JP8 is connected from emergency stop to bit 1.5 for all preferred variants (JP8: pins 1 and 2 connected).

Jumper JP8 is needed when connecting an MPS station to the module. Jumper JP8 must be removed when the module is used for other purposes (JP8: pins 2 and 3 connected).

### 14.3 Technical data

Electrical/Mechanical	
Operating voltage	24 V DC $\pm$ 3%
Digital inputs/outputs Input voltage Output current	0 V to operating voltage Module: max. 0.5 A per output PLC: see PLC manual
Analog inputs/outputs Input/output voltage Input impedance Output current	0 to 10 V DC and $\pm$ 10 V DC respectively See PLC manual Module: max. 0.5 A per output PLC: see PLC manual
Connection	4 mm safety sockets
Front-plate width	9 HP
<b>Subject to change</b>	

### 14.4 Contact allocation table

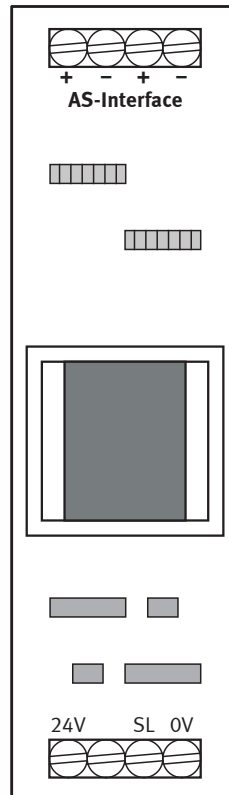
#### 14.4.1 Analogue inputs/outputs

Pin	SV14	SV10	SV13	SV11	SV12	X2
1	UA1	GNDE	0V	GND A	IE3	UA1
2	IA2	IE3	IA2	IA2	GNDE	UA2
3	UA2	GNDE	0V	GND A	IE3	GND A
4	IA1	UE3	GND A	UA2	UE3	IE2
5	GND A	GNDE	0V	GND A	IE3	IE1
6	—	GNDE	UA2	IA1	IE2	GNDE
7	IE2	GNDE	0V	GND A	IE3	UE2
8	IE4	IE2	IA1	UA1	GNDE	UE1
9	IE1	L3+	UE4	UE4	L3+	IA2
10	IE3	UE2	GND A	—	UE2	IA1
11	GNDE	L3+	UE4	UE4	L3+	—
12	UE4	GNDE	UA1	—	IE1	IE4
13	UE2	L3+	UE4	UE4	L3+	IE3
14	UE3	IE1	IE4	GNDE	GNDE	UE4
15	UE1	L3+	UE4	UE4	L3+	UE3
16	—	UE1	GNDE	IE4	UE1	—

### 14.4.2 Digital inputs/outputs

Pin	SV5	SV6	SV7	SV8	PL1	SV1	SV2	SV3	SV4	PL2
1	24V	L2+	0V	0V	Q0	24V_1	L12+	0V_1	0V_1	Q10
2	I0	Q0	I7	Q7	Q1	I10	Q10	I17	Q17	Q11
3	I1	Q1	0V	0V	Q2	I11	Q11	0V_1	0V_1	Q12
4	I2	Q2	I6	Q6	Q3	I12	Q12	I16	Q16	Q13
5	I3	Q3	0V	0V	Q4	I13	Q13	0V_1	0V_1	Q14
6	I4	Q4	I5	Q5	Q5	I14	Q14	I15	Q15	Q15
7	I5	Q5	0V	0V	Q6	I15	Q15	0V_1	0V_1	Q16
8	I6	Q6	I4	Q4	Q7	I16	Q16	I14	Q14	Q17
9	I7	Q7	24V	L2+	L1+	I17	Q17	24V_1	L12+	L11+
10	0V	0V	I3	Q3	L1+	0V_1	0V_1	I13	Q13	L11+
11	—	—	24V	L2+	0V	—	—	24V_1	L12+	0V_1
12	—	—	I2	Q2	0V	—	—	I12	Q12	0V_1
13	—	—	24V	L2+	I0	—	—	24V_1	L12+	I10
14	—	—	I1	Q1	I1	—	—	I11	Q11	I11
15	—	—	24V	L2+	I2	—	—	24V_1	L12+	I12
16	—	—	I0	Q0	I3	—	—	I10	Q10	I13
17	—	—	—	—	I4	—	—	—	—	I14
18	—	—	—	—	I5	—	—	—	—	I15
19	—	—	—	—	I6	—	—	—	—	I16
20	—	—	—	—	I7	—	—	—	—	I17
21	—	—	—	—	24V	—	—	—	—	24V_1
22	—	—	—	—	24V	—	—	—	—	24V_1
23	—	—	—	—	0V	—	—	—	—	0V_1
24	—	—	—	—	0V	—	—	—	—	0V_1

## 15 19-inch AS-interface module



Screw terminals for 24 V DC supply power (0 V, 24 V)  
and protective earth conductor  
Screw terminals for two ASI strings: ASI-, ASI+

### 15.1 Design and function

The 19-inch AS-interface module expands the scope of functions of your PLC EduTrainer® system. Thanks to its integrated AS-interface filter, and in combination with a corresponding AS-interface controller module, it allows for direct connection of AS-interface components via the two M12 AS-interface sockets.

The module supplies power to the AS-interface controller module and makes the AS-interface connection available externally via two M12 AS-interface sockets.

#### Note

Use of the 19-inch AS-interface module is only permissible for training purposes.

## 15.2 Commissioning

1. Connect the 0 V and 24 V screw terminals to the EduTrainer power supply module via the ring cable lugs and wire end sleeves with the help of the blue and red cables.
2. Connect the protective earth screw terminal to the protective earth terminal on the EduTrainer housing with the green-yellow wire (ring cable lug and wire end sleeve).
3. Connect the vacant ASI+ and ASI- screw terminals to the ASI+ and ASI- terminals on the AS-interface controller module via the yellow AS-interface cable (wire end sleeves).
4. Screw the 19-inch module into the frame.

## 15.3 Technical data

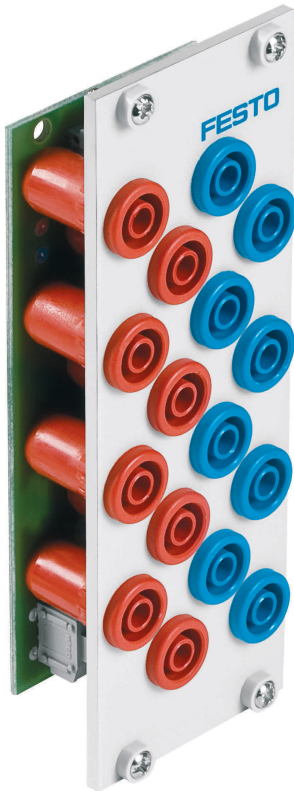
Electrical / mechanical	
Operating voltage	24 V DC $\pm$ 3%
AS-interface voltage	24 V DC $\pm$ 3%
Connection	M12 AS-interface socket
Front panel width	6 HP
<b>Subject to change</b>	

## 15.4 Pin allocation table

Pin	M12 x 1			
1	ASI+			
2				
3	ASI-			
4				



## 16 19-inch module 24 V / 0 V



### 16.1 Design and function

The 19-inch module 24 V / 0 V extends the scope of functions of your PLC EduTrainer® system. It's equipped with eight 24 V and eight 0 V outputs laid out as 4 mm safety sockets.

### 16.2 Commissioning

1. Connect 24 V supply voltage via the single-pole terminal.
2. Connect 0 V supply voltage via the single-pole terminal.
3. Screw the 19" module into the rack.

### 16.3 Technical data

Electrical/Mechanical	
Operating voltage	24 V DC 0 V DC
Connection	4 mm safety sockets
Front-plate width	9 HP
<b>Subject to change</b>	

## 17 19-inch module 24 V



### 17.1 Design and function

The 19-inch module 24 V extends the scope of functions of your PLC EduTrainer® system. It's equipped with eight 24 V outputs laid out as 4 mm safety sockets.

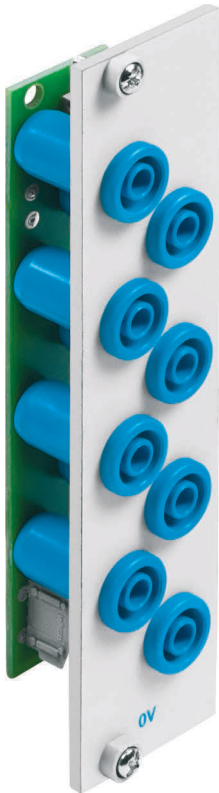
### 17.2 Commissioning

1. Connect 24 V supply voltage via the single-pole terminal.
2. Screw the 19-inch module into the rack.

### 17.3 Technical data

<b>Electrical/Mechanical</b>	
Operating voltage	24 V DC $\pm 3\%$
Output current	Max. 4.0 A
Connection	4 mm safety sockets
Front-plate width	9 HP
<b>Subject to change</b>	

## 18 19-inch module 0 V



### 18.1 Layout and function

The 19-inch module 0 V extends the scope of functions of your PLC EduTrainer® system. It's equipped with eight 0 V outputs laid out as 4 mm safety sockets.

### 18.2 Commissioning

1. Connect 0 V supply voltage via the single-pole terminal.
2. Screw the 19-inch module into the rack.

### 18.3 Technical data

Electrical/mechanical specifications	
Operating voltage	0 V DC
Connection	4 mm safety sockets
Front panel width	6 standard width units
<b>Subject to change</b>	

## 19 19-inch blanking plates



The 19-inch blanking plates are used to cover unused plug-in slots. The blanking plates are available in widths of 3, 6, 9, 12, 18, and 42 HP.

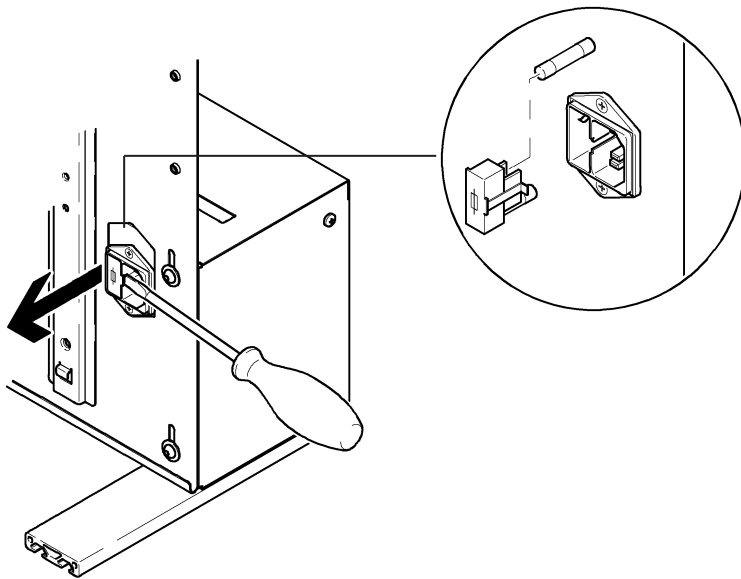
## 20 Maintenance and care

### 20.1 Cleaning

Clean the housing using a clean, dry cloth if required.

### 20.2 Changing fuses

1. Open the fuse compartment on the rear of the housing.
2. Replace the defective glass fuse with a replacement fuse (3.15 A/250 V).



## 21 Disposal



Electronic waste contains reusable materials and must not be disposed of with the trash. Bring electronic waste to a designated collection point.











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