Trainingssystem

PLC Function-Simulators
Bus technology
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Trainingssystem
PLC / Function-Simulators / Technology-Models

The advantage’s of this didactic system:

All Didactic-Equipment from our house follows the same concept: All elements for education are compatible.

Components from Pneumatics, Electrics, Hydraulics and PLC with Function-Simulators can be use in this different Systems.

Now, we have three different PLC-Systems in our Didactic system integrated. That’s OMRON, SIEMENS and MITSUBISHI. Principle we can integrated every PLC-kind in our system.

It’s doesn’t matter: If you have Pneumatics or the insertion system in Hydraulics or both in PLC-Technologie with Function-Simulators,

all equipment can be use in all different Systems.

The Literatur is from our house. That’s the result from 15 years know how in seminars for the systems above. Additionally for every PLC system we are deliver specified document from the due hardware.

The term Simulator means equipment for different process without movement.

The term Technology-model means equipment for different process with movement.

The term Simulator-model is the combination of both above.

At this time we have four different Technoloy-models: Production station "Distribution" Production station "Testing ground"

Production station "Testing ground"

Production station "Process"

Production station "Process"

Production station "Machine"

Production station "Machine"

all Production stations are independent and can be suppose with other stations. So, you can built a small automation factory, the new way: Mechatronic!
PLC - Unit's
OMRON

Description | Order - No.
--- | ---
| | PLC | S-010/O |
- PLC - Compact-unit
- Voltage supply 24 VDC
- 12 digital Input's
- 8 Output's, Relay with socket 250 VAC/2A
- Instruction Execution time: 0,75 µs (Basic Instruction) 2,25 µs (Function)
- integrated High-Speed-Counter up to 2 KHz
- different languages (6 languages)
- 133 (12 Basic, 121 Special) Instruction
- Memory up to 2878 Words (Word=2 Byte)
- 3472 Auxiliary Relay
- 136 Flags
- 1600 Holding Relay
- 512 Timer / Counter
- Real-Time-Clock
- expanding up to 160 In-/Output's
- also with 12 I / 8 O and with 24 I / 16 O delivery
- useable for DIN A4-System (Rack) or for Pneumatics pushing system
- integrated Function-model "7-Segment-LED"
- integrated Digital-Simulator

| | PLC | S - 100 / O |
- PLC - modular unit
- Voltage supply 24 VDC
- 16 digital Input's each Modul
- 12-16 Output's, Relay with socket 250 VAC/2A or Transistor with socket 24 VDC/0,3 A
- Instruction Execution time: 0,70 µs (Basic Instruction) 2,25 µs (Function)
- integrated High-Speed-Counter up to 2 KHz
- different languages (6 languages)
- 133 (12 Basic, 121 Special) Instruction
- Memory 8 KByte)
- 3472 Auxiliary Relay
- 136 Flags
- 1600 Holding Relay
- 512 Timer / Counter
- Real-Time-Clock
- expanding up to 480 In-/Output's
- Sub-Base-Plates and Expanding units for 3,5,8,10 places possible
- useable for DIN A4-System (Rack) or for Pneumatics pushing system
- integrated Function-model "7-Segment-LED"
<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLC PRO-15</strong></td>
<td></td>
</tr>
<tr>
<td>o Programming - Console</td>
<td>PRO-15</td>
</tr>
<tr>
<td>o directly connecting on the top of the PLC</td>
<td></td>
</tr>
<tr>
<td>o Move’able Switch for three different Mode’s:</td>
<td></td>
</tr>
<tr>
<td>RUN / MONITOR / PROGRAM</td>
<td></td>
</tr>
<tr>
<td>o Connection for Cassette-recorder</td>
<td></td>
</tr>
<tr>
<td>o useable for S - 100</td>
<td></td>
</tr>
<tr>
<td><strong>PLC PRO-27</strong></td>
<td></td>
</tr>
<tr>
<td>o Programming - Console</td>
<td>PRO-27</td>
</tr>
<tr>
<td>o with cable connecting to the PLC (cabel ordering seperately)</td>
<td></td>
</tr>
<tr>
<td>o Key-switch for three different Mode’s:</td>
<td></td>
</tr>
<tr>
<td>RUN / MONITOR / PROGRAM</td>
<td></td>
</tr>
<tr>
<td>o Connection for Cassette-recorder</td>
<td></td>
</tr>
<tr>
<td>o useable for S - 100 and S - 010</td>
<td></td>
</tr>
<tr>
<td><strong>PLC CQM-PRO001</strong></td>
<td></td>
</tr>
<tr>
<td>o Programming - Console</td>
<td>CQM-PRO001</td>
</tr>
<tr>
<td>o with cable connecting to the PLC (cabel ordering seperately)</td>
<td></td>
</tr>
<tr>
<td>o Key-switch for three different Mode´s:</td>
<td></td>
</tr>
<tr>
<td>RUN / MONITOR / PROGRAM</td>
<td></td>
</tr>
<tr>
<td>o Connection for Cassette-recorder</td>
<td></td>
</tr>
<tr>
<td>o useable for S - 100</td>
<td></td>
</tr>
</tbody>
</table>
PLC - Unit’s
Mitsubishi

Description          Order - No.

PLC     S - 010 / M
- PLC - Compact-unit
- Voltage supply 24 VDC
- 16 digital Input’s
- 14 Output’s, Relay 24 VDC/2A
- Instruction Execution time: 1,60 µs (Basic Instruction)
  3,5 µs
- (Function)
  - integrated seriell connection for communikation with PC
- 4 integrated High-Speed-Counter up to 5 KHz
- 20 Basic Instruction’s
- Memory up to 800 Words (Word=2 Byte)
- 496 Auxiliary Relay
- 56 Flags
- 16 Holding Relay
- 80 Timer / 16 Counter
- expanding up to 256 In-/Output’s
- also with 8 I / 6 O and with 12 I / 8 O delivery
- useable for DIN A4-System (Rack) or for Pneumatics pushing system
- integrated Function-model “7-Segment-LED”

PLC     S-100/M
- PLC - Compact-unit
- Voltage supply 24 VDC
- 14 digital Input’s
- 10 Output’s, Relay 24 VDC/2A
- expandable with Analog-module
- Instruction Execution time: 1,60 µs (Basic Instruction)
  3,5 µs
- (Function)
  - integrated seriell connection for communikation with PC
- 4 integrated High-Speed-Counter up to 5 KHz
- 20 Basic Instruction’s
- Memory up to 2000 Words (Word=2 Byte)
- 384 Auxiliary Relay
- 57 Flags
- 128 Holding Relay
- 64 Timer / 32 Counter
- expanding up to 128 In-/Output’s
- also with 24 I / 16 O and with 36 I / 24 O delivery
- useable for DIN A4-System (Rack) or for Pneumatics pushing system
- integrated Function-model “7-Segment-LED”
### PLC - Programming units and Software

**Mitsubishi**

<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PG</strong></td>
<td></td>
</tr>
<tr>
<td>o Programming - Console</td>
<td></td>
</tr>
<tr>
<td>o with cable connecting to the PLC (cabel ordering seperately)</td>
<td></td>
</tr>
<tr>
<td>o useable for S - 100 and S - 010</td>
<td></td>
</tr>
</tbody>
</table>

**FX**

![Programming Console](image1.png)

### Description

**Description**

- PC-Software for MS-DOS/Windows
- Ladder diagram and Instructionslist
- German / English
- Disc 3,5"
- incl. 1 Connecting cabel PC - SPS
- incl. Instruction book

![Software Diagram](image2.png)
The PLC is delocable from the didactical-subplate with two screws, thereby easy to integrate in Mechatronics-Flexible production system!!
<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLC</td>
<td>S-100/S7</td>
</tr>
</tbody>
</table>

- PLC - modular-unit S7-300 (CPU 313 C)
- Voltage supply 24 VDC
- 24 digital Input’s
- 16 digital Output’s, 24 VDC / 0,5A
- 4 analog Input’s, +10V, +20mA, solution 11Bit
- 1 analog Input for Resistance and Temperature
- 2 analog Output, +10V, +20mA, solution 11Bit
- Instruction Execution time: 0.1 – 0.2 μs

- (Basic) 0.5 μs
- (Word-Operation)

- integrated seriell connection for communication with PC (MPI-Interface for 32 branches)
- integrated High-Speed-Counter up to 30 KHz
- Word Instructions, fluid-point addition available
- Memory 32 KByte
- 2048 Auxiliary Relay, all remanent adjustable as Holding Relay
- 256 Timer / 256 Counter, all remanent adjustable
- Puls-with-modulation for valve control functions
- Programmable with our Software WINSPS-S7
- Real-Time-Clock
- programmable with S7-Software or WINSPS
- useable for DIN A4-System (Rack) or for Pneumatics pushing system
- integrated Function-model "7-Segment-LED"

The PLC is delocable from the didactical-subplate with two screws, thereby easy to integrate in Mechatronics-Flexible production system!!

3 connectors for MCS
The PLC is delocable from the didactical-subplate with two screws, thereby easy to integrate in Mechatronics-Flexible production system!!

### Description

<table>
<thead>
<tr>
<th>PLC</th>
<th>S-100-S7DP-MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>S-100-S7DP-MCS</td>
</tr>
<tr>
<td>o</td>
<td>CPU 314 CDP</td>
</tr>
<tr>
<td>o</td>
<td>same as S-100-S7DP-MCS but with extra</td>
</tr>
<tr>
<td>o</td>
<td>4 analog Input’s, +10V, +20mA, solution 11Bit</td>
</tr>
<tr>
<td>o</td>
<td>1 analog Input for Resistance and Temperure</td>
</tr>
<tr>
<td>o</td>
<td>2 analog Output, +10V, +20mA, solution 11Bit</td>
</tr>
<tr>
<td>o</td>
<td>ideal for the base education as with the CPU 313C, but after the base training you can start with education in Bus technology.</td>
</tr>
<tr>
<td>o</td>
<td>Programmable with our Software WINSPS-S7</td>
</tr>
<tr>
<td>o</td>
<td>Real-Time-Clock</td>
</tr>
<tr>
<td>o</td>
<td>Puls-with-modulation for valve control functions</td>
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<tr>
<td>o</td>
<td>integrat High-Speed-Counter up to 30 KHz</td>
</tr>
<tr>
<td>o</td>
<td>Word Instructions, fluid-point addition available</td>
</tr>
<tr>
<td>o</td>
<td>Memory 32 KByte</td>
</tr>
<tr>
<td>o</td>
<td>2048 Auxiliary Relay, all remanent adjustable as Holding Relay</td>
</tr>
<tr>
<td>o</td>
<td>256 Timer / 256 Counter, all remanent adjustable</td>
</tr>
<tr>
<td>o</td>
<td>Instruction Execution time: 0.1 – 0.2 μs</td>
</tr>
<tr>
<td>o</td>
<td>(Basic Instruction)</td>
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<tr>
<td>o</td>
<td>0.5 μs</td>
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<tr>
<td>o</td>
<td>(Word-Operation)</td>
</tr>
<tr>
<td>o</td>
<td>integrated seriell connection for communication with PC (MPI-Interface for 32 branches)</td>
</tr>
<tr>
<td>o</td>
<td>integrated High-Speed-Counter up to 30 KHz</td>
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<tr>
<td>o</td>
<td>Word Instructions, fluid-point addition available</td>
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<td>256 Timer / 256 Counter, all remanent adjustable</td>
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<td>o</td>
<td>Puls-with-modulation for valve control functions</td>
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<tr>
<td>o</td>
<td>Programmable with our Software WINSPS-S7</td>
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<tr>
<td>o</td>
<td>Real-Time-Clock</td>
</tr>
<tr>
<td>o</td>
<td>programmable with S7-Software or WINSPS</td>
</tr>
<tr>
<td>o</td>
<td>useable for DIN A4-System (Rack) or for Pneumatics pushing system</td>
</tr>
<tr>
<td>o</td>
<td>incl. top table Aluminium frame</td>
</tr>
<tr>
<td>o</td>
<td>PL - modular-unit S7-300 (CPU 314 C DP)</td>
</tr>
<tr>
<td>o</td>
<td>Voltage supply 24 VDC</td>
</tr>
<tr>
<td>o</td>
<td>16 digital Input’s</td>
</tr>
<tr>
<td>o</td>
<td>16 digital Output’s, 24 VDC / 0.5A</td>
</tr>
<tr>
<td>o</td>
<td>DP-Master-Interface</td>
</tr>
<tr>
<td>o</td>
<td>Instruction Execution time: 0.1 – 0.2 μs</td>
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<tr>
<td>o</td>
<td>(Basic Instruction)</td>
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<tr>
<td>o</td>
<td>0.5 μs</td>
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<td>o</td>
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<tr>
<td>o</td>
<td>Puls-with-modulation for valve control functions</td>
</tr>
<tr>
<td>o</td>
<td>Programmable with our Software WINSPS-S7</td>
</tr>
<tr>
<td>o</td>
<td>Real-Time-Clock</td>
</tr>
<tr>
<td>o</td>
<td>programmable with S7-Software or WINSPS</td>
</tr>
<tr>
<td>o</td>
<td>useable for DIN A4-System (Rack) or for Pneumatics pushing system</td>
</tr>
<tr>
<td>o</td>
<td>incl. top table Aluminium frame</td>
</tr>
</tbody>
</table>
Slaves with all Protocols

Basicly, we can implement the Slave-Adapter with following Bus controllers: Profibus-DP, Ethernet TCP/IP, Profinet IO, Interbus, DeviceNet, CANopen, CAL, MODBUS, CC-Link, Firewire, LONWORKS.

Our Module’s (on the next page) are realized with a **Profibus-Controller**. Other controllers can be switched very easy on the same place as the PROFIBUS-Controller. The I/O’s are the same.
**PLC - Slaves with Profibus-DP-Interface**

Basicly, we can implement the Slave-Adapter with following Bus controllers: Profibus-DP, Ethernet TCP/IP, Profinet IO, Interbus, DeviceNet, CANopen, CAL, MODBUS, CC-Link, Firewire, LONWORKS.

Our Module’s below are realized with a Profibus-Controller. Other controllers can be switched very easy on the same place as the PROFIBUS-Controller. The I/O’s are the same.

---

**Slave-Adapter**

**MCS-569**

- Adapter to realize the SUB-D-plug from a PLC or a following Base-slave to the 4 mm safety plugs. Than you can connect very easy the equipments like Valve’s, switches, sensors, and relays from our Electropneumatics and Electrohydraulics system to the Bus-technology.
- SUB-D-connector with 1.5 m cable
- 6 digital Inputs; 24 VDC
- 4 digital Outputs; 24 VDC; 0.5A
- 24 VDC-Supply

---

**Base-Slave**

**MCS-DP-2D**

- Slave with digital I/O’s
- together with MCS-569 also to connect to standard components like Valve’s, switches, sensors, and relays from our Electropneumatics and Electrohydraulics system to the Bus-technology
- Profibus-Controller with a max. Data width up to 32 Byte
- 12 digital Inputs; 24 VDC

---

**Base-Slave**

**MCS-DP-2DA**

- Slave with digital I/O’s
- together with MCS-569 also to connect to standard components like Valve’s, switches, sensors, and relays from our Electropneumatics and Electrohydraulics system to the Bus-technology
- Profibus-Controller with a max. Data width up to 32 Byte
- 12 digital Inputs; 24 VDC
- 12 digital Outputs; 24 VDC; 0.5A
- 2 analogous Inputs, 0-10V; 16 Bit
PLC - Slaves with Profibus-DP-Interface

Basically, we can implement the Slave-Adapter with following Bus controllers: Profibus-DP, Ethernet TCP-/IP, Profinet IO, Interbus, DeviceNet, CANopen, CAL, MODBUS, CC-Link, Firewire, LONWORKS.

Our Module’s below are realized with a Profibus-Controller. Other controllers can be switched very easy on the same place as the PROFIBUS-Controller. The I/O’s are the same.

**MCS-700-Slave**  **MCS-DP-700**

- Slave with digital I/O’s
- together with MCS-569 also to connect to standard components like Valve’s, switches, sensors, and relays from our Electropneumatics and Electrohydraulics system to the Bus-technology
- Profibus-Controller with a max. Data width up to 32 Byte
- 16 digital Inputs; 24 VDC
- 12 digital Outputs; 24 VDC; 0,5A
- 2 analogous Inputs, 0-10V; 16 Bit

**Big-Slave**  **MCS-DP-10**

- Slave with digital I/O’s
- together with MCS-569 also to connect to standard components like Valve’s, switches, sensors, and relays from our Electropneumatics and Electrohydraulics system to the Bus-technology
- Profibus-Controller with a max. Data width up to 32 Byte
- 48 digital Inputs; 24 VDC
- 40 digital Outputs; 24 VDC; 0,5A
- 2 analogous Inputs, 0-10V; 16 Bit

Exactly for our Big-Module-Systems
Easy Start:

WINSPS is a Programming- Simulations- and Diagnostik-Software für PLC’s from the company SIEMENS. With S7-Software, you can programming all CPU’s (S7-300 und S7-400) and with the integrated Simulator you can check the created program. With a MPI-Interface you can connect a real PLC (CPU-Type’s are described above). The programming and working is the same like a real PLC. Digital I/O and Analogous I/O and also BCD-Display’s and BCD-Input’s is possible to configure. Via a mouse you can switch the CPU in RUN or STOP and also with a mouse you can switch the configured input’s. The input’s are showed via LED-control lamps. Analogous the program the output’s would be switched from the created program and shows your that also with LED-control lamps.

Also it is possible to create Profibus-DP-Nets, configuration and programming

Order-No. WINSPS-S7
**Easy Start:**

SPS-VISU is a Simulation system for STEP®5 und STEP®7-Programms. The PLC-Programm and the Installation or Machine will be simulated. The PLC-Program can be loaded and simulated from a S5D-Data file (STEP®5), a S7P-Data file (STEP®7) or from a S7-MMC-Data.

Order.-No. SPS-VISU-S7
# Software and Literatur

**OMRON / Mitsubishi / SIEMENS**

### Software for WINDOWS

<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC-Software for WINDOWS 95 / 98</td>
<td></td>
</tr>
<tr>
<td>Ladder diagram, Functions diagram and Instructions-list</td>
<td></td>
</tr>
<tr>
<td>German / English</td>
<td></td>
</tr>
<tr>
<td>Disk 3,5” or CD</td>
<td></td>
</tr>
<tr>
<td>Connecting cable PC - PLC</td>
<td></td>
</tr>
<tr>
<td>Incl. handbook</td>
<td></td>
</tr>
<tr>
<td>1) SYSWIN for OMRON-PLC’s</td>
<td></td>
</tr>
<tr>
<td>2) MELSEC MEDOC / MELSEC F for Mitsubishi PLC</td>
<td></td>
</tr>
<tr>
<td>3) WINSPS for SIEMENS S5 (only in German)</td>
<td></td>
</tr>
</tbody>
</table>

### Literatur

- Instruction book for programming unit                                     S-500
- The PLC - Trainer, Volume 1 (acc. IDV)                                    S-520
- The PLC - Trainer, Volume 2 (acc. IDV)                                    S-540
- The PLC - Trainer, Volume 3 (acc. IDV)                                    S-560

The Literatur are for the three different kinds of PLC delivery is possible!!

Additionally:

- for each Simulator a example-programm

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16
## Equipment Rack's

<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack S-050</td>
<td></td>
</tr>
<tr>
<td>o for PLC and Functions-simulators</td>
<td></td>
</tr>
<tr>
<td>o Height DIN A4</td>
<td></td>
</tr>
<tr>
<td>o Wide 720 mm</td>
<td></td>
</tr>
<tr>
<td>o 2 Installation-rows</td>
<td></td>
</tr>
<tr>
<td>o for PLC-Subplats and big / small Simulator-subplate's with 240 / 120 mm wide</td>
<td></td>
</tr>
<tr>
<td>also possible with only one row (S-060)</td>
<td></td>
</tr>
</tbody>
</table>

| Rack S-030  |             |
| o necessity for trolley LW-007 and LW-008 |             |
| o for PLC and Functions-simulators |             |
| o Height DIN A4 |             |
| o Wide 960 mm |             |
| o 1 Installation-rows |             |
| o for PLC-Subplats and big / small Simulator-Subplats with 240 / 120 mm wide |             |
**BCD - Chooser**

- BCD - Chooser, 4-digits

The BCD-Chooser are using for variable processes in control technology. The number 0 - 9 shows in the BCD-Code on 16 Outputs for an easy reading in the PLC.

**Example:**

After push a start button a pneumatic cylinder works so many times as choosing on the BCD-Chooser.

- Number of digital Inputs: 17
- Number of digital Outputs: 1

**Stepper Motor**

- Unipolar - Stepper Motor
- 200 Steps / Rotation
- 24 VDC

**Example:**

With a extern start button we are start the stepper motor with a frequency of 50 Hz.
A second extern switch for the direction are choose the rotating direction (clockwise or anticlockwise). The third extern switch means to stop the motor just in the moment when the stop signal a presented.

- Number of digital Inputs: 3
- Number of digital Outputs: 4
**Stepper-motor control unit S - 255**

- For high frequency control of a stepper motor
- Position, Rotation, Flagposition, Tact-Direction, Analog, Joystick
- 0 till 50 KHz in Tact-/Direction mode
- 0 till 25 KHz in all other modes
- 24 VDC
- USB-Interface
- 6 Input’s (Opto coupler), 24 VDC
- 3 Transistor Output’s (open collector)
- Current sinking adjustable from 0 till 100%
- Incl. Load condensator (important for brake situations)
- All connectors with 4 mm safety plugs

- Simply combination with the integrated Inputs-/ Outputs with a PLC or others (like LOGO) for many applications.
- 16 Positions or Rotation frequencies with the four Inputs are usable with a PLC or LOGO incl. software

---

**Stepper motor positioning module S - 257**

- Complete Modul consist of:
  - Stepper motor, Linear unit with toothbelt drive, Measuring unit
  - Stroke = 500 mm
  - Control with a PLC or with our stepper motor control unit (S-255).
  - Max. Torque: 39,6 Ncm
  - $I_{\text{max}}$: 0,28 A each connection
  - Rotation till app. 1,000 Rpm
  - Linear translation: 54 mm/Rotation
  - Integrable in Alu-subplate with 25 mm grid.
  - All connectors with 4 mm safety plugs

Incl. Program example with PLC and Stepper motor control unit
### Machine control display  
**Order - No.**: S - 260

- For Simulation of a complex machine control loop
- 1 Main-switch
- 2-digit Step-display (BCD)
- Emergency-Stop-Switch
- 2 Switches with detent
- 12 push switches
- 4 lamps
- Connecting with 4 mm safety plugs

**Example:**

For every control loop, we need a control display. It’s controlled some different comfortable control loop’s: Automatic, Emergency-Stop, etc. and a show display to showing with different lamps: Step’s, Interference, etc.

| Number of digital Inputs: | 15 |
| Number of digital Outputs: | 12 |

### Pt-100-Sensor  
**Order - No.**: S - 265

- To connect to the temperature-Input of the PLC
- 2-wire technology
- with 4 mm sockets

**Example:**

Control in a flower house  
Analogous control technology for temperatures

| Number of analogues Inputs: | 1 |
**Delta-Star-Simulator**  
*S - 400*

- Star triangle simulator
- Three lamps
- Simulation of main contactor, star contactor and triangle contactor

**Example:**
A three-phase motor shall be switched at first in the star to the reduction of the residual current on a third opposite the direct connection in the triangle. From the point of view of time limited after this start becomes the machine then into triangle changed.
The switching states "end", "star" and "triangle" become about LED’s shown. One over current fuse more thermally protects the engine against constant overload.

Number of the digital inputs: 7  
Number of the digital outputs: 7

**Relay-Safety relay unit**  
*S - 405*

- Additionally Simulator for S-400
- Practical delta-star control with contact control
- 3 relays with the one NO contact
- 1 fuse, manual operating and release, with a NC-contact

**Example:**
Starts in a control (e.g. delta-star, Motor start control) a disruptive incident, so is in a conventional control of (VPS) a faultless function given also, the contacts of the contactors carry out the function there.
One must with a PLC also perhaps. See appearing disturbances and trigger corresponding reports etc..
To convert around such questions in the reality is this simulator with the corresponding application case deduce.

**Pump-control-loop**  
*S - 410*

- Four pumps (LED)
- A three position switch (too high, too low, OK)

**Example:**
Four pumps are installed in a net as represented in the marginly. Through this one gradual to-or the print shall to switching off of the first two pumps be held in the net within a definite area.
An as similar as possible term shall and switching quantity of the two pumps are reached. The pump must so be switched off always which runs longest. A reaction time must both at the add-on and when switching off be waited, before the next step to-or is switched off (5 seconds).
Pump 3 is for a possible peak demand installed then and always shall switched to be, if the two for first pumps already in operation is and after ten seconds still the report of the P-E transducer "print too low" reported is.
Pump 4 are a need pump which must be switched on always then if one the two first pumps or this one motor contactor, (waiting period 2 seconds) is cancelled during the operating. The failure of a pump shall be questioned because of this about the motor contactor K1/K2 and reported about a respective external indication/acoustics.

Number of the digital inputs: 5  
Number of the digital outputs: 6
### Building site traffic light  S - 420

- Two Red-Green traffic lights
- Two sensors report a car (Switch)

**Example:**
The complete motor traffic must be escorted about a lane at a building site traffic light. The sensors B1 and B2 report the existence of one or several motor vehicles. Well, the control must so react depending on need. S0 shall with the external switch the plant one-and can be turned off.

<table>
<thead>
<tr>
<th>Number of the digital inputs:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of the digital outputs:</td>
<td>4</td>
</tr>
</tbody>
</table>

### Starting motor control  S - 430

- Four contactors (LED) for main and the three switch steps

**Example:**
To extend the initial torque and move the breakdown torque in dependence of the slip, the starting motor shall be switched for a slip-ring rotor into four steps.

<table>
<thead>
<tr>
<th>Number of digital inputs:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of digital outputs:</td>
<td>9</td>
</tr>
</tbody>
</table>

### Conveyor belt control  S - 440

- Three ribbons
  - Two by hand starting
  - The third must in dependence for this one upper two ribbons steered are

**Example:**
In dependence of two conveyor belts and the push button switch (ON, OFF) shall the third conveyor belt be headed automatically. The sensors (B1 -- B3) can be used as to ask the pieces

<table>
<thead>
<tr>
<th>Number of the digital inputs:</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of the digital outputs:</td>
<td>7</td>
</tr>
</tbody>
</table>
### Pedestrian lights  S - 450

- Mutual traffic lights (red green) for pedestrians
- Mutual traffic lights (red-yellow-green) for car
- Two demand switches for the pedestrian

**Example:**
The pedestrian light shall in this day operation go at calling of a pedestrian automatically. In the night operation shall the set of traffic lights work into indicator circuit (yellow lights). The switchover from day- to night operation shall be carried out with an external switch.

- Number of the digital inputs: 3
- Number of the digital outputs: 5

### Fan control  S - 460

- Respect air suppliers (switches)
- Coded 7 segment indication

**Example:**
In a car park switched on depending on need to eight air supply ventilators ON (by switches by hand). Runs 1-3 air suppliers, air exhausters shall so one become switched too. Runs 4-6 air suppliers, two shall so become air exhausters switched too. Runs 7-8 air suppliers, all three shall so become air exhausters switched too.

No order must be observed by hand but the control always shall recognize the number of the switched on air suppliers automatically.

Supposed from wear and tear arguments get so controlled the air exhausters, this they also controlledly become switched too. Well one even load of three air exhausters.

The number of the switched toos air exhausters shall be shown about the coded 7 segment indication.

A difficult formulation of a task which can be solved only with the word processing with a PLC. Also compare operations are to use.

- Number of the digital inputs: 8
- Number of the digital outputs: 7

### Colour mixed station  S - 465

- Three color choose switches
- A maximum sensor (switches)
- A minimum sensor (automatic)

**Example:**
Colour shall be mixed in a retain bin. As soon as one of the three color choose switch (red, green, blue) is pressed, the motor of M1 and M2 and the radiator immediately shall start B3. As soon as the two mixers run, the raw material shall for the duration of 24s be filled about valve Y1. The corresponding valve shall for the colour for a duration after 8s then of be 8s opened also.

Is the complete raw material filled shall mixed further 30s still be. The colour then can Y5 drain about the drain valve.

After the PLC has switched ON Y5 reports the simulator after approx. 6s that the retain bin is empty again. The drain valve then becomes Y5 closed again after that and the mixers are switched off.

Musting as soon as the maximum sensor has effect close all supply valves of (Y1-Y4)

- Number of the digital inputs: 5
- Number of the digital outputs: 8
### PLC - Roulette

<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLC - Roulette</strong></td>
<td>S - 470</td>
</tr>
<tr>
<td>respectively one start and STOP-key,</td>
<td>8 LED ` S (0 -- 7)</td>
</tr>
</tbody>
</table>

An electronic shall here the functions of bit´ s rotate for roulettes represent. If the Start button is pushed then shall with a low frequency (approx.ly) (0.3s Hz) the numbers 0-7 become switched ON. It always may of course become only a number switched ON at this. Runs the light she shall on, so with this frequency now be increased permanently to her the value of approx. 5 Hz reached has.

With this frequency the control runs so long till the Stop button is pressed. Then is the Stop button pressed, the event described above shall so be carried the other way round. Degrading 5 Hz except for 0.3s Hz well continuously.
Then is the lowest frequency reached the control stops and the last number is shown.

Number of the digital inputs: 2  
Number of the digital outputs: 8

### Car park house

<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Car park house</strong></td>
<td>S - 480</td>
</tr>
<tr>
<td>respectively one bring in-and bring out switch</td>
<td></td>
</tr>
</tbody>
</table>

A switch with detent for Sunday (ST) or weekday (WT)

The entry into a car park is steered by a barrier. A traffic lights in addition are (red, green) installed, whether the entry is still possible at all or not.

10 free places shall on weekdays and 20 free places shall be available on Sundays.

In addition, the current value for the free places in the car park shall be announced at an available 7 segment indication.

Becomes one bring in-or bring out signal by the two nonlocking keys to the PLC reported so shall become the barrier open and close after expiry of a time of 4 sec. again. This open or close will by a Lauflichtsimulation directly by the simulator created. In addition, the new current stand must for the free places and perhaps switched over the traffic lights.

Number of the digital inputs: 3  
Number of the digital outputs: 11
A PLC programme shall look after the correct movement for the elevator model.

Four floors shall be able to be run at the corresponding calling. One can call the lift and inform him at once whether you up or to below want in the ground floor and in the 1st upper floor. This causes a more intelligent programme though!
The lift has internally three Position switches: Does the first Position give a signal to the PLC this is the information for the PLC that the Elevator is in the near of the correct position and can change the speed of the Elevator to slowly. After a second signal of this Position, the Motor should be STOP. This works also in the other direction for a Start: First Signal: Slowly Start, second Signal: Fast

Explanation of the different areas:

**Cabine: (to PLC-Input’s)**
4 switches (1, 2, 3, 4) for the calls.  
4 yellow LED’s then (internal electronics)  
7-Segment indication shows the position (PLC-programming logic).

**Cabine -plug’s: (to PLC-Input’s)**
4 Output’s (to the PLC-Inputs) reports the signals from the switches from cabin to the PLC. (4 DI)

**Sensors: (to PLC-Input’s)**
1.: "Position" is the Reference for all level’s of the lift,  
(4 DI)  
2.: "Door is open" gives a signal, if the door is open (simulated running lights of the door, if the door is not complete closed),  
(1 DI)  
3.: "Call": From all levels every call is connected to a plug to give this information to the PLC,  
(6 DI)

**Inputs: (to PLC-Output’s)**
10 plug’s (can energized from the PLC outputs):
1.: BCD-Display to show the actual level of the elevator  
(4 DO)  
2.: Direction to show the drive direction on every level  
(2 DO)  
3. Door open, to start the simulation of the door movement  
(1 DO)  
4.: Motor: (to PLC-Output’s)  
3 plugs for Motor: Up, Down, Fast (with LED-control),  
(3 DO)

24VDC:

---

**Example:**

A PLC programme shall look after the correct movement for the elevator model.

Four floors shall be able to be run at the corresponding calling. One can call the lift and inform him at once whether you up or to below want in the ground floor and in the 1st upper floor. This causes a more intelligent programme though!
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**Example: left side**

Number of the digital inputs: 15  
Number of the digital outputs: 10

**Description**  
Order - No.  

<table>
<thead>
<tr>
<th>Elevator</th>
<th>S - 490</th>
</tr>
</thead>
<tbody>
<tr>
<td>o four levels</td>
<td></td>
</tr>
<tr>
<td>o Cabine moved to all levels</td>
<td></td>
</tr>
<tr>
<td>o Door opens with a Looping light-simulation</td>
<td></td>
</tr>
<tr>
<td>o Controlling with S - 100</td>
<td></td>
</tr>
</tbody>
</table>

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# Basic set

<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-010</td>
<td>S - 001/X</td>
</tr>
<tr>
<td>S-030</td>
<td></td>
</tr>
<tr>
<td>S-060</td>
<td></td>
</tr>
<tr>
<td>E-500.0</td>
<td></td>
</tr>
<tr>
<td>Simulators S-200 to S-420</td>
<td></td>
</tr>
</tbody>
</table>

with each one example

# Advanced set

<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
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</thead>
<tbody>
<tr>
<td>S-050</td>
<td>S - 002/X</td>
</tr>
<tr>
<td>Simulators S-430 to S-490</td>
<td></td>
</tr>
</tbody>
</table>

with each one example

# Complete set

<table>
<thead>
<tr>
<th>Description</th>
<th>Order - No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-100</td>
<td>S - 003/X</td>
</tr>
<tr>
<td>S-030</td>
<td></td>
</tr>
<tr>
<td>S-050</td>
<td></td>
</tr>
<tr>
<td>E-500.0</td>
<td></td>
</tr>
<tr>
<td>Simulators S-200 to S-490</td>
<td></td>
</tr>
</tbody>
</table>

with each one example
Win Ers-Didaktik-Workstation for Analogue control, close loop, PID

Workstation for open loop control

LC2010: Storage tank for use in a practical course of binary control engineering

Depending on different tasks students can develop binary controls for the workstation. Float switches give information about level. The level is varied by switching the three pumps on and off. Switches an at the control desk can be used for tasks such as emergency stop, process start and stop, interruption etc... Message lamps make the marking of error and process conditions possible. The signals of the float switches, toggle switches and buttons are provided at the panel’s laboratory sockets as 24V signals. The control of the pumps and lamps is made likewise by laboratory sockets with a 24V signal.

Workstation for open and close loop control

LC2030, Storage tank with Level, Flow and Temperature Control

Extension of the LC2010 with analog signals for monitoring level, flow and temperature (option). For level and flow control the pump’s flow rate can be steplessly adjusted. Level and flow signals are provided by laboratory socket as 0-10V signals. The flow rate is likewise adjusted over a laboratory socket as 0-10V signal. Temperature control is optional. With these feature not only level and flow but also temperature control is possible. The temperature signal is provided as a 0-10V-signal, the heater can be switched on or off.

LC2010, Open loop Level Control

1x Aluminium frame
2x Plexiglas storage tank, 150 x 200 x 400 (D x W x H, in mm), capacity approx. 9L
3x Radial pump, maximum flow rate 270 l/h
2x Valve for manual flow rate adjustment
3x Level floating switch
3x Quick-release connector, automatically closing for pump connecting
1 x Quick-release connector with drainage hose to empty tanks
2x Signal LED, green
1x Error LED, red
3x Control switch
2x Push button

LC2030, Open and close loop Level Control

As in LC2010, additional:
1x Centrifugal pump with adjustable flow rate, max. 230 L/h (substitutes one radial pump)
1x Process pressure transducer for level measurement
1x Frequency converter for pump control

Optional Open loop Control, Flow control

1x Flow meter
1x Valve for flow rate manipulation

Optional Open loop Control, Temperature control

1x Temperature probe, PT100 with signal converter (0-10V)
1x Heater
1x Circulation pump

Optional Cooler for Temperature control

1x Cooler
2x Ventilator

On the panel all signals are provided as 0-10V (analog) or 24V (binary) on 4mm-sockets. This allow using any PLC (S-100/S7) or industrial controller.

Tasks for automation of the workstation e.g. open and closed loop control or visualisation can easily be carried out by using WINErs-Lab. We further offer a simulation of the workstation. With the simulation students can practice the tasks given before applying them to the real workstation.
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Control technology

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