AUTOMATION TECHNOLOGY - PLC AND MECHATRONICS

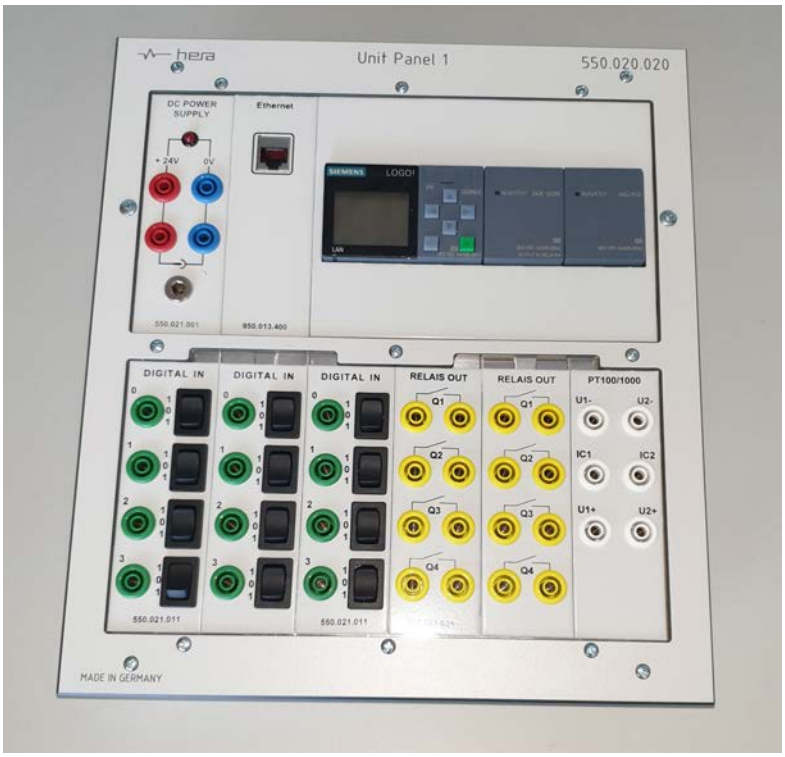
Any professionals related to industrial manufacturing will most likely get in touch with PLC technology. Either as an operator or for programming and wiring. So in following pages you will find a variety of trainers either for software simulations or with mechatronic conveyors and different drives.

LOGIC **CONTROLLER**

Logic controllers are an ideal control for small machines or comfort house installations. In standard we are offering controllers of Siemens and Eaton, but the Unit Panel can accept any other controllers.
Besides the programming of Logic Controllers the students are able to connect the controllers in- and outputs with individual cables. The inputs are on 4mm safety jacks with latching pushbuttons. The 4mm output jacks are either relay outputs (DRO) or transistor outputs (DTO).

Please see page 085 for Mechatronic System Compact with Siemens Logo! 8 (Art-No. 950.034.200).

Dimensions: 266 x 297mm (WxH)



Unit Panel with Siemens Logo! 8 including Temperature Measurement

Erweiterung
Temperaturmessung

Logic Controller Eaton EASY

Training Systems with Logic Controllers	
550.980025	Training System SIEMENS Logo! 8 12/24V, 12x DI / 8x DRO (4 x DI can be used as AI 0-10V) incl. Software Logo! Soft Comfort V8
550.980.026	Training System SIEMENS Logo! 8 230V, 12x DI / 8x DRO incl. Software Logo! Soft Comfort V8
550.980.027	Option: Temperature Measurement (2x AI für Pt100/Pt1000)
550.988.024	Logo! 8, Book EN
550.98A.030	Training System EATON Easy 24V (8x DI + 4x DRO)
550.98A.031	Training System EATON Easy 230V (8x DI + 4x DRO)
550.98A.032	Training System EATON Easy 24V (12x DI + 8x DRO)
550.98A.033	Training System EATON Easy 230V (12x DI + 6x DRO)

PLC TRAINING SYSTEM

The PLC Panel is the ideal base for various CPUs of the Siemens S7 family. Due to the flexible equipment with modules, the trainer can be individually configured with all required in- / outputs and interfaces.
This is very cost efficient and time saving as the trainees learn how to do the correct configuration and connections without spending much time on cable cutting and and connection.
So the lessons can be more efficiently filled with programming tasks.
The below stated numbers are blank boards ready for the acceptance of different PLCs, accessory and modules as listed in the next pages.

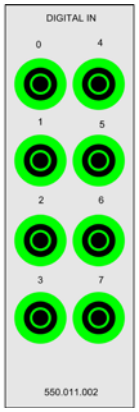
PLC Panel 950.061.600,0 with Siemens 7-1200 and KTP700 Operating Panel in Training System Frame

PLC Training System		
550.010.530	PLC Panel 1 (profile rail 320mm /15x units)	
550.010.531	PLC Panel 2 (profile rail 480mm /12x units)	
550.018.001	Manual with CD, Basics of Automation Technology	
950.061.600	PLC Panel with integrated KTP700	
	More Modules	
950.062.100	Analogue Simulation 0...20mA	
950.062.000	5x Analogue Inputs, 2x Analogue Outputs	
950.017.100	Word I/O (4 coding input switches, 4digit 7-segment display	
950.006.000	4x Analogue Output +-10V, each with analogue display (	

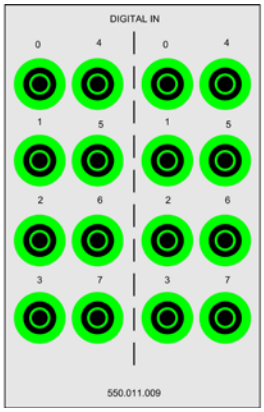
MODULES FOR PLC PANEL

The modules are equipped with touch protected 4mm safety jacks and fully wired to the PLC.

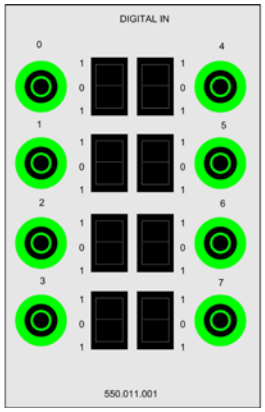
550.021.000
Blank Module



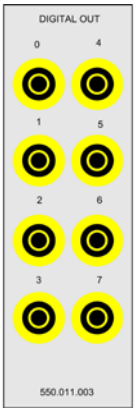
550.011.002
8x Digital Input



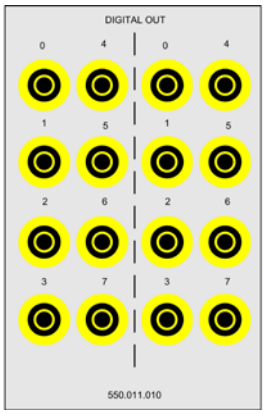
550.011.009
16x Digital Input



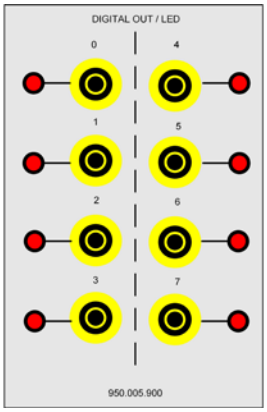
550.011.001
8x Digital Input with Latching Pushbuttons for Simulation



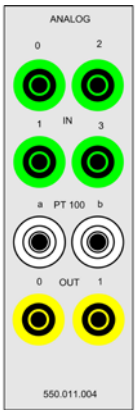
550.011.003
8x Digital Output



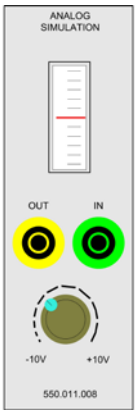
550.011.010
16x Digital Output



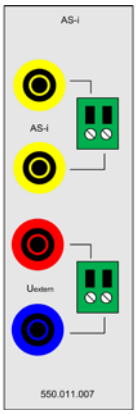
950.005.900
8x Digital Output with LED



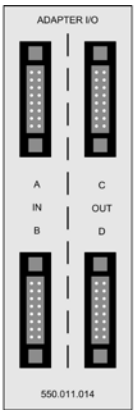
550.011.004
4x Analogue Input
2x Analogue Output
2x PT100 Input



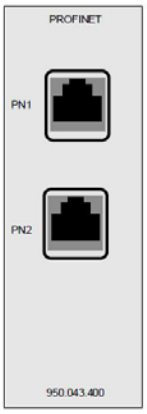
550.011.008
Analogue +/- 10 V In- and Output with Meter and Poti for Simulation



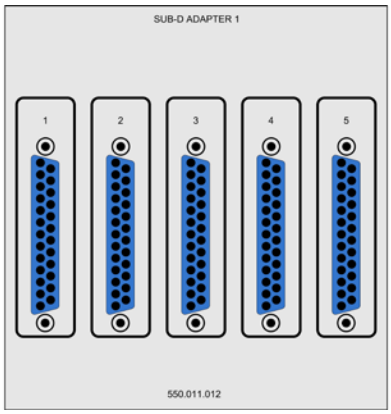
550.011.007
AS-Interface



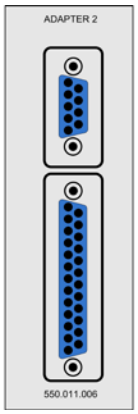
550.011.014
4x In- and Outputs with I/O Connector



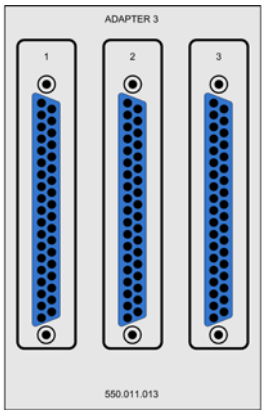
950.043.400
2x Profinet



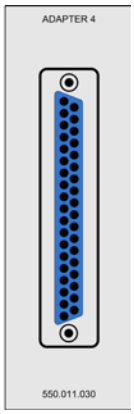
550.011.012
Mechatronic Interface
5x Sub-D 25poles



550.011.006
Mechatronic Int.
Sub-D 9poles
Sub-D 25poles



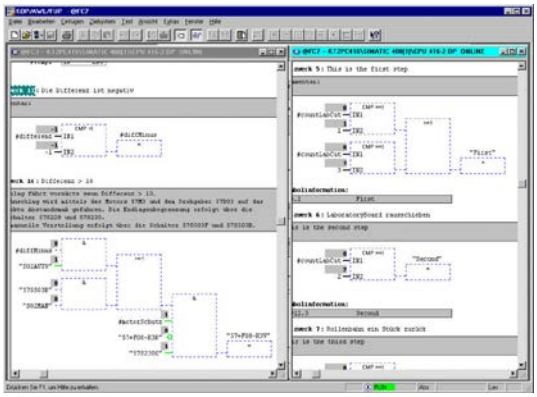
550.011.013
Mechatronic Interface
3x Sub-D 37poles



550.011.030
Mechatronic Int.
Sub-D 37poles

SIMATIC STEP 7 SOFTWARE

The Siemens SIMATIC STEP 7 is one of the most common softwares for automation in process technology. The software in combination with the PC Panel allows the students to design own projects. Below options are exclusively for educational purposes.
Supports following programming languages: AWL, FUP, KOP, SCL, S7-Graph



Learning Content:

- Creating and managing projects
- Configuration and parametrizing of hardware and communication
- Symbol management
- Creating programs for SIMATIC S7 projects
- Uploading the programs to the automation projects
- Testing the automation project
- Diagnostics of system errors

Software	
550.990.090	SIMATIC STEP7 + TIA Portal Single License for educational purpose
550.990.091	SIMATIC STEP7 + TIA Portal classroom license (6x) incl. 20 student licenses (valid 1 year). Exclusively for schools, not for extra-curricular trainings.

PLC TRAINER WITH **SIEMENS S7-1500**

Fully configured PLC Trainer for S7-1500 equipped with:

- 2x ProfiNet Interfaces
- 8x DI with 4mm safety jacks and switches
- 24x DI with 4mm safety jacks
- 32x DO with 4mm safety jacks
- 8x AI with 4mm safety jacks
- 4x AO with 4mm safety jacks
- Interface Sub-D 9poles
- Interface Sub-D 25poles

- CPU1516PN/DP
- incl. Power Supply, I: AC 120/230V, O: DC 24V, 8A
- incl. Memory Card 24MB
- incl. Ethernet Cable 6m
- incl. Software License Step 7 Professional

System requirement Windows 7 or Windows 10
(for educational purpose only!)

>> Operating voltage: 220...240V 50/60Hz >>
Dimensions: 532 x 297mm (WxH)

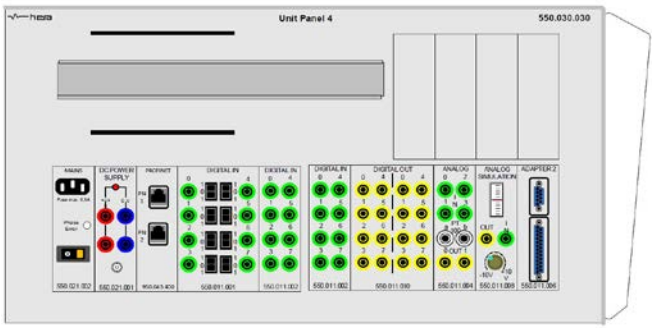
Siemens CPU 1516 PN/DP

PLC Training System (fully configured)	
550.012.530	PLC Training System with S7-1500

PLC TRAINER WITH **SIEMENS S7-1200**

Fully configured PLC Trainer for S7-1200 equipped with:

- 2x ProfiNet Interfaces
- 8x DI with 4mm safety jacks and switches
- 16x DI with 4mm safety jacks
- 10x DO with 4mm safety jacks
- 2x AI with 4mm safety jacks 0...10V DC
- 2x AO with 4mm safety jacks 0...20mA DC
- Simulation Input Module with Poti +/-10V
- Interface Sub-D 9poles
- Interface Sub-D 25poles



- CPU1215PN/DP
- incl. Power Supply, I: AC 120/230V, O: DC 24V, 2,5A
- incl. Ethernet Cable 6m
- incl. Single Software License Step 7 Basic

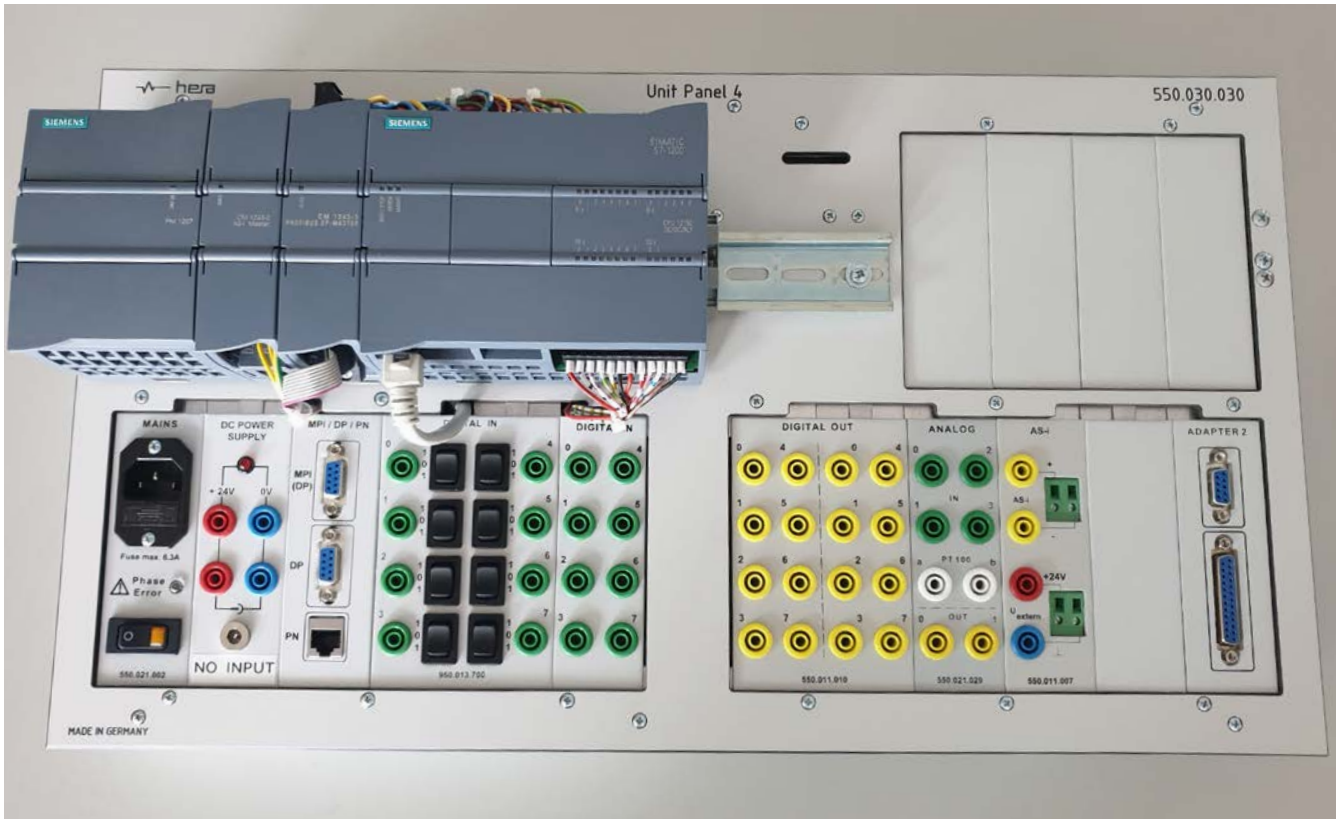
System requirement Windows 7 or Windows 10
(for educational purpose only!)

>> Operating voltage: 220...240V 50/60Hz >>
Dimensions: 532 x 297mm (WxH)

Siemens CPU 1215C

PLC Training System (fully configured)	
550.013.530	PLC Training System with S7-1200

Exemplary PLC Trainer with Siemens CPU 1215C configured for Ethernet, Profibus and AS-i applications



SURVEILLANCE AND **CONTROL**

Automized systems in industry are equipped with operator panels as human-machine-interface.

With this training system the trainees learn how to get this installed, programmed and finally used for controlling the processes.

Operator Panel **KTP700 Touch**:
7“ widescreen touch panel with color display and 8 function keys.
The KTP700 Basic is an operator panel for automized systems with S7-1200 for simple or medium requirements on visualization. The operator panel is available either for MPI/ Profibus or for Ethernet.

Note:
For projects with KTP700 software WIN CC Basic V 13 SP1 is required. The software is included in STEP 7 Basic V13 SP1 and STEP 7 Professional V15

Operator Panel **TP700 Comfort**:
7“ widescreen touch panel with color display and following interfaces:
2x RJ 45 Ethernet for ProfiNet (with integrated switch)
1x RS 485/422 for ProfiBus/MPI
2x USB-Host, 1x USB- Device
2x SD Card Slot

Note:
incl. WIN CC Advanced 15 software

Operator Panel KTP700 Touch 550.055.320

Operator Panel TP700 Comfort 550.060.320

Ethernet Switch

incl. WinCC and Ethernet Cable

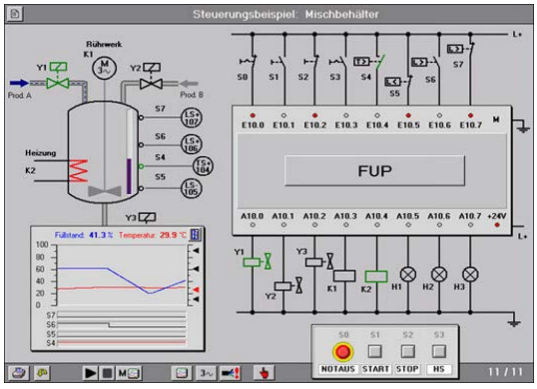
Surveillance and Control			
550.055.320	Touch Panel KTP700 Basic with Ethernet Switch / Cable	550.060.320	Comfort Panel TP700 with Profinet and MPI / Profibus DP interface incl. cable and software
550.056.320	Touch Panel KTP700 Basic DP		

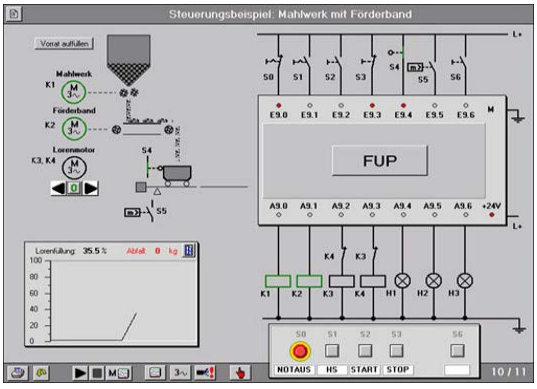
SOFTWARE FOR PLC PROCESS SIMULATION

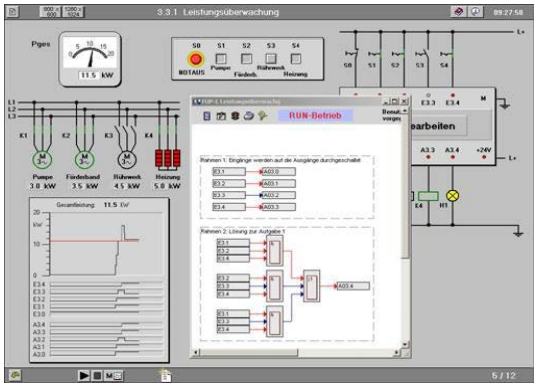
The software solution is a budgetary solution for the students to test their SIMATIC S7 programs in real time by simply connecting the PLC panel to the PC and run the software tasks.
The software with interface for MPI-Bus, Ethernet CP and Netlink Adapter.

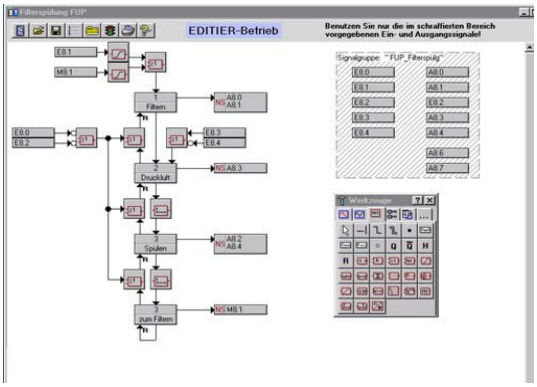
The software holds following tasks:

- Reversing Circuit for Motors
- Star-Delta-Circuit for Starting a Motor
- Star-Delta-Circuit for Motor Starting in either Direction
- Dahlander Circuit
- Control for Motors with 2 Seperate Windings
- Starting Circuit for Slip Ring Motor
- Traffic Light Control
- Power Monitoring
- Storrage Vessel
- Waste Water Tank
- Gate Control
- Filter Rinsing
- Mixing Vessel









Software Applications for S7 Program Testing	
550.041.001	Software for PLC Process Simulation

PROCESS SIMULATION FOR PLC

Instead of software simulation by PC, the processes can be simulated at the process simulation panel. Signal outputs are wired to LEDs, running lights, 7-segment-display and buzzer.

included Process Masks:

- Start-Delta-Connection
- Staircase Lighting
- Intruder Alarm System
- Traffic Lights (traffic dependant / - independant)
- Conveyor Belt with Buffer Store
- Segment Gate Control
- Machining Station
- Bottling Plant
- Mixing Vessel

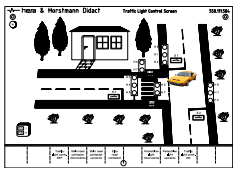
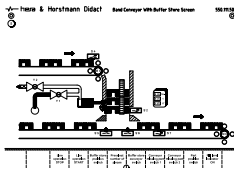
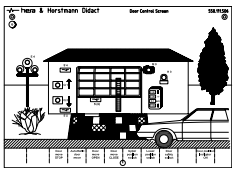
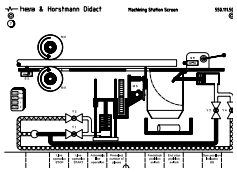
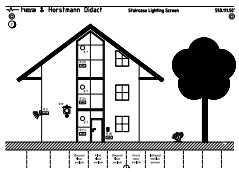
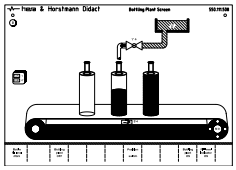
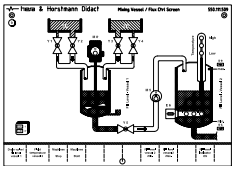
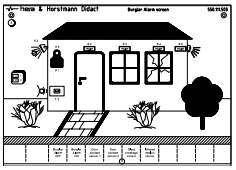
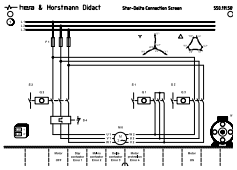
>> 24VDC supply required <<

The panel is equipped with a head rail for the acceptance of a Siemens S7 CPU, a compact controller e.g. Siemens Logo or ET200S for decentral control. Of cause you can control the process simulation panel with an extra PLC Panel and connect the 4mm in- / output jacks.

Technical Details:

- 16x digital input (8x 4mm jacks, 8x 4mm jacks with latching pushbuttons)
- 16x digital output (8x 4mm jacks, 8x LED-field)
- 2x analogue input (4mm safety jacks, with bridge connector for potentiometer use)
- 2x analogue output (4mm safety jacks and LED bar)
- 1x double-digit 7-segment display
- 2x acoustic signals

Article No. 950.032.800 is supplied with 115-240VAC and fully equipped with S7-1200, it is without 7-segment display.


Process Simulation Panel 950.062.200 with S7-1500

Prozess Simulation			
550.110.330	Process Simulation Panel	550.118.001	Manual with CD, Process Simulation
950.032.800	Process Simulation Panel with S7-1200	950.062.200	Process Simulation Panel with S7-1500

CONVEYOR BELT FOR MECHATRONICS

The mechatronic systems with conveyor belt are for an easy entry into the complex world of automation techology. It offers programming tasks like hardware parametrizing, back and forth, cummuting, driving in steps, rotation speed, drive and stop, softstart and -stop with DC small gear motor, 3phase AC motor or servo motor and can be used for training configurations with PLC and frequency conerter.
Dimensions 750 x 225 x 165mm (LxWxH).

Technical Details:

- 2x inductive sensors (NCC) with adjustable holder for end position.
- Coding disk with optical sensor for path measurement.
- 3x inputs with M12 connector for IO-Interface.
- 3x outputs with M12 connector for IO-Interface.
- IO-Interface with Sub-D 25poles connector for direct control to the PLC Panel and 8x M12 connector which can assigned either as in- or outputs.

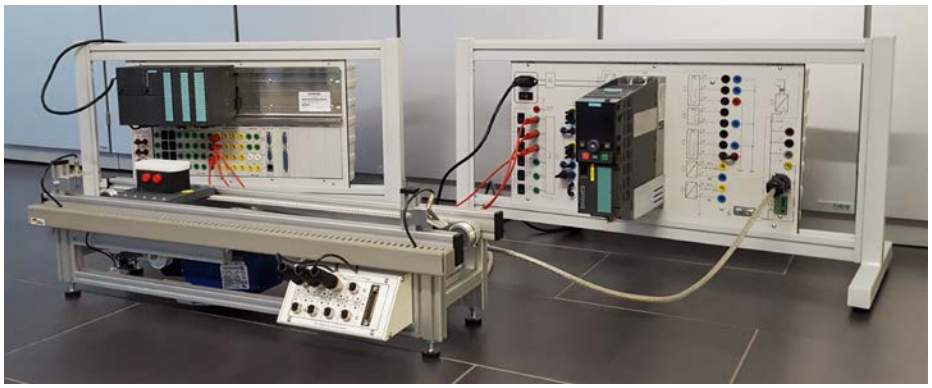
Drive Types:

- Small-gear motor 24V_{DC} with operator panel for rotation speed and drive direction.
- 24V_{DC} motor with operator panel for rotation speed and rotation direction and extra connector for sensors.
- 3phase motor 230/400V_{AC} (suitable for frequency gene rator, see page 091)
- Servo motor incl. power supply and software for parametrizing and control.

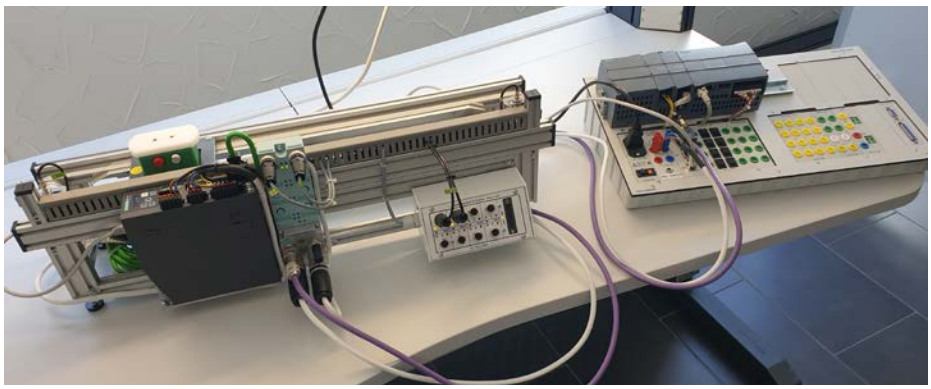
Optional Interfaces for the Conveyor Belts:

- AS-i (slave) with 4x digial inputs and 4x digital outputs (AS-i master and AS-i power supply is required).
- ProfiBus DP (slave) with 8x digital input and 8x digital output (ProfiBus master is required).
- ProfiNet (slave) with 8x digital input and 4x digital output (ProfiNet master is required).

DC Conveyor Belt with Operating Panel



3phase AC Conveyor Belt with Frequency Converter G120 and PLC Panel

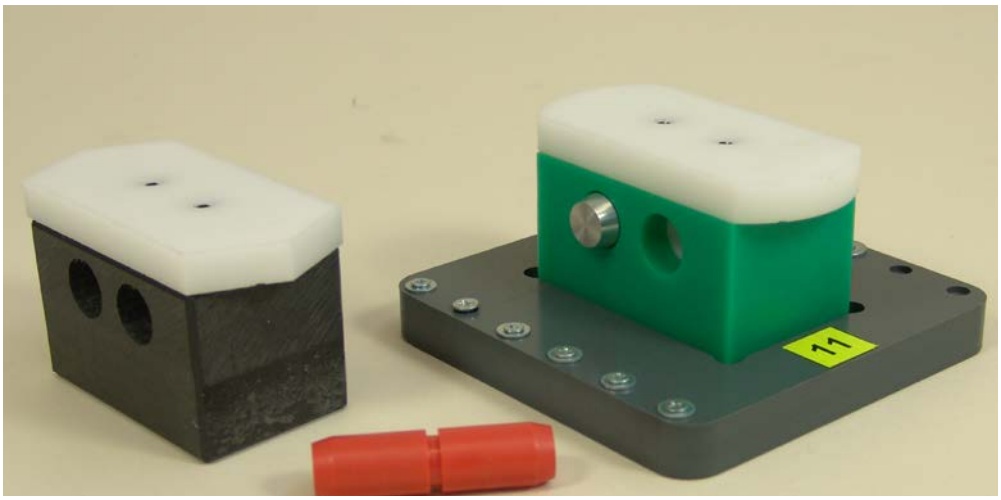


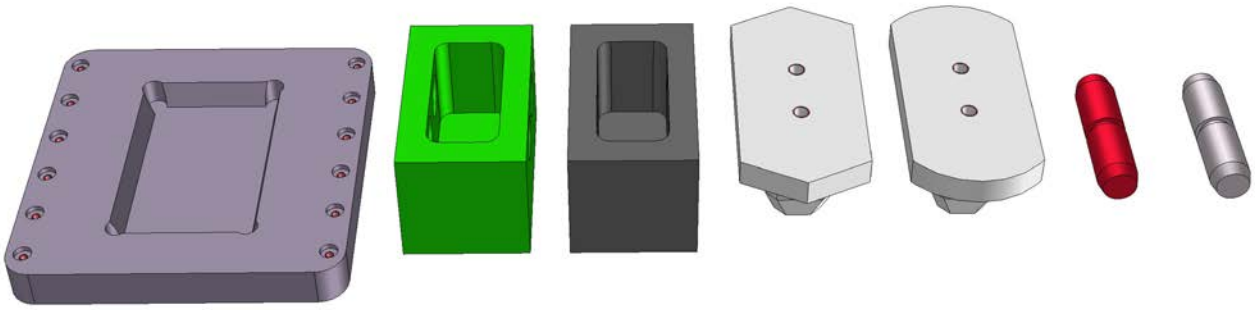
Conveyor Belt with Servo Motor and PLC Panel with S7-1200

Conveyor Belt for Mechatronics			
551.019.200	Conveyor Belt with Small-Gear Motor 24V_{DC} (2x DI + 2x DO)	551.011.040	Option AS-i Interface (4x DI + 4x DO)
551.019.300	Conveyor Belt with 24V_{DC} Motor (3x DI + 3x DO)	551.011.050	Option ProfiBus DP Interface (8x DI + 8x DO)
551.019.500	Conveyor Belt with 3phase Motor 230/400V (2x DI + 2x DO)	551.011.060	Option ProfiNet Interface (8x DI + 4x DO)
551.019.600	Conveyor Belt with Servo Motor	551.018.010	Sub-D Cable 25poles, 1,8m
551.018.001	Manual with CD: Transfer Systems	551.011.000	Workpiece Carrier 119x119mm
551.011.020	Option IO-Interface (8x DI + 8x DO)	551.011.001	Four-Part Workpiece: Lower/Upper, 2x Bolts

PALLET AND FOUR-PART WORKPIECE FOR MECHATRONICS

The pallet is suitable for all types of conveyor belts and for moving the four-part workpiece.
The four-part workpiece is especially necessary for the sensor test station of the Mechatronic Compact.





Pallet | Lower Workpart | Upper Workpart | Pin

Pallet and Four-Part Workpiece for Mechatronics			
551.011.000	Pallet 119 x 119mm	551.011.002	Aluminium Pin
551.011.001	Four-Part Workpiece I: Upper Workpart, round edges + Lower Workpart, black + 2 PVC Pins, red		
551.011.008	Four-Part Workpiece II: Upper Workpart, edged + Lower Workpart, green + 2 Aluminium Pins		
551.011.006	PVC Pin, red		

FREQUENCY **CONVERTER**

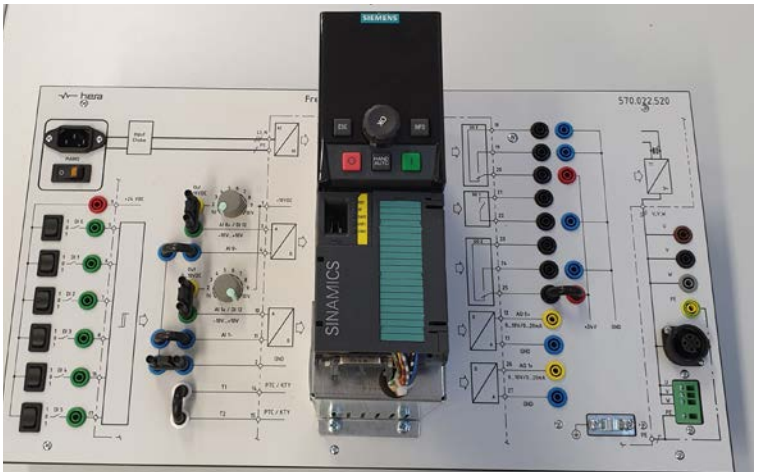
The training system teaches the students everything about the application, the correct connection and commissioning of a professional industrial frequency converter with EMC filter at the example of the Siemens G120. We offer a 1phase (200V) or 3phase solution (400V) for 50Hz and 60Hz.

Learning Content:

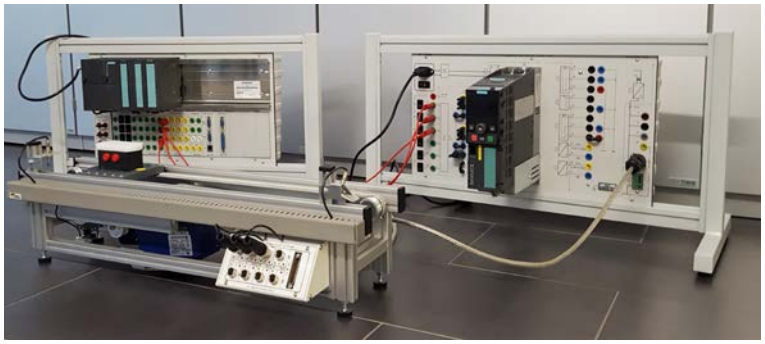
- Basics to Frequency Converters
- Connecting a Frequency Converter EMC-conform
- Commissioning a Frequency Converter
- Programming and Testing of Drive Functions
- Programming and Testing of Safety Functions
- Operation and Surveillance at the FU
- Operation and Surveillance at the PC
- Commissioning with Profibus

For a complete training system we recommend either the mechatronic AC conveyor belt or the FC Motor Panel with following technical data:

- 3phase AC Motor, rated power: 0,12kW.
- Nominal rotation speed: 1500U/min.
- Reading for rotation speed and - direction.



Frequency Converter Panel G120 1phase 570.022.520



Frequency Converter with PLC and 3phase AC conveyor belt 551.019.500 and Workpiece Set 551.011.001 (PLC Panel see e.g. page 076/077)

Frequency Converter with 300W Motor 540.030.630

Training System Frequency Converter			
570.022.520	Frequnecy Converter SIMATIC G120 1AC 200V incl.		**Optional 3phase Drive Solutions**
	IOP, Memory Card	540.030.630	3phase AC Motor, 300W
570.023.520	Frequency Converter SIMATIC G120 3AC 400V incl.	551.019.500	3phase AC Conveyor Belt, geared, 65W
	IOP, Memory Card and EMC Filter	551.011.001	Workpiece Set for Conveyor Belt
950.008.732	Set of Cables and Connectors	960.010.021	Mobile Training System Frame 860 x 300 x 360mm
570.028.010	Manual with CD, Frequency Converter G120		
550.990.092	Projecting Software for Electric Drives		
570.021.520	FC Motor Panel		

MECHATRONIC COMPACT WITH S7-1200

The Mechatronic Compact is a compact solution for PLC training in combination with sensors and pneumatics.

The ejecting unit requires pressured air!

Technical Details:

- PLC Panel with Siemens S7
- Conveyor Belt 24VDC small gear (2x inductive sensors, 1x optical sensor)
- Manual speed and direction control
- Test Station (3x inductive sensor, 1x reflective sensor, 1x capacitive sensor)
- Pneumatic Ejecting Unit for Pallet (2x reed switches, 2x magnetic valves)
- Power Supply 24VDC / 4A
- Pressured Air Control with Fine Filter

Learning Content:

- Programming with Simatic S7 (sample programs included!)
- Uploading the program to the PLC
- Tasks of different sensors in an industrial process
- Sensor adjustments
- End position -, position and speed detection
- Ejecting - and stop cylinder
- Pneumatic two-way cylinders

Mechatronic Compact with S7-1200	
950.050.800	Mechatronic Compact with S7 (incl. manual and example programs)
551.990.020	Silent Compressor

MECHATRONIC COMPACT WITH SIEMENS LOGO!

The Mechatronic Compact is a compact solution for small controller training in combination with real sensors and pneumatics.

The ejecting unit requires pressured air!

Technical Details:

- Panel with Siemens Logo!
- Conveyor Belt with 24VDC small gear (2x inductive sensors, 1x optical sensor)
- Manual speed and direction control
- Test Station (3x inductive sensor, 1x reflective sensor, 1x capacitive sensor)
- Pneumatic Ejecting Unit for Pallet (2x reed switches, 2x magnetic valves)
- Power Supply 24VDC / 4A
- Pressured Air Control with Fine Filter

Learning Content:

- Programming with Siemens Logo! (sample programs included!)
- Uploading the program to the Controller
- Tasks of different sensors in an industrial process
- Sensor adjustments
- End position -, position and speed detection
- Ejecting - and stop cylinder
- Pneumatic two-way cylinders

Mechatronic Compact with Siemens Logo!	
950.034.200	Mechatronic Compact with Logo! (incl. manual and example programs)
551.990.020	Silent Compressor

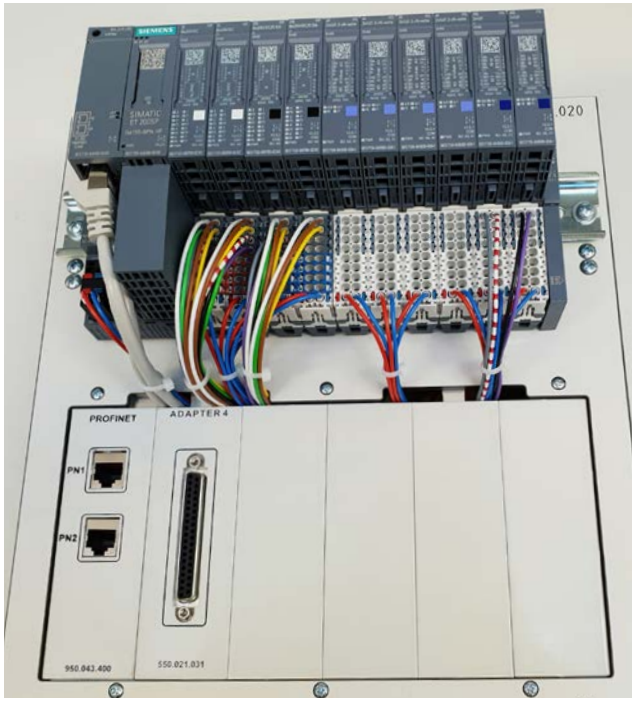
MODULAR **BUS SYSTEM**

The modular Unit Panel offers the possibility to integrate different industrial components into various bus systems, such as:

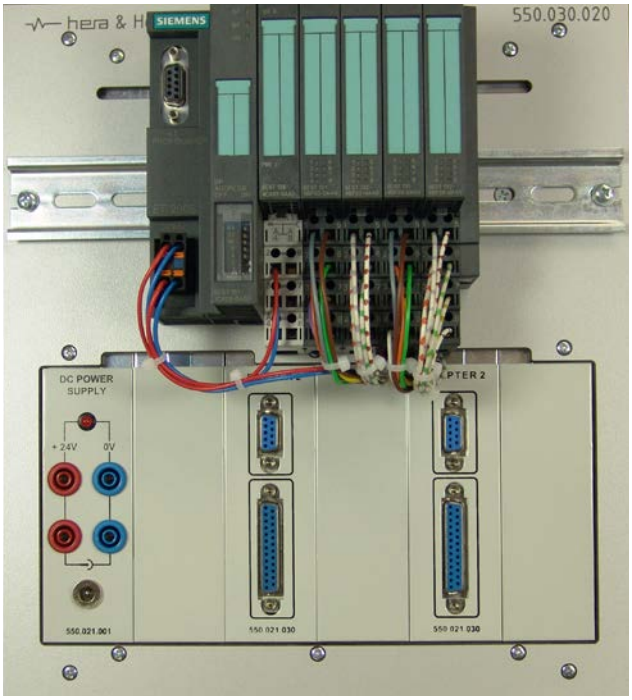
- ProfiBus
- InterBus
- Canopen
- DeviceNet
- Ethernet
- ProfiNet

Furthermore the Unit Panel is applicable for decentral peripheral systems.

Depending on the application the panel can be equipped with an individual choice of industrial automation components and a suitable choice of modules on the following page.



Example to Unit Panel 550.030.020 with ET200S



Example to Unit Panel 550.030.020

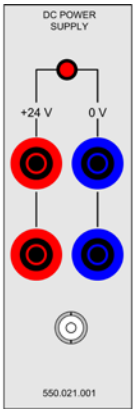
Modular Bus System			
550.020.020	Unit Panel I (inner head rail for 6x modules (W: 266mm)	550.030.020	Unit Panel III (outer head rail for 6x modules (W: 266mm)
550.020.030	Unit Panel II (inner head rail for 12x modules (W: 532mm)	550.030.030	Unit Panel IV (outer head rail for 12x modules (W: 532mm)

MODULES FOR **UNIT PANELS**

The modules are equipped with 4mm safety jacks and fully wired with the PLC components.

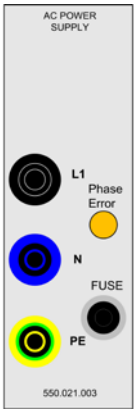
Not required spaces are covered with blank modules.

550.021.000
Blank Module

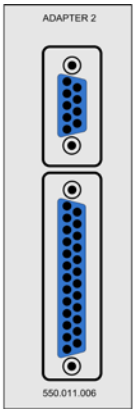


550.021.001
24VDC with
4mm Safety Jack
and Jack Socket

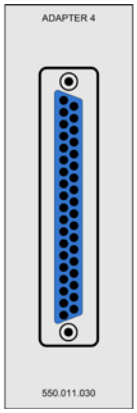
550.021.002
230V Mains
Connector



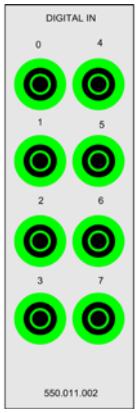
550.021.003
230V 4mm
Safety Jacks



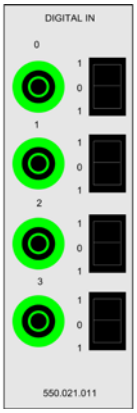
550.021.030
Interface
Sub-D 9poles
Sub-D 25poles



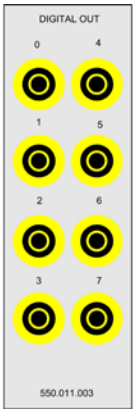
550.021.031
Interface
Sub-D 37poles



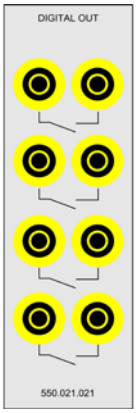
550.021.010
8x Digital Input



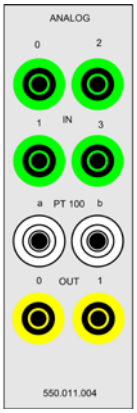
550.021.011
4x Digital Input
with Latching
Pushbuttons



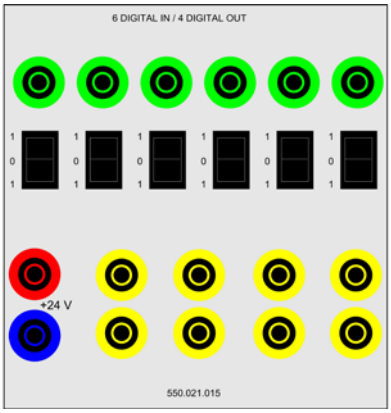
550.021.020
8x Digital
Output



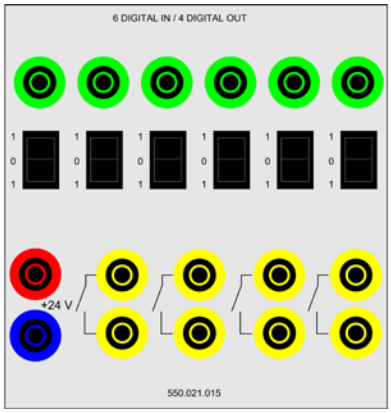
550.021.021
4x Relay Output



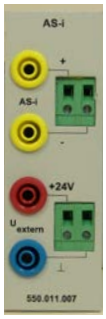
550.021.029
4x Analogue Input
2x Analogue Output
2x PT100 Input



550.021.015
6x Digital Input with
Latching Pushbuttons
4x Digital Outputs



550.021.016
6x Digital Input with Latching
Pushbuttons
4x Relay Output



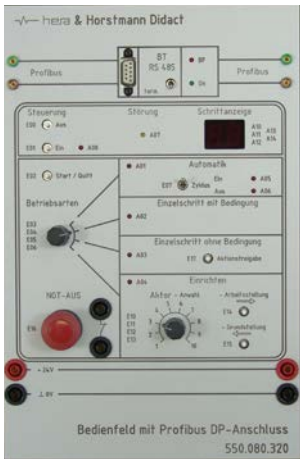
OPTIONS TO PLC PANEL

The Data Word I/O Panel is for manually entering 16 bit data words at the coding switches and receive the output on the 4digit 7-segment display.
The I/O word is available as a seperate panel or directly as module on the PLC Panel.
Connection between Data Word I/O Panel and the PLC Panel is done with 4x flat ribbon cables. The 4-digit coding switch is assigned to an input word and the 4-digit 7-segment display is assigned to an output word (depending on the hardware-sided wiring and the address assignment).
In - and output is coded hexadecimal.

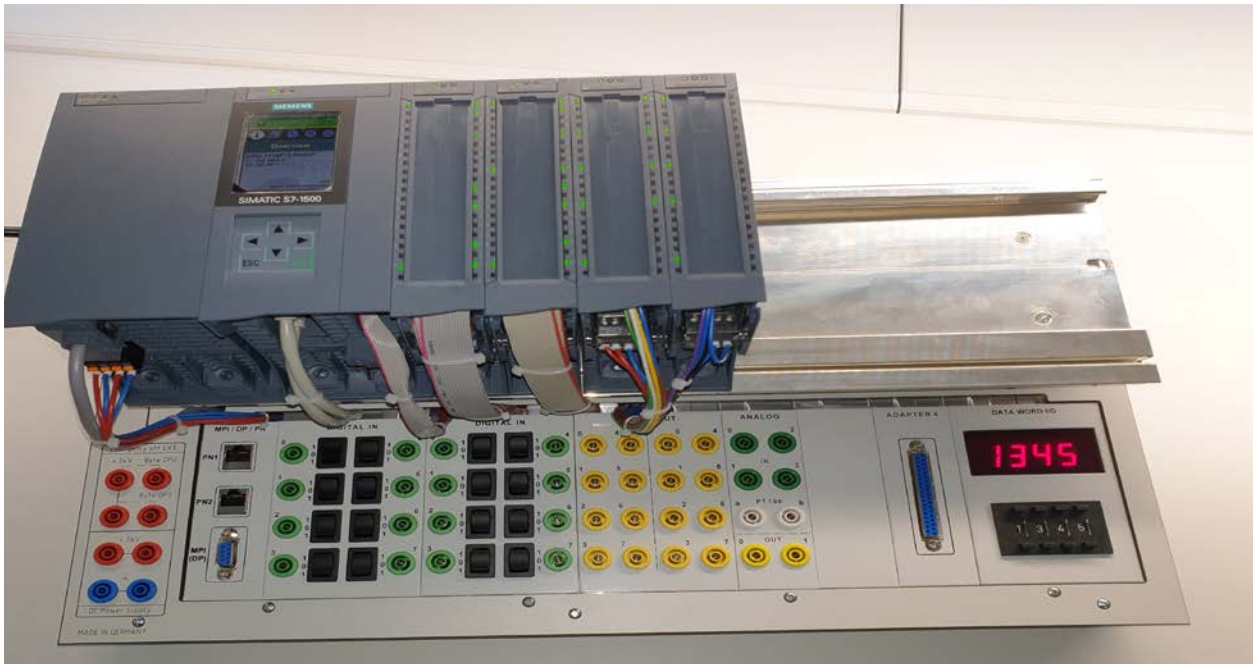
- 4-digit coding switch for input
- 4-digit 7-segment display for output
- Operating Voltage: external $24V_{DC}$

Data Word I/O Panel
550.100.310
(I/O interface on PLC Panel is required)

The Operator Panel with Profibus DP adapter is for the operation of the PLC via Profibus DP.
The panel holds selector switches and pushbuttons, which are required for an operator to interrupt the PLC programs. The signal and message elements for the operator's information are also included.
A 2digit display indicates each actual step of the sequence cascade. Four different operating modes can be selected: automatic, single step with condition, single step without condition and set-up mode.
In- and outputs of the operation panel are connected to the PLC by Profibus DP.
The panel is equipped with Profibus-slave (16x DI /16x DO).



Operating Panel with Profibus DP Adapter 550.080.320



PLC Panel with S7-1500 and Data Word I/O

Options to PLC Panel			
550.100.310	Data Word I/O Panel	550.102.000	Set of Flat Ribbon Cables to connect the Word I/O Panel to the PLC Panel
550.080.320	Operating Panel with Profibus DP Adapter		
550.011.014	Module I/O Adapter for PLC Panel to connect the Word I/O Panel with the PLC Panel	950.017.100	Data Word I/O for PLC Panel

AS-INTERFACE BUS

For trainings with AS-Interface Bus we have a selection of industrial components which can be used in combination with the PLC panel. In this case the panel must be equipped with AS-i communicator and AS-i power supply as well as a module in the panel for AS-interface.

Learing content is the connection and commissioning of AS-interface components.

AS-i Lamp Panel 550.090.310

AS-i Triple Pushbutton 550.090.330

Panels with Industrial Components for AS-Interface			
550.900.001	AS-i Compact Module	550.990.074	AS-i 3-fold Indicator Lamp
	(8x M12 Jacks with 4 DI + 4 DO)	550.990.075	AS-i Contact Module with Sensor
059.945.401	SIMATIC S7-1200 Communication Processor for AS-i	590.600.001	AS-i, Addressing - & Diagnostic Device
550.990.072	AS-i Power Supply 3A (integrated in PLC Panel)	590.600.002	Cable to the Addressing Device zum Adres
550.011.007	AS-i Adapter Module for PLC Panel	590.600.003	Adapter AS-i Cable to M12 Sockets
505.900.501	AS-i Cable, yellow	550.908.001	Manual with CD
505.900.502	AS-i Cable, black		
550.090.310	AS-i Lamp Panel		
550.090.330	AS-i Tripple Pushbutton		