Tec2Screen®
The interactive learning companion
What actually is Connected Learning?

Learning methods which frequently supplement and support each other and include the following:
- Practical learning
- Classroom-based learning
- Self-learning

With Connected Learning, these methods are fused into a single form of learning. The virtual and the real world are seamlessly integrated. Software and hardware, theory and practice, learner and teacher – Connected Learning promotes intuitive, interactive learning.

Our patented solution for Connected Learning: Tec2Screen®. Fun and motivation while learning are guaranteed!

The concept consists of:
- Tec2Screen® app
- Courses
- Simulations
- Tec2Screen® Manager for 20 users / 20 workstations
- Learning management system: Classroom Manager (optional for all other license levels) full functionality of a learning management system
  - Connects
  - Tec2Screen® hardware
  - Other learning systems

Exciting courses for explorative learning
Videos, animations, measuring exercises and test assignments inspire students to explore and discover. The measuring instruments integrated into the courses additionally make interactive troubleshooting exciting.

Completing the courses offline outside of the lab is also possible, so that technical knowledge can be learned anywhere at any time.

Understand the real world better thanks to simulations
As a component of modern training systems, the Tec2Screen® simulations can be used to test and simulate controllers and applications for PLC technology under realistic conditions. The new knowledge encourages practical and safe experimenting without real consequences or the need to purchase additional hardware.
The learning management system
The Classroom Manager manages courses and simulations as well as self-made documents and materials. The trainer assigns these to the students individually and can simultaneously record their learning progress.

New interfaces: Connects
To explore the connection between the real and the virtual world, we have developed the Connects – plug-in interface modules with a patented interface. The Connects enable direct interaction between software and hardware, and thus direct interaction between theory and practice.

Unique: the signal flow is completely transparent and easy to follow.

The overall system
The trainer uses the Classroom Manager to assign individual courses, simulations and own documents to the students. The training topics are loaded onto Tec2Screen® via a network. The student logs in with the allocated user data and sees the available courses. They can be completed online as well as offline.

In the courses, the student has the opportunity to interact directly with other learning systems via the Connects. The Classroom Manager documents individual learning progress continuously. This allows the trainer to actively coach the student.

The hardware
As a basic unit, the Tec2Screen® base links the iPad® with the patented Connects. The iPad® can also be used as a fully functional tablet, independently of the Tec2Screen®, in the classroom and elsewhere.

Festo Didactic won the 2015 iF Design Award for the Tec2Screen®.

Tec2Screen®
Our all-in-one device
– One device for everything: learning, measuring, open- and closed-loop control, simulation, programming
– Can be used everywhere:
  Learn digitally at various locations – in the teaching lab, on the go, at home, etc.
  Present grey theory in an exciting multimedia format
– Get off to a flying start with the intuitive operating concept
Tec2Screen®
Fun and motivation in learning

What do the simulations offer?
It is essential to represent complex topics simply and clearly.
– The Tec2Screen® simulations show fascinating and realistic applications of PLC technology.
– Controllers and applications can be tested and simulated quickly – independently of the programming language and PLC.
– The ability to change parameters allows the student to recognise and understand the impacts right away.
– Learning from mistakes – errors are allowed with simulations and they show their impact without any damage being done to the real hardware.
– Simulations replace large and complex systems that take up space and cost money.

New incentives for successful learning
Tec2Screen® teaches complex technologies in an understandable and simple way.
– Merge theory and practice seamlessly with Connects.
– The integrated signal flow between software and hardware makes cause and effect transparent and easy to follow.
– Doesn’t fit, doesn’t function, doesn’t work? The mobile learning tool is a helper-on-demand.
– Construction, start-up, repair: Tec2Screen® interactively shows how it’s done – with text, pictures and video.
– Hardware and software promptly provide an “answer” – does something flow, light up, move, etc.?

The transition to (learning process) companion
Not only are students and trainees excited about Tec2Screen®, the trainer also benefits hugely from the time savings, not least in terms of preparation.
– Once configured, the system requires minimal setup times – meaning more valuable time for teaching!
– As a “virtual toolbox”, the Classroom Manager provides a complete overview of materials for students and trainers. No need to worry: your own materials can be easily integrated.
– Some need a challenge – others need encouragement: assign an appropriate course too one student and coach the other one individually, depending on skill level and aptitude.
– Existing learning systems as well as the students’ own iPads® can be easily integrated.

The courses
– Learn various training topics: measurement, open- and closed-loop control, programming, simulation, etc.
– Videos, animations, measuring exercises and test assignments inspire students to explore and discover – this makes learning exciting.
– The integrated QR code scanner quickly provides in-depth information as needed.
– The virtual measuring instruments such as multimeter or oscilloscope integrated in the courses support interactive troubleshooting and prepare the measured values perfectly for analysis.
– Learn always and everywhere – offline completion of the theoretical parts of a course is possible on all popular devices.
– The project- and problem-oriented courses are available for many technologies and new courses are added constantly.

The Connects
The integrated signal flow between the virtual and the real world is easy to follow via the Connects. The Connects connect the Tec2Screen® with real learning systems. This is unique in technical basic and further training, which is why we’ve patented our Connects.
What does the Classroom Manager do?
The learning management system for the Classroom Manager on a Windows® PC manages all digital learning media such as Tec2Screen® courses, simulations, multimedia training programs or self-made documents and materials in a central library. Trainers also have the option of preparing their own tests or questionnaires.

These learning media can be used by the trainer to create their own teaching units and assign them to the students individually according to their abilities.

The Classroom Manager also provides a clear and structured model of a participant’s success with learning. The system for continuously monitoring learning progress means you always have an overview of individual learning progress — allowing you to encourage and support individual participants very specifically.

iEasyLab – for digital circuits
The iEasyLab software integrated in the Tec2Screen® app allows you to design digital circuits virtually. You select symbols such as logic components, indicators and measuring instruments from a library, place them on the iPad and start the experiment. The program then presents the corresponding results immediately.

Connected Learning – in a separate and independent network
The Classroom Manager and the Tec2Screen® system can be integrated into your existing local network environment. Even without linking to the local network or the Internet, a separate network can be set up quickly, easily and trouble-free with the Tec2Screen® Media Systainer.

Courses and simulations are transferred via WLAN to the user’s Tec2Screen®. Similarly, individual learning progress is synchronised in real time and documented in the Classroom Manager.

Off you go!
The Tec2Screen® app is already pre-installed on the Tec2Screens® and iPads® delivered by Festo Didactic – so that you can start immediately.

The app is also available free of charge from the Apple App Store®.
Tec2Screen® – the unique mobile learning tool for interactive learning in the lab. Using the patented interface – the Connect – users explore the connection between the real and the virtual world. The signal flow is completely transparent and easy to follow.

All-in-one device – one device for everything

With Tec2Screen® ...
– Experience all the important technologies of basic and further training
– Learn various training topics such as measurement, open- and closed-loop control, simulation, etc.
– Learn digitally at various locations – in the teaching lab, on the go, at home, etc.
– Present grey theory in an exciting multimedia format
– Get off to a flying start immediately with the pre-installed Tec2Screen® app
– Get to know and appreciate the Connected Learning interactive learning concept

1 Set comprising Apple iPad®, base, eight Connects and power supply unit in a systainer®:
– 4x digital I/O Connect
– 1x analogue In Connect
– 1x analogue Out Connect
– 2x Power Connect

2 Set comprising base, eight Connects and power supply unit in a systainer®:
– 4x digital I/O Connect
– 1x analogue In Connect
– 1x analogue Out Connect
– 2x Power Connect

Note: Tec2Screen® and Tec2Screen® Base require a country-specific small appli-ance power cable. Small appli-ance power cable ➔ Page 27
1 Digital I/O
Connect with 4x 24 V digital input or output channels.

Technical data
– 4 digital channels, channel-specific switching as input or output
– Output voltage 24 V DC
– Output current max. 0.5 A per channel
– Total output current max. 1 A
– Connection via 4 mm safety sockets

Order no. 8028146

2 Analogue In
Connect with 2 analogue input channels.

Technical data
– 2 analogue inputs, channel-specific switching 0 – 10 V or ±10 V
– Resolution 14 bits
– Connection via 4 mm safety sockets

Order no. 8028147

3 Analogue Out
Connect with 2 analogue output channels.

Technical data
– 2 analogue outputs, switching 0 – 10 V or ±10 V
– Resolution 12 bits
– Connection via 4 mm safety sockets

Order no. 8028148

4 Power
Connect for 2x 24 V supply voltage.

Technical data
– Output voltage 24 V DC
– Output current max. 1 A per channel
– Resolution 14 bits
– Connection via 4 mm safety sockets

Order no. 8028149

5 Multimeter
Connect with multimeter function.

Technical data
– Measuring range, automatic changeover:
  Voltage: 0 – 50 V AC/DC
  Current: A 0 – 5 A AC/DC, mA 0 – 200 mA AC/DC
  Resistance: 0 – 2 MΩ
– Resolution 14 bits
– Connection via 4 mm safety sockets

Order no. 8028150

6 SysLink
Connect with SysLink connector.

Technical data
– 8x digital inputs 24 V DC
– 8x digital outputs 24 V DC, max. 0.3 A per channel
– Total output current max. 2 A
– Connection via 24-pin Centronics plug (SysLink)

Order no. 8028152

7 Digital I/O TTL (5 V)
Connect with 4x 5 V digital input or output channels.

Technical data
– 4 digital channels, channel-specific switching as input or output
– Output voltage 5 V DC
– Output current per channel max. 20 mA
– Connection via 2 mm safety sockets

Order no. 8045481

8 15-pin Sub-D HD
Connect with 2x 15-pin Sub-D HD plug socket.

Technical data
– 2x 4 digital inputs 24 V DC/2.5 mA
– 2x 4 digital outputs 24 V DC/0.5 A
– 2x 2 analogue inputs 0 – 10 V/0.5 mA
– 2x 1 analogue output 0 – 10 V/20 mA
– Connection via 15-pin Sub-D HD socket

Order no. 8046053

9 Connect Oscilloscope
Connect with oscilloscope function.

Technical data
– 2-channel digital oscilloscope
– Scanning rate 50 MS/s
– Analogue bandwidth 4 MHz
– Time base 100 ns/div – 5 s/div
– Resolution 8 bits
– Y deflection 20 mV/div 5 V/div
– Input impedance 1 Mohm parallel to 16 pF
– Input voltage max. 50 Vss
– Triggering: CH1, CH2, auto, norm, single, rising/falling edge
– Connection via BNC socket

Order no. 8028151
Pneumatics

Energy-efficient movement

Training content
– Moving a load efficiently
– Performing a reference measurement of the existing circuit
– Reducing consumption by reducing pressure
– Optimising flow control
– Shutting off the compressed air supply in the end position

Required Connects
– 2x Digital I/O Connect
– 1x Analogue In Connect
– 3x Power Connect
– 3x Digital I/O Connect

The accessories mentioned below are required to conduct the courses.

– 2x Proximity sensor, electronic, with cylinder mounting
– Plastic tubing
– 1x Single-acting cylinder
– 2x 3/2-way solenoid valve with LED
– 1x Flow sensor, 0.5 – 50 l/min, analogue
– 1x Cover for cylinder
– 4 mm Safety laboratory cables

Pneumatics

Energy-efficient clamping

Training content
– Reducing consumption by reducing pressure on the return stroke
– Shutting off the compressed air supply in the retracted position
– Using a short-circuit valve
– Restricting supply air for the return stroke
– Using a 5-port/2-way double solenoid valve to save electrical power

Required Connects
– 2x Digital I/O Connect
– 2x Analogue In Connect
– 2x Power Connect
– 1x 5/2-way solenoid valve
– Plastic tubing
– 1x Double-acting cylinder
– 4 mm Safety laboratory cables

The accessories mentioned below are required to conduct the courses.

– 2x Proximity sensor, electronic, with cylinder mounting
– 1x 5/3-way solenoid valve, mid position closed
– Pressure regulator valve with pressure switch (vacuum switch)
– Non-return valve
– 2x One-way flow control valve
– 1x Single-acting cylinder
– Plastic tubing
– 1x Start-up valve with filter control valve
– 1x 5/2-way solenoid valve with LED
– Pressure gauge
– Stop, adjustable
– Pressure regulator valve with pressure gauge
– 2x Pressure sensor with display
– 1x Flow sensor, 0.5 – 50 l/min, analogue
– 1x Cover for cylinder
– 4 mm Safety laboratory cables

Pneumatics

Energy-efficient lifting

Training content
– Optimising circuits
– Eliminating and utilising system-internal physical factors
– Holding by containing compressed air

Required Connects
– 2x Digital I/O Connect
– 1x Analogue In Connect
– 3x Power Connect

The accessories mentioned below are required to conduct the courses.

– 2x Proximity sensor, electronic, with cylinder mounting
– 1x 5/3-way solenoid valve, mid position closed
– Pressure regulator valve with pressure gauge
– Non-return valve
– 2x One-way flow control valve
– 1x Single-acting cylinder
– Plastic tubing
– 1x Start-up valve with filter control valve
– 1x 5/2-way solenoid valve with LED, normally closed
– 2x Vacuum gauge
– 1x Vacuum generator, type L
– 1x Suction gripper 30 SS
– 1x Workpiece set “Housings”
– 1x Flow sensor, 0.5 – 50 l/min, analogue
– 4 mm Safety laboratory cables

Pneumatics

Energy-efficient gripping

Training content
– Efficient gripping with vacuum
– Reducing consumption by using a vacuum-saving circuit
– Implementing the ejector pulse

Required Connects
– 2x Digital I/O Connect
– 1x Analogue In Connect
– 3x Power Connect
– 1x Non-return valve, delockable
– 1x Non-return valve
– 1x One-way flow control valve
– 1x Flow control valve
– 1x Pressure switch, 0 – -1 bar (vacuum switch)
– Plastic tubing
– 1x Start-up valve with filter control valve
– 1x 2x 3/2-way solenoid valve with LED, normally closed
– 2x Vacuum gauge
– 1x Vacuum generator, type L
– 1x Suction gripper 30 SS
– 1x Workpiece set “Housings”
– 1x Flow sensor, 0.5 – 50 l/min, analogue
– 4 mm Safety laboratory cables

Tec2Screen® Manager

The Tec2Screen® Manager 20/20 is available as a free download and can be used as an alternative to Classroom Manager for purchase.

The following licence levels are available for courses and simulations:
– 20 users/20 workstations
In addition to course and simulation management, the Classroom Manager learning management system offers comprehensive user management. It also has numerous learning management functions, such as integrating your own training media/documents and documenting progress. The following licence levels are available:
- 100 users/10 workstations
- 200 users/20 workstations
- 500 users/50 workstations
- 1000 users/100 workstations
Tec2Screen® Courses

Hydraulics

Flow rate control

Training content
– Flow rate control with a 2-way and 3-way flow control valve
– Investigating the power loss in hydraulic circuits with flow rate control
– Reducing the power loss in a hydraulic circuit by using a 3-way flow control valve

Required Connects
– 2x Analogue In Connect
– 2x Power Connect

de/en 8034093

The accessories mentioned below are required to conduct the courses.
– 1x 2-way flow control valve
– 1x 3-way flow control valve
– 2x Pressure switch, electronic
– 2x Pressure relief valve
– 2x Flow sensor
– 2x Hydraulic motor
– 1x T-distributor
– 1x Shut-off valve
– 1x Hydraulic power pack with a constant-displacement pump, 230 V
– 6x Hose line with quick release couplings, 600 mm
– 3x Hose line with quick release couplings, 1000 mm
– 2x Hose line with quick release couplings, 1500 mm
– 2x 4-way distributor with pressure gauge
– 4 mm Safety laboratory cables

Digital technology

Basic logic functions

Training content
Basic logic functions
– Statements and variables
– Truth tables
– AND function
– OR function
– NOT function
– XOR function
– NAND function
– NOR function

Required Connects
2x Digital I/O TTL (5 V) Connect
d/en 8046972

The accessories mentioned below are required to conduct the courses.
– 1x Equipment set TP 1012
– 2 mm Safety laboratory cables
– 4x 4 mm – 2 mm safety measuring adapter

Digital technology

Boolean laws

Training content
Boolean laws
– Commutative law
– Associative law
– Distributive law
– De Morgan’s laws
Simple Boolean relationships

Required Connects
2x Digital I/O TTL (5 V) Connect
d/en 8046972

The accessories mentioned below are required to conduct the courses.
– 1x Equipment set TP 1012
– Basic principles of digital technology
– 2 mm Safety laboratory cables
– 4x 4 mm – 2 mm safety measuring adapter

Digital technology

Disjunctive and conjunctive normal form

Training content
Optimising logic circuits
– Disjunctive normal form
– Conjunctive normal form
– Karnaugh maps

Required Connects
2x Digital I/O TTL (5 V) Connect
d/en 8046973

The accessories mentioned below are required to conduct the courses.
– 1x Equipment set TP 1012
– Basic principles of digital technology
– 2 mm Safety laboratory cables
– 4x 4 mm – 2 mm safety measuring adapter

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- 1000 users/100 workstations

Digital technology

Schmitt triggers, astable and monostable multivibrators

Training content
Schmitt trigger
- Function and application, e.g. distorted signals
- Trigger levels and hysteresis
- Characteristic curves
- Debouncing switches

Astable and monostable multivibrators
- Function and application
- Edge control
- Retriggerability

Required Connects
2x Digital I/O TTL (5 V) Connect

De/en 8046991

The accessories mentioned below are required to conduct the courses.
- 1x Equipment set TP 1012
  Basic principles of digital technology
  Complete equipment set TP 1012
  2 mm Safety laboratory cables
  4x 4 mm – 2 mm safety measuring adapter

Bistable multivibrators

Training content
- Asynchronous multivibrators
- State-controlled synchronous multivibrators
- Edge-triggered synchronous multivibrators
  - RS flip-flop, D flip-flop, JK flip-flop, T flip-flop, JKMS flip-flop

Required Connects
2x Digital I/O TTL (5 V) Connect

De/en 8046994

The accessories mentioned below are required to conduct the courses.
- 1x Equipment set TP 1012
  Basic principles of digital technology
  Complete equipment set TP 1012
  2 mm Safety laboratory cables
  4x 4 mm – 2 mm safety measuring adapter

DC technology

Ohm’s law, power, work, energy

Training content
Basic electrical variables
- Voltage, current, charge
- Measuring voltage and current
Ohm’s law
- Deriving Ohm’s law from measurements and applying it
- The resistor as a component: designs, value ranges, colour coding
Power, work, energy
- Learning about the terms power and work and how to calculate them
- Calculating costs when using electrical energy

Required Connects
2x Multimeter Connect
1x Analogue In Connect

De/en 8028129

The accessories mentioned below are required to conduct the courses.
- 1x Equipment set TP 1011
  Fundamentals of electrical engineering/electronics

Resistors and consumers

Training content
Connecting ohmic resistors/consumers in series
- Laws governing the series connection of ohmic consumers
- Calculating components and equivalent resistances
- Line resistances and voltage drop
- Series resistors for bulbs or LEDs
Connecting ohmic resistors/consumers in parallel
- Laws governing the parallel connection of ohmic consumers
- Calculating components and equivalent resistances
- Power ratings of voltage sources

Mixed circuits
- Practice: Deriving laws from measurements
- Kirchhoff’s second law
- Kirchhoff’s first law
- Resistor networks
- Potentials and potential differences

Required Connects
1x Multimeter Connect
1x Analogue In Connect

De/en 8034077

The accessories mentioned below are required to conduct the courses.
- Equipment set TP 1011
  Fundamentals of electrical engineering/electronics
### Tec2Screen® Courses

#### DC technology

**Voltage sources, adaptations**

**Training content**
- Voltage sources: series connection
  - Internal resistance
  - Load conditions
- Voltage sources: parallel connection
  - Even and uneven voltage
  - Even and uneven internal resistances
  - With and without load resistance

**Adaptations**
- Interfaces between electrical circuits
- Voltage adaptation
- Power adaptation
- Current adaptation

**Required Connects**
- 2x Multimeter Connect
- 1x Analogue In Connect

#### DC technology

**Capacitors, parameter-dependent resistors, measuring**

**Training content**
- Capacitors in DC circuits
  - Functional principle and designs
  - Calculating capacitance
  - Permittivity and dielectric properties
  - Electrolytic capacitors
  - Charge and discharge curves
  - Typical applications
  - Series and parallel connection
  - Capacitors as energy storage devices
- Parameter-dependent resistors
  - Non-linear, voltage-dependent, temperature-dependent, light-dependent resistors
  - Characteristics, applications, characteristic curves
  - Components for protective circuits, alarm systems

**Measuring and measuring errors**
- Multimeters: designs, safety, resolution, accuracy
- Direct and indirect measuring of resistance values
- Measuring circuits and measuring errors

**Required Connects**
- 2x Multimeter Connect
- 1x Analogue In Connect

#### AC technology

**Three-phase systems**

**Training content**
- Presenting 3-phase alternating current
- Star and delta circuits in generators and consumers
- Standardized casing colors for three-phase wires
- Circuit symbols
- Phase voltage and phase-to-phase voltage
- Concatenation factor (ratio of phase voltage to phase-to-phase voltage)
- Phase shift

**Required Connects**
- 1x Analogue In Connect

#### AC technology

**Characteristics**

**Training content**
- Generation of alternating current
- Signal shapes (sine, rectangular, triangular, sawtooth)
  - Presentation forms: Pointer diagram and linear representation
  - Frequency, period, amplitude, momentary values
  - Current intensity and power (without phase shift)

**Required Connects**
- 1x Analogue In Connect

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- 100 users/10 workstations
- 200 users/20 workstations
- 500 users/50 workstations
- 1000 users/100 workstations

### AC technology

#### Capacitors

**Training content**
- Charging and discharging with rectangular voltage
- Measuring voltage and current at the capacitor with an oscilloscope
- Measuring and calculating phase shift of sine signals
- Frequency-dependent reactance
- Capacitors in series/parallel
- Calculating capacity values

**Required Connects**
1x Analogue In Connect

den 8034080

The accessories mentioned below are required to conduct the courses.

- 1x Equipment set TP 1011 Fundamentals of electrical engineering/electronics
- 4 mm Safety laboratory cables

#### Coils

**Training content**
- Types of coils, distinguishing features
- Magnetic fields, inductance, time constant
- Progression of voltage and current when applying DC voltage
- Measuring and calculating reactance
- Connecting coils in series and parallel
- Phase shift for sinusoidal signals
- Inductance with and without coils

**Required Connects**
1x Analogue In Connect
den 8034081

The accessories mentioned below are required to conduct the courses.

- 1x Equipment set TP 1011 Fundamentals of electrical engineering/electronics
- 4 mm Safety laboratory cables

### AC technology

#### RC elements

**Training content**
- Resistor for alternating current: ohmic, capacitive and inductive resistors
- Phase shift
- Design and function of a low-pass filter
- Design and function of a high-pass filter
- Cut-off frequency of a filter

**Required Connects**
1x Analogue In Connect
den 8034082

The accessories mentioned below are required to conduct the courses.

- 1x Equipment set TP 1011 Fundamentals of electrical engineering/electronics
- 4 mm Safety laboratory cables

#### Electric power

**Training content**
- Measuring and calculating effective power
- Capacitive and inductive reactive power
- Apparent power
- Phase shift $\phi$ (phi) between active and reactive power
- Power factor: Ratio between the active power and the apparent power
- Reactive power using electric motor as an example

**Required Connects**
1x Analogue In Connect
den 8034084

The accessories mentioned below are required to conduct the courses.

- 1x Equipment set TP 1011 Fundamentals of electrical engineering/electronics
- 4 mm Safety laboratory cables
Tec2Screen® Courses

Sensors

**Inductive proximity sensors with switching output**

**Training content**
- Design and function
- Terms that describe the switching characteristics of an inductive proximity sensor
- Relationship between design and sensing distance
- Relationship between object material and sensing distance
- Material dependency of the sensing distance when validating different metals
- Relationship between object size (area) and sensing distance
- Influence of differently sized objects on the sensing distance

**Required Connects**
- 1x Digital I/O Connect
- 1x Analogue In Connect
- 1x Power Connect

de/en 8028120

The accessories mentioned below are required to conduct the courses.
- 1x Equipment set TP 1311
- Sensors for object detection
- 1x Tec2Screen® measuring unit
- 1x Supplement to the set of measuring objects, TP 1311

**Sensors**

**Inductive sensors with analogue output**

**Training content**
- Determining the characteristic curve
- Learning about response characteristics and sensitivity
- Relationship between output voltage and object material
- Dependency of the output voltage on the material of the item to be measured and on the distance from that item
- Relationship between output voltage and object size
- Dependency of the output voltage on the size of the cross-sectional area and on the distance from the item to be measured

**Required Connects**
- 1x Analogue In Connect
- 1x Power Connect

de/en 8034075

The following licence levels are available for courses and simulations:
- 20 users/20 workstations

**Tec2Screen® Manager**
The Tec2Screen® Manager 20/20 is available as a free download and can be used as an alternative to Classroom Manager for purchase.

**Sensors**

**Light barriers**

**Training content**
- Through-beam sensor
- Design, function and response characteristics with different materials
- Retro-reflective sensor
- Influence of the workpiece surface on the scanning width

**Required Connects**
- 1x Digital I/O Connect
- 1x Analogue In Connect
- 1x Power Connect

de/en 8028121

The accessories mentioned below are required to conduct the courses.
- 1x Equipment set TP 1311
- Sensors for object detection
- 1x Tec2Screen® measuring unit
- 1x Supplement to the set of objects for the light curtain, TP 1311

**Sensors**

**Light sensors**

**Training content**
- Diffuse sensors with background suppression
- Fibre-optic cables
- Design, function and application range

**Required Connects**
- 1x Connect Digital I/O
- 1x Connect Analogue In
- 1x Connect Power

de/en 8034076

The accessories mentioned below are required to conduct the courses.
- 1x Equipment set TP 1311
- Sensors for object detection
- 1x Tec2Screen® measuring unit
Sensors

**Capacitive proximity sensors**

**Training content**
- The setup, function and switching characteristics of a capacitive proximity sensor.
- Relationship between object material and sensing distance
- Relationship between object material thickness and sensing distance
- Material sensing through container walls
- Effect of the container wall on the material verification
- Fill level measurement, content check

**Required Connects**
- 1x Connect Digital I/O
- 1x Connect Analog In
- 1x Connect Power

del/en 8028122

The accessories mentioned below are required to conduct the courses.
- 1x Equipment set TP 1311
- Sensors for object detection
- 1x Tec2Screen® measuring unit

**Magnetic Proximity Switches**

**Training content**
- Design and function of magnetic proximity switches
- Switching characteristics of magnetic proximity switches
- Selecting and aligning magnetic proximity switches
- Industrial applications for magnetic proximity switches

del/en 8028119

This course does not contain experiments with direct hardware interaction.

**Required Connects**
- 1x Connect SysLink

del/en 8028125

The accessories mentioned below are required to conduct the courses.
- 1x Distributing station (Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

**MPS® Stacking Magazine module (Distribution station)**

**Commissioning**

**Training content**
- Commissioning the Stacking Magazine module of the Distribution station
- Function and applications of a stacking magazine in production
- Learning about the electric and pneumatic components
- Actuating a linear cylinder
- Creating the assignment list
- Adjusting the end-position switches
- Setting the one-way flow control valves
- Mounting the through-beam sensor

**Required Connects**
- 1x Connect SysLink

del/en 8028126

The accessories mentioned below are required to conduct the courses.
- 1x Distributing station (Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

**Logic programming**

**Training content**
- Programming the Stacking Magazine module of the Distribution station using logic programming
- Control system structure
- Programming with function elements
- Basic logic functions (AND, OR, NOT)
- Programming motion sequences using the basic logic functions
- What are overlapping signals and how can I avoid them?
- Signal storage with memory modules – differences and correct use

**Required Connects**
- 1x Connect SysLink

del/en 8028126

The accessories mentioned below are required to conduct the courses.
- 1x Distributing station (Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m
Training content

– Commissioning the Stacking Magazine module of the Distribution/Conveyor station
– Function and applications of a stacking magazine in production
– Learning about the electric and pneumatic components
– Actuating a linear cylinder
– Creating the assignment list
– Adjusting the end-position switches
– Setting the one-way flow control valves
– Mounting the through-beam sensor

Required Connects
1x SysLink Connect
d/e/en 8036587

The accessories mentioned below are required to conduct the courses.

– 1x Stacking magazine module
– 15-pin Sub-D HD cables: connector – connector
– 1x C interface
– 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

Training content

– Commissioning the Changer module
– Function and applications of a changer in production
– Learning about the electric and pneumatic components
– Correct actuation of a rotary cylinder
– Creating the assignment list
– Adjusting the end-position switches
– Setting the one-way flow control valves

Required Connects
1x SysLink Connect
d/e/en 8028127

The accessories mentioned below are required to conduct the courses.

– 1x Distributing station (Model series 2000 – 2014)
– 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

Required Connects
1x SysLink Connect
d/e/en 8028128

The accessories mentioned below are required to conduct the courses.

– 1x Distributing station (Model series 2000 – 2014)
– 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

The Tec2Screen® Manager 20/20 is available as a free download and can be used as an alternative to Classroom Manager for purchase.

The following licence levels are available for courses and simulations:

– 20 users/20 workstations
MPS® Processing station

**Commissioning**

**Training content**

- Commissioning the Processing station and its modules
- Learning about the components of the Processing station modules
- Learning about and describing the design and function of the modules and components and using them in a different context
- Adjusting the individual components

**Required Connects**

1x SysLink Connect
de/en 8046988

The accessories mentioned below are required to conduct the courses.

- 1x Processing station (Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

MPS® Pick&Place station

**Commissioning**

**Training content**

- Commissioning the Pick&Place station with SysLink
- Learning about the requirements for safe use of the station
- Learning about practical applications of pick & place
- Learning about the functions of the station
- Commissioning and learning about the station modules
- Learning about the intended sequence for the station
- Adjusting the station sensors

**Required Connects**

1x SysLink Connect
de/en 8046992

The accessories mentioned below are required to conduct the courses.

- 1x Pick&Place station (Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

MPS® Testing station

**Commissioning**

**Training content**

- Commissioning the Testing station
- Design, function and commissioning of the Detection, Lifting, Slide and Measuring modules
- Station experiments for enhancing knowledge in practical exercises at the station

**Required Connects**

1x SysLink Connect
de/en 8046970

The accessories mentioned below are required to conduct the courses.

- 1x Testing station (Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

MPS® Testing station, Detection and Lifting modules

**Logic programming**

**Training content**

- Programming the Detection and Lifting modules in the Testing station using logic programming
- Programming and testing simple and advanced logic control systems with the Detection and Lifting modules
- Learning about and using the logic functions
- AND, NOT, OR and NAND
- RS flip-flop, SR flip-flop (memory modules)
- timer
- counter

**Required Connects**

1x SysLink Connect
de/en 8046989

The accessories mentioned below are required to conduct the courses.

- 1x Testing station (Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

In addition to course and simulation management, the Classroom Manager learning management system offers comprehensive user management. It also has numerous learning management functions, such as integrating your own training media/documents and documenting progress. The following licence levels are available:

- 100 users/10 workstations
- 200 users/20 workstations
- 500 users/50 workstations
- 1000 users/100 workstations

www.festo-didactic.com
**Tec2Screen® Courses**

**MPS® Testing station, Measuring and Lifting modules**

**Logic programming**

**Training content**
- Programming the Measuring and Lifting modules in the Testing station using logic programming
- Programming and testing simple and advanced logic control systems with the Measuring and Lifting modules
- Learning about and using the logic functions
  - AND, NOT, OR and NAND
  - RS flip-flop, SR flip-flop (memory modules)
- Fault documentation and fault analysis

**Required Connects**
1x SysLink Connect

de/en 8046999

The accessories mentioned below are required to conduct the courses.

- 1x Testing station
(Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

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**MPS® Pick&Place station, Troubleshooting in mechatronic systems**

**Training content**
- General troubleshooting using the MPS® station Pick&Place as an example
- Systematic troubleshooting in a mechatronic system
- Fault documentation and fault analysis

**Required Connects**
1x SysLink Connect

de/en 8046999

The accessories mentioned below are required to conduct the courses.

- 1x Pick&Place station
(Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

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**MPS® Processing station, Rotary Indexing Table module**

**Logic programming**

**Training content**
- You will be able to program and test logic control systems with the Testing and Rotary Indexing Table modules
- You will become familiar with the basic logic functions RS flip-flop (memory module), timer and counter
- You will be able to identify and correct errors in the logic control system

**Required Connects**
1x SysLink Connect

de/en 8046995

The accessories mentioned below are required to conduct the courses.

- 1x Processing station
(Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

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**MPS® Processing station, Drilling module**

**Logic programming**

**Training content**
- You will be able to program and test logic control systems with the Clamping and Drilling modules
- You will become familiar with the basic logic functions RS flip-flop (memory module) and timer
- You will be able to identify and correct errors in a given logic control sequence

**Required Connects**
1x SysLink Connect

de/en 8046996

The accessories mentioned below are required to conduct the courses.

- 1x Processing station
(Model series 2000 – 2014)
- 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

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**Tec2Screen® Manager**

The Tec2Screen® Manager 20/20 is available as a free download and can be used as an alternative to Classroom Manager for purchase.

The following licence levels are available for courses and simulations:
- 20 users/20 workstations

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www.festo-didactic.com
MPS® Pick&Place station, Pick&Place module

Logic programming

Training content
– You can program and test logic control systems with the Pick&Place module
– You will become familiar with the basic logic functions RS flip-flop and SR flip-flop (memory module)
– You will become familiar with the basic logic functions Timer (time module)
– You will be able to apply these basic logic functions
– You will be able to expand an existing logic control system with new functions

Required Connects
1x SysLink Connect

de/en 8046997

In addition to course and simulation management, the Classroom Manager learning management system offers comprehensive user management. It also has numerous learning management functions, such as integrating your own training media/documents and documenting progress. The following licence levels are available:
– 100 users/10 workstations
– 200 users/20 workstations
– 500 users/50 workstations
– 1000 users/100 workstations

MPS® Pick&Place station, Conveyor module

Logic programming

Training content
– You can program and test logic control systems with the Conveyor module
– You will become familiar with the basic logic function RS flip-flop (memory module)
– You will become familiar with the basic logic functions RS flip-flop, SR flip-flop (memory modules), Timer and XOR (exclusive or)

Required Connects
1x SysLink Connect

de/en 8046998

The accessories mentioned below are required to conduct the courses.
– 1x Pick&Place station
  (Model series 2000 – 2014)
– 1x I/O data cable with SysLink connectors (IEEE 488), 2.5 m

MPS® Conveyor station

Start-up

Logic programming

Training content
– Starting up the MPS® conveyor module and its components
– Inspecting the setup
– Identifying components in a circuit diagram and inspecting wiring
– Becoming familiar with, testing, and aligning sensors (reflex light sensor, one-way light barrier)
– Testing and calibrating drive function (DC motor with transfer conveyor, solenoid with feed separator)

Required Connects
1x 15-pin D-sub HD Connect

de/en 8034071

The accessories mentioned below are required to conduct the courses.
– 1x Conveyor station
– 1x 15-pin D-sub HD Connector, 2 m

MPS® Conveyor station

Start-up

Logic programming

Training content
– Creating an assignment list based on the circuit diagram
– Using logic programming as a simple programming method
– Learning and programming logic functions
– Learning and programming memory functions, timers (switch-on and switch-off delay), and counters
– Editing simple controller programs
– Learning and applying a method for creating a controller program that meets requirements

Required Connects
1x 15-pin D-sub HD Connect

de/en 8034072

The accessories mentioned below are required to conduct the courses.
– 1x Conveyor station
– 1x 15-pin D-sub HD Connector, 2 m
Tec2Screen® Simulations

Tec2Screen® Manager
The Tec2Screen® Manager 20/20 is available as a free download and can be used as an alternative to Classroom Manager for purchase.

The following licence levels are available for courses and simulations:
– 20 users/20 workstations

7-segment display
The 7-segment display is used to graphically represent numbers and letters using seven segments. The numbers and letters are actuated directly (binary) or via a HEX module. This simulation uses logic programming to teach the user about different data formats (binary, BCD, HEX).

Training content
– Actuation of a 7-segment display
– Data formats (binary, BCD, HEX)

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 2 digital inputs
– 9 digital outputs

Traffic light-controlled junction
Traffic lights at a junction control the flow of traffic in all directions. Demand-controlled pedestrian lights allow pedestrians to cross the road safely. The objective is to switch the lights for vehicles to red after a button is pressed to enable the pedestrians to cross the road safely.

Training content
– Complex sequence control systems with sequencers

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 1 digital input
– 9 digital outputs

Belt control systems
Two conveyors feed bulk material onto a third belt. The infeed conveyors are actuated via a control console, with the operating status indicated by LEDs. The outfeed conveyor starts or stops automatically when the infeed conveyors are operating. Touching and holding a conveyor simulates a fault. The conveyor then stops and outputs an error message in the control console.

Training content
– Dependencies and timing

Required Connects
4x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 2 digital inputs
– 9 digital outputs

Closed-loop level control
A heating coil in a water heater heats water to a temperature within a specified range. A thermometer measures the current water temperature and maintains the temperature above the minimum and below the maximum by switching the heating coil. Four proximity sensors additionally monitor the level and control the water supply via two solenoid-actuated shut-off valves. Touching the tap decreases the water level.

Training content
– Closed-loop control based on disturbance variables

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 6 digital inputs
– 6 digital outputs

Belt control systems
Two conveyors feed bulk material onto a third belt. The infeed conveyors are actuated via a control console, with the operating status indicated by LEDs. The outfeed conveyor starts or stops automatically when the infeed conveyors are operating. Touching and holding a conveyor simulates a fault. The conveyor then stops and outputs an error message in the control console.

Training content
– Complex sequence control systems with sequencers

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 2 digital inputs
– 9 digital outputs

Traffic light-controlled junction
Traffic lights at a junction control the flow of traffic in all directions. Demand-controlled pedestrian lights allow pedestrians to cross the road safely. The objective is to switch the lights for vehicles to red after a button is pressed to enable the pedestrians to cross the road safely.

Training content
– Complex sequence control systems with sequencers

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 1 digital input
– 9 digital outputs

Belt control systems
Two conveyors feed bulk material onto a third belt. The infeed conveyors are actuated via a control console, with the operating status indicated by LEDs. The outfeed conveyor starts or stops automatically when the infeed conveyors are operating. Touching and holding a conveyor simulates a fault. The conveyor then stops and outputs an error message in the control console.

Training content
– Dependencies and timing

Required Connects
4x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 2 digital inputs
– 9 digital outputs

Closed-loop level control
A heating coil in a water heater heats water to a temperature within a specified range. A thermometer measures the current water temperature and maintains the temperature above the minimum and below the maximum by switching the heating coil. Four proximity sensors additionally monitor the level and control the water supply via two solenoid-actuated shut-off valves. Touching the tap decreases the water level.

Training content
– Closed-loop control based on disturbance variables

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 6 digital inputs
– 6 digital outputs

Belt control systems
Two conveyors feed bulk material onto a third belt. The infeed conveyors are actuated via a control console, with the operating status indicated by LEDs. The outfeed conveyor starts or stops automatically when the infeed conveyors are operating. Touching and holding a conveyor simulates a fault. The conveyor then stops and outputs an error message in the control console.

Training content
– Complex sequence control systems with sequencers

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 2 digital inputs
– 9 digital outputs

Traffic light-controlled junction
Traffic lights at a junction control the flow of traffic in all directions. Demand-controlled pedestrian lights allow pedestrians to cross the road safely. The objective is to switch the lights for vehicles to red after a button is pressed to enable the pedestrians to cross the road safely.

Training content
– Complex sequence control systems with sequencers

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 1 digital input
– 9 digital outputs

Belt control systems
Two conveyors feed bulk material onto a third belt. The infeed conveyors are actuated via a control console, with the operating status indicated by LEDs. The outfeed conveyor starts or stops automatically when the infeed conveyors are operating. Touching and holding a conveyor simulates a fault. The conveyor then stops and outputs an error message in the control console.

Training content
– Dependencies and timing

Required Connects
4x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 2 digital inputs
– 9 digital outputs

Closed-loop level control
A heating coil in a water heater heats water to a temperature within a specified range. A thermometer measures the current water temperature and maintains the temperature above the minimum and below the maximum by switching the heating coil. Four proximity sensors additionally monitor the level and control the water supply via two solenoid-actuated shut-off valves. Touching the tap decreases the water level.

Training content
– Closed-loop control based on disturbance variables

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 6 digital inputs
– 6 digital outputs
Pedestrian lights system
A pedestrian lights system is switched at the press of a button. The objective is to switch the lights for vehicles to red after a button is pressed to enable the pedestrians to cross the road safely.

Training content
– Simple sequence control systems with sequencers

Required Connects
2x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 1 digital input
– 6 digital outputs

Handling device
A two-axis handling device transports workpieces into a clamping device. The handling device is composed of a pneumatic linear axis, a double-acting stroke cylinder and a parallel gripper. Proximity sensors for determining the end positions are located on the linear axis and the stroke cylinder.

Training content
– 2-axis, pneumatic, with possibility of collision
– Collision avoidance

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 5 digital inputs
– 4 digital outputs

Incremental encoder
An incremental encoder is a system composed of numerous sensors for determining changes in position, in this case of the direction of rotation. Three inductive proximity sensors generate signals using the two toothed discs; these signals are used to determine the direction of rotation of the motor.

Training content
– Mode of operation of an incremental encoder
– Programmatic evaluation of incremental encoder signals

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 4 digital inputs
– 8 digital outputs

Coffee vending machine
A coffee vending machine offers various coffee mixed drinks to choose from. The feed separator releases a cup after the appropriate selection is made. A sensor detects the cup once it reaches the filling position and forwards the filling signal to the controller. This then controls the filling process based on the preset filling recipe.

Training content
– Data modules and recipes

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 4 digital inputs
– 8 digital outputs

In addition to course and simulation management, the Classroom Manager learning management system offers comprehensive user management. It also has numerous learning management functions, such as integrating your own training media/documents and documenting progress. The following licence levels are available:
– 100 users/10 workstations
– 200 users/20 workstations
– 500 users/50 workstations
– 1000 users/100 workstations
Coding switch
The coding switch connects a specific output as a function of the input signal. A value is entered via two selector switches. A timer is actuated for visualisation. Values from 00DEC to 99DEC or from 00HEX to FFHEX can be entered in this timer depending on the selected time system.

Training content
– Interrogation of a coding switch
– Data formats (binary, BCD, HEX)

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 9 digital inputs
– 1 digital output

Motor speed adjustment
A DC motor drives a sanding disc whose speed can be adjusted to three levels between zero and 2000 rpm. Pressing a broach against the sanding disc simulates a load which reduces the rotational speed as a function of the contact pressure. The control console shows the resultant deviation from the specified rotational speed as a percentage.

Training content
– Speed adjustment based on disturbance variable and setpoint jumps

Required Connects
– 1x Digital I/O Connect
– 1x Analogue In Connect
– 1x Analogue Out Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 1 digital input
– 1 digital output
– 2 analogue inputs
– 1 analogue output

Tec2Screen® Manager
The Tec2Screen® Manager 20/20 is available as a free download and can be used as an alternative to Classroom Manager for purchase.

The following licence levels are available for courses and simulations:
– 20 users/20 workstations
Pallet transport system
A transporting slide carrying workpiece blanks moves under a drilling jig. The workpieces are located using a stopper and workpiece clamps. Spiral drills drill a defined hole pattern as a function of the workpiece identifier, interrogated by inductive sensors.

Training content
– Simple sequence control system with sequencers

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 8 digital inputs
– 4 digital outputs

Car park control system
A cabinet system controls transits in a car park with one entrance and one exit. The car park has space for 15 vehicles. The occupied spaces are displayed in the overview. Touching the parking ticket switch allows vehicles to drive into or out of the car park.

Training content
– Sequencers and counters

Required Connects
– 4x Digital I/O Connect or – 1x SysLink Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 8 digital inputs
– 8 digital outputs

Sorting system
The sorting system distributes workpieces detected by the diffuse sensor at the start of the conveyor to three chutes. Two sensors upstream of the barrier detect the colour and material of the workpieces (black, red, metal) in order to then distribute them to the corresponding chutes via electromagnetically operated shunts. A retro-reflective sensor additionally monitors the level of the chutes.

Training content
– Sequencers and dependencies

Required Connects
3x Digital I/O Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 6 digital inputs
– 4 digital outputs

Tunnel furnace
A conveyor transports workpieces through a tunnel furnace. The workpieces remain in the tunnel furnace for a specified time in order to reach the required temperature. To maintain the fixed oven temperature, a sensor measures the temperature and forwards its output signal to a controller. This controls the temperature in the furnace by switching the electric heater on and off in order to compensate for heat loss.

Training content
– Closed-loop control based on disturbance variables

Required Connects
– 1x Digital I/O Connect
– 1x Analogue Out Connect

Required accessories
Programmable logic controller, e.g. in the EduTrainer® Universal or EduTrainer® Compact, with at least:
– 1 analogue input
– 1 digital output

In addition to course and simulation management, the Classroom Manager learning management system offers comprehensive user management. It also has numerous learning management functions, such as integrating your own training media/documents and documenting progress. The following licence levels are available:
– 100 users/10 workstations
– 200 users/20 workstations
– 500 users/50 workstations
– 1000 users/100 workstations
Classroom Manager
Learning management system for WBTs and Tec2Screen®

Simple, professional, affordable: The Classroom Manager learning management system

- Creating and managing users and user groups
- User self-registration
- Individual assignment of training topics to users or groups
- Monitoring learning progress in the tutor cockpit
- Easy integration of own resources
- Option to design own courses by using existing learning units
- Individual creation of certificates
- Support for SCORM standards 1.2 and 1.3

The Classroom Manager is the ideal platform for quick and tailored management and implementation of online training courses. The Classroom Manager provides the user with classroom seminars, e-learning modules and Tec2Screen® courses as needed.

All the digital training media are compiled in a central library. Direct access to training media greatly reduces course preparation time.

The participants are provided with the right material for each session. You can create new training media for tests or questionnaires as needed for the completion of courses or training sessions.

The Classroom Manager defines course structures and sets time frames, dates for attendance, training aids, access requirements and certification options. Participants and potential applicants can access this information as required.

Has everyone done their homework? The Classroom Manager provides a clear picture of participants’ learning success. The learning progress monitoring system means you always have an overview of course attendance and the progress of individual participants.

The Classroom Manager also allows students to keep an eye on their courses: the qualifications on offer are displayed clearly and registering is quick and easy.

We’ve got great offers for ordering all the training programs with the Classroom Manager – take a look at the table.

Please note:
- WBTs that have already been installed from CD-ROM cannot be integrated into the Classroom Manager after installation. To do this, you will require a new version.
- The WBTs and Tec2Screen® courses are not included in the scope of delivery for the Classroom Manager. Please order separately.

Refer to the product description or the Internet for details of the WBTs and Tec2Screen® courses as well as the available languages.

System requirements
- Windows 2000 Server (web edition) or later
- Flash Player 8.0 or later
- Administrator access is essential for installation
- In addition to Classroom Manager, a number of free open-source components need to be installed (Apache 2.x/MySQL 4.x or 5.x/PHP 4.x/Zend Optimizer). These are supplied in the installation bundle.
- For standard installation, the required ports are 80 (Apache) and 3306 (MySQL)
- The hardware should be an Intel/AMD x86 or x86-64 platform. No minimum requirements for CPU, memory or hard disk
Ordering Information:
– Classroom Manager (CRM) with up to 1000 named registered users on 100 workstations simultaneously
– CD-ROM with installation instructions
– Execution in de/en/it/es/pt/sv/el/zh
– Note: The order number is configurable.

100 users at 10 workstations  8034067-100/10
200 users at 20 workstations  8034067-200/20
500 users at 50 workstations  8034067-500/50
1000 users at 100 workstations  8034067-1000/100
Campus/enterprise licence On request
ASP solution On request

Tec2Screen® Manager 20/20 is free to download after ordering the courses/simulations. It can be used as an alternative to Classroom Manager for purchase when the learning management system is not necessary.

Software maintenance agreement for the learning management system

The software service for the Classroom Manager includes:
– Premium telephone support
– Free updates of the latest version of the software
– Agreement runs for 36 months

100 users at 10 workstations  8028155-100/10
200 users at 20 workstations  8028155-200/20
500 users at 50 workstations  8028155-500/50
1000 users at 100 workstations  8028155-1000/100
On-site training day (for Germany only)

The training content will be individually defined in consultation with the customer based on the customer's needs. For example, it could include:
– Installation of the Classroom Manager on a server
– Installation of the Content Builder (if included in the scope of delivery)
– Instruction on operation of the systems
– Installation of Apple TV and access points (if included in the scope of delivery)
– Training in the Tec2Screen® system
– Training in the Classroom Manager

Training in DE  8028154
Training outside DE On request
Devise digital training media quickly and inexpensively.
Build up and consolidate knowledge: create whole training scenarios!

Easy creation of exercises and tests thanks to a wide choice of exercise types and ready-made interaction scenarios. PowerPoint import functionality allows rapid e-learning.
Experience optimized workflow in the production of training media.

The authoring tool Content Builder allows the development of high-quality digital training media such as classic web-based training, Tec2Screen® courses or material for blended learning scenarios.

Use Content Builder, for example, in training projects or in publicity work. No matter whether you are dealing with data, facts or arguments – with Content Builder you can communicate information in a structured and stylish way.

As regards design and form, you can make use of numerous attractive and functional templates. Add content yourself using drag & drop or save time by importing it from other digital media formats such as PowerPoint.

Create interaction! Integrated facilities for creating interaction scenarios mean additional motivation for students. Intelligent functions allow you to produce ready-to-use results without any need for programming knowledge.

Speak many languages! The language import and export function allows you to create multilingual training media in next to no time. Texts which need to be translated can be output easily – thanks to the automatic import function, translations can easily be inserted at the same places in written or audio form.

Order no. 576293
Components of the Tec2Screen® Media Systainer

- **Apple AirPort Extreme®**
  The intelligent, user-friendly Apple AirPort Extreme® base station with simultaneous dual-band operation is the ideal WLAN solution for at home, school or in the office.
- **Apple TV® box**
  Apple AirPlay® is used to display the contents of iOS devices or Mac® computers on the television or digital projector.
- **HDMI cable**
  For carrying digital HD video and multi-channel audio signals.
- **Ethernet cable**
  For connecting Apple TV® and Apple AirPort Extreme®
- **Systainer®**
  Systainer® with high-quality flexible foam padding and space for a digital projector

Order no. 8034070

Two small appliance power cables (order no. 8050968) are included in delivery.

Required accessories, also order (not DE):
- Mains cable for small appliances (2x)
- 1. Connector as per CEE 7/7VII for DE, FR, NO, SE, FI, PT, ES, AT, NL, BE, GR, TR, IT, DK, IR, ID, CH, ZA, IN, PT, HK, (GB), (AE)
  Order no. 8050968
- 2. Connector as per BS 1363 for GB, IE, MY, SG, UA, HK, AE
  Order no. 8060969
  3. Connector as per AS 3112 for AU, NZ, CN, AR
  Order no. 8060970
  Order no. 8060971

Mains cable for small appliances

One end designed as a C7 IEC power socket and one end with a country-specific plug.

1. Connector as per CEE 7/7VII for DE, FR, NO, SE, FI, PT, ES, AT, NL, BE, GR, TR, IT, DK, IR, ID, CH, ZA, IN, PT, HK, (GB), (AE)
2. Connector as per BS 1363 for GB, IE, MY, SG, UA, HK, AE
3. Connector as per AS 3112 for AU, NZ, CN, AR
Tec2Screen® Extensions and accessories

New

Tec2Screen® media trolley

The media trolley is designed for mobile use in various spaces and for quickly charging up to 16 Tec2Screen® devices simultaneously.

This mobile media trolley makes planning lessons easy – it can be put to use quickly in any space and is easy to operate, space-saving and sturdy. The media trolley is fully prepared for the everyday challenges of school and education, bringing new technology to any classroom.

It has plenty of space to charge and store Tec2Screen® units, Apple iPad® devices, additional Connects, laptops, projectors and other technical devices.

Components of the Tec2Screen® media trolley:
- I/O box with 2 separate circuits
- 1x 6-outlet power strip for permanent power supply circuit
- 1x 12-outlet and 1x 6-outlet power strip for charging circuit with timer
- Switch-on current limiter
- 16x metal pull-outs on rollers for storing up to 16 Tec2Screen® units, incl. Systainer molded foam inserts
- 1x wooden pull-out for teacher’s laptop
- 1x foam insert for max. 16 Apple iPad® devices
- 1x metal pull-out with foam insert for storing additional Connects
- 1x drawer
- Charging station for charging max. 16 Apple iPad® devices simultaneously, 16x 12-watt lightning connections for quick charging
- Charging station for max. 16 Tec2Screen® Base units
- 2x RJ-45 network connections with internal cabling
- 1x mains cable
- 4 self-adhesive plastic rollers included, 2 of which can be fixed in place (roller diameter: 125 mm – not installed)
- 2 keys
- Sturdy wooden body with sliding doors at front
- Fixed, perforated steel plate back-wall with locking service hatches for attaching power supply units, AppleTV, Wi-Fi access point

Technical data
- Dimensions (B x T x H): 1132 x 690 x 1360 mm
- Weight: 135 kg

Order no. 8049376

Country-specific variants:
CA, CO, EC, TW, JP, US 110 V 8059639
GB, IE, MY, SG, HK 220 V 8059640
IN, SG, HK, GB, ZA 220 V 8060052
CH 220 V 8060053
AUS, AR, CN, NZ 220 V 8060054
1 I/O data cable with SysLink connectors (IEEE 488)
For connecting to SysLink interfaces (MPS®).
Length: 2.5 m
Order no. 34031

2 BNC – 4 mm safety measuring adapter
Measuring lead for BNC plug on 4 mm safety plug for use with the oscilloscope Connect.
Technical data
– Insulated BNC plug
– 4 mm plug with rigid protective sleeve and axial socket contact
– 600 V CAT II
– Length: 1600 mm
Order no. 8023959

3 15-pin D-sub cables: connector–connector
For connecting MPS® modules to the C interface via the mini-I/O terminal. The I/O data cable connects 24 V/0 V, four digital inputs and outputs, two analogue inputs, and one analogue output in parallel.
Technical data
– Cores: 16 x 0.25 mm²
– 15-pin D-sub HD connector
– Length: 2.0 m
Order no. 8033584

4 Tec2Screen® bracket
For mounting and using Tec2Screen® on workstation systems/workbenches with flexibility.
Quickly and securely mount Tec2Screen® on the Tec2Screen® bracket. Easy mounting with novus® QuickRelease can be released with one hand, meets mounting standard 75/100, and can be comfortably changed without tools to promote interaction between student, software, and hardware.
Order no. 8068678

5 Tec2Screen® mounting for MPS®
For vertically mounting the Tec2Screen® bracket to an MPS® station. It can be mounted directly on a profile plate.
Aluminum profile dimensions (W x D x H): 505 x 40 x 40 mm
Order no. 8068679