

ETS DIDACTIC SMARThome

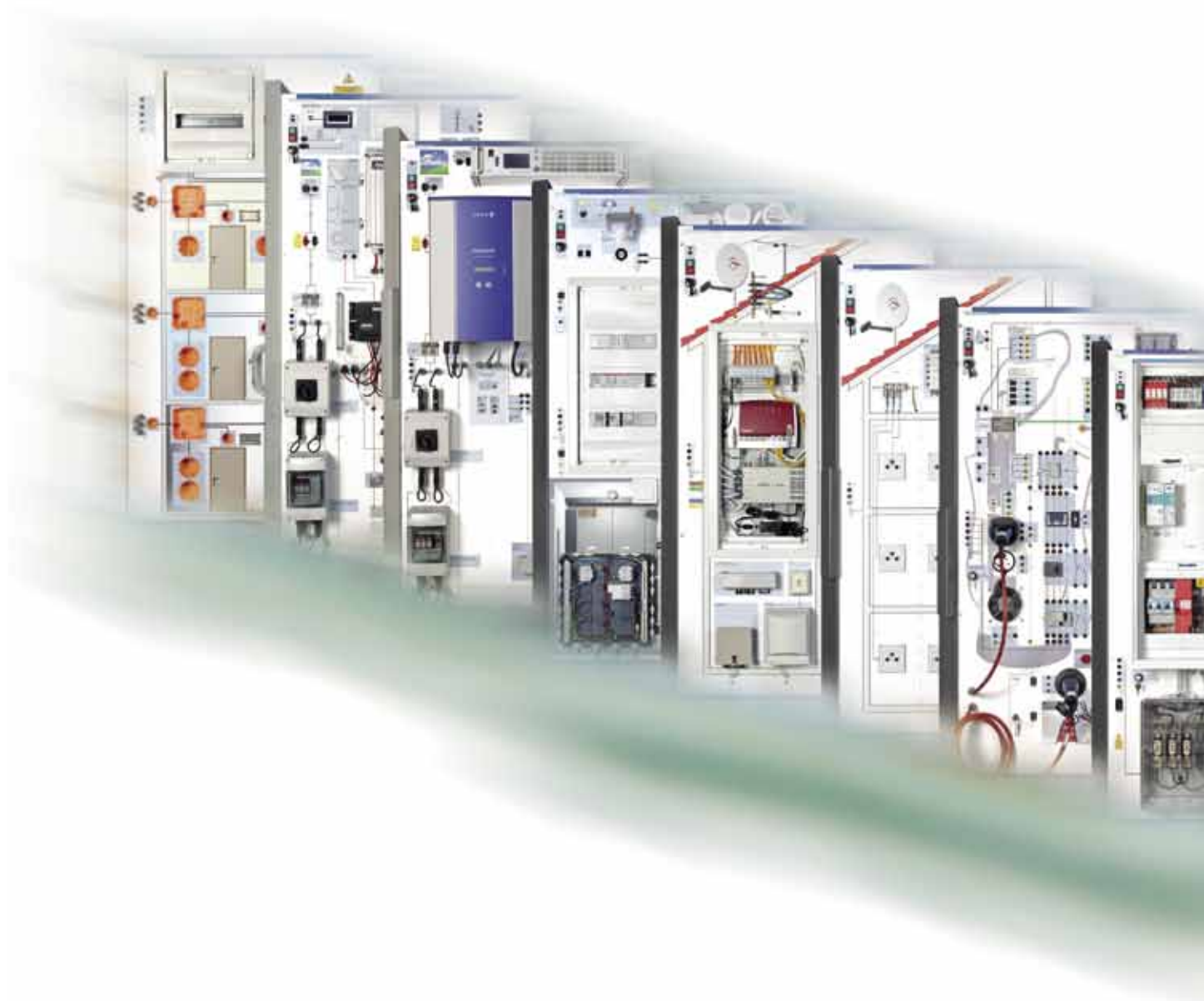


BST® – the flexible training system from ETS DIDACTIC GMBH for building automation – based on real components.



BST®–BuildingSystemsTrainer

Mobile – Practical – Safe



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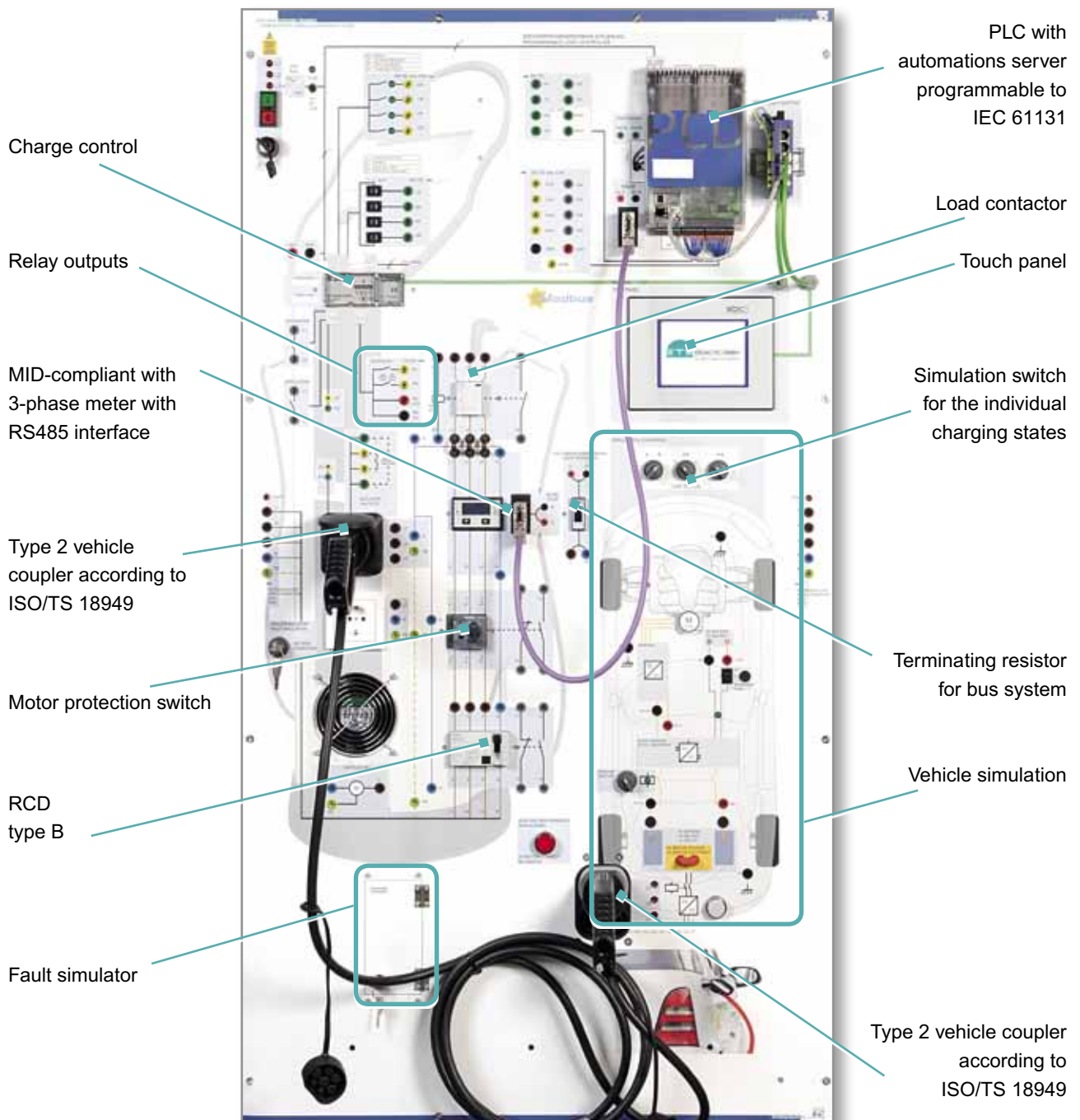
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Electric Vehicle Charging System



43 580 BST® Electric Vehicle Charging System

→ BST®–Building Systems Trainer Charging System

Learning objectives 1

- Designing energy management systems with an interface to EV charging stations
- Implementation of electric charging stations in smart metering and smart grid solutions
- Installation and commissioning of measuring, control and regulation systems
- Visualisation of energy systems and their energy flows
- Maintenance and service of building-integrated automation units
- Testing and securing the electrical safety of energy management systems

Learning objectives 2

- Configuring the components of electric charging stations
- Configuration and implementation of decentralized energy supply and energy conversion systems
- Setting up and connecting the required energy supply and communication units
- Establishing the necessary lightning and surge protection
- Maintenance and service of electric charging stations in and at buildings and public places
- Testing and securing the electrical safety of electric charging systems

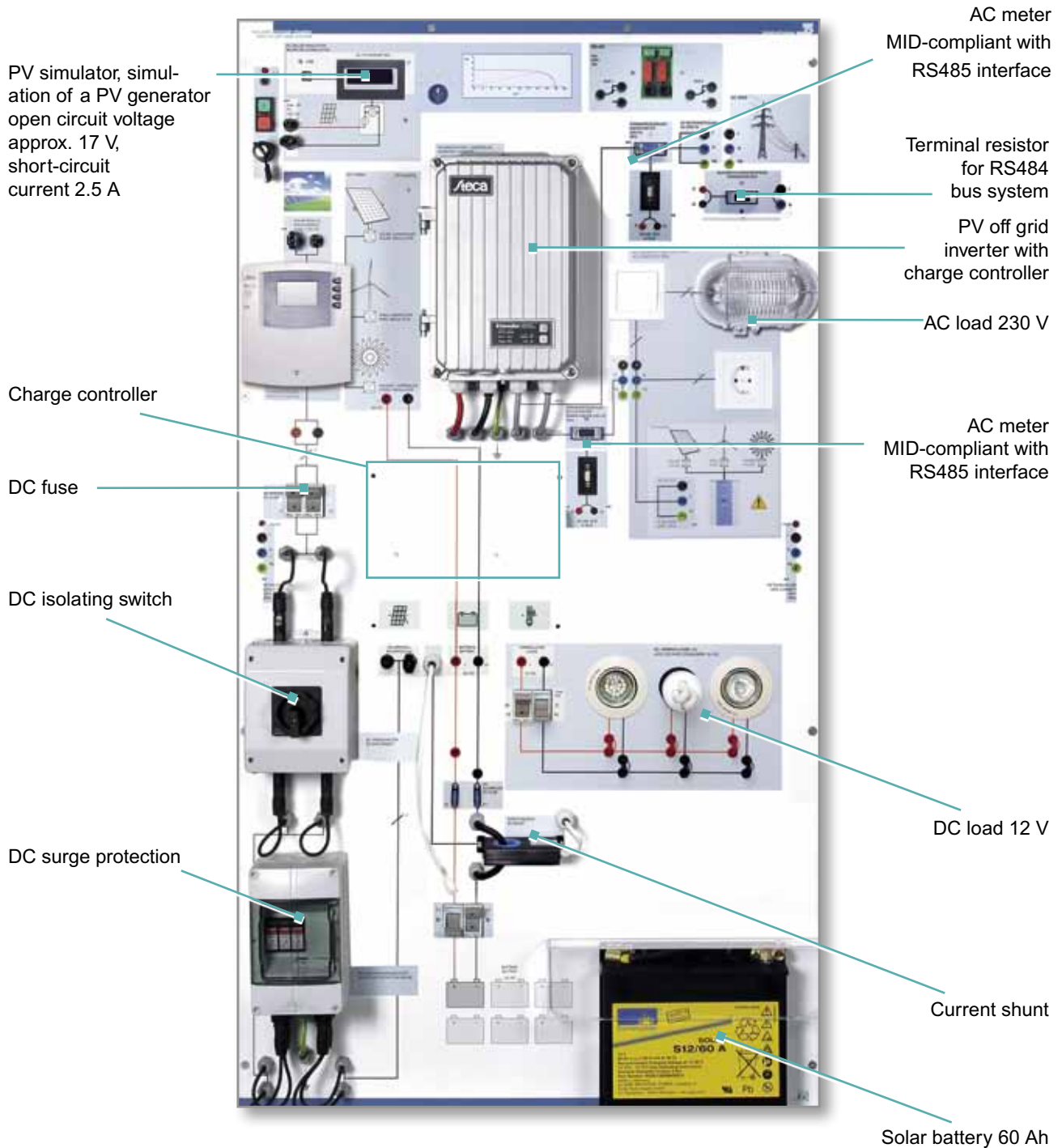
Consisting of:

- Protective facilities: RCD type B, circuit breakers
- EV charge control with MODBUS-IP interface
- Fault simulator
- PLC incl. Modbus TCP/Ethernet/KNX communication
- Touch panel, Ethernet switch
- Terminal resistor for RS485 bus system
- Load contactor
- Type 2 vehicle coupler according to ISO/TS 18949 (Mennekes)
- MID-compliant with 3-phase meter with RS485 interface
- Relay outputs on charge control on 4 mm safety sockets
- Simulation switch for the individual charging states
- RCD type B
- Motor protection switch
- Vehicle simulation with the functions essential for a charging process

Advantages:

- Learning objectives integrated into an overall concept
- Better understanding of the inter-relationships
- Practical applications like Smart Grid, Smart Metering...

Photovoltaics - Off Grid PV System • DC



43 521 BST® Off Grid PV System

Hybrid • AC Hybrid

→ BST®–Building Systems Trainer Photovoltaics

Learning objectives:

- To plan components of PV systems
- Setting up and integration of decentral energy supply and conversion systems
- Installation and connection of all relevant energy supplies and communication units
- Installation of lightning and surge protection systems
- Maintenance and services of PV systems

The system consists of:

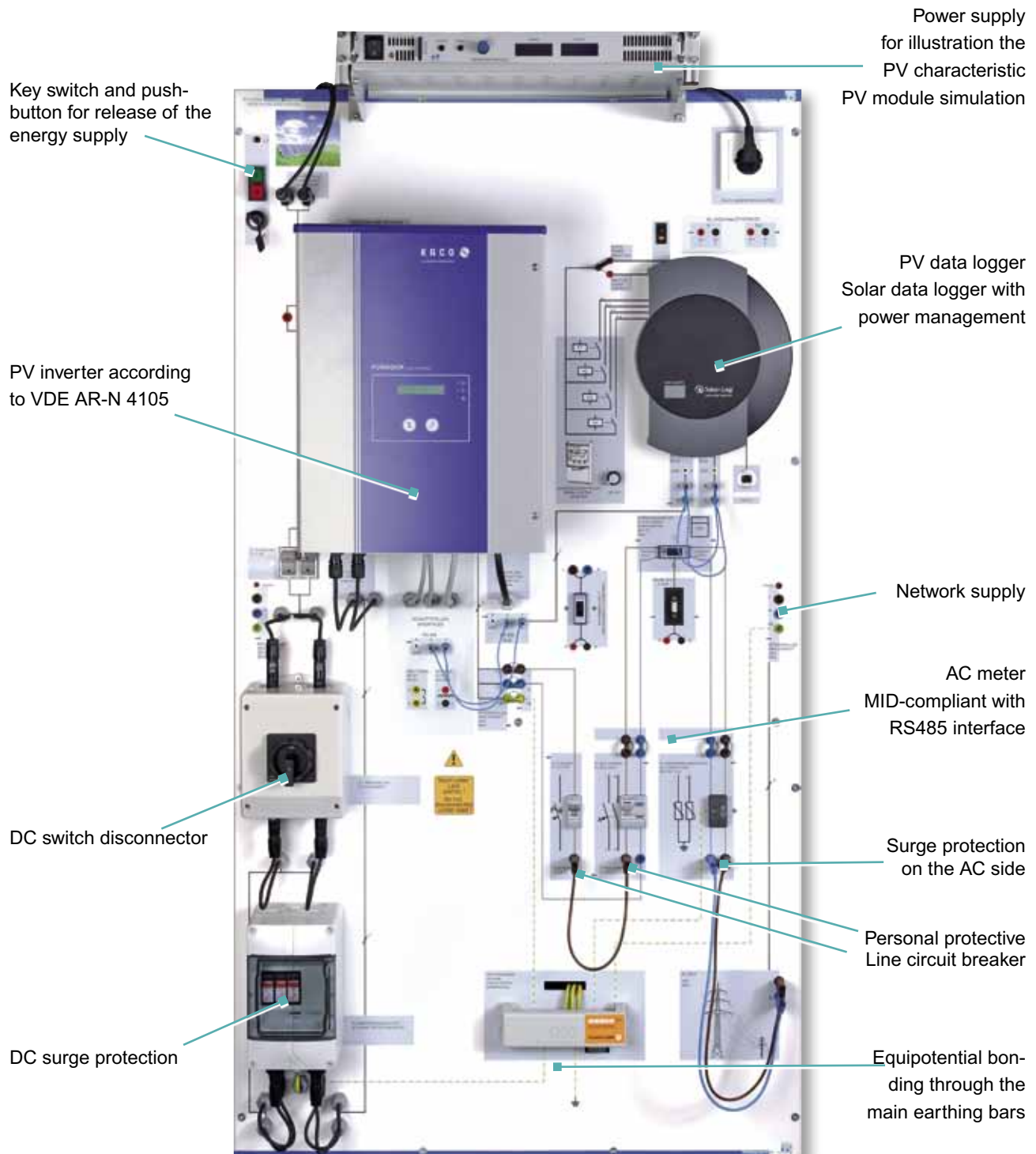
PV simulator, simulation of a PV generator, OC voltage approx. 17 V, short-circuit current 2.5 A

- Displayed quantities: U, I, P
- USB interface for value display on a PC
 - 2 energy counters with bus connection, MID-compliant with RS485 interface
 - Charge controller, DC fuse
 - DC isolating switch, DC surge protection
 - Terminal resistor for RS484 bus system
 - PV off grid inverter with charge controller
 - AC load, DC load
 - Solar battery 60 Ah, current shunt

Advantages:

- The off-grid PV system allows to simulate and examine an off-grid system, a DC connected hybrid system, an AC-coupled hybrid system and a backup system. Hybrid means that the system is supplied by several forms of energy generation. e.g.
- DC Hybrid: PV system, small wind turbine, small hydro power installation
- AC Hybrid: mains electricity, on grid PV system, generator, etc.

Photovoltaics - On Grid PV System • Supply



43 520 BST® On Grid PV System

into a Power Grid

→ **BST®**–Building Systems Trainer **Photovoltaics**

Learning objectives:

- Setting up a PV system for feeding into the grid
- Request in accordance with VDE AR-N4105
- Choosing the appropriate protective measures for PV systems
- Implementing a performance control in accordance with § 6 of the German Renewable Energy Act
- Integrating a data logger for recording performance data and for remote control of the inverter
- Commissioning the inverter
- Examination of the behavior of the inverter with shaded PV array
- Integration of the PV system in a smart grid
- Use of surge protective devices in a PV system

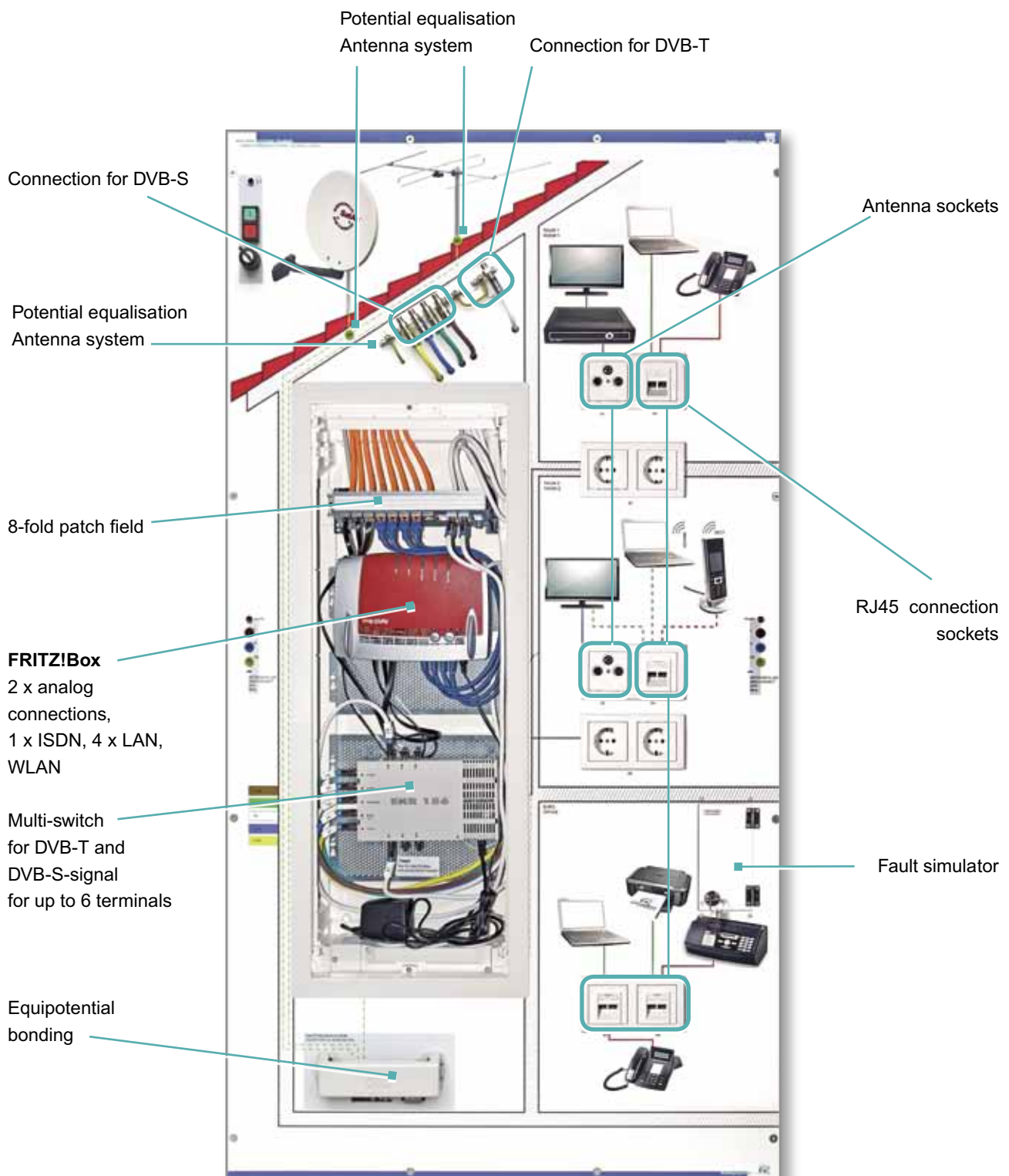
The system consists of:

- PV simulator, replicating a PV module open circuit voltage approx. 17 V, short-circuit current 2.5 A
- Displayed values: U, I, P
- USB interface to display the values on a PC
- 2 x AC meter, MID-compliant with RS485 interface
- Charge controller, DC fuse, DC switch disconnecter, DC surge protection
- Terminating resistor for RS484 bus system
- PV stand-alone inverter with charge controller
- AC load, DC load
- Solar battery 60 Ah, current shunt

Advantages:

- Integration of the PV system into a Smart Grid/Smart Home System
- Hands-on applications in Smart Grid, Smart Metering, Smart Home
- Interesting setup based on real components

Communication Technologies I



43 560 BST® Communication Technologies I

→ **BST®–BuildingSystemsTrainer Communication Technologies I**

Learning objectives:

- Setting up communication facilities in buildings according to customer's requirements
- Inspecting and testing communication facilities
- Getting familiar with networked IT systems
- Installing devices and systems, integrating them in existing networks and altering them
- Troubleshooting in communication systems

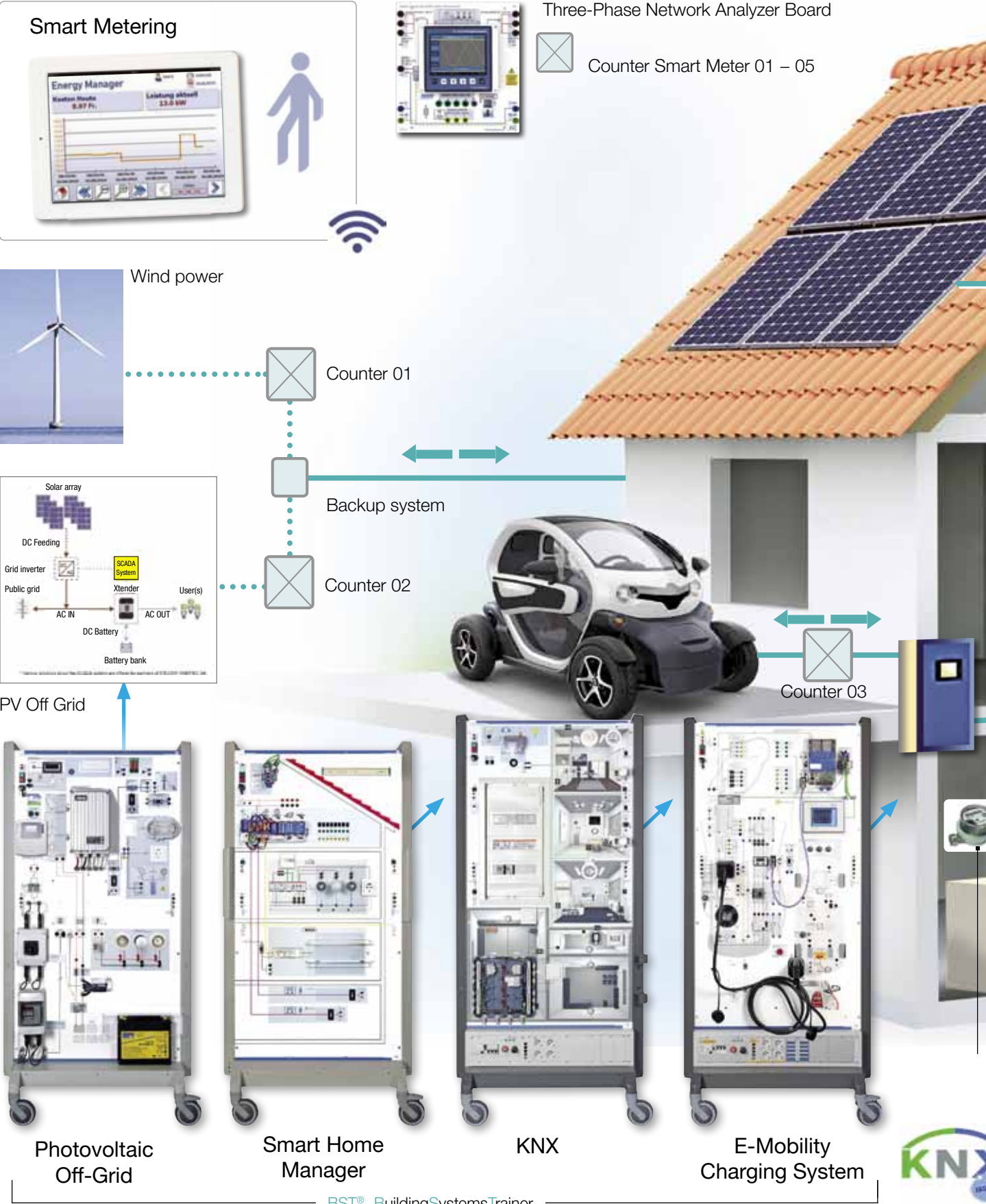
The system consists of:

- Connection for DVB-S antenna with Universal Quad LNB
- 8-fold patch field RJ45
- FRITZ!Box (2x analog connections, 1x ISDN, 4x LAN, WLAN)
- Multi-switch for DVB-T and DVB-S-signal for up to 6 termination devices
- Fault simulator
- Structured cabling
- Multimedia sub-distributor
- RJ45 connection sockets
- Antenna connection sockets
- Equipotential bonding

Advantages:

- The Building Systems Trainer Communication Technologies I covers the subjects of satellite reception (DVB-S), telecommunication and network technology.
- Telecommunication and network cabling is installed as structured cabling. A FRITZ!Box is used as a „residential gateway“ for the subjects of telecommunication (analog, ISDN and DECT) and the network types LAN and WLAN.

ETS DIDACTIC SMARThome





M-Bus

Modbus

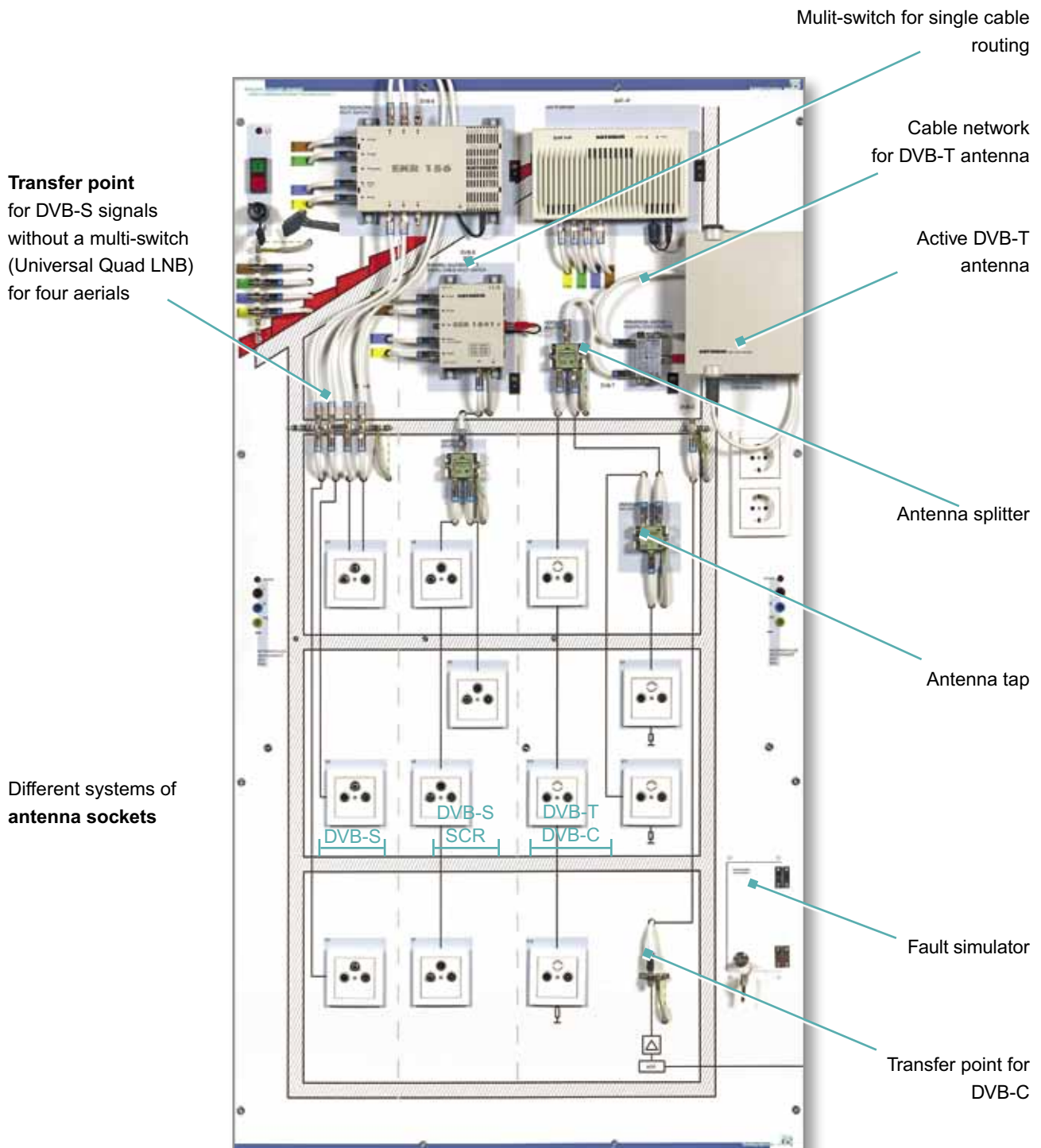
BACnet

EEBUS

SMART
grid



Communication Technologies II

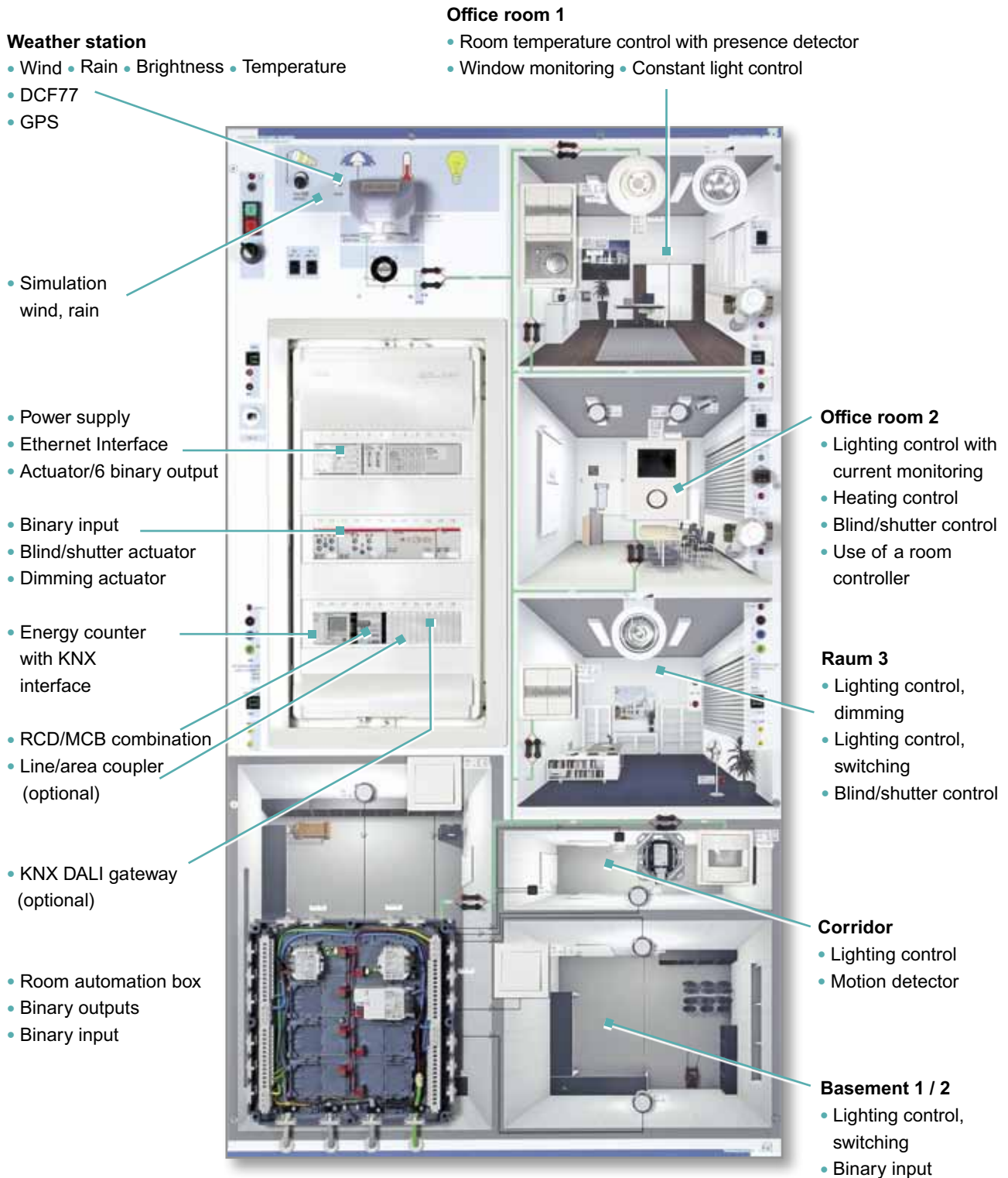


→ **BST®**–BuildingSystemsTrainer **Communication Technologies II**

The system consists of:

- Transfer point for DVB-S signals without a multi-switch (Universal Quad LNB) for four aerals
- 3 connection sockets for DVB-S
- Single cable multi-switch, 5in, 4out
- 3 connection sockets for DVB-S SCR
- Active DVB-T antenna with remote feed
- Transfer point for DVB-C
- 5 antenna sockets and cable network for DVB-T and DVB-C
- Antenna tap and antenna splitter
- Fault simulator
- Remote feed power supplies

KNX Installation Technology



43 540 BST® KNX Technology

→ **BST®–BuildingSystemsTrainer KNX Installation Technology**

Learning objectives:

- Planning and configuring KNX systems
- Commissioning and troubleshooting
- Extension of existing systems
- Documentation and maintenance
- Integration in a control level
- MODBUS TCP
- BACnet
- KNX IP
- Networking of existing KNX systems
- Optional use of line / area couplers

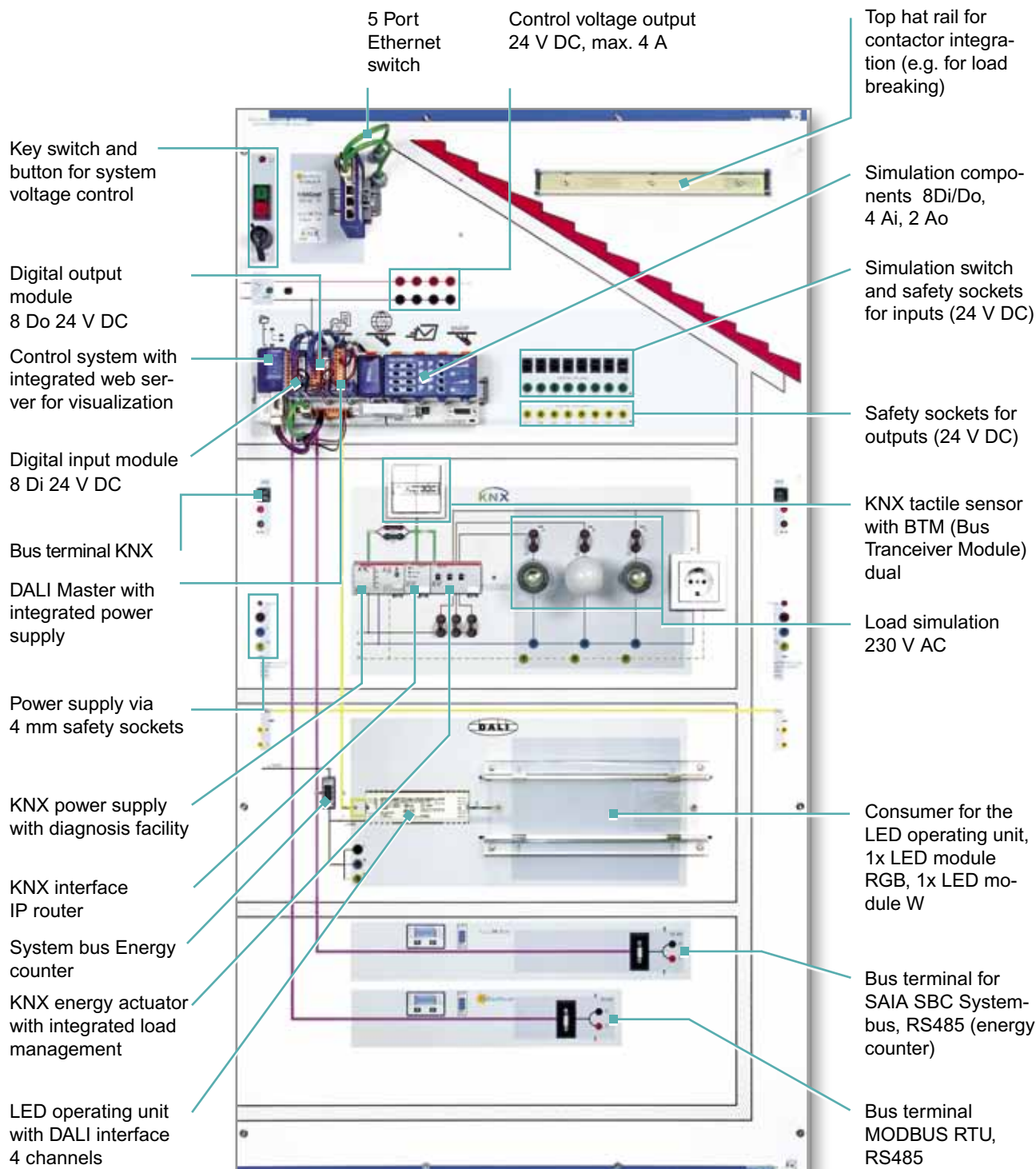
The system consists of:

- Rooms can be activated individually
- Various designs of KNX participants
 - Rail-mounted devices
 - Flush-mounted devices
 - Room automation box
 - Control and display devices
- Many manually operated devices
- Realistic arrangement of the components

Advantages:

- Saving of expenses (integrating fundamentals and complex project in a single device)
- Flexible use (movable)
- Fast training for trainers (didactically prepared documents)
- Realistic assembly of components

Smart Home Manager



43 630 BST® Smart Home Manager

→ **BST®–BuildingSystemsTrainer Smart Home Manager**

Learning objectives:

- Planning of energy management systems
- Visualizing of power distribution systems and their energy flow
- Installing and commissioning measurement and control systems
- Integrating various bus systems into a management station, e.g. KNX, ModBus, DALI, BACnet
- Maintenance and service of building-integrated automation units
- Planning of energy management systems on a KNX basis
- Planning of lighting control systems on a DALI basis

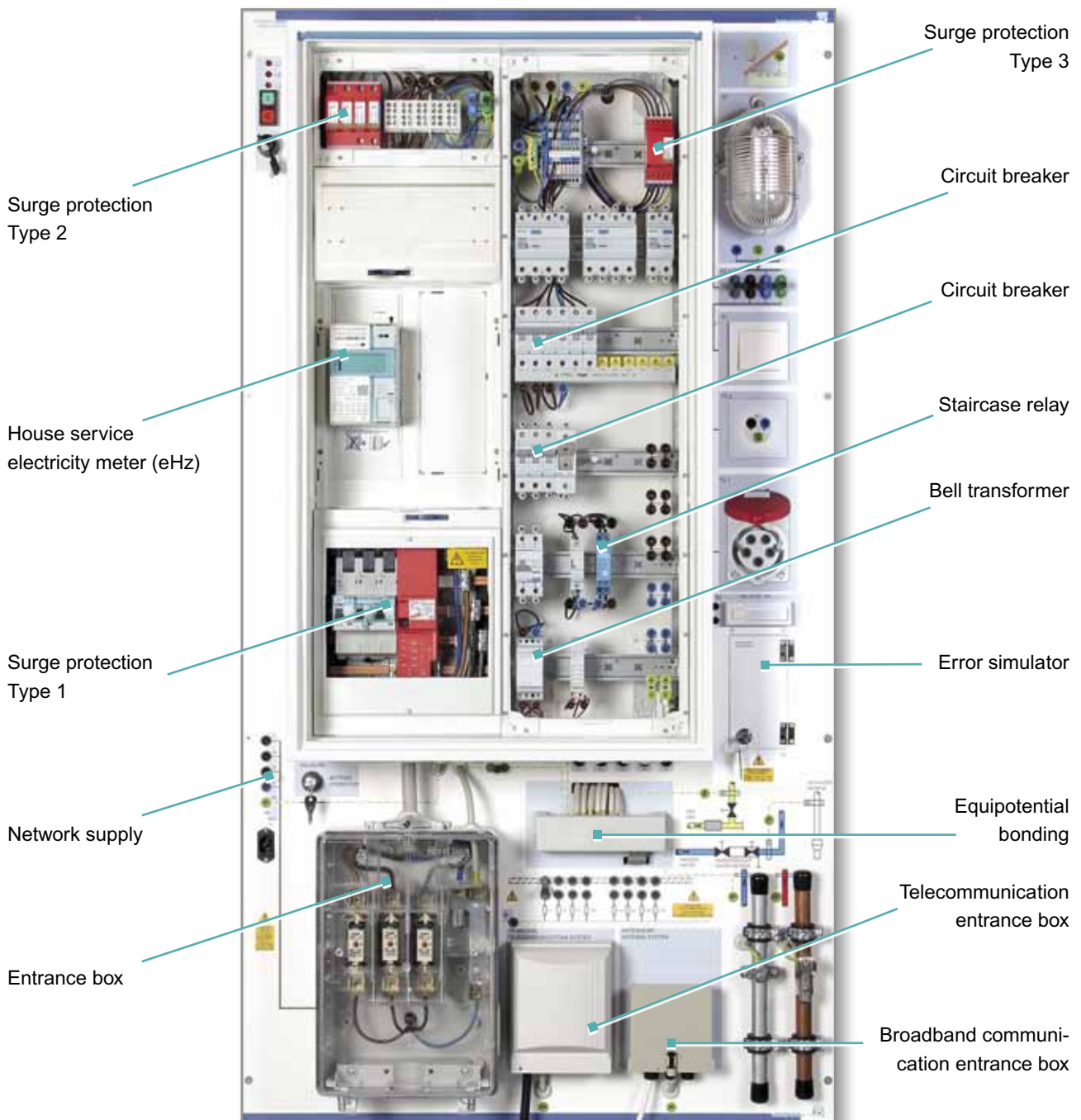
Advantages:

- Saving of expenses (integrating fundamentals and complex project in a single device)
- Flexible use (movable)
- Fast training for trainers (didactically prepared documents)
- Realistic assembly of components

Supported Bus Systems:

- | | |
|-----------------|---------------|
| • BACnet | • KNX IP |
| • Modbus RS485 | • DALI |
| • Modbus TCP/IP | • S-Bus RS485 |
| • S-Bus IP | |

VDE 0100 / House Connection



43 503 BST® Protective Measures

→ **BST®**–BuildingSystemsTrainer

Learning objectives:

- Mains of the consumer's installation
- Choosing the appropriate protective measures for a consumer's installation
- Choosing and applying measuring and test instruments according to DIN VDE 0100-600, DIN VDE 0105-100 and Accident Prevention Regulations BGV A3, and interpreting the measured values
- Applying rules for initial and repeated test and setting up a schedule of the required measurements
- Commissioning of a low-voltage system
- Carrying out initial and repeated test of electrical installations and writing a test report
- Use of personal protection equipment
- Planning and carrying out electrical installations
- Troubleshooting in electrical installations

The flexible training system for building systems engineering, made by ETS DIDACTIC, with real components, such as the meter cabinet, complying with the safety regulations. The system is characterised by the holistic approach to knowledge transfer. It is mobile and the workplace can be equipped individually on both sides. The trainee can work and make measurements under real conditions at the highest possible safety.

Apart from troubleshooting, flush mounted installation, replacement of NH fuses and lots more is possible in terms of training content. Work on the BST® is supported by comprehensive multimedia-based courseware.

Training Stand

43510 H-profile Frame,

4-row DIN A4



43500 Training Stand

BST® 2000



43501 Training Stand

BST® 1800



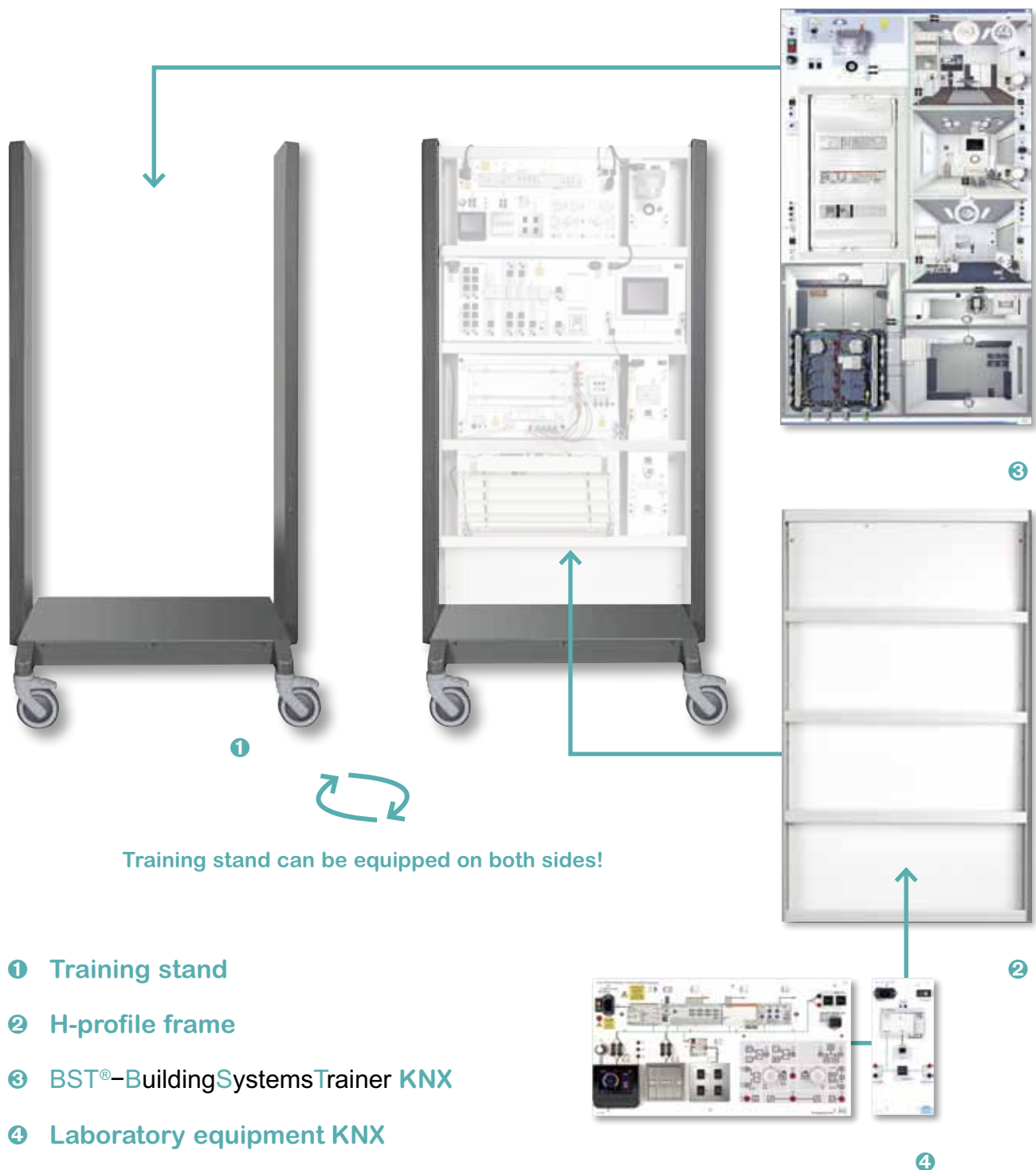
- Mobile stand, completely mounted
- Four big swivel castors for heavy weights, two of which with brake
- Profile columns on the sides allow integrated cable duct, column door with magnetic lock
- Cable and accessory holders in one profile column
- Dimensions:
Training stand BST® 2000,
2000 x 920 x 750 mm (hxwxd)

alternate: Training stand BST® 1800,
1800 x 920 x 750 mm (hxwxd)



Energy Supply Channel
for Training Stand BST® 2000

Modular System



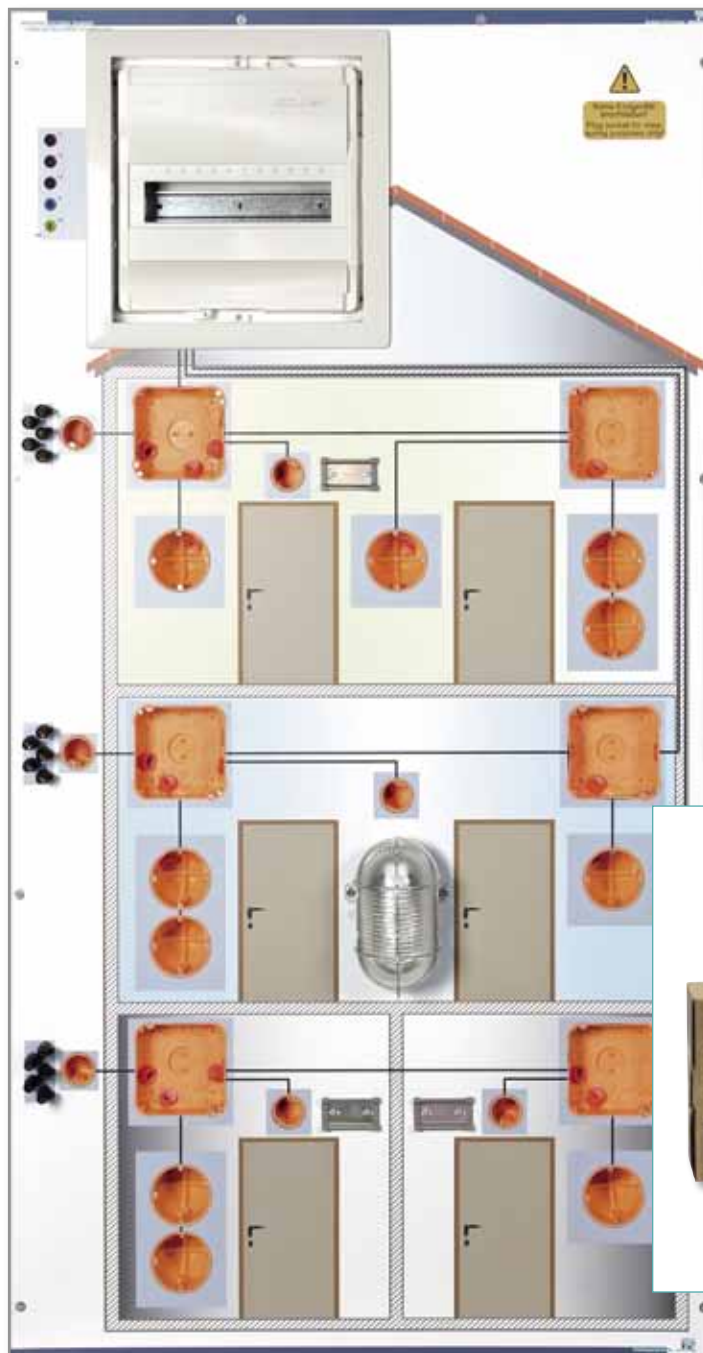
Protection Equipment

→ Personal protection equipment



10 007 Personal protection equipment consisting of safety helmet with face protection, NH-fues an rubber gloves

Installation Engineering



→ Tool set

→ Installation material



10 005 Tool set in a case , 32 parts



43 505 Installation materials - accessories kit

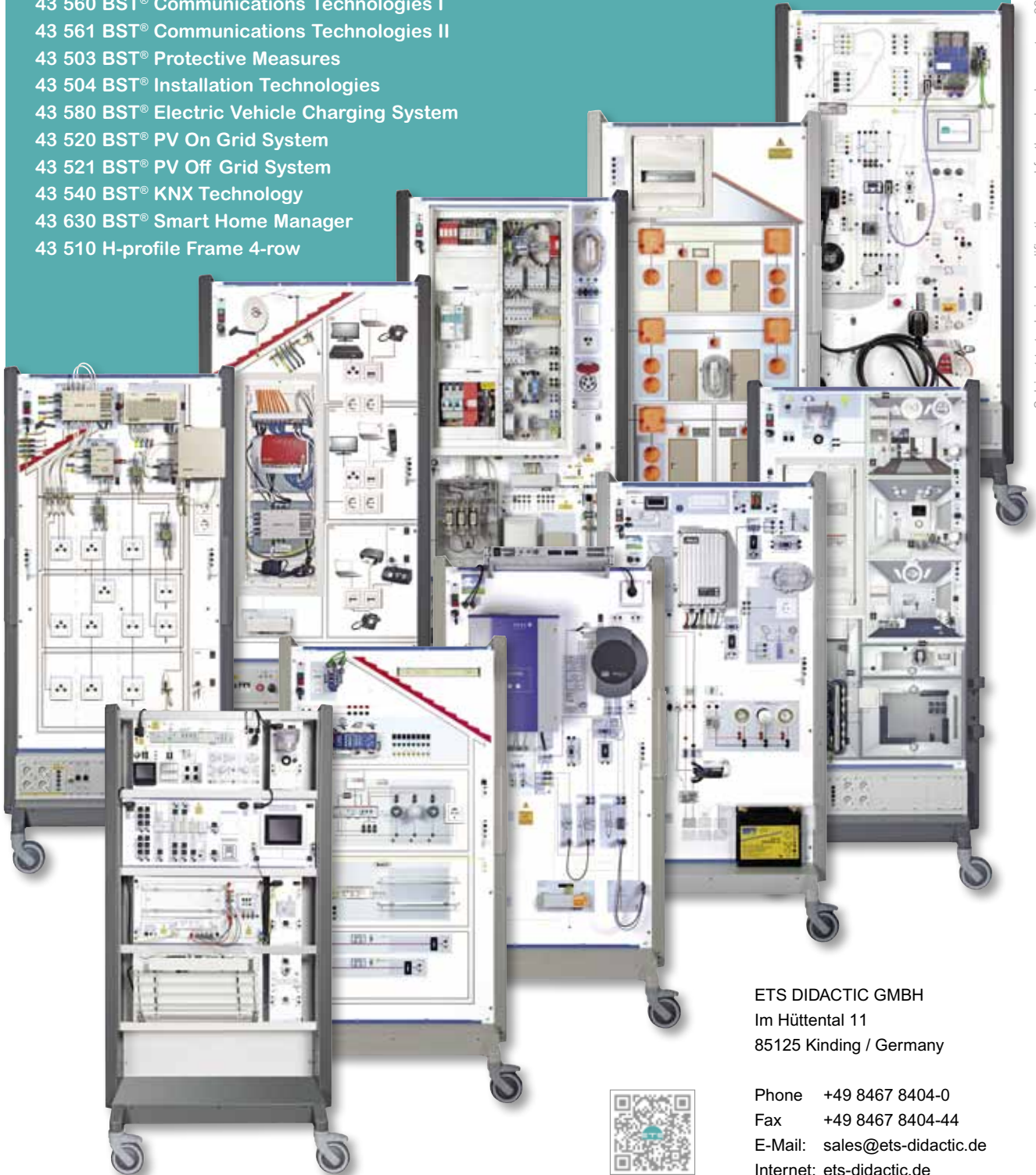
43 504 BST® Installation Technologies





Going Other Ways

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- 43 561 BST® Communications Technologies II
- 43 503 BST® Protective Measures
- 43 504 BST® Installation Technologies
- 43 580 BST® Electric Vehicle Charging System
- 43 520 BST® PV On Grid System
- 43 521 BST® PV Off Grid System
- 43 540 BST® KNX Technology
- 43 630 BST® Smart Home Manager
- 43 510 H-profile Frame 4-row



Subject to technical modifications and further developments · 03 / 2017

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