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## Installation Technology / Protective Engineering / Installation Technology

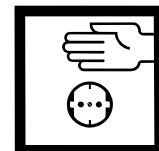
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### Protective Engineering

|      |                                      |
|------|--------------------------------------|
| 2300 | <b>Series</b> Protective Engineering |
| 2330 | Safety Board                         |
| 2340 | Installation Test Board              |

### (EIB / KNX)

|        |                                       |
|--------|---------------------------------------|
| 2401.1 | (EIB / KNX) KNX-Installation Board    |
| 2402   | (EIB / KNX) Extension Board           |
| 2410   | (EIB / KNX) <b>Series</b> Demo Boards |
| 003013 | (EIB / KNX) Software                  |



### LCN Installation Bus

|        |                     |
|--------|---------------------|
| 2403   | LCN Board           |
| 2403.2 | LCN Extension Board |

### Installation Technology

|      |                                |
|------|--------------------------------|
| 2101 | Electric Installation Board    |
| 2200 | <b>Series</b> Demo Boards      |
| 3100 | <b>Series</b> Fault Simulators |

### Lighting Engineering

|      |                    |
|------|--------------------|
| 2102 | Illumination Board |
| 2103 | Special Lamp Board |
| 2104 | Halogen Board      |
| 2109 | Basic LED Board    |

### House Intercom

|      |                  |
|------|------------------|
| 2105 | Outside Intercom |
| 2106 | Inside Intercom  |

### Monitoring Systems

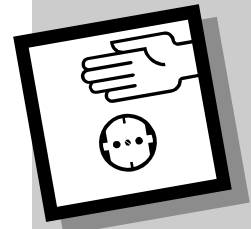
|      |                  |
|------|------------------|
| 2107 | Alarm Board      |
| 2108 | Fire Alarm Board |

### Network Technology

|      |                 |
|------|-----------------|
| 4410 | Network Trainer |
|------|-----------------|



## Protective Engineering / Installation Technology



### Protective Engineering

Series 2300



The Protective Engineering series 2300 is used for measurements in the field of electrical safety engineering and installation engineering. The system is a demonstration system, but is very suitable as students working place, too. The training system consists of seven demonstration boards, an experimental manual and needs a common commercially-available measuring instrument. The measurements are performed at 230 V / 400 V; therefore the protective safety measures could be done due to the corresponding international regulations.

#### The system allows numerous experiments with problems and solutions for the following subjects:

- Effects of electric current on the human body
- Electrical resistance of the human body
- Behaviour in case of accidents measuring the contact voltage and contact current
- Regulations for the protective engineering and installation technology measures for the electrical safety
- Consumer installations and network systems: Current carrying capacity of lines and cables, fault current and voltage, earthing methods, fuses, circuit breakers, faulty current devices (RCD's)

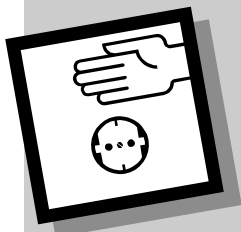
#### Network systems:

- TN-system, TT-system, IT-system
- Mains voltage, mains frequency, overvoltage protection
- Measuring conductivity of potential equalizer
- Measuring of the earth resistance and residual voltage
- Measuring loop impedance, short-circuit current and insulation resistance
- Measuring and testing of the phase sequence
- Testing of faulty current devices (RCD's)
- Professional testing of electric installations for the living area, preparing and recording reports & test reports
- Measuring directly earthed consumers / loads
- Measuring within the IT-system

#### Faults manual adjustable with switches:

- Service Line and Potential Equalisation: 12 different faults possible
- Apartment: 15 different faults possible
- For example: insulation faults, circuit-breaks, phase faults, loop resistance (loop impedance)

- Practice-oriented measuring with commercially available VDE test equipment, measurements at 230 V / 400 V
- For checking safety measures according to international regulations
- For measurements in the 1- and 3-phase mains
- TN / TT / IT system
- Practice-oriented and clearly arranged industrial components
- State-of-the-art technology industrial components
- Exchangeable RCD's: Type A, 30 mA (high sensitivity) or 300 mA (medium sensitivity) Type A selective: 300 mA Type B, universal current sensitive: 30 mA
- Simulation of frequently occurring faults in safety and installation engineering, lockable switch field for simulation of faults
- Perfectly suitable for examination purposes
- Transformer separately safeguarded
- Pushbutton Emergency Off
- Uses safety connections and safety plugs

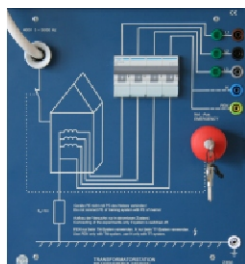


## Protective Engineering

Series 2300

# Protective Engineering / Installation Technology

## Demonstration boards for protection technology



Type 2350

### Transformer station

Type 2350

The Transformer station supplies all boards with voltage.

#### Specifications:

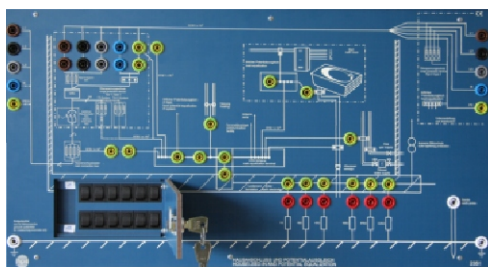
- Cekon Connector (CEE standard) for connection to the mains (alternatively supply able with 4 mm safety connectors)
- Four-Pole Line Circuit Breaker as protection device
- Key operated pushbutton emergency off
- Each phase with pilot LED

#### Technical data:

Mains Connection: 3-phase 230 V / 400 V; 50 ... 60 Hz,  
Cekon Connector (CEE standard)  
Four-Pole Line Circuit Breaker B6 (A)

Output voltage: 230 V (phase to neutral), 400 V (phase to phase)

Dimensions: 266 x 297 x 100 mm (w x h x d)  
Weight: approx. 2.5 kg



Type 2351

### Service Line and Potential Equalisation

Type 2351

This board is used for the reproduction of service lines and potential equalisation.

#### Specifications:

- Each phase separately connectable
- Reproduction of different Network systems possible
- Local potential equalisation connectable
- Different values of earthing resistance switchable
- 12 different faults switchable (insulation faults, circuit-breaks, high resistance of transitional point, loop resistance / loop impedance)
- Probe for measuring of earth resistance with a common commercially-available measuring instrument

#### Technical data:

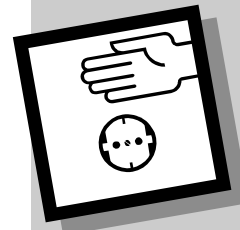
Mains Connection: 3-phase 230 V / 400 V; 50 ... 60 Hz,  
Output voltage: 230 V (phase to neutral), 400 V (phase to phase)

Dimensions: 532 x 297 x 100 mm (w x h x d)  
Weight: approx. 2.9 kg



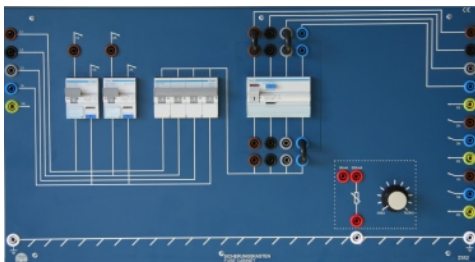
## Protective Engineering / Installation Technology

### Demonstration boards for protection technology



## Protective Engineering

### Series 2300



Type 2352

#### Fuse cabinet

#### Type 2352

This board reproduces a fuse cabinet in a consumer's installations.

##### Specifications:

- Two two-pole combined breaker (Circuit breaker, Faulty current devices)
  - One four-pole Circuit breaker
  - One four-pole Faulty current devices (RCD's), exchangeable supplied one Type A 30 mA RCD's;
- optional RCD's:
- Type A 300 mA, Type B 30 mA (universal current sensitive), Type A 300 mA (selective)
  - Test potentiometer for checking the faulty current devices (RCD's)

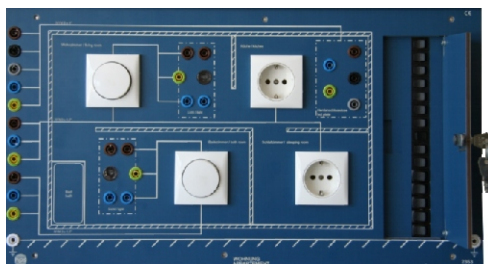
##### Technical data:

- Mains Connection:
- 3-phase 230 V / 400 V; 50 ... 60 Hz
  - Two two-pole combined breaker B13 (A), 30 mA Typ A
  - One Four-pole Circuit breaker B6 (A)
  - One Four-pole Faulty current devices (RCD's), 30 mA Typ A, (high sensitivity) optional e.g. Typ A 300 mA or other RCD's of your own choice
  - Test potentiometer for 30 mA, 100 mA and 300 mA faulty current devices (RCD's)

Output voltage: 230 V (phase to neutral), 400 V (phase to phase)

Dimensions: 532 x 297 x 100 mm (w x h x d)

Weight: approx. 3.8 kg



Type 2353

#### Apartment

#### Type 2353

This board reproduces an apartment fuse with four rooms as an example for consumer installations.

##### Specifications:

- Available rooms: living room, kitchen, bath, bedroom
- 15 different faults possible (insulation faults, circuit-breaks, phase faults, disconnection on phase, disconnection on PE (protective earth), Phase and PE wrong wired, loop resistance (loop impedance), wrong line impedance)
- Each phase separately connectable
- Heater simulation via 4 mm safety jacks
- Sockets, switches and lamps built-in

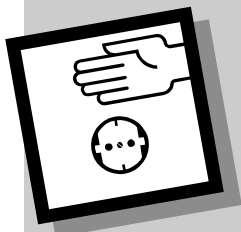
##### Technical data:

Mains Connection: 3-phase 230 V / 400 V; 50 ... 60 Hz

Output voltage: 230 V (phase to neutral), 400 V (phase to phase)

Dimensions: 532 x 297 x 100 mm (w x h x d)

Weight: approx. 3.0 kg



## Protective Engineering

Series 2300

## Protective Engineering / Installation Technology

### Demonstration boards for protection technology



Type 2354

#### Isolating Transformer 3-phase

Type 2354

The 3-phase isolating transformer is used for the experiments if the IT-network system.

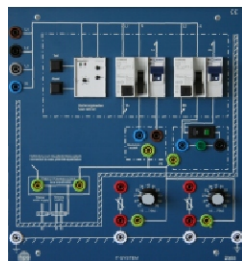
##### Specifications:

- Input voltage: 400 V / 50 ... 60 Hz (triangle)
- Output voltage: 230 V (phase to neutral), 400 V (phase to phase); (star)
- Shield winding for the connection of the PE (protective earth).
- Galvanic / electrically isolated

##### Technical data:

Mains Connection: 3-phase 400 V; 50 ... 60 Hz  
 Output voltage: 3 x 230 V (phase to neutral), 400 V (phase to phase)  
 Power Rate: 150 VA; 0.22 A each phase to neutral

Dimensions: 133 x 297 x 100 mm (w x h x d)  
 Weight: approx. 2.7 kg



Type 2355

#### IT-system

Type 2355

The board is used for the experiments and demonstration of the IT-network system. That network system is often used in hospital and for medical devices.

##### Specifications:

- Monitoring of the Insulation Resistance with a Earth-Leakage Monitor
- Faulty current device (RCD), Circuit breaker
- Socket, switch and lamp
- Potentiometer for experiments with the faulty current device (RCD)
- Local potential equalisation connectable

##### Technical data:

Mains Connection: 3-phase 230 V / 400 V; 50 ... 60 Hz,  
 (via Isolating Transformer)

Output voltage: 3 x 230 V (phase to neutral),

Earth-Leakage Monitor: iso monitor industrial type for one- and three-phase use with test and reset button

Two faulty current devices (RCD):

Type A with a rated residual current of 10 mA, high sensitivity (HS)

Two circuit breakers: B1 (A)

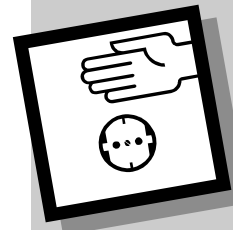
Potentiometer: two for RCD with a rated residual current of 10 mA

Dimensions: 266 x 297 x 100 mm (w x h x d)

Weight: approx. 2.3 kg

## Protective Engineering / Installation Technology

### Demonstration boards for protection technology



## Protective Engineering

### Series 2300



Type 2356

#### Shelter TT-system

Type 2356

The board Shelter TT-system is used as a load board for the net systems TN and TT.

##### Specifications:

- Simulation of a load / consumer 3-phase (e.g. a machine)
- Different values of earthing resistance
- Probe for measuring of earth resistance with a common commercially-available measuring instrument

##### Technical data:

Mains Connection: 3-phase 400 V; 50 ... 60 Hz

Earthing resistance: 1  $\Omega$ , 100  $\Omega$ , 470  $\Omega$ , 1 k $\Omega$ , 4,7 k $\Omega$

Dimensions: 133 x 297 x 100 mm (w x h x d)

Weight: approx. 0.7 kg



Type 2352.1

#### RCD - Faulty current devices 300 mA - Type A

Type 2352.1

RCD-Faulty current devices 300 mA is usable with Fuse cabinet Type 2352.

##### Specifications:

- Four-pole RCD connectable via 4 mm safety jacks
- Exchangeable with RCD of the Fuse cabinet Type 2352
- That module could be used with other RCD's of your own choice (E.g. B-Type or super resistant RCD)

##### Technical data:

RCD-Faulty current devices: four-pole RCD 300 mA / 25 A Type A or own choice

Dimensions: 95 x 123 x 76 mm (w x h x d)

Weight: approx. 0.5 kg



Type 2352.2

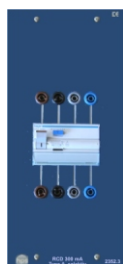
#### RCD - Faulty current device 30 mA - Type B

Type 2352.2

RCD-Faulty current devices 30 mA Type B (universal current sensitive) is usable with Fuse cabinet Type 2352.

##### Specifications:

- Universal current sensitive
- Exchangeable with RCD of the Fuse cabinet Type 2352
- Four-pole RCD connectable via 4 mm safety jacks



Type 2352.3

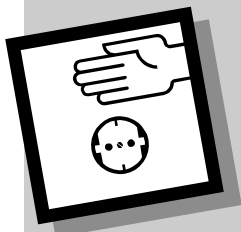
#### RCD - Faulty current device 300 mA - Type A, selective

Type 2352.3

##### Specifications:

- Selective
- Separate board, connectable with the fuse cabinet
- For checking of series connected residual current protective devices

Dimensions: (w x h x d) 133 x 297 x 100 mm



## Protective Engineering

Series 2300

## Protective Engineering / Installation Technology

### Demonstration boards for protection technology

### Accessories Recommended



#### Experiment manual with CD "Electric Safety Technology", English

Type V 0117-GB

The manual has the following content:

- Introduction
- General part
- Regulations and standards
- Exercises and measurements
- Solutions part



#### Set of connections for the protective engineering

Type 2350.1

For the measurements of the experiment manual use the following safety connection leads and safety connectors:

Set of connections for the protective engineering

- 12 safety connections, 4 mm, 75 cm
- 6 safety connections, 4 mm, 150 cm
- 2 safety connections, 4 mm, 25 cm (different colours)

30 safety connectors, 4 mm

Weight: approx ca. 1.5 kg



#### Measuring instruments

Any common commercially-available measuring instrument for protective safety measures (European regulations) could be used.

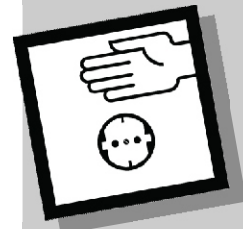
Recommended measuring instrument:

Profitest SII+ / 0100 (Brand: Gossen Metrawatt)  
(For the experiments of the manual the Profitest SII+ / 0100 was used)

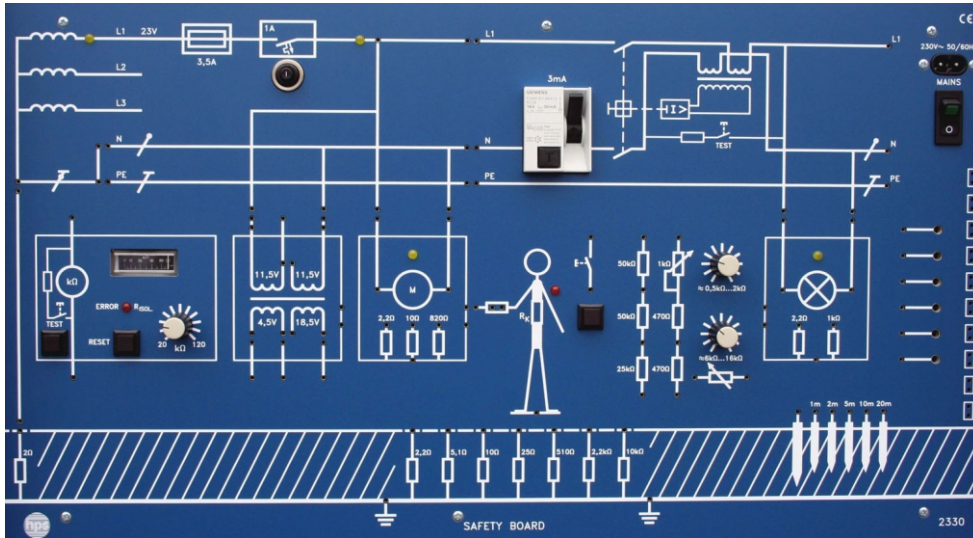
Any commercially-available multimeter with following rates could be used.

Voltage: 600 V (AC)  
Current: 4 A (AC)

## Protective Engineering



### Safety Board Type 2330



SAFETY BOARD (Type 2330)

- All the important electric safety measures on one Board
- Built-in power supply, single-phase mains socket suffices
- Optimum safety for the user due to protective low voltage
- Short setup time because all accessories are integrated directly in the unit
- TT mains, TN-C-S mains, IT mains possible by replugging
- Detailed experiment instructions with solutions

With the SAFETY BOARD, hps SystemTechnik offers a training system with which experiments from the whole field of electric safety measures can be conducted.

It is possible to use the device in any room without any special installation as all the experiments are conducted with a protective low voltage and the device only requires a single-phase mains socket.

The functionality of the most important modules is indicated visually by LEDs.

All the necessary experiment components have been integrated directly in the SAFETY BOARD to minimise the time required for preparing and dismantling the experiments.

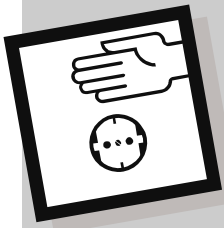
The compact design of this training system allows several units to be kept in the smallest of storage spaces.

hps SystemTechnik also offers the experiment manual „Electric Safety Technology“ in conjunction with the SAFETY BOARD.

This contains numerous experiments with problems and solutions for the following subjects:

- Protection against direct and indirect contact
- Protection by protective low voltage
- Autotransformer
- Protective devices against overcurrent
- Summation current transformer
- Protection against leakage current

- Protective measures in the TN system
- Protective measures in the TT system
- Measuring the earthing resistance
- Protective measures in the IT system
- Protective insulation
- Protective isolation
- Earth electrodes



## Safety Board Type 2330

To conduct the experiments, the SAFETY BOARD is placed on a table or suspended in an hps rack for demonstration purposes.

The SAFETY BOARD can be converted into a portable training unit by simply screwing it into a Box:

All the experiments can be conducted directly in the Box. Dust-free storage and protection against transport damages are further advantages of the Box version.

## Accessories Recommended

Experiment manual: „Electric Safety Technology“ (Type V 0119)

- Set of Accessories (Type 2330.1), consisting of connecting plugs and leads (2 mm)

Subject to technical modifications.

## Protective Engineering

### Technical Data

#### Mains connection

- Voltage: 230 V AC / 115 V AC (110 V AC); 50 ... 60 Hz; 40 VA

#### Output voltage for experimenting

- $U_1 = 23 \text{ V}$ ;  $1.5 \text{ A} \pm \%$  of the mains voltage; for experimenting without danger

#### Fault current circuit breaker

- 1phase; with test button  $I_F = 30 \text{ mA}$

#### Insulation monitor

- With test and reset button; adjustable earthing resistance:  $20 \text{ k}\Omega \dots 120 \text{ k}\Omega$ ; with built-in meter

#### Man symbol

- With pluggable body resistor:  $2.4 \text{ k}\Omega$  and  $820 \Omega$

#### Fuse

- For free application up to  $2 \text{ A}$ ; connectable through  $2 \text{ mm}$  jacks

#### Loads(simulation)

- Motor: body contacts can be simulated by connectable resistors  $2.2 \Omega$ ;  $10 \Omega$ ;  $820 \Omega$
- Lamp: body contacts can be simulated by connectable resistors  $2.2 \Omega$ ;  $1 \Omega$

#### Transformer

- The transformer can be used as a low voltage transformer, an auto-transformer, an isolating transformer and a summation current transformer.

#### Earth contact, auxiliary earth contact

- With the measuring points for voltage measurement at  $1 / 2 / 5 / 10 / 20 \text{ m}$

#### Mechanical Data

The front panel of the SAFETY BOARD is made of  $5 \text{ mm}$  thick Laminate, matt blue in colour with white engraving representing the built-in function groups.

The rear of the Board is protected with a grey plastic cover. Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.

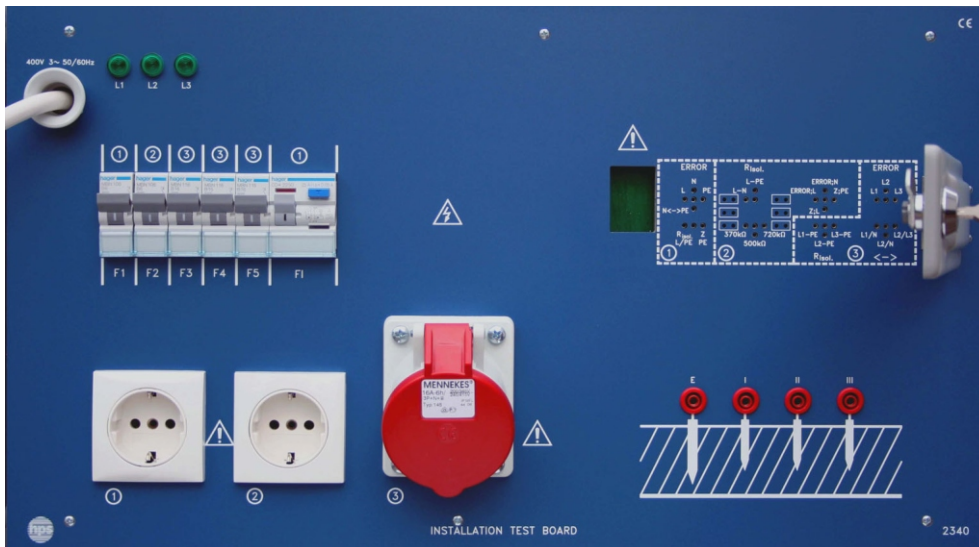
#### Dimensions and weights

- Board version (Type 2330):  
 $532 \times 297 \times 110 \text{ mm}$  (w x h x d)  
weight: ca.  $4.5 \text{ kg}$
- Box version, consisting of:  
SAFETY BOARD (Type 2330) and  
Box (Type 2330.20):  $580 \times 450 \times 155 \text{ mm}$   
total weight: approx.  $7.25 \text{ kg}$





### INSTALLATION TEST BOARD Type 2340



INSTALLATION TEST BOARD (Type 2340)

The INSTALLATION TEST BOARD is used for measurements in the field of electrical safety engineering and installation engineering.

For this purpose there are two PE sockets on the front of the device for measuring:

- Conductor failure
- Loop impedance
- Insulation resistance
- Trigger characteristic of an RCD safety switch

An additional three-phase connection (Cekon socket) allows the field of rotation to be measured.

Other installation components integrated in the front panel are:

- 1 RCD safety switch: 1-phase,  $I_N = 25\text{ A}$ ;  $I_F = 0.03\text{ A}$
- 2 line safety switches: 6 A
- 3 line safety switches: 16 A

The INSTALLATION TEST BOARD can also be used to simulate those faults which occur most frequently in safety and installation engineering. There is a patch panel with 2 mm jacks on the front for this purpose.

Single or combined errors can be simulated as well as loop and insulation resistance measured by connecting the jacks.

A lockable safety cover prevents unauthorised access to the patch panel which

means that the INSTALLATION TEST BOARD is also very suitable for examination purposes.

#### Technical data

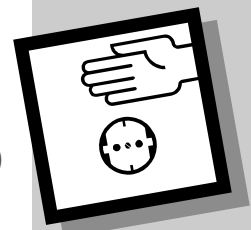
- Mains connection, 3-phase Mains voltage: 230/400 V AC; 50...60 Hz; Connector: Cekon (CEE standard)
- Dimensions: (w x h x d) 532 x 297 x 140 mm
- Weight: approx. 5.5 kg

- Practice-oriented measuring with commercially available VDE test equipment
- For checking safety measures according to VDE 0100
- For measurements in the 1- and 3-phase mains power
- With simulation of insulation and loop resistance
- Simulation of frequently occurring errors in safety and installation engineering
- Ideally suitable for testing purposes
- Measuring and simulation of the earth resistance



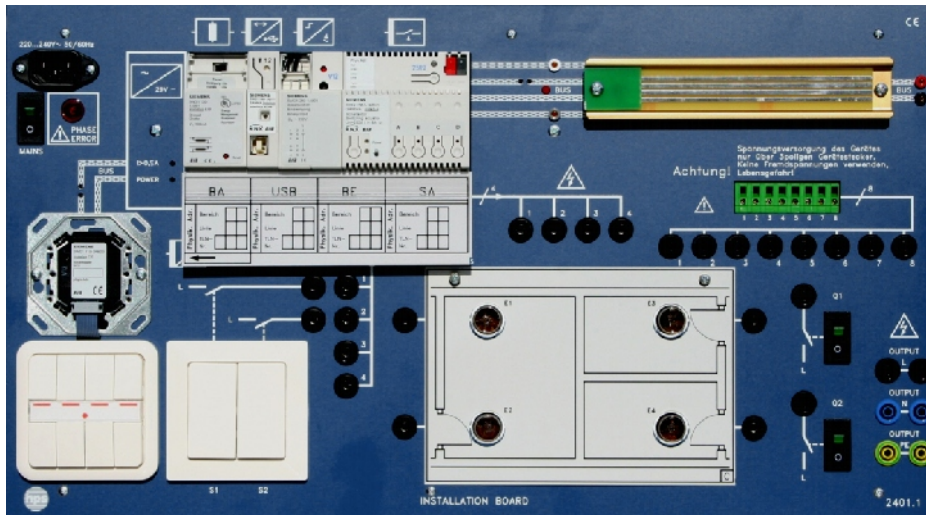


## Installation Technology – KNX European Installation Bus (EIB)



### Installation Board

2401.1



INSTALLATION BOARD (Type 2401.1)



- Compact training unit for the field of „European Installation Bus“ (EIB)
  - The unit contains all the important basic components, single-phase mains outlet sufficient
  - Additional EIB components from different manufacturers can be plugged to an integrated tophat mounting rail and adapted to safety jacks (4 mm)
  - With integrated bus detector displaying the bus activity
  - Integration of conventional installation technology possible
  - PC-programmable through the integrated USB interface
  - Can be used as a desktop unit, in a demonstration rack or as a mobile training unit in a Box
- Switching actuator, 4-fold
  - Bus coupler  
Modules for other applications can be mounted on the bus coupler in place of the connected sensor.
  - Sensor consisting of 4 pairs of keys with programmable LED displays
  - Bus detector (LED)
  - 2 pushbuttons/2 switches, with pilot lamp (230 V)
  - 4 lamps for simulating loads (230 V AC, 5 W)
  - Tophat rail with data bus for integrating additional commercially available EIB components
  - Adapter, 8-pole, for adapting normal installation lines to 4 mm safety jacks
  - Connection for extensions with safety jacks (4 mm), L / N / PE

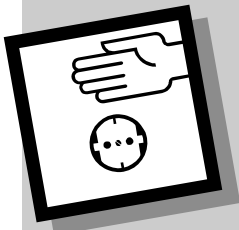
With the INSTALLATION BOARD, hps SystemTechnik offers a training unit which has been designed for conducting experiments in the field of „European Installation Bus“ KNX (EIB). The unit contains all the important basic components necessary for setting up experiments in connection with the European Installation Bus.

There is a tophat mounting rail on the front of the Board for mounting additional KNX components from different manufacturers to extend the range of experiments.

Templates with printed ground plans are placed on the front of the INSTALLATION BOARD for defining problems.

#### The INSTALLATION BOARD contains the following function groups:

- Power supply unit, 29 V / 500 mA, for supplying power to the EIB components through the bus
- Choke
- Data interface (USB)
- Binary input, 4-fold



## Installation Board

2401.1

The inputs and outputs are wired to 4 mm safety jacks and 2 mm jacks. The bus connection and the 29 V power supply for external equipment are made through 2 mm jacks.

To conduct the experiments, the INSTALLATION BOARD is placed on a table or suspended in an hps rack for demonstration purposes.

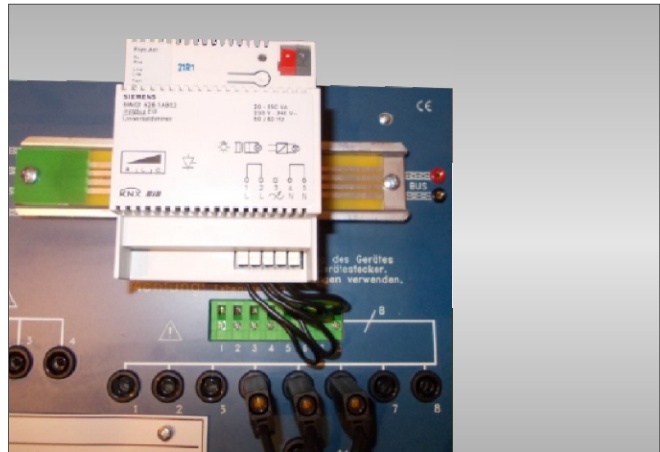
Fig.:  
Partial view of the  
INSTALLATION BOARD

Tophat rail with plugged  
EIB components

Example of wiring with  
installation lines and safety  
leads in connection with  
the adapter

The INSTALLATION BOARD can be converted into a portable training unit by simply screwing it into a Box: All the experiments can be conducted directly in the Box.

Dust-free storage and protection against transport damages are further advantages of the Box version.



## Technical Data

### Mains connection

- Voltage: 230 V AC; 50 ... 60 Hz; 50 VA

### Power supply (built-in)

- 29 V DC; 500 mA (short-circuit-proof, with operating and overload display by LEDs)  
The power supply feeds all EIB components.  
The 29 V can be tapped additionally at 2 mm jacks or tophat rail contacts, e. g. for connecting another choke.

### Mechanical data

The front panel of the INSTALLATION BOARD is made of 5 mm thick laminate, matt blue in colour with white engraving representing the built-in function groups. The individual EIB components are integrated in the front panel. The rear of the Board is protected with a grey plastic cover. Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.

### Accessories included

- Templates with printed ground plans
- Tagboard with label strips for documentation of the parameters dedicated to the EIB components

### Dimensions and weights

- Board version (Type 2401.1): 532 x 297 x 120 mm (w x h x d)  
weight: approx. 3.75 kg
- Box version, consisting of:  
INSTALLATION BOARD (Type 2401.1) and  
Box (Type 2401.20): 580 x 450 x 155 mm  
total weight: approx. 6.55 kg

## Accessories Required

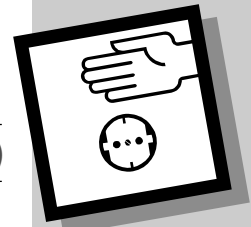
- Personal computer,  
CPU: 1 GHz and upwards, working memory: 256 MB RAM,  
operating system for PC: Windows® Software  
monitor and graphic card (VGA),  
mouse, USB interface
- Safety connecting leads (4 mm), plugs (2 mm)
- Connecting Lead USB, 3 m (Type 9102.54)
- Software: ETS4 and product data bank
- Experiment manual:  
Experiments with the European Installation Bus KNX (EIB)  
with ETS4, Type V 0118-V4

## Expansion Possibilities

- EXTENSION BOARD (Type 2402)
- Demonstration Boards for  
„European Installation Bus“

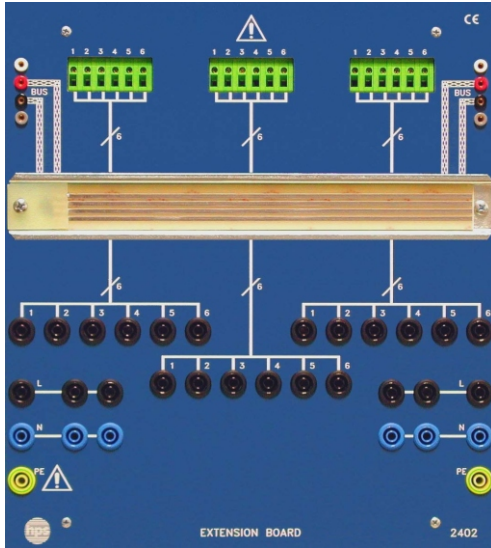
Subject to technical modifications.

## Installation Technology – European Installation Bus (EIB)



### EXTENSION BOARD

Type 2402



#### EXTENSION BOARD

(Type 2402)

- For expanding hps training systems for the „European Installation Bus“
- Assembly of EIB components on a tophat rail
- Adaptation of common installation lines to safety jacks (4 mm)
- Tophat rail with integrated data rail
- Interconnection of several EXTENSION BOARDS possible
- Can be used as a desk-top unit or in a demonstration rack

The EXTENSION BOARD is used for experiments with the „European Installation Bus“ to extend the following hps training systems:

- INSTALLATION BOARD (Type 2401)
- Demonstration Boards for „European Installation Bus“ (series 2410)
- Demonstration Boards for installation technology (series 2200)

A tophat rail is mounted on the front of the EXTENSION BOARD. This can be assembled with any commercially available EIB components of different manufacturers.

Three 6-pin adapters enable adapting of the common installation lines to 4 mm safety jacks.

The inputs and outputs of the EXTENSION BOARD are wired by 4 mm safety jacks, the bus connection by 2 mm jacks.

To conduct the experiments, the EXTENSION BOARD can be placed on a table or suspended in an hps rack for demonstration purposes.

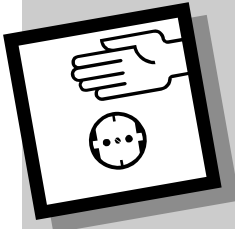
### Accessories Required

- Commercially available EIB components for top-hat rail mounting
- Set of Accessories (Type 2402.1) consisting of connecting leads and plugs

### Mechanical Data

The front panel of the EXTENSION BOARD is made of 5 mm thick laminate, matt blue in colour with white engraving. The rear of the Board is protected with a grey plastic cover. Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.

- Dimensions: 266 x 297 x 110 mm (w x h x d)
- Weight: 1.6 kg



## BUS DETECTOR

### Type 2401.5

- For displaying bus activities with LEDs
- Can be plugged anywhere between two Demonstration Boards
- Power supply via bus



The Bus Detector is used in experiments with the „European Installation Bus“ for displaying activities on the bus and for the bus connection between two Demonstration Boards.

The bus activity can also be traced for example by linear couplers.

The bus connection of two Demonstration Boards is achieved by plugging in the Busdetector; there are four

gold-plated lamella plugs in the housing base for this.

Through these lamella plugs also, the Bus Detector is fed with the required operating voltage which is tapped directly from the bus.

## Technical Data

- Operating voltage and current: 29 V / 30 mA (reverse polarity protected)
- 4 lamella plugs:  
diameter: 2 mm; spacing: 19 / 9.5 mm
- Housing dimensions: 75 x 56 x 35 mm (w x d x h)
- Weight: approx. 50 g

### Mechanical design of the Bus Detector

The Bus Detector housing consists of a top part made of unbreakable transparent plastic and a rugged bottom part made of black glass-fibre reinforced plastic.

The top and bottom parts are connected by two snap catches; this enables quick and easy opening of the housing.

White printing shows the bus route on the front of the housing symbolically.

The LED for displaying the bus activity is also on the front of the housing.

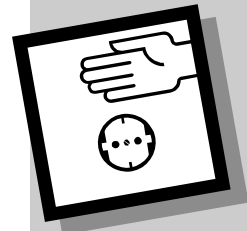
Subject to technical  
Modifications.

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## Installation Technology - European Installation Bus (EIB / KNX)

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- **Modular training system on the subject of „European Installation Bus (EIB)“**
- **Suitable for demonstrations, but also for desktop experiments**
- **Direct use in the PC lab possible because no special lab desks are necessary**
- **A single-phase socket suffices for the power supply**
- **Integration of conventional installation technology possible**
- **Additionally extendible with EXTENSION BOARD for assembling EIB components on a tophat rail**



**EIB / KNX  
Demo Boards**

**Series 2410**



With the demonstration boards hps SystemTechnik offers a modular training system designed specially for conducting experiments on the subject of „European Installation Bus (EIB)“.

The demonstration boards can be placed on a table or suspended in an hps rack for demonstration purposes.

The inputs and outputs are wired by 4 mm safety jacks.

The bus connection is made by 2 mm jacks.

Special power supplies and lab desks are not required, a single-phase socket suffices.

The implemented UP bus couplers and the appropriate EIB components such as the Pushbutton Sensor are always mounted separately on the demonstration boards. This enables direct access to the programming key.

---

### Accessories Required

---

- **Personal Computer:**  
CPU: 1 GHz upwards / 256 MB RAM  
operating system for PC: Windows 98/2000/ME/NT/XP,  
RS 232 interface, USB interface
- **Connecting Lead RS 232:**  
1:1, 9-pin (Type 9102.50)
- **Software ETS and product database**  
Experiments manual:  
Experiments with the INSTALLATION BOARD -  
„European Installation Bus (EIB)“, Type V 0118
- **Bench Rack (Type 8112)** for demonstration experiments
- **Set of Accessories (Type 2410.1)**, for EIB Demo Panels, consisting of connecting leads and plugs

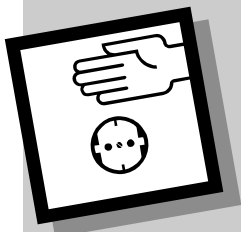
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### Extension Possibilities

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- **EXTENSION BOARD (Type 2402)**
- **Bus Detector (Type 2401.5)**





## EIB / KNX Demo Boards

### Series 2410

## Installation Technology - European Installation Bus (EIB / KNX)

### Demonstration Boards for the European Installation Bus

#### Mechanical data of the Demonstration Boards

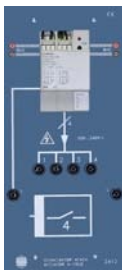
- Material of the front panel: Laminate (5 mm), matt blue
- Rear front: Grey plastic cover (angled)



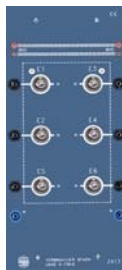
Type 2410



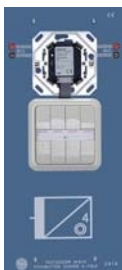
Type 2411



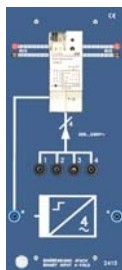
Type 2412



Type 2413



Type 2414



Type 2415

#### Bus Power Supply Type 2410

For power supply to EIB components;  
Mains connection: 230 V AC; 50 ... 60 Hz; 50 VA;  
mains output voltage and current: 230 V/3 A, protected by internal fuse 3.15 A;  
bus voltage and current: 29 V DC / 640 mA;  
with built-in choke; additional voltage tap in front of the choke through 2 mm sockets; display for operation standby and overload by LEDs;  
Dimensions: 133 x 297 x 110 mm (w x h x d); Weight: 0.9 kg

#### Data Interface Type 2411

RS 232; for programming the system with the PC in connection with the ETS software; with UP bus coupler (interface mounted separately);  
Dimensions: 133 x 297 x 125 mm (w x h x d); Weight: 0.6 kg

#### Actuator 4-fold Type 2412

For switching 4 single loads; supply voltage: 230 V AC;  
rated voltage and current: 230 V AC/6 A;  
Dimensions: 133 x 297 x 110 mm (w x h x d); Weight: 0.8 kg

#### Load 6-fold Type 2413

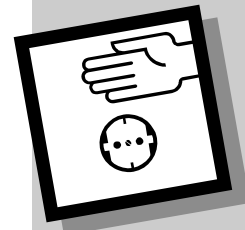
6 lamps E1 ... E6; rated voltage: 230 V AC;  
power consumption: approx. 5 W per lamp;  
Dimensions: 133 x 297 x 100 mm (w x h x d); Weight: 0.8 kg

#### Pushbutton Sensor 4-fold Type 2414

4 programmable sensor pairs with programmable LEDs; with UP bus coupler (pushbutton sensor mounted separately from UP bus coupler);  
Dimensions: 133 x 297 x 105 mm (w x h x d); Weight: 0.6 kg

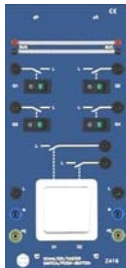
#### Binary Input 4-fold Type 2415

For converting switching signals (230 V AC) into bus signals;  
possible to integrate conventional installation technology;  
Dimensions: 133 x 297 x 110 mm (w x h x d); Weight: 0.7 kg



### EIB / KNX Demo Boards

#### Series 2410



Type 2416



Type 2417



Type 2419



Type 2420



Type 2421



Type 2422

#### Switch/Push-Button Type 2416

4 on/off-switches (Q1 ... Q4) with control LEDs;  
2 pushbuttons (S1/S2);  
rated voltage: 230 V AC;  
Dimensions: 133 x 297 x 100 mm (B x H x T);      Weight: 0,7 kg

#### Info Display Type 2417

For indication of 16 freely configurable bus messages; display of alarm signals, input keys are integrated; up to 5 lines with 30 characters each can be displayed;  
Dimensions: 133 x 297 x 100 mm (w x h x d);      Weight: 0.5 kg

#### Temperature Controller Type 2419

For setting up a heating control system close to practice; Temperatures from -4 °C to +45 °C can be set with an integrated potentiometer; Display of the operating status via 5 LEDs;  
Dimensions: 133 x 297 x 100 mm (w x h x d);      Weight: 0.5 kg

#### Line-/Area Coupler Type 2420

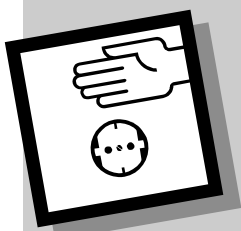
For establishing a secondary line.  
Additional use as a backbone coupler or repeater.  
With integrated choke to allow supply of the Board directly from the second voltage output of the Bus Power Supply (type 2410).  
Dimensions: 133 x 297 x 110 mm (w x h x d);      Weight: 0.7 kg

#### Motion Sensor Type 2421

The motion sensor sends a telegram on the bus whenever it detects a moving object.  
Dimensions: 133 x 297 x 110 mm (w x h x d);      Weight: 0.5 kg

#### Combi Sensor Type 2422

Provides brightness and temperature values to be sent as telegrams on the bus.  
Dimensions: 133 x 297 x 130 mm (w x h x d);      Weight: 0.5 kg



## EIB / KNX Demo Boards

### Series 2410

## Installation Technology - European Installation Bus (EIB / KNX)



Type 2423



Type 2424

#### Shutter Actuator 2fold Type 2423

For setting up a blinds actuator control, e. g. with the Shutter (type 2425). Up to two blinds can be connected.

Dimensions: 133 x 297 x 110 mm (w x h x d); Weight: 0.7 kg

#### Dimming Actuator Type 2424

Universal dimmer for dimming electrical loads;

Dimensions: 133 x 297 x 110 mm (w x h x d); Weight: 0.7 kg



Type 2425

#### Shutter Type 2425

For connection with the Shutter Actuator (type 2423). Integrated limit switches define the end top and bottom positions of the shutter.

Dimensions: 532 x 297 x 110 mm (w x h x d); Weight: 1.5 kg

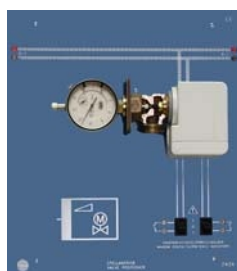
#### Valve Positioner Type 2426

Demonstration model of a heating valve actuator, for recommended use with the Temperature Controller (type 2419).

For better visualization, the stroke of the valve is picked up by a dial gauge.

Two input ports can be stimulated by two 2 mm jacks each or by a switch.

Dimensions: 266 x 297 x 130 mm (w x h x d); Weight: 1.5 kg



Type 2426

#### IR Receiver Type 2427

Programmable pushbutton with built-in IR receiver.

UP bus coupler (sensor is mounted to the UP bus coupler separately)

Dimensions: 133 x 297 x 125 mm (B x H x T) Weight: 0.6 kg

#### Data Interface USB Type 2429

Data interface USB, for programming the system with the PC in connection with the software ETS3.

Dimensions: 133 x 297 x 125 mm (B x H x T) Weight: 0.6 kg



Type 2427



Type 2429

Subject to technical modifications.



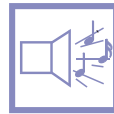


**SystemTechnik**

# INSTALLATION ENGINEERING BUILDING SYSTEM ENGINEERING

hps SystemTechnik  
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E-Mail: [export@hps-systemtechnik.com](mailto:export@hps-systemtechnik.com)



(Type 003013)

The **European Installation Bus** training software is suitable for beginners and advanced trainees for learning and revising the basic theory of the special EIB field. All subjects and training content are delivered by spoken commentaries. Numerous animations, videos and interactions increase the overall learning effect. Knowledge is tested both during the training and at the end of every phase. The program reacts to every answer given by the trainee during an exercise with the appropriate response.

## Training Contents:

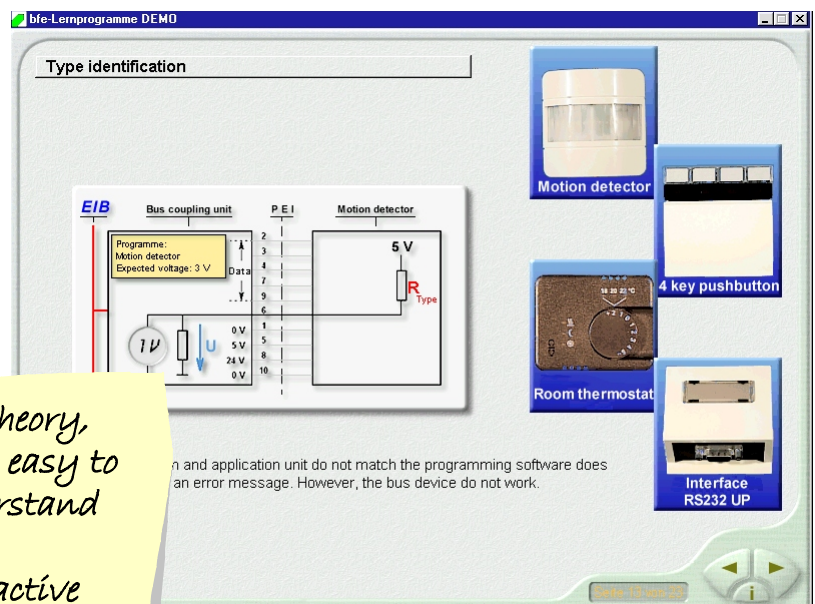
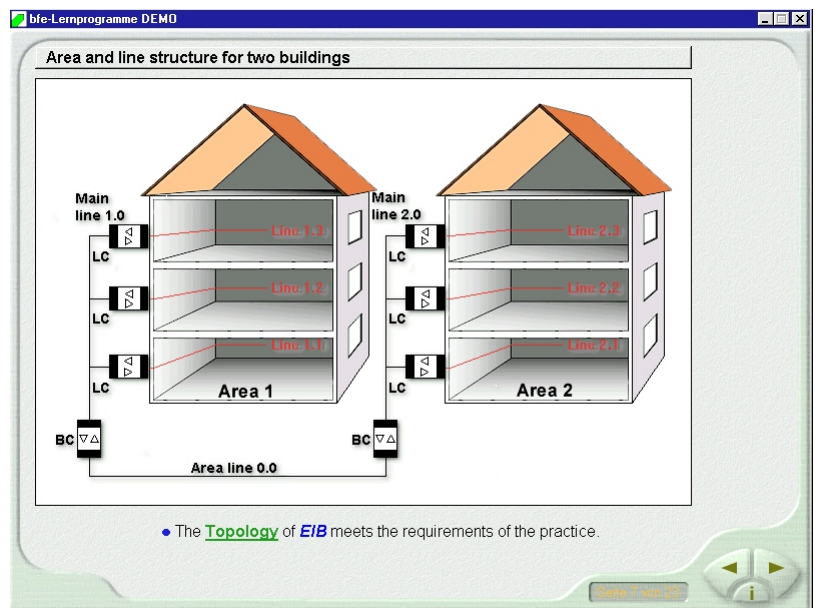
- Symmetrical transmission
- Version and structure
- Line coupler connection technique
- Principle of the group address
- Telegrams
- Bus couplers
- Transformer module
- Type detection
- Data interface RS 232
- Bus cable
- Safe isolation
- Loops
- Testing the installation

## System Requirements:

- PC with Windows® Software
- Hard disk: 10 MB free
- Working memory: 4 MB
- 3.5" disk drive
- SVGA graphic card (800 x 600)

## European Installation Bus

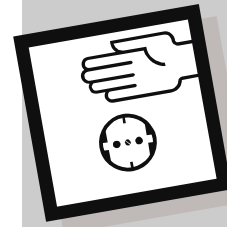
Electrical installation by a EIB / KNX bus system



*EIB theory,  
clear, easy to  
understand  
and  
interactive*

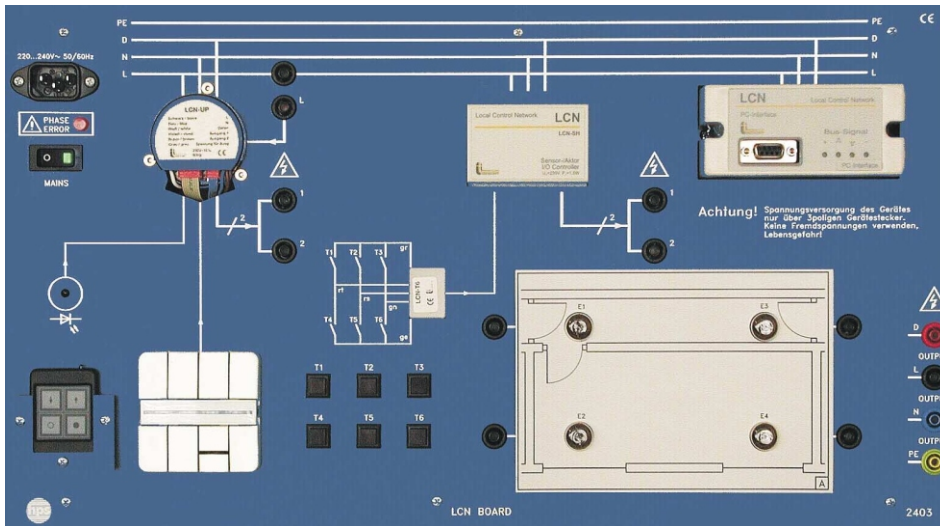


## Installation Technology – LCN Installation Bus



### LCN BOARD

Type 2403  
Type 2403.2



Front view of the  
LCN BOARD  
Type 2403

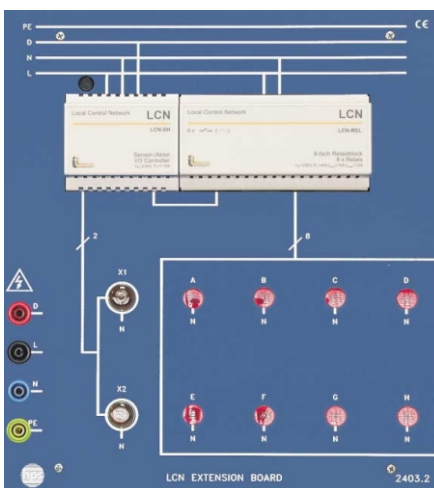
- Compact training unit for the LCN installation bus
- The unit contains all the important components, a 1-phase socket suffices
- PC-programmable through an integrated RS 232 interface
- Simple networking of several LCN BOARDS
- Extension of the system by linking conventional installation technology
- With detailed descriptions on the subject of LCN, the programming software and the hardware components
- Functional extension by software possible
- Can be used as a desktop unit, in a demonstration rack or as a mobile training unit in a case (box)

The LCN BOARD from hps SystemTechnik is a training unit which has been designed to conduct experiments in modern installation engineering especially in connection with the LCN bus (Local Control Network).

The unit contains all the important basic components which are necessary to set up experiments in connection with the LCN.

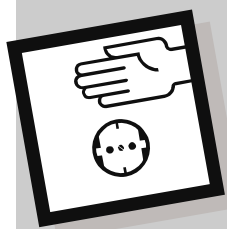
To set tasks, templates with printed layout plans of the installation technology can be fit onto the load simulation panel provided on the front of the LCN BOARD.

The LCN BOARD can be connected to a PC through the LCN-PC interface and programmed with the software LCN-P.



Front view of the  
LCN EXTENSION BOARD  
Type 2403.2

- Extension for LCN BOARD with 10 additional outputs with fix Loads:
  - 2 single dimming outputs
  - 8 with single controlled contacts



## LCN BOARD

Type 2403  
Type 2403.2

### Components and function blocks of the LCN BOARD (Type 2403)

- **LCN-UP**  
Combined sensor-actuator universal switching module for flush wall sockets
- **LCN-T6**  
Cable set for the universal switching module LCN-SH, permanently wired, with six keys
- **LCN-SH**  
Combined sensor-actuator module with switching and dimming functions
- **LCN-RR**  
Infrared receiver module, connected with the LCN-UP
- **LCN-RT**  
Programmable IR remote control with four keys for switching and dimming functions and for locking systems
- **LCN-PC**  
Data interface RS 232 for connecting a PC
- **Load simulation panel**  
With four lamps E1...E4 (230 V / 5 W), for simulating individual loads
- **6 pushbuttons (T1 ... T6)**  
for programmed edge evaluation with the module LCN-T6
- **EIB sensor**  
For programming up to eight keys and five LEDs

### Components and function blocks of the LCN EXTENSION BOARD (Type 2403.2)

- **LCN-SH**  
Combined sensor-actuator module with switching and dimming functions
- **LCN-REL**  
Relais block with 8 Outputs (250 V / 16 A), contacts single controlled (ON / OFF / OVER)
- **Load simulation panel**  
With ten lamps, for simulating individual loads

## Installation Technology – LCN Installation Bus

### Technical data of the LCN BOARD and the LCN EXTENSION BOARD

#### LCN BOARD (Type 2403)

##### Mains connection

- Mains voltage 220 ... 240 V AC, 50 ... 60 Hz; 30 VA

##### Accessories required

- Personal computer, CPU: as of 80386 DX/30 MHz, RAM: 4 MB MS-DOS as of version 3.0, disk drive 3.5"/1.44 MB, mouse, monitor and graphic card (VGA), free serial interface
- RS 232 connecting lead, 1:1, 9-pin (Type 9102.50)
- Safety leads (4 mm)

##### Accessories included

- Templates with printed layout plans
- Programming software LCN-P
- Detailed descriptions of the LCN components and the programming software LCN-P
- Experiment manual

##### Extension possibilities

- LCN-W: PC centre with visualisation (max. 2 plans)
- LCN-WA: Access control for LCN-W (in connection with several remote controls)
- LCN-WT: Timer for LCN-W

##### Dimensions / weights

- Board version (Type 2403): 532 x 297 x 131 mm (w x h x d); weight: 2.9 kg
- Box version, consisting of:  
LCN BOARD (Type 2403) and Box (Type 2403.20);  
580 x 450 x 155 mm; total weight: 5.7 kg

#### LCN EXTENSION BOARD (Type 2403.2)

##### Dimensions / weight

- 266 x 297 x 110 mm (w x h x d) / weight: approx. 1.9 kg

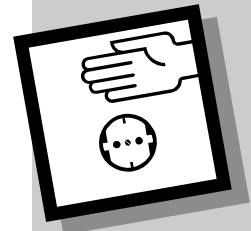
##### Common technical data

- The front panel of the Boards is made of 5 mm thick laminate, matt blue in colour. The individual components are integrated in the front panel. Circuit symbols and bus paths are printed in white on the front panel. The rear of the Boards is protected with a grey plastic cover which is shaped to allow the unit to be placed in an ergonomical position on the desktop.
- Connecting via 4 mm safety jacks (L, N, PE and data lines)

Technical changes without prior notice!

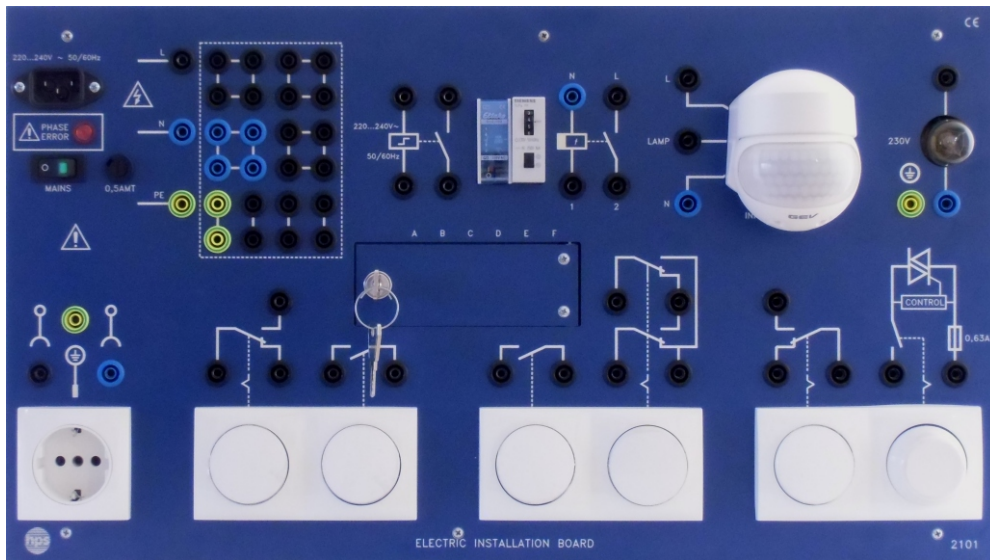


## Installation Technology



### ELECTRIC INSTALLATION BOARD

Type 2101



Front view of the  
ELECTRIC  
INSTALLATION BOARD

- The most important basic circuits of installation technology on one board
- Close-to-practice experiments by direct use of mains power
- With built-in error simulation
- No special lab desk required, mains socket suffices
- Also available in the handy hps Box

#### Built-in components:

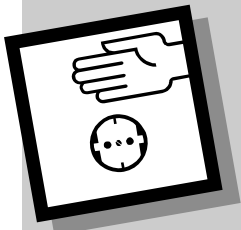
- 1 distributor panel
- 2 three-way switches
- 2 buttons
- 1 intermediate switch
- 1 dimmer (200 W), combined with pushbutton OFF switch
- 1 PE socket
- 1 movement sensor, range: 120°, adjustable time: 5 ... 300 s, twilight: 5 ... 1000 lux
- 1 timer switch, 3 and 4-wire, adjustable time: 1 ... 10 min
- 1 filament lamp, for free wiring
- 1 switch panel for error simulation (lockable)

All inputs and outputs are wired through safety sockets (4mm).

#### Possible Experiments

Excerpt from the experiments manual:  
„Basic Circuits in Installation Technology“  
(Type V 0110)

- Off circuit
- Pole changing circuit
- Intermediate circuit
- Surge circuit
- Stairway circuit
- Dimmer circuit
- Outdoor light with movement sensor
- Error simulation and troubleshooting



## ELECTRIC INSTALLATION BOARD

Type 2101

## Installation Technology

### Technical Data

#### Mains connection (with PE contact)

- Mains voltage: 220 ... 240 V AC; 50 ... 60 Hz; approx. 30 VA

#### Mechanical data

The front panel of the ELECTRIC INSTALLATION BOARD is made of 5 mm thick laminate, matt blue in colour. The individual components are integrated in the front panel. Circuit symbols are engraved in white on the front panel. A grey plastic cover protects the rear of the unit and enables the unit to be placed on a desktop at an ergonomically favourable angle.

#### Dimensions and weights

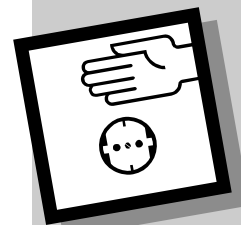
- Board version (Type 2101):  
532 x 297 x 130 mm (w x h x d);  
weight: approx. 3 kg
- Box version, consisting of:  
ELECTRIC INSTALLATION BOARD (Type 2101)  
and Box (Type 2101.20): 580 x 450 x 155 mm;  
total weight: 5.7 kg

### Recommended Accessories

- Set of Accessories (Type 2101.1),  
consisting of safety leads and plugs (4 mm)
- Experiment manual:  
„Basic Circuits in Installation Technology“  
(Type V 0110)
- Multimeter (standard)

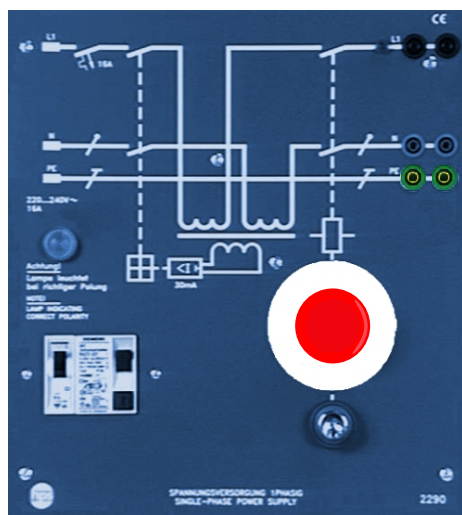
Subject to technical modifications.

## Installation Technology



### Demonstration Boards

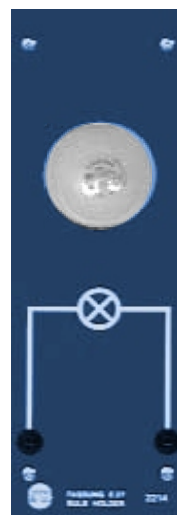
Series 2200



**Single-phase  
Power Supply**  
Type 2290



**Dimmer  
400 W**  
Type 2203



**Bulb  
Holder E 27**  
Type 2214

- Didactically sophisticated training system
- Designed for basic and further training in installation technology
- Consisting of Demonstration Boards with graphic circuit illustrations on the front
- Detailed experiment instructions with circuit and installation diagrams

The training system is accompanied by the experiment manual „Installation Technology“ (Type V 0081), which contains numerous experiments with circuit and installation diagrams.

### Technical Data

With this training system, hps SystemTechnik offers a comprehensive program for conducting experiments in installation technology.

The training system consists mainly of Demonstration Boards such as:

- Single-Pole Switch
- Dimmer
- Socket
- Pushbutton
- Sodium Vapour Lamp
- Filament Transformer and Basic Load
- Bulb Holder E 27
- Fluorescent Lamp Holder
- Choke / Starter
- Bell Transformer
- Buzzer
- AC Meter
- Active Power Meter
- Frequency Meter
- Electronic Phase-Angle Meter
- Power Supply (Single-phase)

The standard illustration of the respective circuit on the Demonstration Boards enables optimum signal tracing.

The circuit is assembled with safety leads and safety connecting plugs through 4 mm jacks inset in the front of the board.

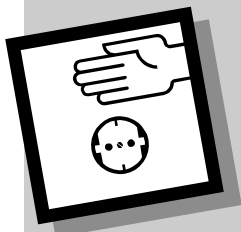
The rear of the Demonstration Boards is protected with a grey plastic cover.

To conduct the experiments, the Boards are placed on a table or suspended in an hps rack for demonstration purposes.

- Dimensions of the Demonstration Boards:  
95 x 297 mm (w x h)  
266 x 297 mm (w x h)  
The depths differ, see the following pages.

- The front panel of the Demonstration Boards is made of 5 mm thick laminate, matt blue in colour with white printing representing the built-in function groups.

The following pages contain further technical data and illustrations of the Demonstration Boards.

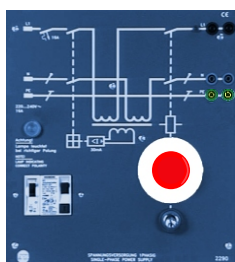


## Demonstration Boards

Series 2200

## Installation Technology

### Demonstration Boards for Installation Technology



Type 2290

#### Single-Phase Power Supply

**Type 2290**

220 ... 240 V AC / 16A; with FI circuit breaker;  $I_{FN} = 30 \text{ mA}$ ; fuse 16 A; contactor control through key-operated switch and emergency push button; dimensions: 266 x 297 x 165 mm (w x h x d); weight: 2.1 kg



Type 2297

#### Current Relay

**Type 2297**

Adjustment range: 0.1 ... 1A; 1 change-over contact: 250 V AC / 3 A; auxiliary voltage: 220 ... 240 V AC, 50 Hz; dimensions: 95 x 297 x 125 mm (w x h x d); weight: 0.95 kg



Type 2200

#### Single-Pole Switch

**Type 2200**

250 V AC / 10 A; dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.45 kg



Type 2201

#### Two-Pole Switch

**Type 2201**

250 V AC / 10 A; dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.45 kg



Type 2202

#### Multi-Circuit Switch

**Type 2202**

250 V AC / 10 A; dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.45 kg



Type 2203

#### Dimmer (400 W)

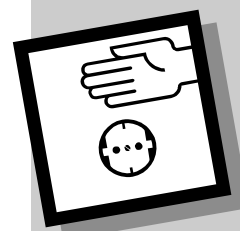
**Type 2203**

220 ... 240 V AC; for continuous adjustment of ohmic loads; dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.5 kg



# Installation Technology

## Demonstration Boards for Installation Technology



### Demonstration Boards

#### Series 2200



Type 2203.1



Type 2204

#### Dimmer (600 VA)

220 ... 240 V AC; for continuous adjustment of fluorescent lamps;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.51 kg

Type 2203.1

#### Two-Way Switch

250 V AC / 10 A;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.45 kg

Type 2204



Type 2205



Type 2206

#### Intermediate Switch

250 V AC / 10 A;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.45 kg

Type 2205

#### Socket

250 V AC / 16 A;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.41 kg

Type 2206



Type 2207



Type 2207.2

#### Pushbutton (with pilot lamp)

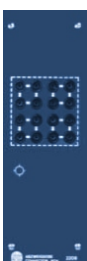
250 V AC / 10 A; glow lamp: 220 ... 240 V;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.4 kg

Type 2207

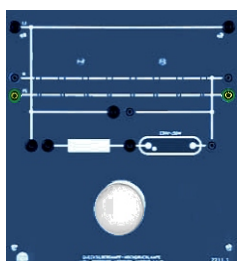
#### Pushbutton (with door opener symbol)

250 V AC / 10 A;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.4 kg

Type 2207.2



Type 2208



Type 2211.1

#### Connector Box

With 4 distributor points;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.35 kg

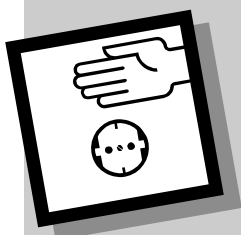
Type 2208

#### High-Pressure Mercury Vapour Lamp

220 ... 240 V AC; max. 50 W; with ballast;  
dimensions: 266 x 297 x 125 mm (w x h x d); weight: 2.6 kg

Type 2211.1



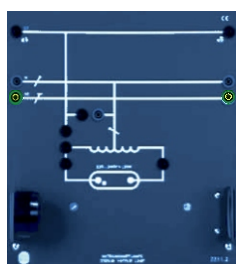


## Demonstration Boards

Series 2200

## Installation Technology

### Demonstration Boards for Installation Technology



Type 2211.2



Type 2212

#### Sodium Vapour Lamp

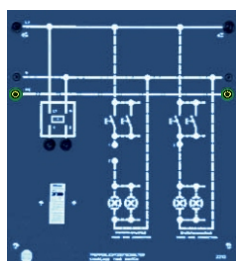
220 ... 240 V AC; max. 35 W; with ballast;  
dimensions: 266 x 297 x 125 mm (w x h x d); weight: 4.6 kg

Type 2211.2

#### Remote Control Switch

Actuation voltage: 220 ... 240 V AC, 50 ... 60 Hz;  
contacts: 2 NO; output voltage: 250 V AC / 16 A;  
dimensions: 95 x 297 x 125 mm (w x h x d); weight: 0.86 kg

Type 2212



Type 2213



Type 2214

#### Staircase Time Switch

220 ... 240 V; for 3- and 4-wire circuits; adjustable from 1 ... 6 minutes;  
dimensions: 266 x 297 x 80 mm (w x h x d); weight: 1.15 kg

Type 2213

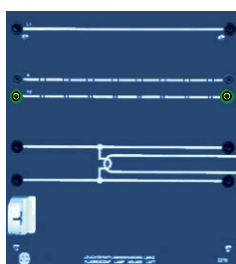
#### Bulb Holder E 27

With filament lamp: 220 ... 240 V AC; 60 W;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.4kg

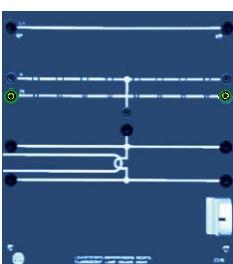
Type 2214

**Blended Lamp (HWLS)** (not illustrated)  
E 27; 160 W; 230 V AC

Type 2214.1



Type 2215



Type 2216

#### Fluorescent Lamp Holder Left

dimensions: 266 x 297 x 115 mm (w x h x d); weight: 0.95 kg

Type 2215

#### Fluorescent Lamp Holder Right

dimensions: 266 x 297 x 115 mm (w x h x d); weight: 0.95 kg

Type 2216

#### Fluorescent Lamp 18W (not illustrated)

Universal white; length: 0.6 m

Type 2215.1

#### Fluorescent Lamp 36 W (not illustrated)

Universal white; length: 1.2 m

Type 2215.3



Type 2217



Type 2217.1

#### Choke / Starter (20 W)

dimensions: 95 x 297 x 125 mm (w x h x d); weight: 1.1 kg

Type 2217

#### Choke / Starter (40 W)

dimensions: 95 x 297 x 150 mm (w x h x d); weight: 1.1 kg

Type 2217.1

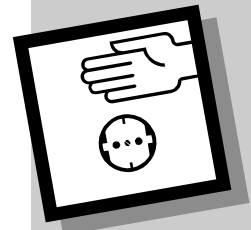


SystemTechnik

Competence in Training

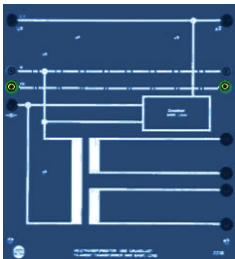
# Installation Technology

## Demonstration Boards for Installation Technology

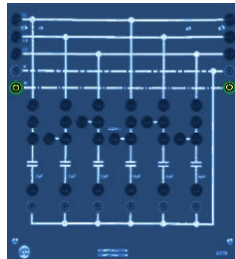


### Demonstration Boards

Series 2200



Type 2218



Type 2219

#### Filament Transformer and Basic Load

20 ... 65 W;  
dimensions: 266 x 297 x 80 mm (w x h x d); weight: 1.5 kg

Type 2218

#### Compensation

3 x 2  $\mu$ F; 3 x 4  $\mu$ F; 400 V AC; discharge resistors 1.8 M $\Omega$ , each;  
dimensions: 266 x 297 x 80 mm (w x h x d); weight: 1.55 kg

Type 2219



Type 2220



Type 2221

#### Bell Transformer

Primary: 220 ... 240 V AC, 50 ... 60 Hz; secondary: 4 / 6 / 8 V; 1 A;  
Dimensions: 95 x 297 x 125 mm (w x h x d); weight: 0.35 kg

Type 2220

#### Buzzer

5 ... 8 V AC;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.4 kg

Type 2221



Type 2222



Type 2223

#### Door Opener

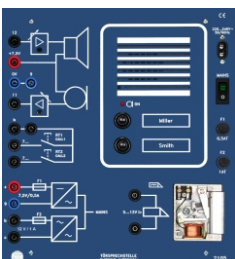
5 ... 8 V DC; 5 ... 12 V AC;  
dimensions: 95 x 297 x 125 mm (w x h x d); weight: 0.75 kg

Type 2222

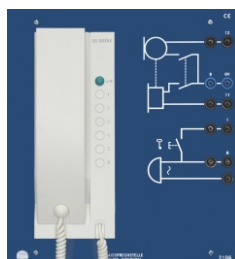
#### Bell Pushbutton

Triple;  
dimensions: 95 x 297 x 45 mm (w x h x d); weight: 0.35 kg

Type 2223



Type 2105



Type 2106

#### Outside Intercom

- Built-in microphone, loudspeaker, and adjustable amplifiers
- Door opener, with transparent cover
- 2 bell pushbuttons
- DC power supply for house intercom, voltage and current: 7.5 V DC / 0.5 A
- AC power supply for bell and door opener, voltage and current: 12 V AC / 1 A
- Mains connection: 220 ... 240 V AC, 50 ... 60 Hz, 20 VA

dimensions: 266 x 297 x 100 mm (w x h x d); weight: 2.1 kg

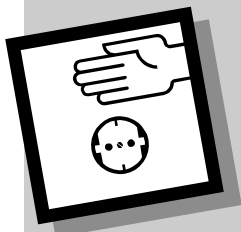
Type 2105

#### Inside Intercom

- Unhookable handset with integrated receiver and microphone
- Bell
- Pushbutton for door opener

dimensions: 266 x 297 x 150 mm (w x h x d) weight: 1.4 kg

Type 2106

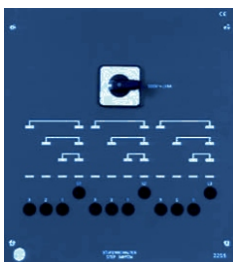


## Demonstration Boards

Series 2200

## Installation Technology

### Demonstration Boards for Installation Technology



Type 2255



Type 2277

#### Step Switch

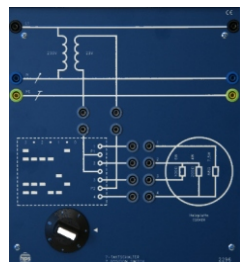
Type 2255

Three-pole; 500 V AC / 16 A; with overlapping switching;  
switch sequence: 0 - 1 - 2 - 3;  
dimensions: 266 x 297 x 125 mm (w x h x d); weight: 1.3 kg

#### Current Transformer

Type 2277

To reduce current in a measuring circuit (2.5 A and 5 A to 1 A);  
protection class 1; S = 5 VA; n < 5; transformation ratio: 5:1 and 2.5:1;  
dimensions: 95 x 297 x 125 mm (w x h x d); weight: 1.15 kg



Type 2296

#### 7-Position Switch

Type 2296

with heater simulation and transformer 230 V to 23 V  
dimensions: 266 x 297 x 125 mm (w x h x d); weight: 1.7 kg

## Demonstration Meters and Power Supplies for Installation Technology



Type 2280

#### Frequency Meter

Type 2280

46 ... 54 Hz; 230 V AC;  
dimensions of the measuring instrument: 144 x 144 mm;  
dimensions: 266 x 297 x 80 mm (w x h x d); weight: 1.5 kg



Type 2281

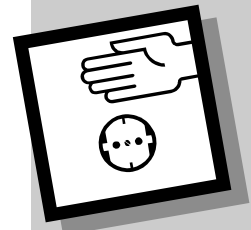
#### AC Meter

Type 2281

220 ... 240 V AC, 50 Hz; 10 A rated current; 40 A limit current;  
meter constant = 600 revol. / kWh;  
dimensions: 266 x 297 x 200 mm (w x h x d); weight: 2.1 kg

# Installation Technology

## Demonstration Boards for Installation Technology



### Demonstration Boards

Series 2200



Type 1070

#### Electronic Multimeter

Type 1070

Measuring ranges:

- Voltage (DC / AC): 0,2 / 2,0 / 20 / 200 / 600 V  
Input impedance: 10 MOhm,  
Input capacitance: < 100 pF  
Frequency range: 40 ... 400 Hz
- Current (DC / AC): 0,2 mA / 2 mA / 20 mA / 200 mA / 10 A  
Frequency range: 40 ... 400 Hz
- Resistance: 200 Ohm / 2 k / 20 k / 200 k / 2 M / 20 MOhm
- Continuity tester with acoustic sound
- Voltage test for batteries
- Diode test

#### Miscellaneous

- Voltage and current input via 4-mm-safety jacks

#### Mains connection:

- 230 V AC / 115 V AC (110 V AC); 50 ... 60 Hz; 15 VA  
dimensions: 266 x 297 x 90 mm (w x h x d); weight: 3,2 kg



Type 1079 USB

#### AC Multifunction Tester

Type 1079 USB

Measuring ranges:

- Voltage: 5 V ... 250 V (ms)
- Current: 0.1 A ... 10 A
- Frequency: 45 Hz ... 65 Hz
- Phase angle: 0° ... 90° lagging (leading indicated with LED display);  
Phase angle between  $U_1$  / I or  $U_1$  /  $U_2$

**Mains connection:** 100 V ... 240 V AC (110 V AC); 50 ... 60 Hz; 10 VA  
dimensions: 266 x 297 x 150 mm (w x h x d); weight: 2.7 kg



Type 1091 USB

#### Universal Power Meter

Type 1091 USB

Measuring ranges:

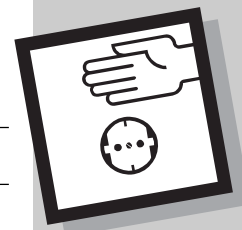
- Voltage / Current: 0 ... 250 V (rms) / 0,1 ... 10 A
- Power factor (cos phi): 0 ... 1 lagging / leading indicated with LED display
- Active power, Apparent power, Reactive power, Frequency
- USB-interface

**Mains connection:** 100 V ... 240 V (110 V AC); 50 ... 60 Hz; 15 VA  
dimensions: 266 x 297 x 150 mm (w x h x d); weight: 2.6 kg

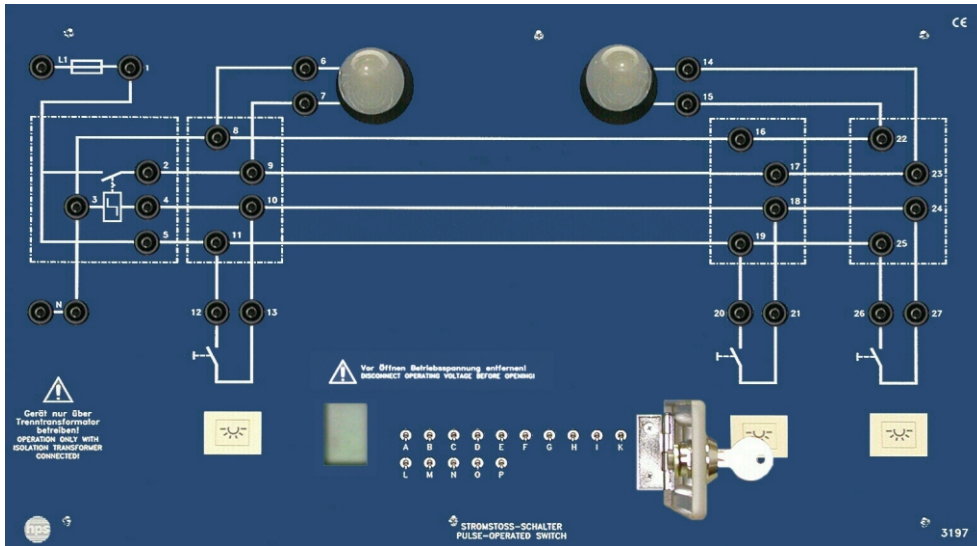
## Accessories Recommended

- Storage Cabinet (Type 8132)
- Set of Safety Connecting Leads (Type 9102.10), 40pcs.
- Safety Connecting Plug (Type 9101.4), 4 mm / 19 mm
- Experiment manual: „Installation Technology“ (Type V 0081)





### Fault Simulators Series 3100



Pulse-Operated Switch (Type 3197)

- For troubleshooting and signal tracing in applied circuits in Safety and installation technology
- Perfectly suitable for examination purposes
- Up to 20 errors can be set by toggle switches
- Short experiment setup times
- With detailed circuit descriptions

With the Fault Simulators, hps SystemTechnik offers a comprehensive program for troubleshooting and signal tracing in applied circuits in the field of installation technology.

Up to 20 possible practice-oriented errors such as breaks, short-circuits in lines and components, dimensioning errors and various defects in semiconductors, are simulated by toggle switches located behind a lockable panel.

The lockable panel over the toggle switches makes the Fault Simulators particularly suitable for conducting tests.

The respective circuit is illustrated in standard form on the Fault Simulators and enables optimum signal tracing and troubleshooting in connection with the external measuring points (4 mm jacks).

The rear of the Fault Simulators is protected by a plastic cover.

For conducting experiments or for troubleshooting the Fault Simulators are installed in the hps desktop or demonstration rack and wired with connecting plugs and leads.

A detailed technical description is delivered with every Fault Simulator. In addition to a short description and error list, this contains general information on troubleshooting in circuits which lead to recognizing the error simulated by the Fault Simulator.

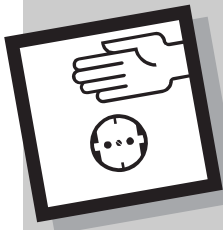
### Technical Data

- Dimensions of the Fault Simulators:  
266 x 297 mm (w x h)  
532 x 297 mm (w x h)  
The depths and weights differ (see overleaf).

- Front panel material:  
5 mm thick laminate,  
matt blue in colour

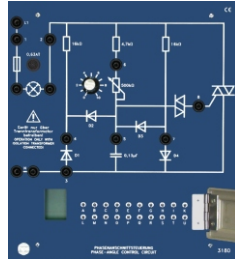
Please see overleaf for other technical data of the individual Fault Simulators.





## Fault Simulators Series 3100

### Installation Technology

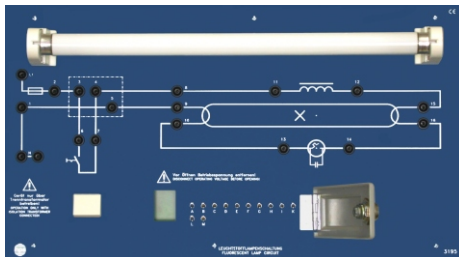


Type 3180

#### Phase-Angle Control Circuit

#### Type 3180

Operating voltage: 230 V AC / 50 Hz (through isolating transformer);  
load capacity: max. 660 W; settable errors: 20;  
dimensions: 266 x 297 x 70 mm (w x h x d); weight: 1.5 kg

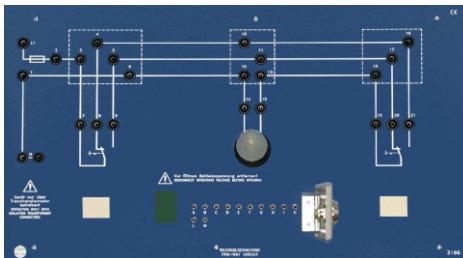


Type 3195

#### Fluorescent Lamp Circuit

#### Type 3195

Consisting of fluorescent lamp (15 W), choke, starter and switch; operating voltage: 230 V AC (through isolating transformer);  
settable errors: 12;  
dimensions: 532 x 297 x 160 mm (w x h x d); weight: 3.3 kg

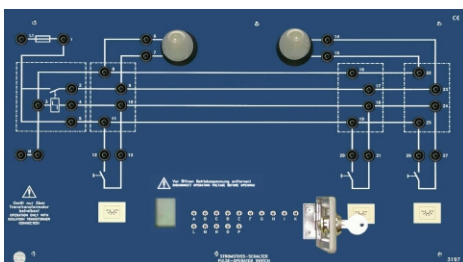


Type 3196

#### Two-Way Circuit

#### Type 3196

Consisting of 2 two-way circuits, 3 junction boxes, 1 filament lamp (25 W); operating voltage: 230 V AC (through isolating transformer);  
settable errors: 12;  
dimensions: 532 x 297 x 115 mm (w x h x d); weight: 2.6 kg



Type 3197

#### Pulse-Operated Switch

#### Type 3197

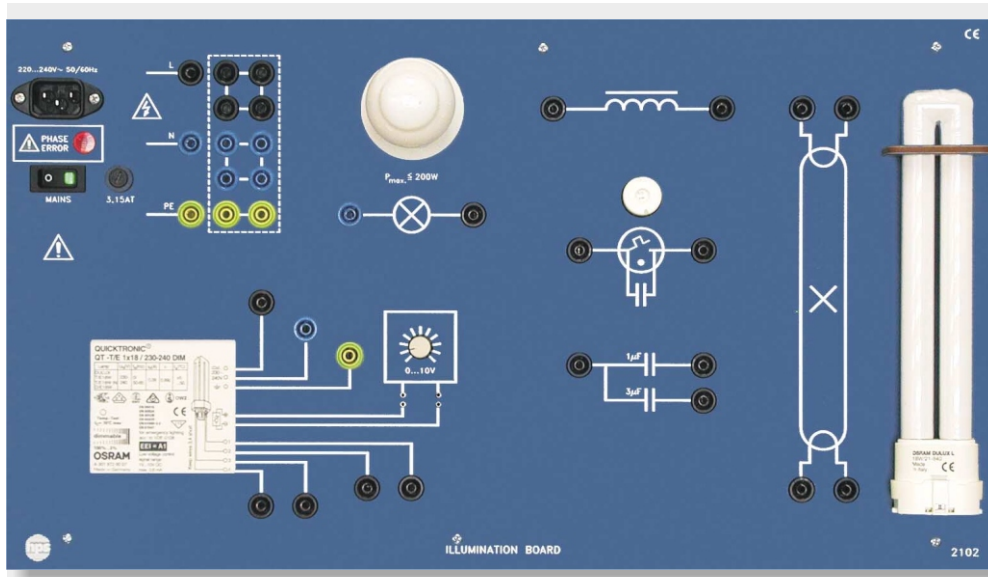
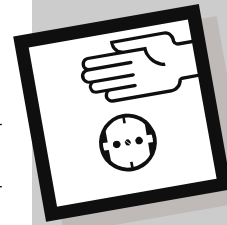
Consisting of 3 turn-on switches, 2 lamps (25 W), 3 junction boxes, 1 pulse-operated switch; operating voltage: 230 V AC (through isolating transformer);  
settable errors: 15;  
dimensions: 532 x 297 x 112 mm (w x h x d); weight: 2.6 kg

### Accessories Recommended

- Connecting Leads (Type 9102.3), with 4 mm plugs, length 100 cm
- Isolating Transformer (Type 8626)
- Bulb Holder E 27 (Type 2214), required for Fault Simulator Type 3180

Technical changes without prior notice!



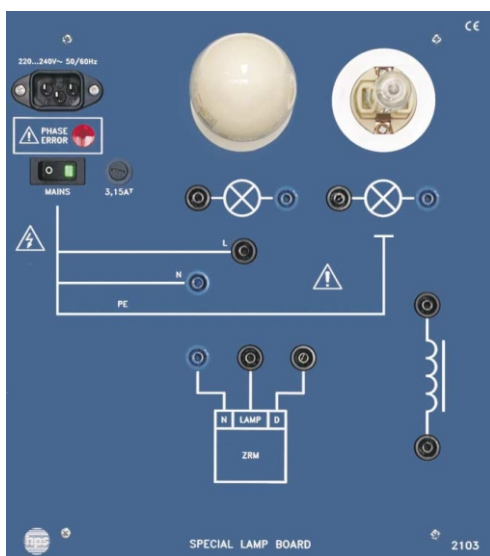


**ILLUMINATION BOARD, Type 2102**

**SPECIAL LAMP BOARD, Type 2103**

Front view of the  
(Type 2102)  
**ILLUMINATION BOARD**

- The most important lamp types and circuits on one board
- Comparison of 5 different lamps
- Consumed energy, measured light power
- No special lab table required, a mains socket suffices
- Also available in the handy hps Box
- **SPECIAL LAMP BOARD** can be added for experiments with special lamps



Front view of the **SPECIAL LAMP BOARD**  
(Type 2103)

### Possible Experiments

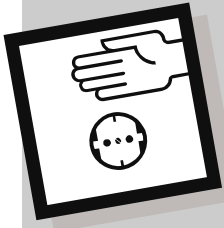
Excerpt from the experiment manual:  
„Lighting Engineering“ (Type V 0111)

With the **ILLUMINATION BOARD**

- Filament lamp
- Halogen lamp
- Fluorescent lamp with choke
- Fluorescent lamp with electronic ballast
- Fluorescent lamp with dimmer
- Compact fluorescent lamp (economy lamp)
- Mixed light lamp

With the **SPECIAL LAMP BOARD**

- High-pressure halogen vapour lamp
- High-pressure sodium vapour lamp
- High-pressure mercury vapour lamp



## ILLUMINATION BOARD, Type 2102

## SPECIAL LAMP BOARD, Type 2103

### Accessories Recommended

- Set of Accessories (Type 2101.1), consisting of safety leads and plugs (4 mm)
- Set of Accessories for the ILLUMINATION BOARD (Type 2102.2), consisting of: filament, halogen, fluorescent, mixed light and economy lamps as well as bimetallic and electronic starter
- Experiment manual: „Lighting Engineering“ (Type V 0111)
- Multimeter (RMS)
- Phase angle meter
- Lux meter

Subject to technical modifications

## Installation Technology / Lighting Engineering

### Technical Data

#### ILLUMINATION BOARD, Type 2102

##### Mains connection (with PE contact)

- Mains voltage: 220 ... 240 V AC, 50 ... 60 Hz; approx. 15 VA ... 160 VA (depending on the lamp used)

##### Installed components

- 1 patch panel (safety jacks, 4 mm: L/N/PE)
- 1 E27 socket
- 1 fluorescent lamp socket
- 1 choke
- 1 starter socket
- 2 compensating capacitors
- 1 electronic ballast with dimmer

##### Dimensions and weights

- ILLUMINATION BOARD (Type 2102): 532 x 297 x 130 mm (w x h x d), weight: approx. 2.8 kg
- Box version, consisting of: ILLUMINATION BOARD (Type 2102) and Box (Type 2102.20): 580 x 450 x 155 mm; total weight: 5.7 kg

#### SPECIAL LAMP BOARD, Type 2103

##### Mains connection (with PE contact)

- Mains voltage: 220 ... 240 V AC; 50 ... 60 Hz; approx. 50 VA ... 70 VA (depending on the lamp used)

##### Installed components

- 1 E27 socket
- 1 socket for halogen and high-pressure lamps
- 1 ballast
- 1 igniter with timer

##### Accessories included

- 1 high-pressure halogen vapour lamp
- 1 high-pressure sodium vapour lamp
- 1 high-pressure mercury vapour lamp

##### Dimensions / weight

- 266 x 297 x 110 mm (w x h x d) / 2.3 kg (without lamps)

### Common data

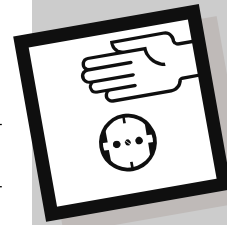
#### Mechanical specifications

The front panel of the boards is made of 5 mm thick laminate, colour matt blue.

The individual components are integrated in the front panel.

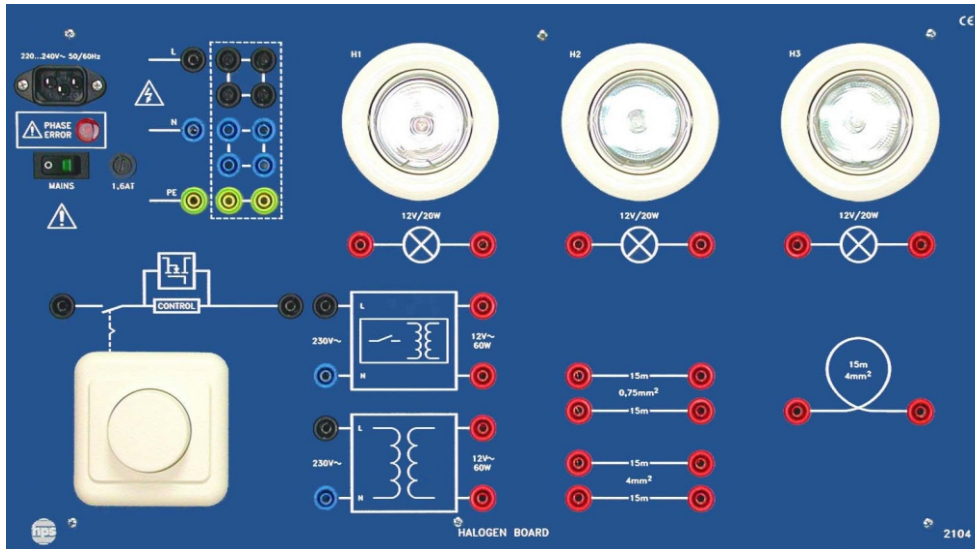
Circuit symbols are printed on the front panel in white.

A grey plastic cover protects the back of the unit and is shaped to stand the unit at an ergonomically favourable angle on the desktop.



### HALOGEN BOARD

Type 2104



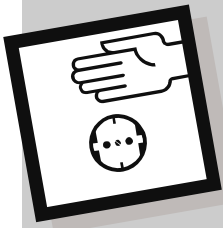
Front view of the  
HALOGEN BOARD

- This board can be used for conducting all experiments with low-voltage Halogen lamps
- Three built-in, swivel-mounted lamps, one of them with higher efficiency
- With conventional and electronic transformer
- Built-in phase angle control
- Various line simulations for simulating real wirings
- No special lab table required, a mains socket suffices
- Also available in the hps Box

### Possible Experiments

Excerpt from the experiment manual: „Lighting Engineering“ (Type V 0111)

- Characteristic values and power ratios of the standard low-voltage halogen lamp
- Characteristic values and power ratios of the low-voltage halogen lamp with higher efficiency
- Transformer power loss
- Dimming of low-voltage halogen lamps
- Influence of the cable cross section and cable length



## HALOGEN BOARD

Type 2104

### Accessories Recommended

- Set of Accessories (Type 2104.1), consisting of safety leads and plugs (4 mm)
- Experiment manual: „Lighting Engineering“ (Type V 0111)
- Multimeter (RMS)
- Lux meter
- Power meter

Subject to technical modifications.

## Installation Technology / Lighting Engineering

### Technical Data

#### Mains connection (with protective contact)

- Mains voltage: 220 ... 240 V AC; 50 ... 60 Hz; approx. 20 ... 70 VA (depending on the wiring)

#### Built-in components

- 1 patch panel (safety jacks, 4 mm: L / N / PE)
- 2 low-voltage halogen lamps  
12 V / 20 W
- 1 low-voltage halogen lamp with higher efficiency due to heat recovery  
12 V / 20 W
- 1 phase-shift control  
230 V / 20 ... 315 W
- 1 transformer, conventional  
230 V AC / 12 V AC, 60 W
- 1 transformer, electronic  
230 V AC / 12 V AC, 60 W
- 2 line simulations (resistors)  
length: 15 m; cross section: 0.75 mm<sup>2</sup>
- 2 line simulations (resistors)  
length: 15 m; cross section: 4 mm<sup>2</sup>
- 1 line simulation, wound  
length: 15 m; cross section: 4 mm<sup>2</sup>

#### Mechanical data

The front panel of the HALOGEN BOARD is made of 5 mm thick laminate, matt blue in colour.

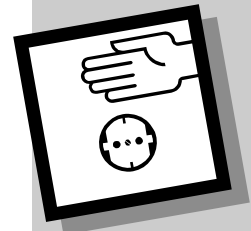
The individual components are integrated in the front panel. Circuit symbols are printed in white on the front panel.

A grey plastic cover protects the rear of the unit and enables the unit to be placed on a desktop at an ergonomically favourable angle.

#### Dimensions and weights

- HALOGEN BOARD (Type 2104):  
532 x 297 x 130 mm (w x h x d);  
weight: approx. 3.8 kg
- Box version, consisting of:  
HALOGEN BOARD (Type 2104)  
and Box (Type 2104.20): 580 x 450 x 155 mm;  
total weight: approx. 7 kg

# Installation and Lighting Technology



## Basic LED Board

Type 2109



Basic LED Board  
(Type 2109)

### Technical Description

This training system can be used to investigate the basic of the light emitting diodes: technology, efficiency, operational parameters and color characteristics of different LED types.

The board is divided into two fields.

The 230 V field consists of the standardized bulb holders of types GU10, GU 5.3, GX53 and E 27 and grants compatibility with the most commonly used and commercially available LED bulbs.

The 12 V field includes manually adjustable LED matrix with PWM control module, different types of single diodes and the MR11 holder for the 12 V bulbs. Furthermore the board includes a built-in 12 V measuring device to use during experiments.

Additionally a set of plastic screens enables studying the optical characteristics of the LED lights.

### Learning Objectives / Experiments

- LED specific light properties like diffusion, color temperature etc.
- Physical characteristics of LEDs, e.g. power consumption, heat generation
- Differences between various LED types
- Comparison to the other light sources
- Controlling the RGB LEDs with pulse-width modulation

### Features

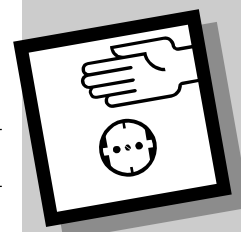
- Built-in 12 V measuring device (power, temperature)
- All power measurements also possible with traditional multimeter
- Exchangeable bulbs
- 4 mm safety jacks for 230 V and 2 mm low voltage jacks
- BNC connectors for external oscilloscope

- Practice-oriented measurements with customary devices
- Can be used with commercially available LED Lamps
- Exchangeable 230V and 12V LED bulbs
- Integrated power supply
- PWM module for controlling RGB LEDs



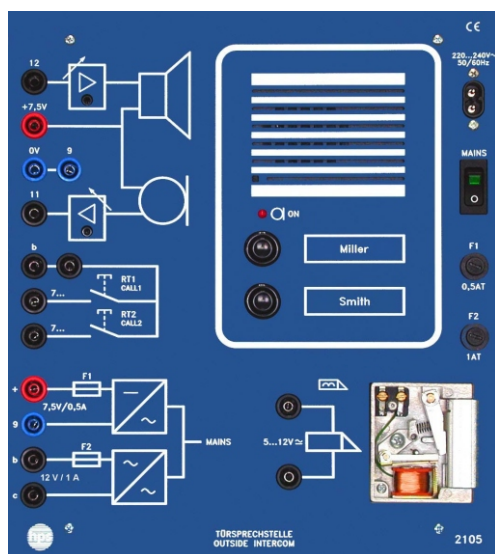


## Installation Technology / House Intercom

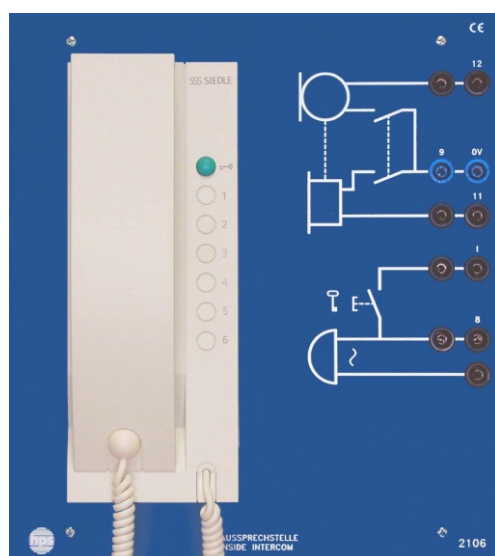


### Outside Intercom Type 2105

### Inside Intercom Type 2106



Outside Intercom (Type 2105)



Inside Intercom (Type 2106)

For the subject of installation technology, hps System-Technik offers a house intercom training system consisting of the two Boards

- Outside Intercom
- and
- Inside Intercom

It can be operated with either one or two inside intercoms.

## Technical Data

### Outside Intercom

- Built-in microphone, loudspeaker, and adjustable amplifiers
- Door opener, with transparent cover
- 2 bell pushbuttons
- DC power supply for house intercom, voltage and current: 7.5 V DC / 0.5 A
- AC power supply for bell and door opener, voltage and current: 12 V AC / 1 A
- Mains connection: 220 ... 240 V AC, 50 ... 60 Hz, 20 VA
- Dimensions / weight:  
266 x 297 x 100 mm (w x h x d) / 2,1 kg

### Inside Intercom

- Unhookable handset with integrated receiver and microphone
- Bell
- Pushbutton for door opener
- Dimensions / weight:  
266 x 297 x 150 mm (w x h x d) / 1,4 kg

### Common data

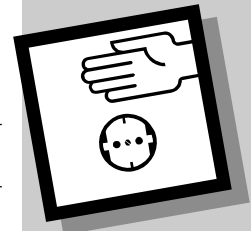
The front panel of the Boards is made of 5 mm thick laminate, matt blue in colour with white engraving representing the built-in function groups.

The rear of the Boards is protected with a grey plastic cover. Its shape allows the Boards to be placed at an ergonomically favourable angle for example on a table.

All inputs and outputs are wired through safety sockets (4 mm).

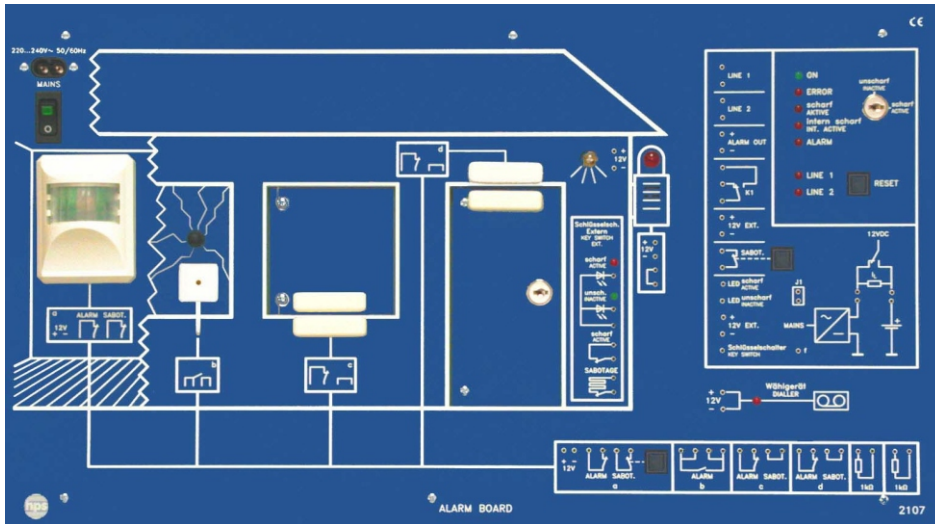
Subject to technical modifications





### ALARM BOARD

Type 2107



Front view of the  
ALARM BOARD

- Complete alarm system for buildings on one Board
- All the individual components are freely wirable for step-by-step introduction right up to complete commissioning of the entire system
- With integrated practice-oriented alarm centre
- The entire building simulation with original sensors:  
Movement detector, glass breakage detector and reed contact switch with functioning window
- Entrance door with key-operated switch, additionally protected by reed contact
- With integrated signalling devices such as outside light and alarm (optical/acoustic)

### Built-in components

PIR movement detector (PIR: Passive Infrared Intrusion), with alarm and sabotage output

2 reed contact switches for windows and doors with one alarm contact and sabotage loop each

Glass breakage alarm

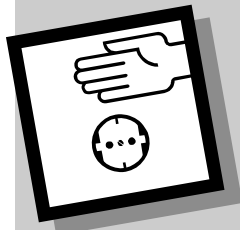
Key-operated switch (door) with external display (LEDs): active/inactive

Outside light

Alarm siren with flashing light

Alarm centre:

- Key-operated switch
- Inputs: LINE 1 / LINE 2 / key-operated switch
- Outputs: Alarm out / relay K1 / power supply / sabotage / LED: active, inactive / 12 V external
- Displays (LEDs): operation / fault / active / internally active / alarm / LINE 1 / LINE 2
- Simulation: power failure and missing battery



## ALARM BOARD

Type 2107

### Accessories Recommended

- Set of Accessories (Type 2107.1), consisting of connecting leads (2 mm) and plugs (2 mm)
- Experiment manual: V 0112 - Experiments with a Burglar Alarm System
- Multimeter

## Installation Technology / Monitoring Systems

### Technical Data

#### Mains connection

- Mains voltage: 230 V AC / 115 V AC (110 V AC), 50 ... 60 Hz; approx. 10 VA

#### PIR movement detector

- Operating voltage: 12 V DC

#### Glass breakage detector

- Operating voltage: 5 ... 12 V DC / max. 8 mA

#### Selector (simulation)

- Operating voltage: 12 V DC

#### Outside light

- Operating voltage: 12 V DC / 1 W

#### Alarm siren with flashing light

- Operating voltage: 12 V DC

#### Alarm centre:

- Voltage output: 12 V DC / 0.2 A

All inputs and outputs are wired with 2 mm jacks.

#### Mechanical data

The front panel of the ALARM BOARD is made of 5 mm thick Laminate, matt blue in colour with white engraving representing the built-in function groups.

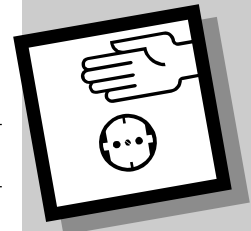
The rear of the Board is protected with a grey plastic cover. Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.

The ALARM BOARD can be converted into a portable training unit by simply screwing it into a Box: All the experiments can be conducted directly in the Box. Dust-free storage and protection against transport damages are further advantages of the Box version.

#### Dimensions and weights

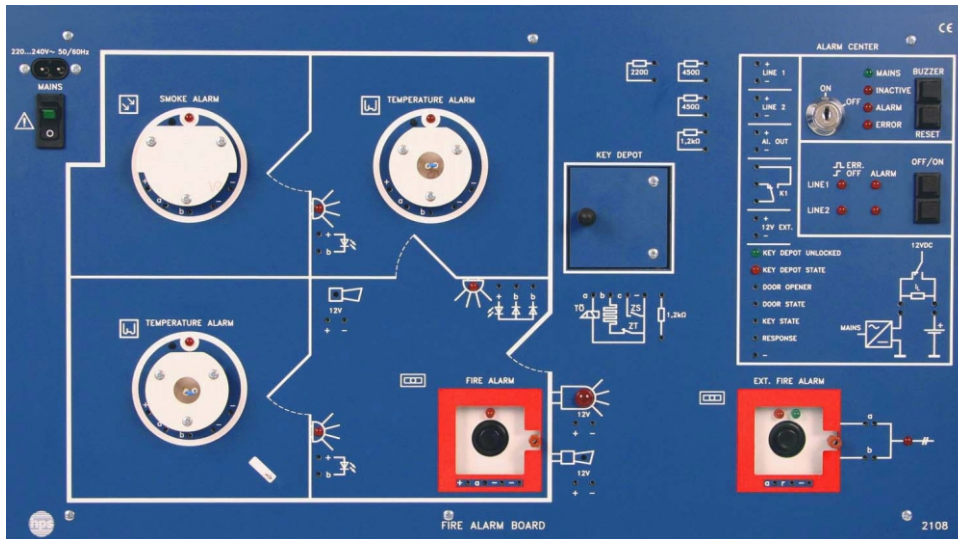
- ALARM BOARD (Type 2107):  
532 x 297 x 140 mm (w x h x d); weight: 3.1 kg
- Box version, consisting of:  
ALARM BOARD (Type 2107) and Box (Type 2107.20):  
580 x 450 x 155 mm; total weight: 6.3 kg

Subject to technical modifications.



### FIRE ALARM BOARD

Type 2108



Front view of the  
FIRE ALARM BOARD

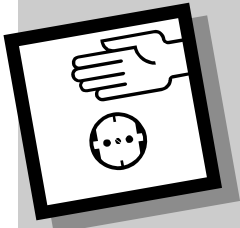
- Complete fire alarm system on a single Board
- All single components freely wirable, for step-by-step introduction right up to complete commissioning of the whole system
- With integrated fire alarm centre
- With integrated signalling devices such as acoustic alarm generator, flashing light and alarm relaying by main alarm
- Integrated key depot

### Built-in components

2 thermo-differential alarms (infrared)  
Smoke alarm  
Manual alarm  
Main alarm with connection to the fire station  
Key depot  
Inside and outside horn  
Optical alarm indicators (LEDs)  
4 terminating resistors

#### Fire alarm centre:

- Key-operated switch for locking relaying of fire alarms to the main alarm
- Inputs: LINE 1 / LINE 2 / DOOR STATE / KEY STATE / RESPONSE
- Outputs: ALARM OUT / Relay K1 / 12 V EXTERNAL / DOOR OPENER
- Indicators (LEDs): Operation ON, operation OFF / ALARM / ERROR / ERROR OFF, ALARM for LINE 1 and LINE 2 / KEY DEPOT UNLOCKED / KEY DEPOT STATE
- Button: BUZZER OFF / RESET / OFF, ON for LINE 1 and LINE 2
- Simulation: power failure and missing battery



## FIRE ALARM BOARD

Type 2108

### Accessories Recommended

- Connecting leads (2 mm) and plugs (2 mm)
- English experiment manual, order no. V 0113
- Multimeter

## Installation Technology / Monitoring Systems

### Technical Data

#### Mains connection

- Mains voltage: 230 V AC / 115 V AC (110 V AC)  
50 ... 60 Hz; approx. 10 VA

#### Thermo-differential alarm (infrared)

- Operating voltage: 12 V DC

#### Optical smoke alarm

- Operating voltage: 12 V

#### Hand alarm

- The glass pane is simulated by a sliding plexiglass door.
- The alarm is indicated by a red LED.
- The alarm is triggered by a pushbutton.
- Operating voltage: 12 V

#### Main alarm

- The alarm is indicated by a red LED.
- Main alarm at rest, green LED alight
- The alarm is triggered by a pushbutton.
- Alarm to fire station additionally indicated by a red LED
- Operating voltage: 12 V

#### Alarm centre:

- Voltage output: 12 V DC / 0.2 A

All inputs and outputs are wired by 2 mm jacks.

#### Mechanical data

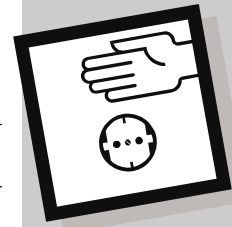
- The front panel of the FIRE ALARM BOARD is made of 5 mm thick laminate, matt blue in colour with white engraving representing the built-in function groups.  
The rear of the Board is protected with a grey plastic cover. Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.  
The FIRE ALARM BOARD can be converted into a portable training unit by simply screwing it into a Box: All the experiments can be conducted directly in the Box. Dust-free storage and protection against transport damages are further advantages of the Box version.

#### Dimensions and weights

- FIRE ALARM BOARD (Type 2108):  
532 x 297 x 120 mm (w x h x d); weight: 3.0 kg
- Box version, consisting of:  
FIRE ALARM BOARD (Type 2108) and Box (Type 2107.20):  
580 x 450 x 155 mm; total weight: 6.2 kg

Subject to technical modifications.





### Network Trainer

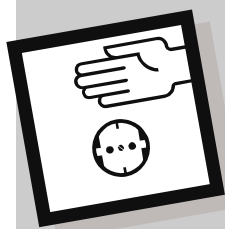
Type 4410



Network Trainer (Type 4410)

### You can do the following practical exercises with the hps Network Trainer:

- Exercises with the LSA-PLUS contact system
- Wiring the patch panel with different cables (Cat. 3, 5, 7) and checking them
- Wiring ISDN, Cat. 6, and TAE sockets
- Troubleshooting for wiring errors with the built-in error simulator:
- Short-circuit, wire change, interruption and grounding
- Testing of plug systems TAE and RJ 45
- Practice-oriented working with different tools and measuring instruments in network technology:  
Stripping tool / LSA contact tool / wire cutters / line tester (measuring instrument for measuring wire, short-circuit, twist and interruption)
- Connection of individual modules of the network trainer with patch cable Cat. 3 / 5 / 7



## Network Trainer

### Type 4410

#### Set of Accessories Type 4410.1

- Line tester, consists of transmitter and receiver with LED indicators
- 3 patch cable (Cat. 3 / 5 / 7)
- Wire cutters
- LSA insertion tool
- Cutting- and stripping tool

## Installation Technology / Network Technology

### Technical Data of the Network Trainer

#### Desktop rack (19" grid)

- Material: aluminium section
- Dimensions: approx. 49.5 cm x 64.5 cm x 31.0 cm (w x h x d)
- Weight: approx. 5.7 kg, modules included

#### Modules contained

- 2 patch units, Network Cat. 6
  - 1 patch unit, Network Cat. 6, error simulator
  - 1 patch unit RJ 45-ISDN, unshielded
- Module carrier made of aluminium, silver-anodised

- 4 data ports, Network Cat. 6
- 2 ISDN data ports
- 2 TAE data ports

Accommodated in 2 cable ducts

The Network Trainer offers space for extensions by additional modules, e.g. switch or PBX system

#### Cables for wiring exercises

- analogue cable Cat. 3, length 7.5 m
- network cable Cat. 5, 160 MHz, length 7.5 m
- network cable Cat. 7, 300 MHz, length 7.5 m
- 1 TAE connecting cable, TAE plug / RJ 45 plug, NFF coded
- 1 TAE connecting cable, TAE plug / RJ 45 plug, NFN coded



Cables for wiring exercises

Subject to technical modifications.