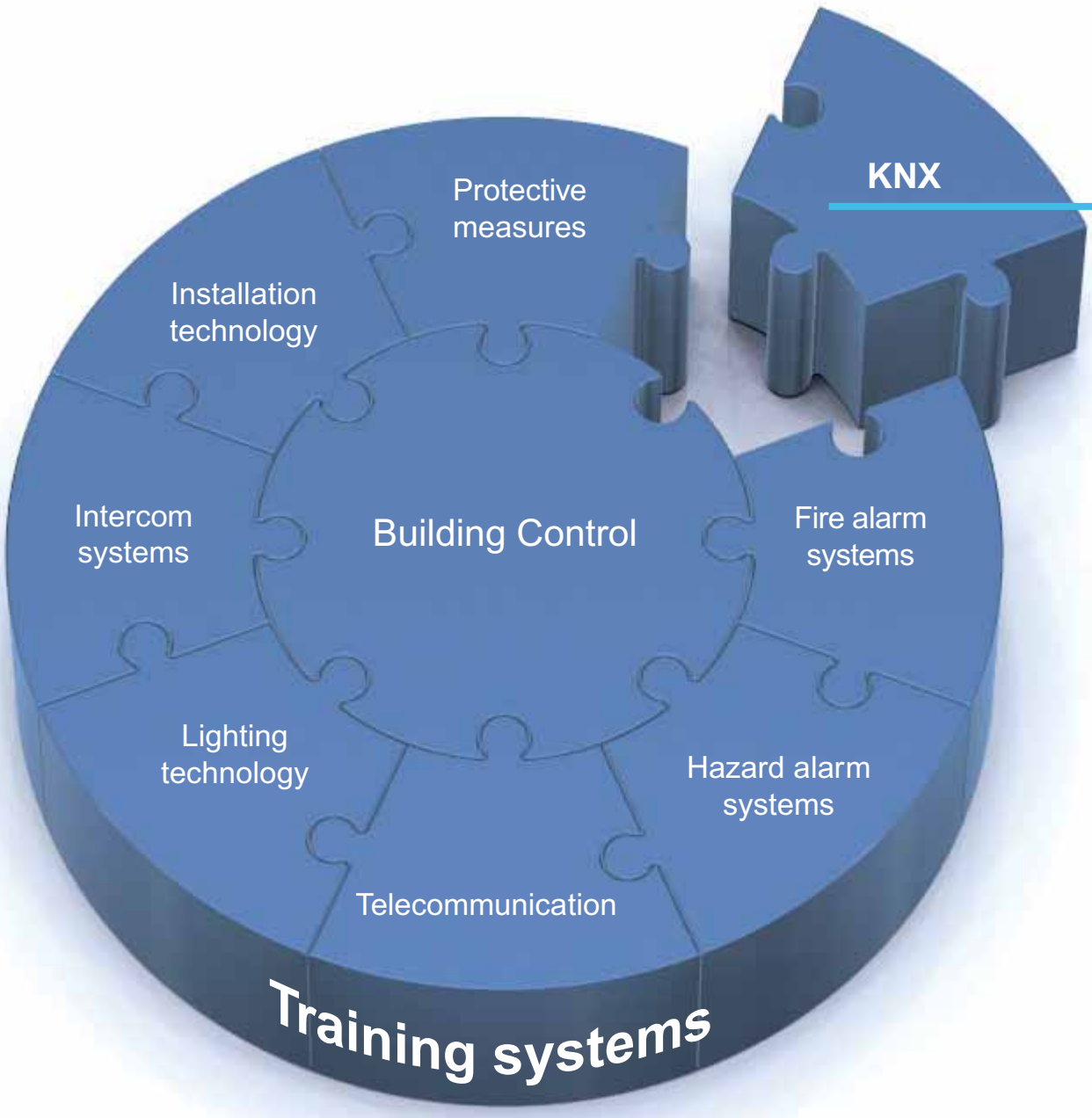
ELABO*TrainingsSysteme*
Aus- und Weiterbildung GmbH

KNX Installation Bus System

www.elabo-ts.com

KNX SYSTEMS

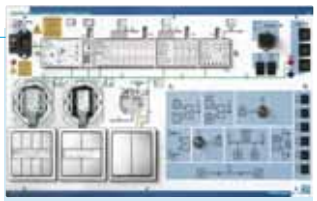
Configuration and Commissioning



ELABO TrainingsSysteme

BASIC FUNCTIONS

- SWITCHING
- DIMMING
- BLINDS AND SHUTTERS
- BINARY INPUTS



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PROGRAMMING

- ETS4 SOFTWARE
- ALARM CONTROL
- TOUCH PANEL

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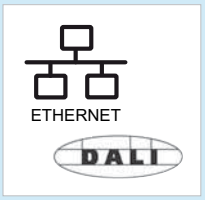
PROJECTS

- DIMMING
- ALARM SYSTEM

Page 16 – 19

NETWORKS

- ETHERNET
- DALI



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SENSOR AND ACTUATOR SYSTEMS

- WEATHER STATION
- LOGO!
- BLINDS AND SHUTTERS

Page 36 – 41

COURSWARE

- MANUALS
- TRANSPARENCY SETS
- TECHNOCARDS

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INFORMATION AND CONSULTING

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THE INTELLIGENT BUILDING

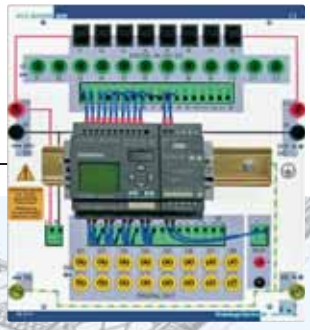
Project: Alarm functions

Weather station

Project: Dimming

Room Controller

Access control



PLC Board 24 V
with KNX extension module

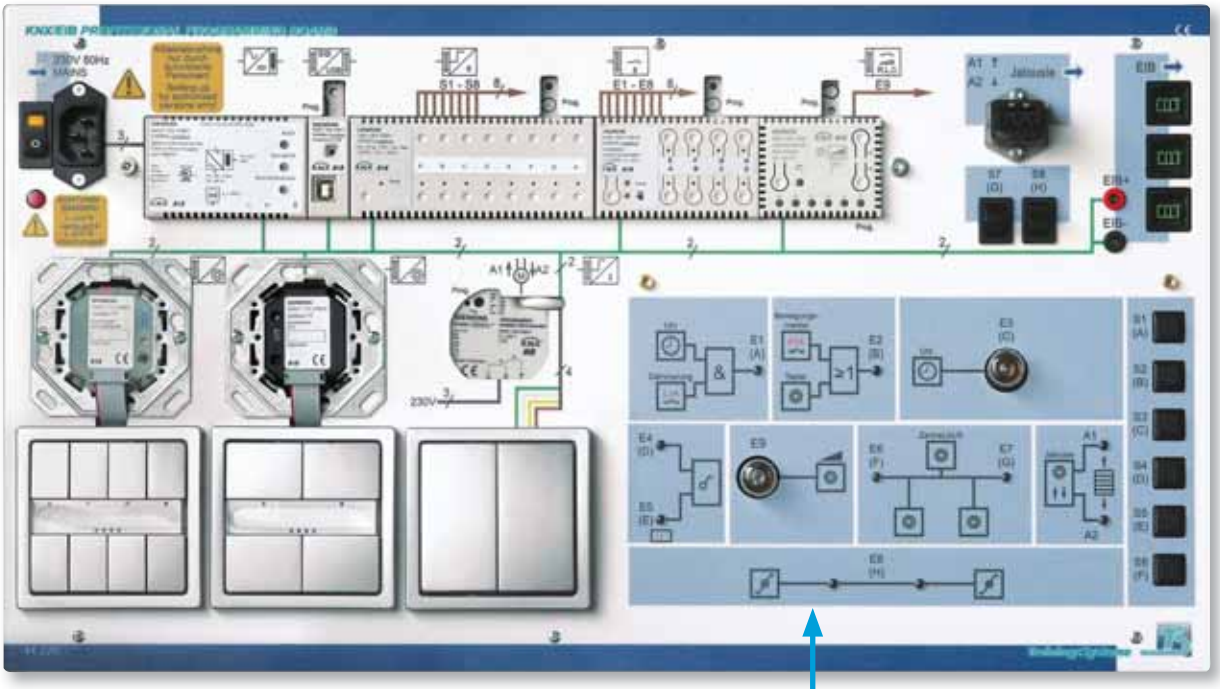
KNX Professional Programming Board

Colour Touch Panel

Technology model: Blind

HARDWARE

KNX Professional Programming Board



41 220 KNX Professional Programming Board

LEARNING OBJECTIVES

- Configuring KNX systems
- Commissioning and troubleshooting
- Documentation and maintenance

Four different templates for exchange

41 220 KNX Professional Programming Board

in the DIN A4 system, with the following components:

- 1 KNX power supply
- 1 USB programming interface
- 1 binary input, 8-X with 8 simulation switches, manual/automatic operation
- 1 8-X binary output with manual/automatic operation
- 1 1-X dimmer actuator, manual/automatic operation
- 1 4-X KNX push button sensors
- 1 2-X KNX push button sensors
- 1 2-X button with 2-X KNX binary input and flush-mounted blind actuator
- 11 indicator lamps
- Sockets for onward connection to other systems
- Industrial blind socket

Application examples:

- *Switching:*
  Logic, delay, time, staircase, status
- *Binary input:*
  Switching, edge, cyclical, dimming, blinds
- *Push button sensor:*
  Dimming, switching, edge, blind

KNX applications

Residential house

41 221

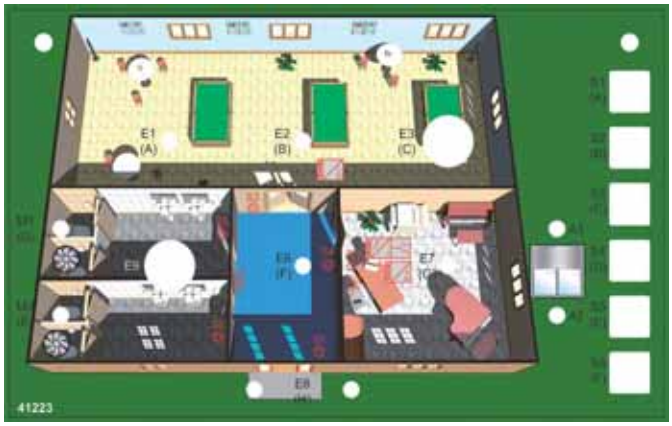
Consisting of:
- Entrance area
- Living room
- Bedroom
- Kitchen / dining room
- Office
- Hallway

Administration building

41 222

Consisting of:
- Outdoor area
- Entrance area
- Lobby
- 2 office rooms
- Recreation rooms

Recreation centre



41 223

Consisting of:
- Entrance area
- Sanitary facilities
- Service centre
- Billiards room

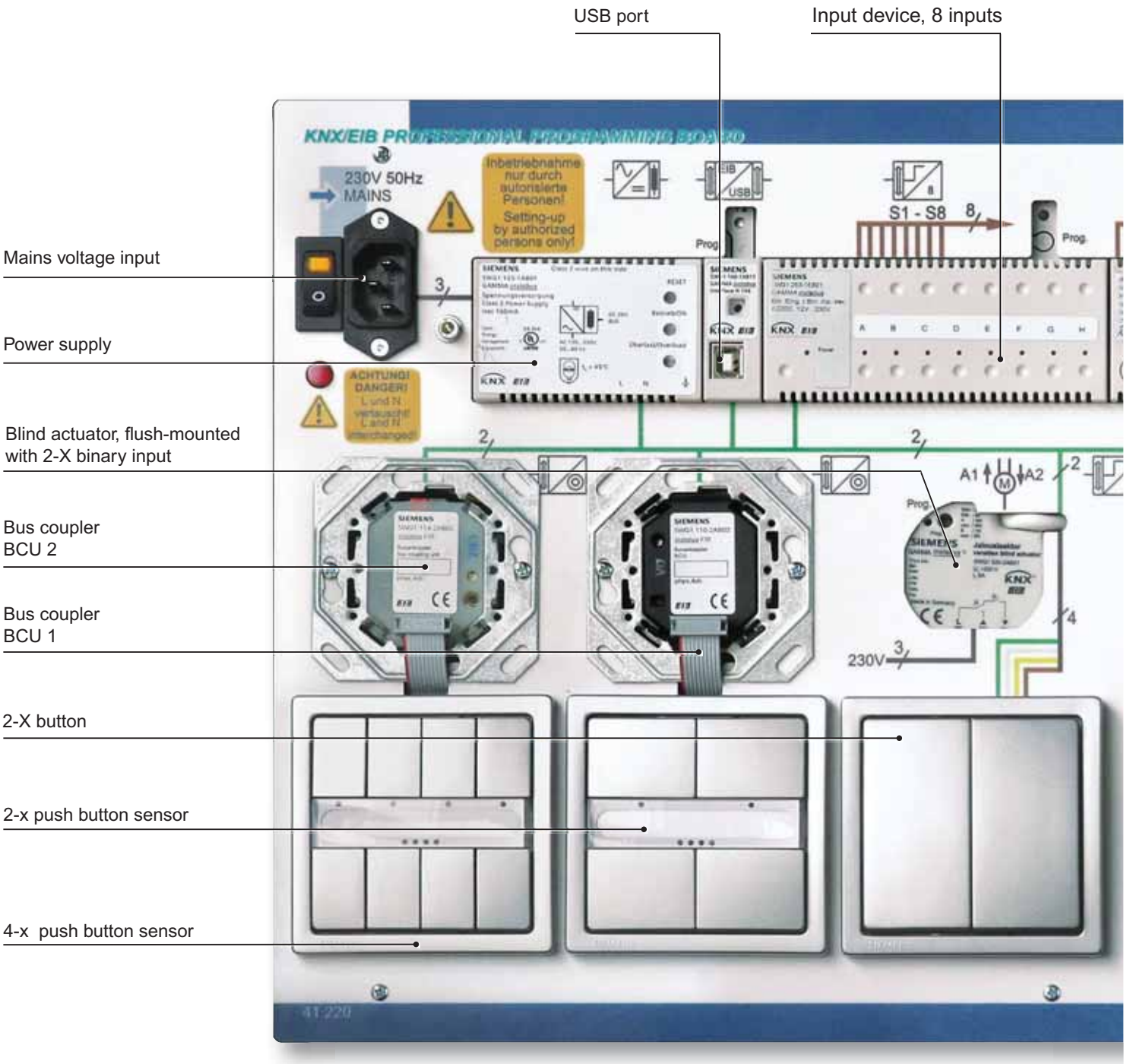
Office building with outdoor area

41 224

Consisting of:
- Outer lighting
- Staircase
- 1 large-area office
- 2 individual offices with blinds

HARDWARE

KNX Professional Programming Board



Templates for exchange

- 41 221 Residential house
- 41 222 Administration building
- 41 223 Recreation centre
- 41 224 Office building with outdoor area

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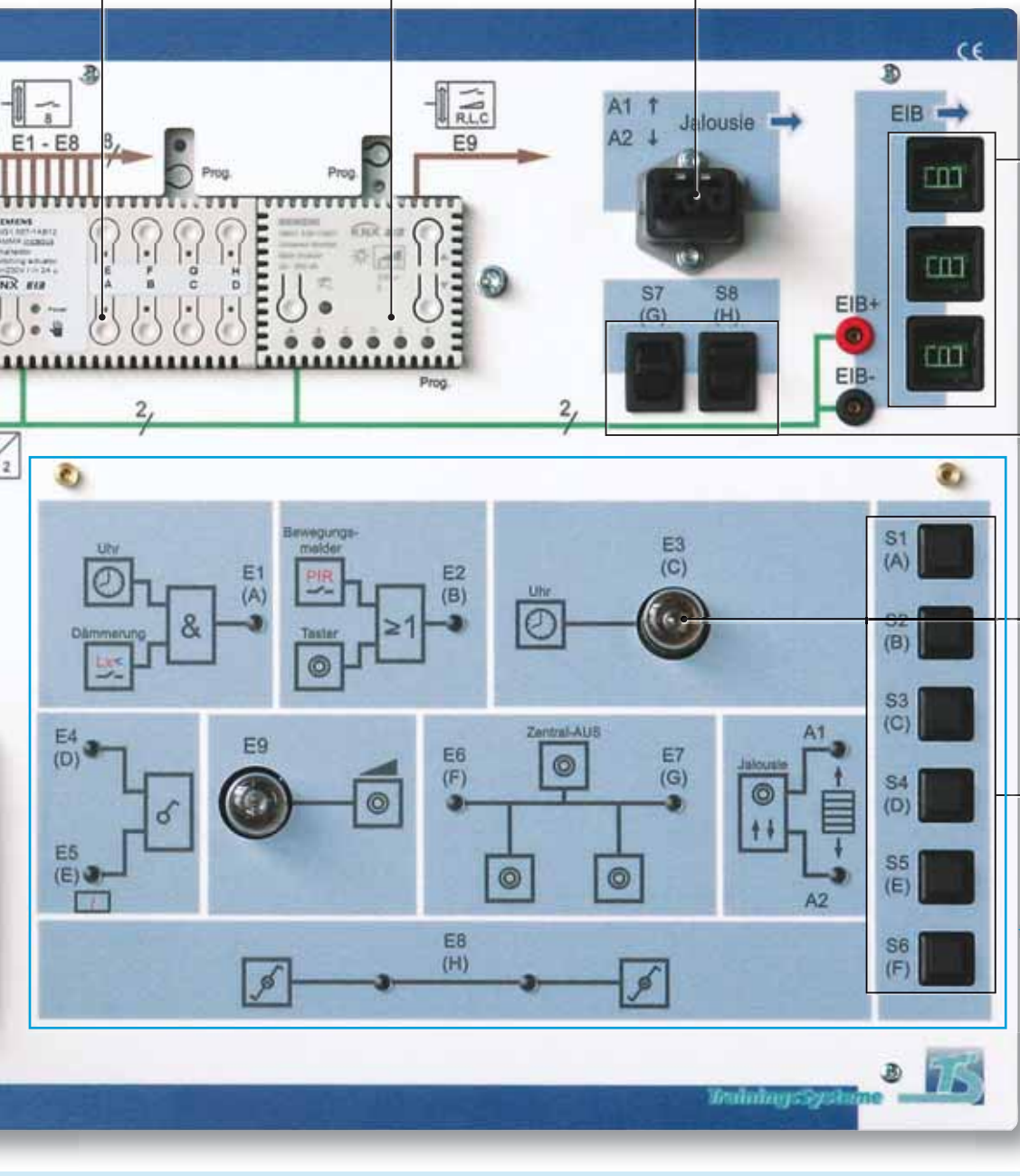
Switching actuator 8-X

Dimming actuator

Blind socket

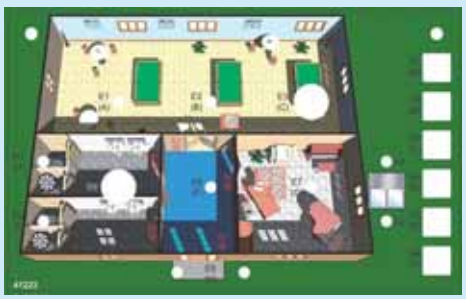


System plug
for connecting the projects

2 simulation switches
connected to the
inputs of the binary input

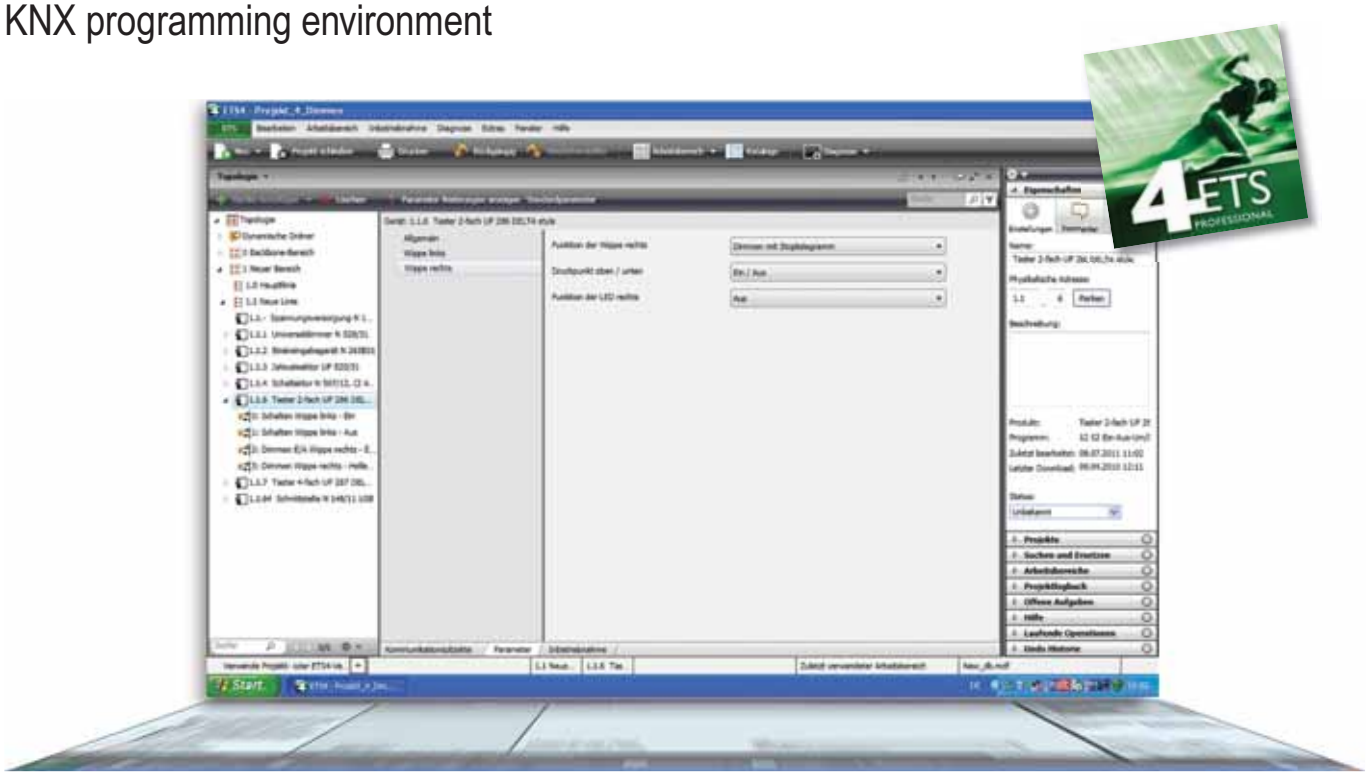
LEDs and incandescent lamps
to simulate the outputs

6 simulation buttons
connected to the
inputs of the
binary input device



SOFTWARE

KNX programming environment



90 144 KNX programming environment ETS4 Lite
90 145 KNX programming environment ETS4 Professional

LEARNING OBJECTIVES

- Configuring KNX systems
- Commissioning and troubleshooting
- Documentation and maintenance

KNX programming environment

- Configuration and commissioning automation solutions in residential and functional buildings
- Functions for resetting and restoring
- Full drag & drop functionality
- Editing feature within the working window
- Clear display of the parameters
- Connection with the bus via USB interface, network or internet
- Reports for project documentation
- Administration of different project databases

Installation requirements:

- *IBM-compatible PC with Windows Vista, Windows 7 or Windows XP, 32 / 64 bit, monitor resolution 1024 x 768 min. 2.0 GHz and 2 GB RAM*
- *20 GB hard disk memory (without projects)*
- *USB, RS232 or IP interface, depending on the hardware connection*

ETS4 Lite and ETS4 Professional

The KNX programming environment is used for the planning and configuration of intelligent KNX home and building control. It supports the execution of home and building control projects in the following phases:

1. Configuration

2. Commissioning

3. Project documentation

4. Diagnosis and troubleshooting

CD-ROM KNX
Programming environment

90 144 KNX programming environment ETS4 Lite

- The execution of individual projects up to max. 20 devices in a line, with bus access is possible, without any time restriction.
- For schools and vocational training

90 145 KNX programming environment ETS4 Professional

- Full software version without any limitation

90 146 KNX programming environment ETS4 Trainer Package

- 1x ETS4 Professional, 10x ETS4 Lite, 2x Home and Building Control manual
- For schools and vocational training

Accessories

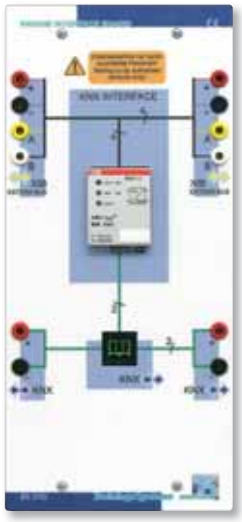
80 544 USB Programming Connection Line

41 002 KNX Professional Connection Line

HARDWARE

Alarm Control Board / KNX Interface

45 000 Alarm Control Board



45 010 KNX Interface Board

LEARNING OBJECTIVES

45 000 Alarm Control Board

- ✔ Configuration and commissioning of a security alarm system
- ✔ Selection of suitable detectors and sensors
- ✔ Programming of the security alarm system via an LCD display or a PC
- ✔ Maintenance work, testing the detectors used
- ✔ Use of different activating devices, selection according to security requirements
- ✔ Commissioning an access control system
- ✔ Integration in a KNX system

45 010 KNX Interface Board

- ✔ Connecting security alarm systems with a KNX system
- ✔ Forwarding the signals of the security alarm system to the KNX system
- ✔ Calling up scenes in a KNX system via the security alarm system

Technical data, KNX Interface Board

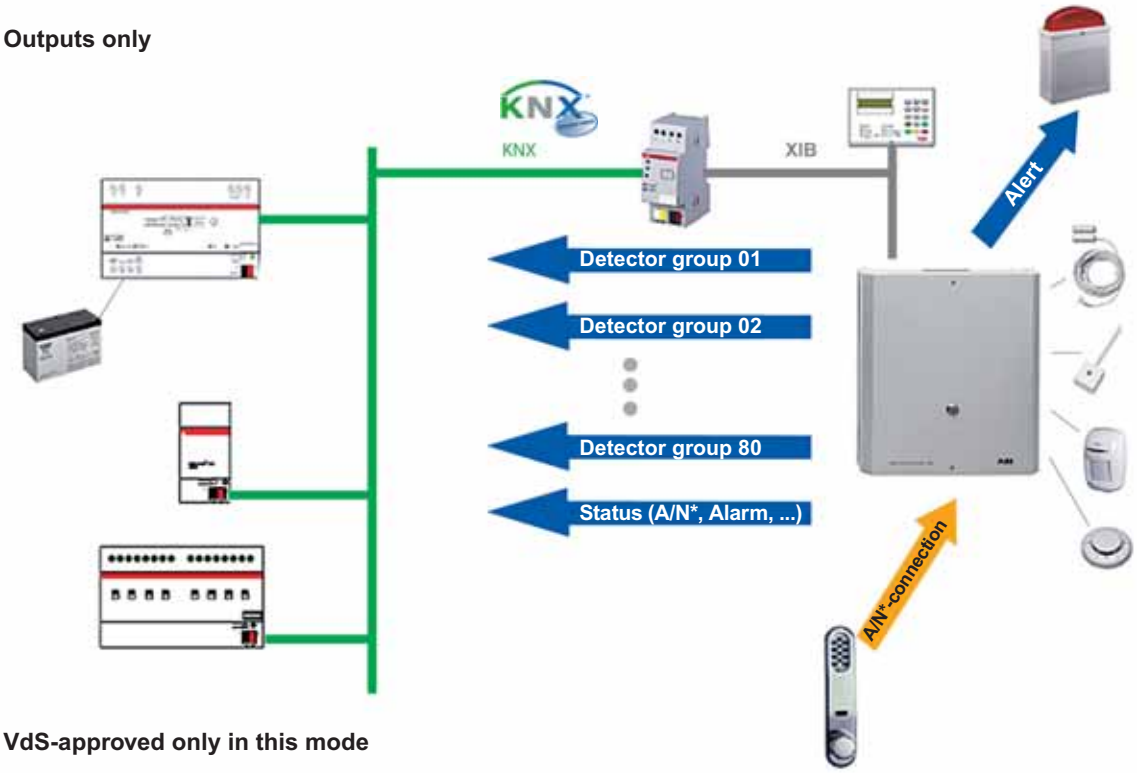
- KNX interface for connection to the external safety bus
- All connections on 2mm safety sockets
- Operating Power supply from the safety bus of the control centre

Technical data, Alarm Control Board

- 10 detector groups
- 2 relay outputs, programmable
- 1 relay output for continuous alarm
- 1 internal safety bus
- 1 external safety bus
- 1 transistor output for a strobe light
- 2 transistor outputs for sirens
- 8 transistor outputs for e.g. a dialler
- 1 input for an emergency power supply
- 1 input for telephone dialler Fault
- 1 input for telephone dialler Alarm
- 1 input for telephone dialler Sabotage
- VdS approval: Classes A, B, C in accordance with DIN VDE 0833 parts 1&3

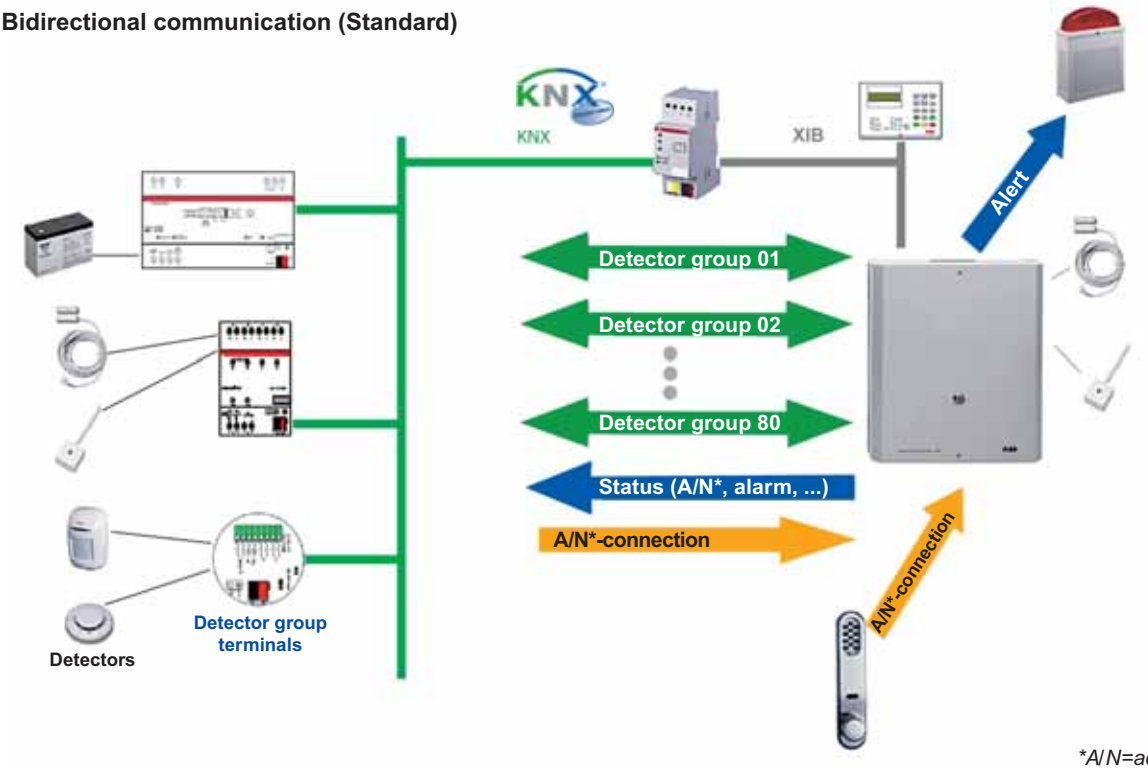
Interface KNX to the intrusion alarm central panel

Outputs only



VdS-approved only in this mode

Bidirectional communication (Standard)



*A/N=activated / non-activated

HARDWARE

Touch Panel

41 227 KNX Colour Touch Panel

LEARNING OBJECTIVES

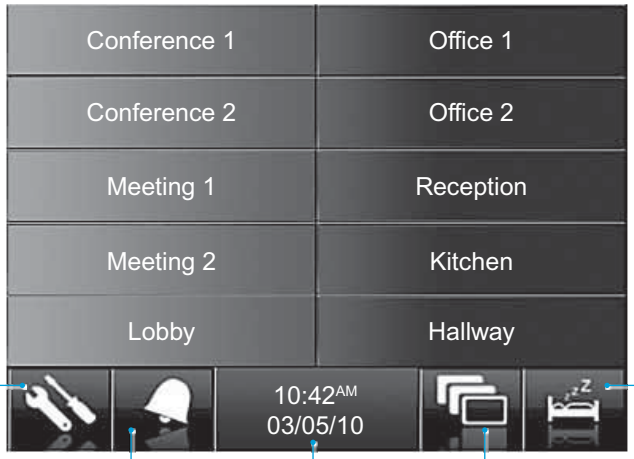
- Control and visualisation of KNX systems
- Switching
- Switching/dimming with stop telegram
- Switching with forcible control
- Blind control
- Setting values, 1 byte
- Setting temperature value
- Setting value counter
- Calling/saving scenes
- Setting heater operating mode
- 1-bit status display
- 1-byte status display
- 2-bytes status display
- 4-bytes status display
- Screen saver
- Time and logic functions
- Presence simulation

41 227 KNX Colour Touch Panel

The Board contains the following components:

- KNX Color Touch panel 5,7"-colour TFT
- Mains and bus voltage connection
- 10 operating pages with 5 functions each
- Up to 60 additional functions can be implemented
- Up to 64 scenes can be stored
- 16 alarm/event objects available

Clear menu guidance on the Touch Panel



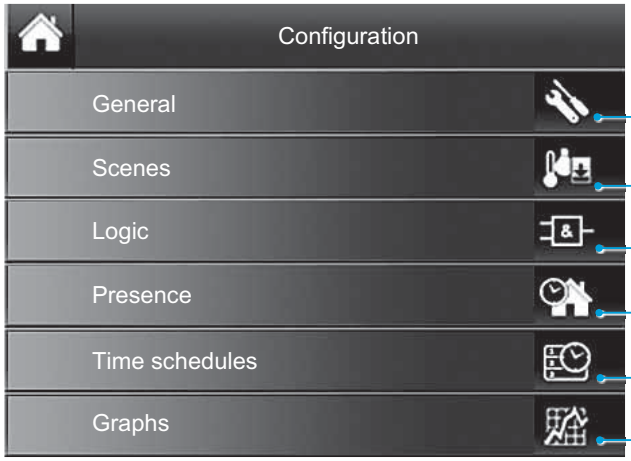
Skip to selection of the configuration

Activate the silent mode

Skip to alarm screen

Start the Logo / slide show

Display of the date and time



General system settings

Configuration of the scenes

Configuration of the logic

Presence simulation

Configuration of the schedules

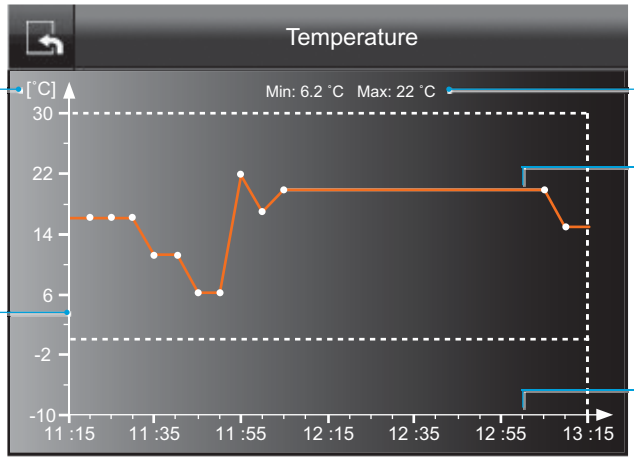
Trending module

Physical unit of the status value

Discrete indication of the min. and max. values

Parameterised scaling for the y-axis

Progression of the status value over the parameterised period



PROJECTS

Project: Dimming

41 012 KNX Project Dimming

LEARNING OBJECTIVES

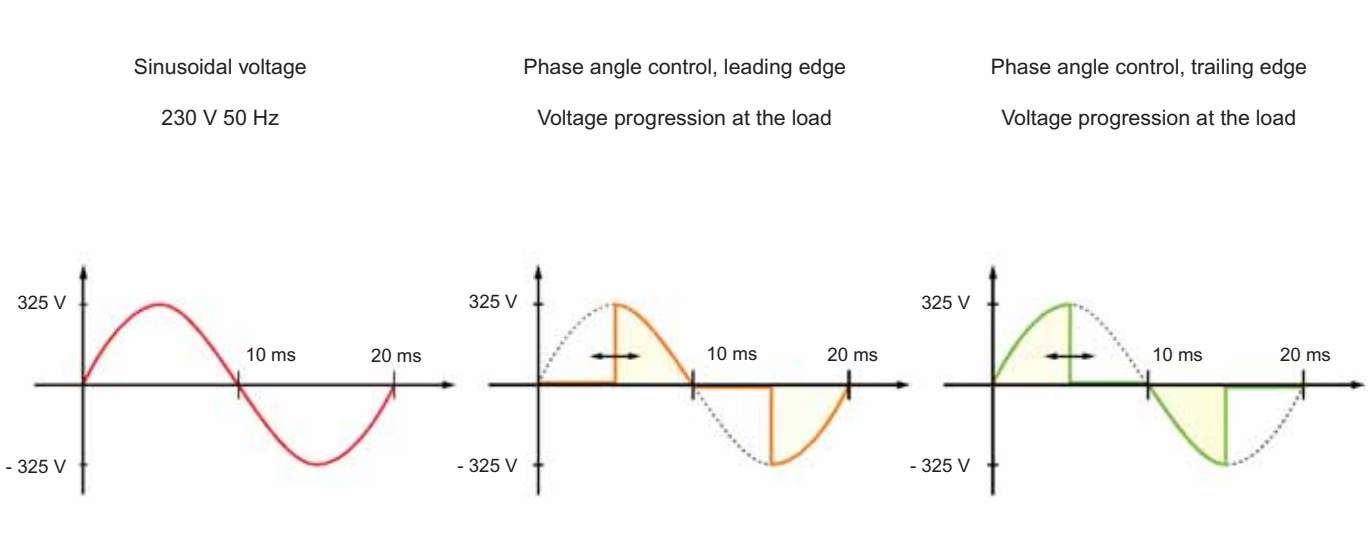
- ✔ Switching ON/OFF
- ✔ Dimming (relative and absolute) 0 % – 100 % of the adjustable range
- ✔ Set dimming value continuously / switch on directly
- ✔ Integration in the scene control
- ✔ Feedback of the initial state and the initial value via the bus in case of changes
- ✔ Commissioning and troubleshooting

41 012 KNX Project Dimming

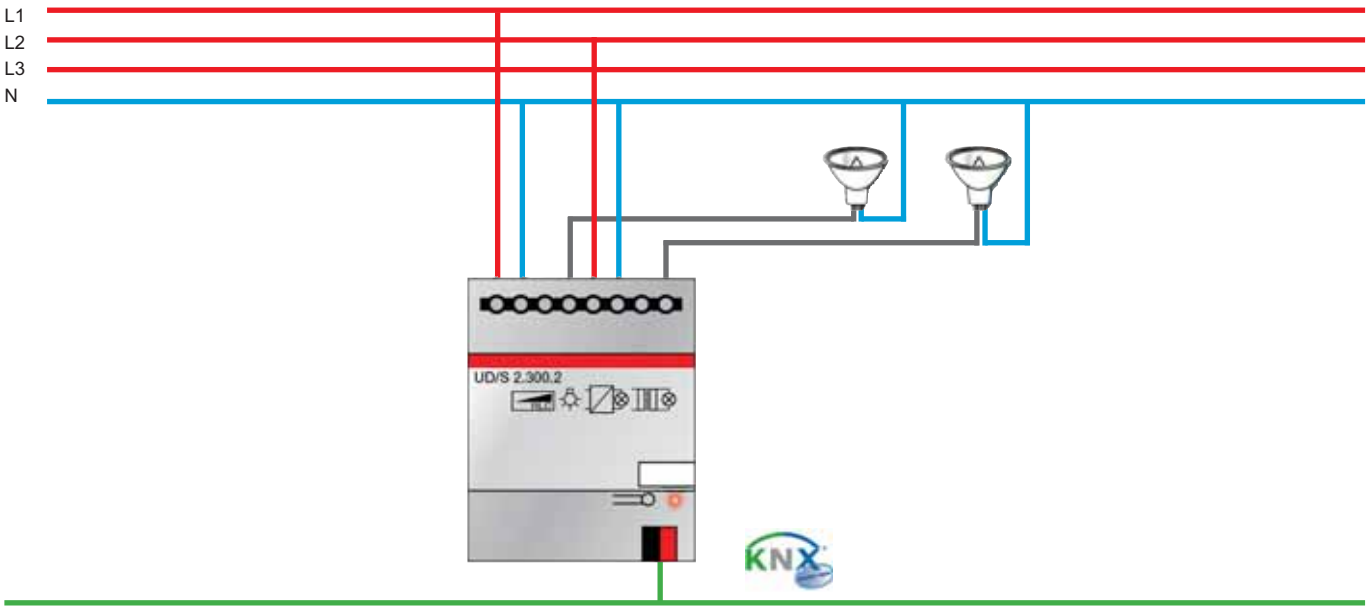
Set of circuit components for the project Dimming, assembled on a grid panel, consisting of:

- Small-scale distributor
- RCD circuit breaker 40/0.03 A, 4-pole
- Line circuit breaker B10 A, 1-pole
- Universal dimming actuator, 2-X, 300 W
- Electronic ballast for halogen lamps with recessed 50 W luminaire, in a system casing
- 4-X push button sensor with bus coupler and base
- Halogen lamp 60 W, incl. bulb
- Set of KNX system cables with branching and connecting cables
- Set of wiring and distribution accessories
- Scene and logic module
- Binary input 2-X with 2-X push button

Dimming by means of universal dimming actuators



Dimming by means of universal dimming actuators



Connection of an incandescent lamp load to the universal dimming actuator

PROJECTS

Project: Alarm functions

41 014 KNX Project Alarm functions

LEARNING OBJECTIVES

- Configuring KNX signalling systems
- Integrating sensors of alarm technology
- Putting telephone gateway into operation
- Evaluating and monitoring alarm signals
- Parameterisation of an LCD display
- Commissioning and troubleshooting

41 014 Project alarm function KNX

Set of circuit components for the project Dimming, assembled on a grid panel, consisting of:

- Analogue telephone gateway analogue with web server
  - Power supply 12 V DC
- Distribution
  - small-scale distributor
- Detectors and sensors
  - Reed contacts for door and window monitoring
  - Infrared motion detector
  - Glass breakage sensor
  - Alarm distributor with sabotage monitoring
  - KNX detector group terminal KNX 12 V DC with 2 detector group inputs for several passive detectors
  - KNX LCD display for displaying alarm states and for parameterising values
  - Set of KNX system cables with branching and connecting cables
  - Set of wiring accessories

PROJECT: ALARM FUNCTIONS

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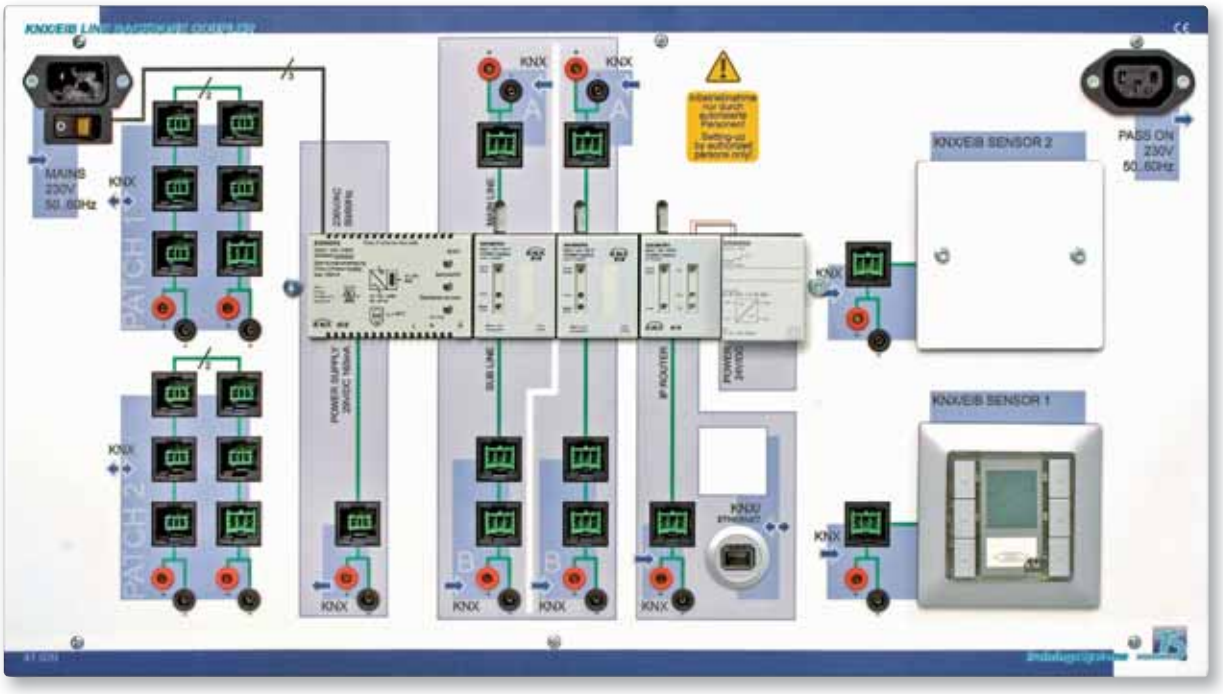
HARDWARE

KNX network coupler



41 020 KNX network coupler

LEARNING OBJECTIVES

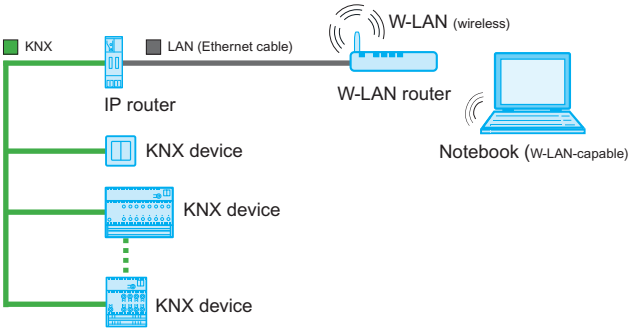
- Using line/area couplers
- Parameterising line/area couplers
- Using filter tables
- Evaluating routing counter contents
- Commissioning and troubleshooting
- Line/area coupling via IP
- Programming via IP

41 020 KNX network coupler

Set of circuit components for the project Dimming, assembled on a grid panel, consisting of:

- KNX Power supply
- 2 line/area couplers
- 1 IP router
- Power supply 24 V DC
- Push button sensor with LCD display and timer function
- Distribution panels for lines A and B
- Free mounting space for additional sensor

Commissioning via LAN / W-LAN



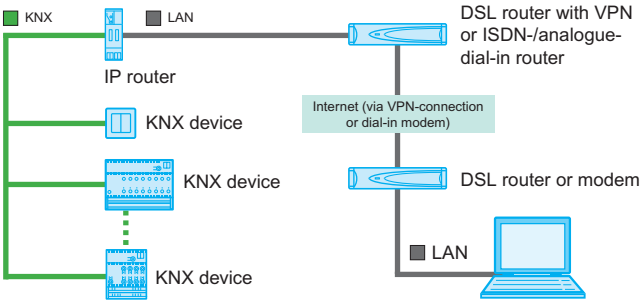
Procedure

Connect the IP router to the KNX bus. Use the Ethernet cable to connect the W-LAN router to the IP router. You can now go into the individual rooms with a notebook and the ETS software.

Advantages

- Wireless KNX commissioning via W-LAN
- Freedom of movement in the building
- Commissioning possible by only one person

Remote access over the Internet (DSL)



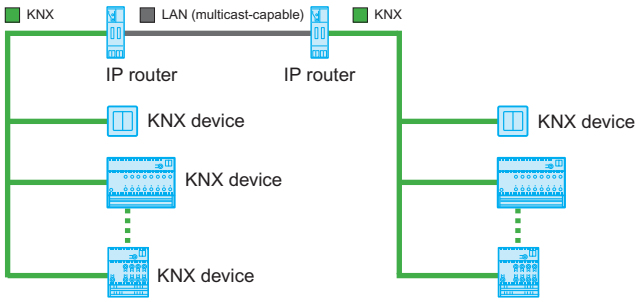
Procedure

1. Connect the IP router to the KNX bus
2. Connect the IP router to the LAN
3. Configure the VPN-DSL router or the dial-in router

Advantages

- Parameters can be quickly changed via remote access
- Cost reduction through remote access (physical approach not required)
- Guarantee of data security

Coupling lines over Ethernet (LAN)



Procedure

1. Connect the IP router to each KNX line (instead of a line coupler)
2. Connect IP router via multicast-capable LAN
3. Commission each IP router with the ETS3 or ETS4 software as you would do with a "conventional" line/area coupler

Advantages

- LAN as main and sub-area line
- Data transfer over longer paths possible
- Use of existing data networks and components (LAN)

FROM INSTALLATION TECHNOLOGY...

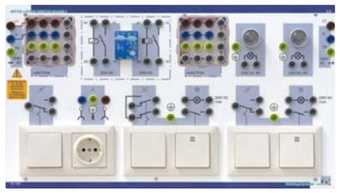
ELABO*TrainingsSysteme*

...TO BUILDING COMMUNICATION

NETWORKED BUILDING CONTROL

INSTALLATION TECHNOLOGY

Installation Switch Board I



Intercom Main System

Intercom Sub System

Set of house intercom and signalling systems consisting of:
1 outer station and 2 inner stations

AUDIOVISUAL TELECOMMUNICATION SYSTEMS

Video Outdoor Station

Video Power Supply Board

Video Indoor Station

Audio Indoor Station

HOME BUS

Door Phone

ISDN Board + KNX

TAE Connection Board

ISDN Fault Simulator

S_0-Bus Extension Board

ISDN

Weather station

LOGO!

Network analysis

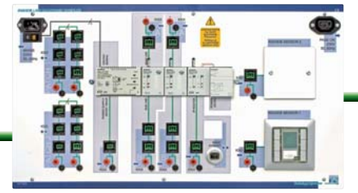
Telephone

ISDN tester

FAX machine

KNX

KNX network coupler



KNX Programming Board

Main line

Project: Dimming

Project: Alarm system

Project: Blinds

LIGHTING TECHNOLOGY / DALI

ALARM SYSTEMS / FIRE ALARM SYSTEMS
SAFETY BUS / ACCESS CONTROL

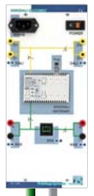
1st line

KNX Programming Board

Fluorescent Lamps Boards A and B

Detector Circuits Board

Gateway



Room Controller

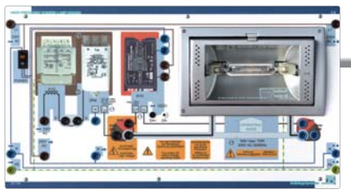
Energy Saving Lamps Board

Keypad Board

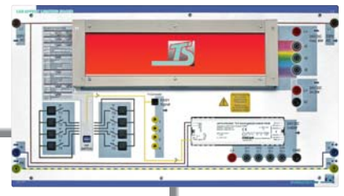
LAN Interface Board

Colour Touch Panel

High-Pressure Sodium Lamp Board



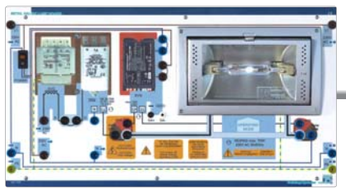
LED Effect Lighting Board



Interface Board

Fire Detector Board

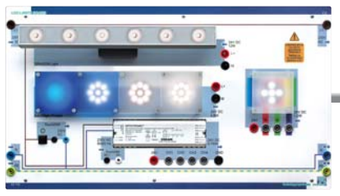
Metal Halide Lamp Board



Alarm Control Board

Technical Alarm Board

LED Lamps Board

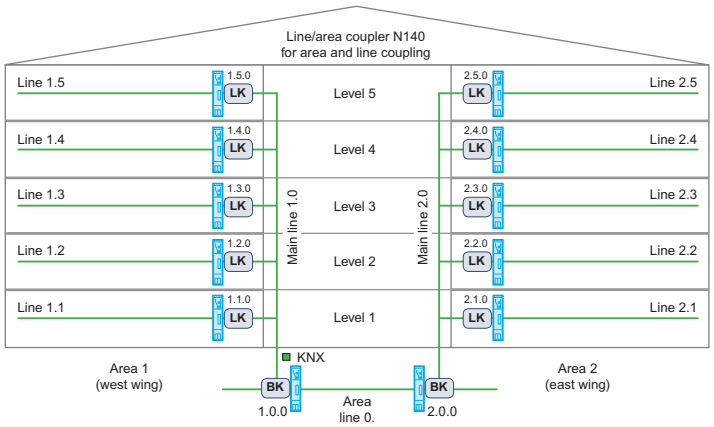


LED Control Board

Access control

Burglar Alarm Board

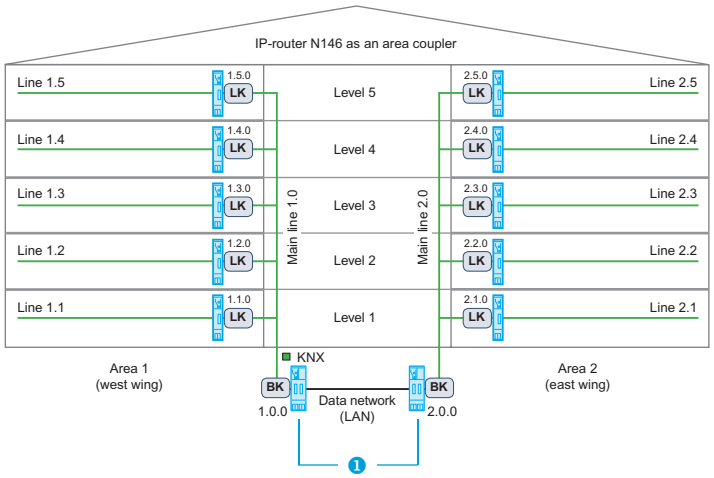
Classical topology



- In the classical topology, all the line and area couplers are traditionally configured as KNX couplers.

  This topology is proven and used extensively. The bus line lengths are mostly limited to one building.

Modern topology

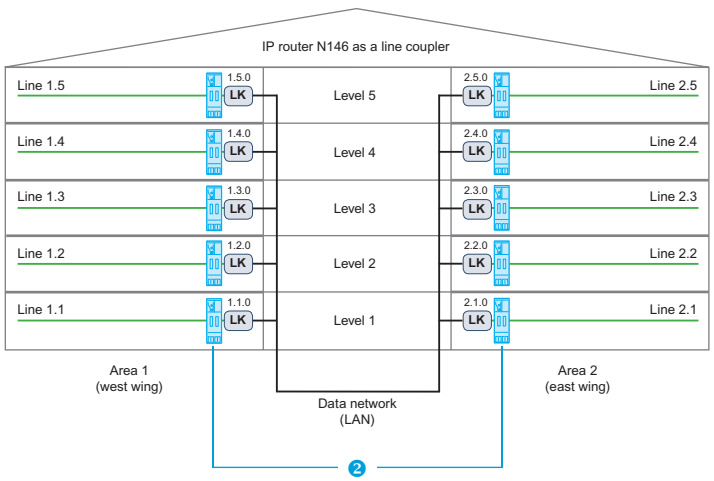


- In this modern topology, the area couplers are replaced by IP routers ❶.

  Owing to the use of standard network components, the connection of e.g. two parts of a building is not limited to bus line lengths.

  Even other media like fibre optic cables or W-LAN can be employed to couple to remote buildings and to exchange group address telegrams.

Innovative topology



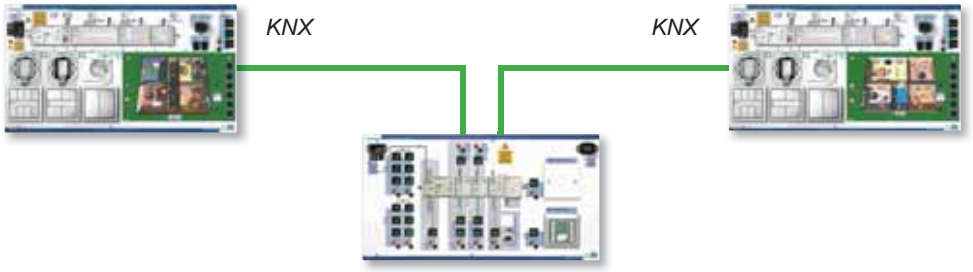
- In this innovative topology, all the line couplers are replaced by IP routers ❷.

  The use of area couplers is not necessary any more. This configuration allows connecting every individual floor via Ethernet (LAN) and using existing LAN networks.

  Moreover, through the correct configuration of the IP router, large projects can be commissioned more clearly and easily in the form of smaller individual projects.

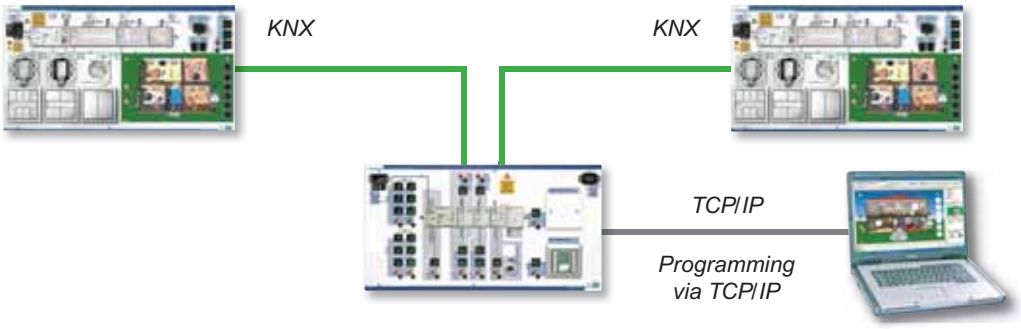
  An exchange of group address telegrams is possible despite the division into individual projects.

Line area coupling



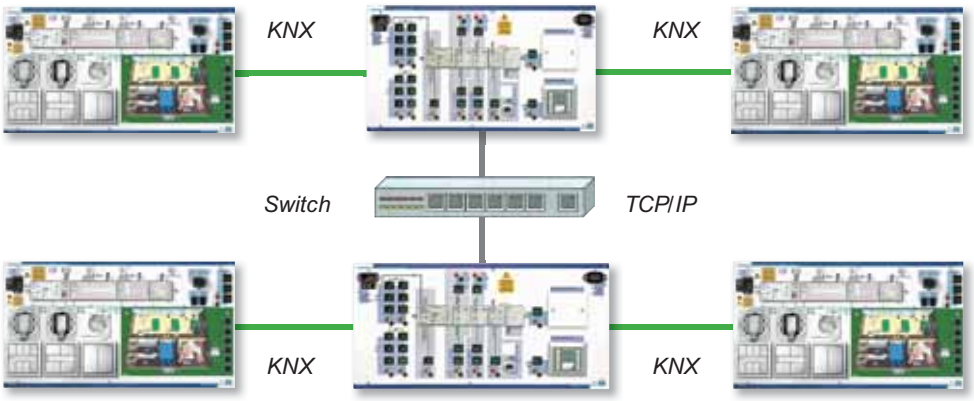
Use of the KNX line / area couplers

Commissioning via LAN



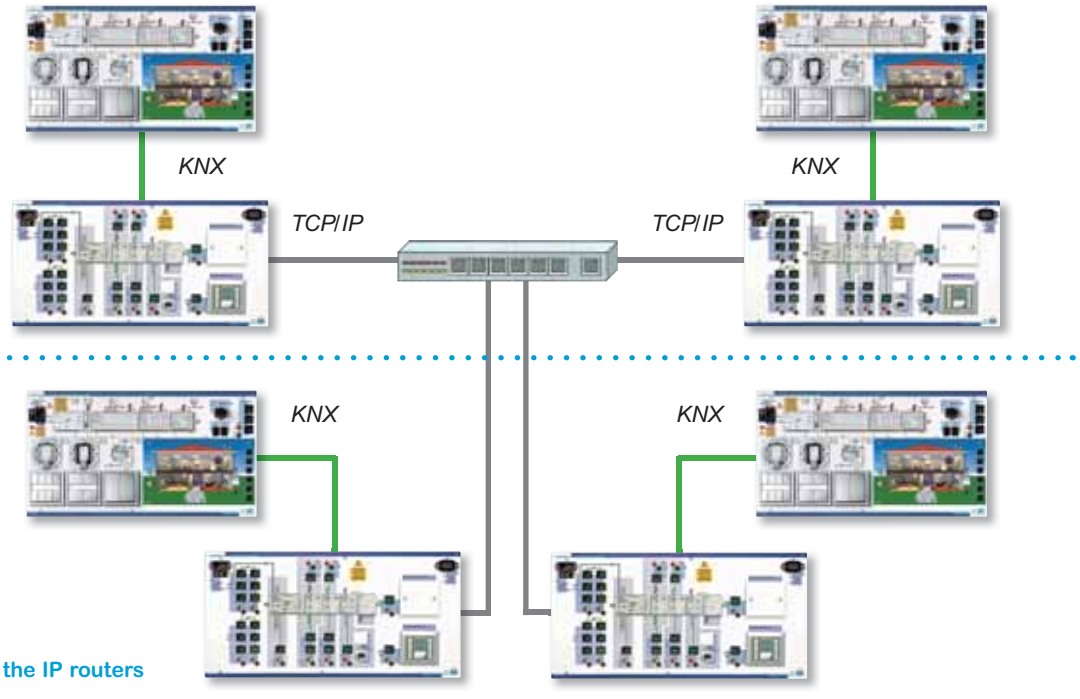
Use of the KNX line / area couplers and the IP router

Area line via TCP/IP



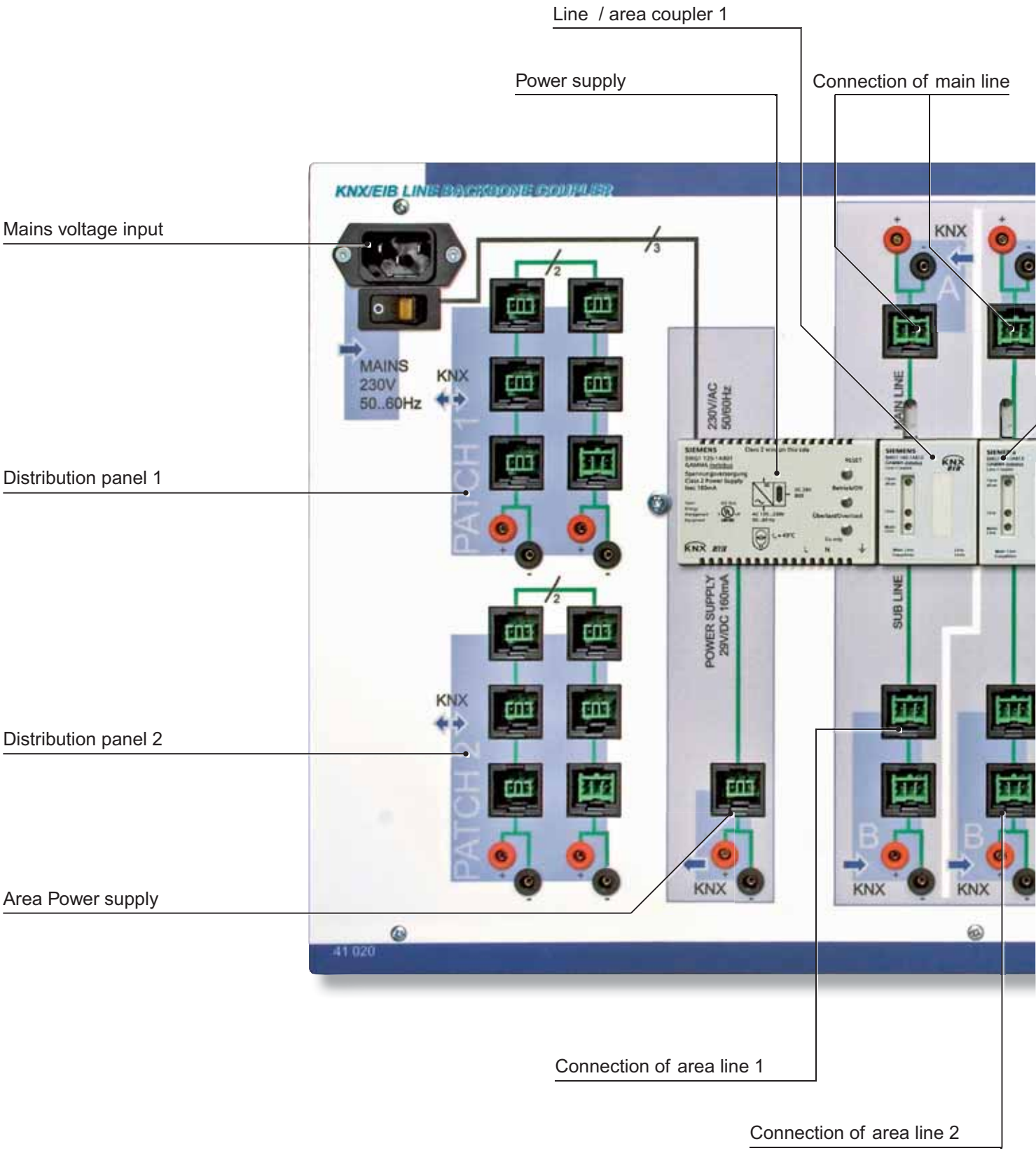
Use of the KNX line / area couplers and the IP router

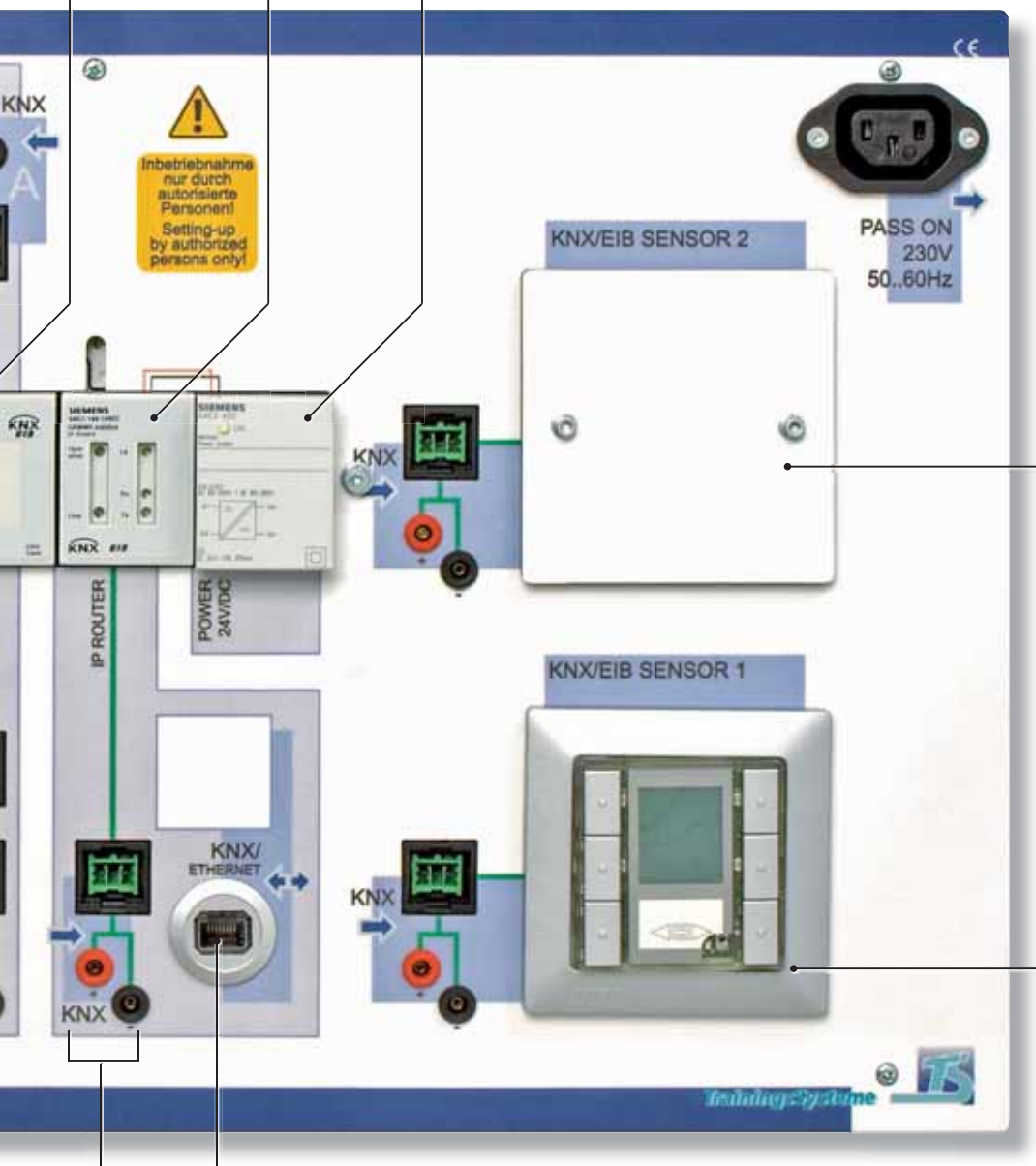
Line coupler via TCP/IP



Use of only the IP routers

KNX NETWORK COUPLER





Line / area coupler 2

IP router

Power supply for IP router

Distribution panel 1

Push button panel 3-X
with LCD display and
timer function

up to 40
weekly timer entries

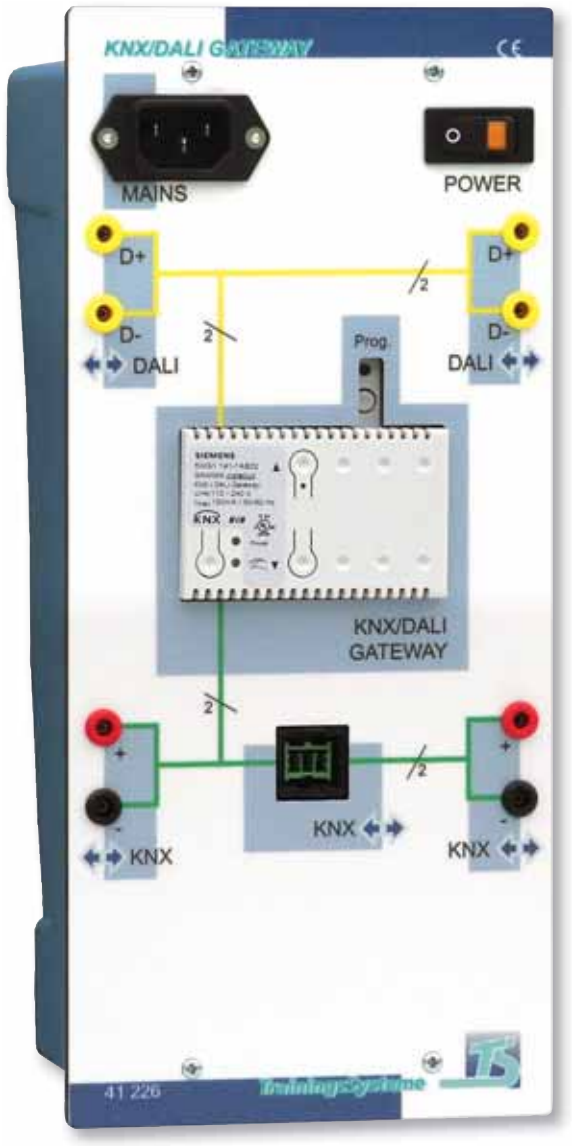
8 switching functions possible

Ethernet connection for IP router

Connection KNX line

HARDWARE

KNX Gateway



41 226 KNX Gateway

FUNCTIONS

- ✔ Time functions:
  - Timer mode
  - Night mode
  - Warning of impending OFF
- ✔ Dimming:
  - Brighter/darker
  - Brightness limitation
  - Adjustable dimming time
- ✔ Switching:
  - On/Off
  - On/Off via dimming
- ✔ Emergency lighting:
  - Control of self-contained luminaires
  - Support of obligatory test sequences
- ✔ Status:
  - short-circuit
  - power supply
  - Status outputs
  - Status groups
  - Status electronic ballast

Technical data

- interface for integrating of up to 64 devices
- bus voltage: approx. 19 V DC
- KNX-bus connection
- Mains voltage: 110 − 240 V AC, 50/60 Hz
- Connection of all inputs and outputs via safety sockets (2 mm)

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Innovation in lighting technology

Digital Addressable Lighting Interface

DALI was jointly created by the leading manufacturers of control units and electronic control gears as a non-proprietary standard to satisfy all the demands that are placed on a modern light management.

Approved by almost all luminaire and control equipment manufacturers, DALI has become the new standard in lighting industry. DALI was designed mainly for room lighting control.
Ease of use of the lighting systems and their components has always been in the focus. As an interface standard, DALI provides the means to configure complete light management systems for rooms such as DALI room controllers or KNX-DALI gateways.

FEATURES

- **Simple installation**
  DALI and power supply wires can be handled in a single, common cable. Any wiring topology can be used, such as line, star or mixed.
- **Stable dimming function**
  Precise dimming values are achieved from digital signals which are insensitive to interferences.
- **Flexibility**
  The assignment of the luminaires to the light groups and the operating buttons are defined after the installation, thus offering easy planning even after start-up.
- **Polarity of wiring irrelevant**
  Wiring errors can almost be excluded.

Innovation in lighting technology

The configuration of situation-dependent light settings requires lighting systems allowing to group luminaires and to save the light values of individual groups as light scenes.
There are further requirements for the integration of lighting systems in building management with centralized switch control and status reporting.

Benefit for installers

Changing the use of a room does not require rewiring as in 1…10 V systems. The complete lighting can be software-controlled over a single gateway.

DALI is bus-capable

Light switching and dimming is only one function of DALI. It can also be used to control colourful light scenes, fluorescent lamps or metal halide lamps.
DALI furthermore allows complex programming for setting up constant light control circuits.


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KNX weather station

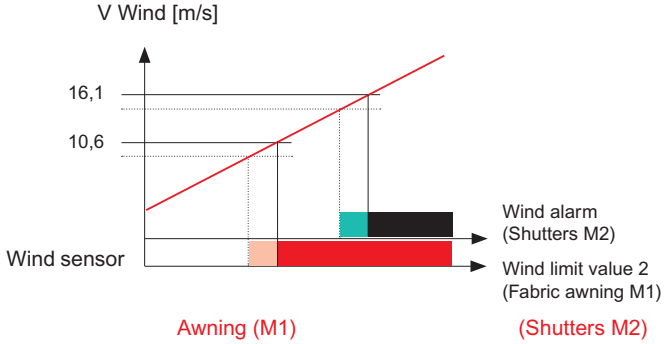
41 022 KNX weather station

LEARNING OBJECTIVES

- Recording and evaluation of weather data
- Temperature monitoring
- Evaluation of the brightness
  e.g. for constant light regulation
- Brightness-dependent lighting control
- Wind monitoring
  e.g. for controlling blinds
- Time recording via DCF 77
  and transmission to the bus
- Logical connection of signals
- Facade control of blinds or roller shutters
- Evaluation of rain alarms or precipitation

41 022 KNX weather station

- Power supply 12 V DC
- Rain simulation button
- Continuously variable wind simulation
- Weather station with
  - Rain sensor
  - Wind sensor
  - Temperature sensor
  - DCF 77 receiver
  - Light sensor
  - Facade control
  - Logic function/timer



Evaluation of the different sensors

Precipitation sensor with wind limit value for fabric awning

OR

Wind limit value 2

Actuator for awning

Precipitation sensor, digital

Value range: 0/1 — Address: 3/6/31

Building no: 31 — Name: Precipitation alarm

Wind sensor

Value range: 0 – 70 m/s — Address: 3/6/7

Building no: 7 — Name: Wind speed [m/s] 16 bit

Brightness sensor

Value range: 0 – 99 Lux — Address: 3/6/16

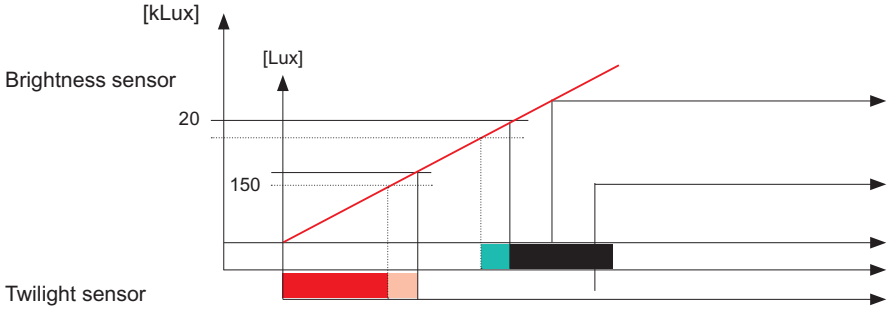
Building no: 16 — Name: Brightness [Lux] 16 bit

Temperature sensor

Value range: -40 – +80° C — Address: 3/6/33

Building no: 33 — Name: Outside temperature [°C/F] 16 bit

Definition of different limit values



20 — Address: 3/6/20

Object number — Sunshine

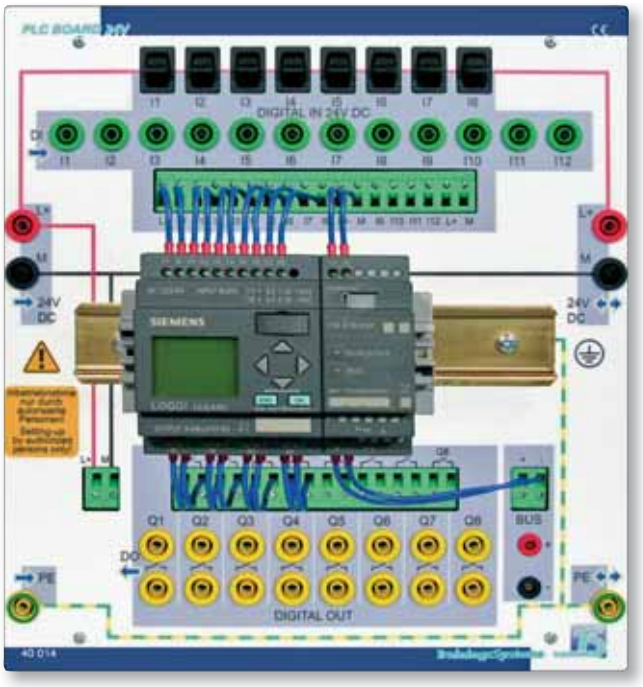
26 — Address: 3/6/26

Object number — Name: Darkness

Brightness limit value 1 (awning)

Twilight limit value 1 (blind)

PLC Board with LOGO! and KNX



40 016 LOGO! PLC Board 24 V with KNX Expansion Module 40 026

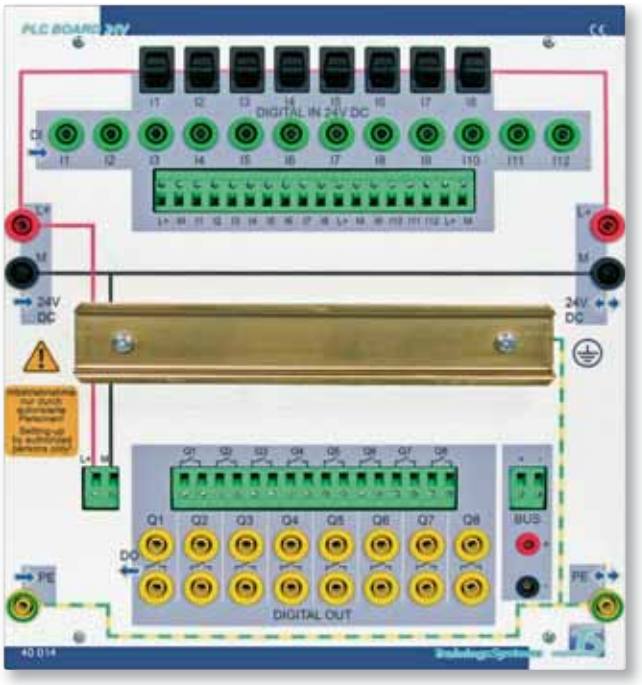
LEARNING OBJECTIVES

- Parameterising logic modules
- Fundamentals of digital technology
- Programming with the operating elements
- Programming with the PC

40 016 PLC Board 24 V

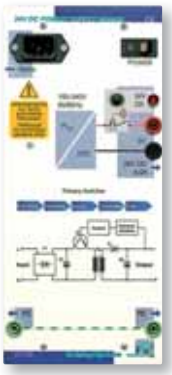
LOGO! 24RC:

- Integrated display panel with backlighting and operating panel with buttons
- Memory EPROM for switching program and internal set values
- 8 inputs (of which 4 are usable analogously): 0...10 V
- 4 relay outputs 10 A max. (– 10 A with resistive load – 3 A at inductive load)
- Short-circuit protection: via external fuse
- 8 integrated timers with summer/winter time switching
- Power reserve approx. 80 hours
- Modularly expandable
- Mounted on PLC Board 40 014



40 014 PLC Board 24 V

40 026 KNX Expansion Module



63 526 24 V DC Power Supply Board 2.5 A

E40 804 Industry user manual LOGO!

40 029 LOGO! USB interface cable

40 808 Software LOGO!Soft Comfort
Training and programming software

TECHNOLOGY MODEL

Blind

41 115 Technology model, Blind

Table model of a blind in a transport frame. Connection is achieved via a common blind or roll-down shutter actuator.
The following functions are possible with the technology model 'Blind':

- Blind movement
- Slat adjustment
- Positioning
- Safety function

Technical data

- Operating voltage 230 V AC
- Connection to blind socket
- Connecting cable approx. 1 m
- Dimensions: 800 x 640 x 120 mm (B x H x T)

Weather-dependent blind control

Blind

KNX weather station

KNX Professional Programming Board

91 801 Experiment case for mobile use

KNX Colour Touch Panel

Project-oriented training

Printed and digital!

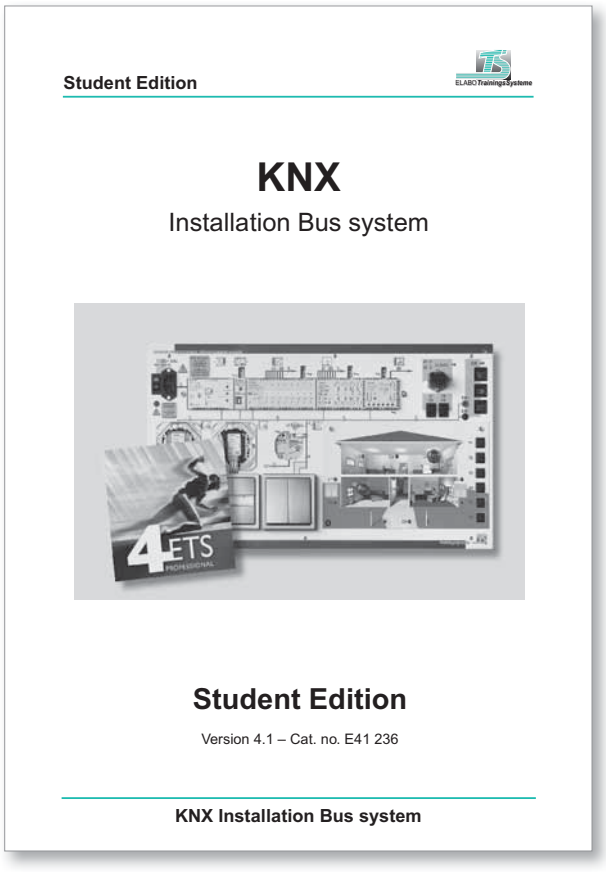
Manual contents

- Principles
- KNX Toolsoftware Version 4.x (ETS4.x)
- Tests for basic building functions

- Project 1: Breaker circuit, button switched line, dimming and blind function
- Project 2: Extension with a time function
- Project 3: Breaker circuits, dimming, blind control with central OFF, use of feedback objects
- Project 4: Control of building functions in a recreation centre; lighting control, blind control dimming, logical connectives and time function
- Project 5: Office building with safety function for the blind and logical connective OR

Practical experiments
Practical experiments for the trainee or the student equal to the trainer part, with tasks, but without solutions.

E41 235CD Manual, Trainer Part KNX

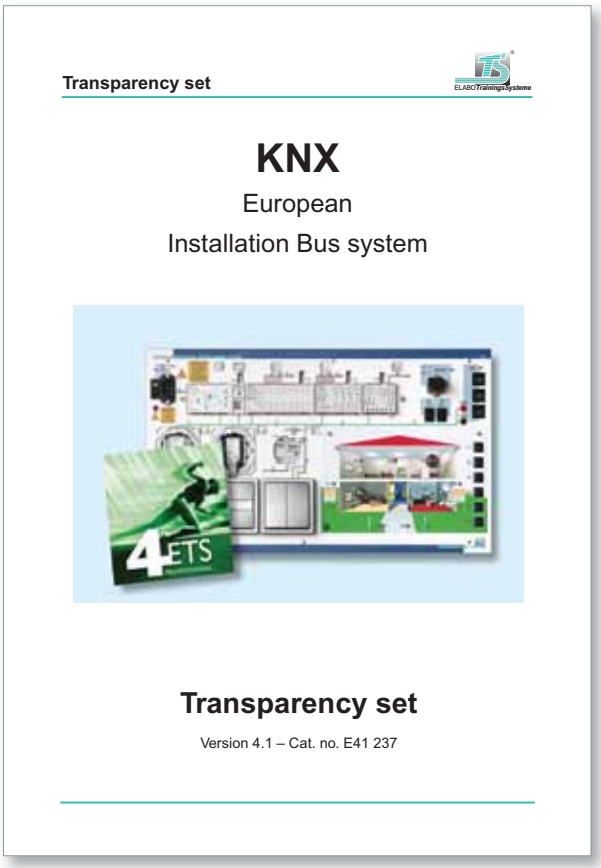


E41 236CD Manual, Practical Experiments KNX

Transparency set

- Principles
- Applications
- KNX Toolsoftware
- Example solutions
- Components

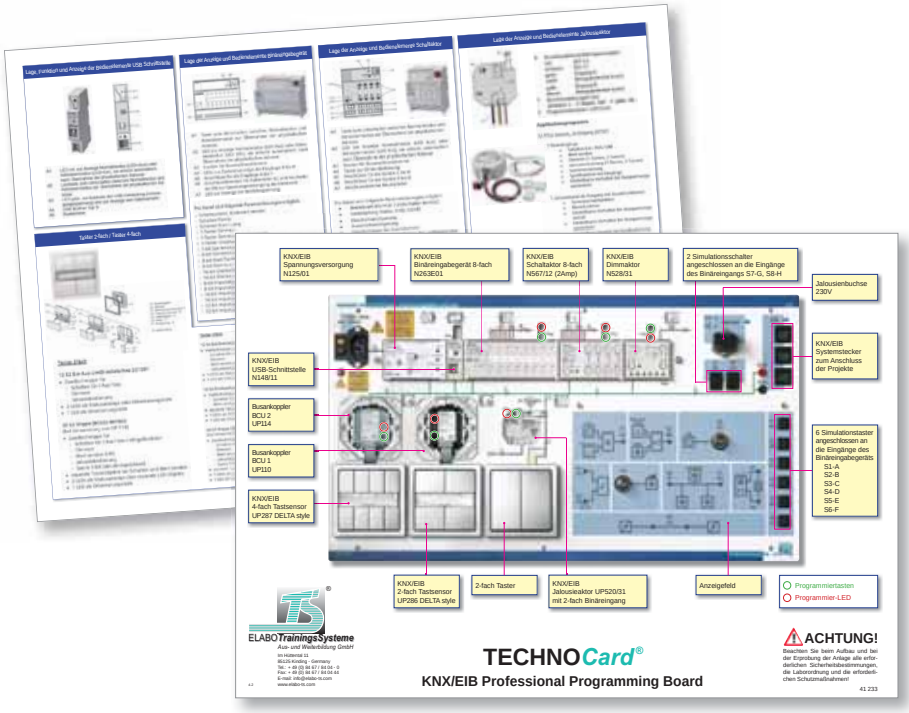
E41 237CD Set of transparencies KNX



Software

E41 210 KNX database collection

TECHNO*Card*



E41 233 KNX Professional Programming Board

INFORMATION AND CONSULTATION

CONSULTANCY

- Design of customer oriented solutions
- Presentation, product demonstration and on-site consultation
- Assistance in the choice of products complying with syllabuses
- Customized products according to requirements
- Development of room concepts
- Design of ergonomic workplaces
- Turnkey projects

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  - Universities / Universities of Applied Sciences

WE ASSIST YOU

- On-site installation and commissioning
- Technical support
- Warranty and maintenance
- Briefing and training
- Qualification, advanced training, workshops
- Comprehensive product documentation
- Detailed courseware for trainers and students


EnBW

YOUR INQUIRY

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Company / Institution / Government agency

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ZIP Code, City, Country

Telephone Fax

E-Mail

We would like to be contacted:

☐ by telephone ☐ by e-mail

☐ Please send us an offer:

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☐ 41 222	Application – administration building	7	
☐ 41 223	Application – recreation room	7	
☐ 41 224	Application – office building with outdoor area	7	
☐ 90 144	KNX-Programming environment ETS4 Lite	11	
☐ 90 145	KNX-Programming environment ETS4 Professional	11	
☐ 80 544	USB Programming Connection Line	11	
☐ 41 002	KNX Professional Connection Line	11	
☐ 45 000	Alarm Control Board	12	
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Copy and fax

Subject to technical modifications and further developments

07 / 2012

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