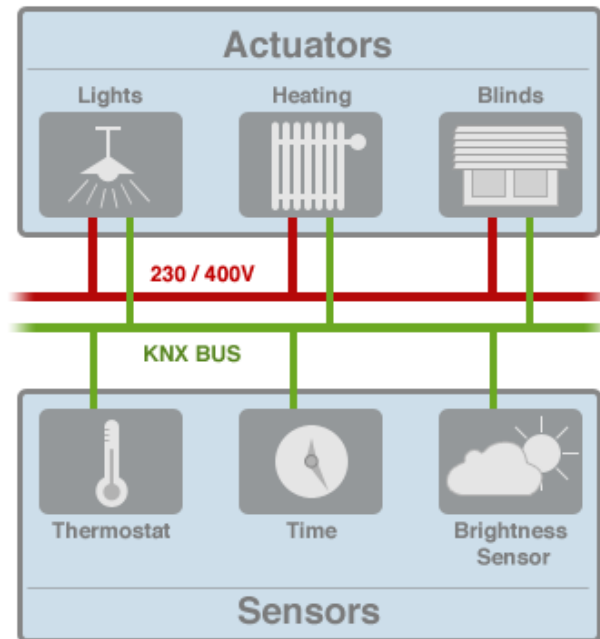# KNX city

Part 1: KNX Introduction

www.knx.org

The KNX fieldbus

- KNX is a standardized communication protocol for intelligent buildings

- Sensors, actuators and control systems (e.g. controllers) are connected via the KNX bus

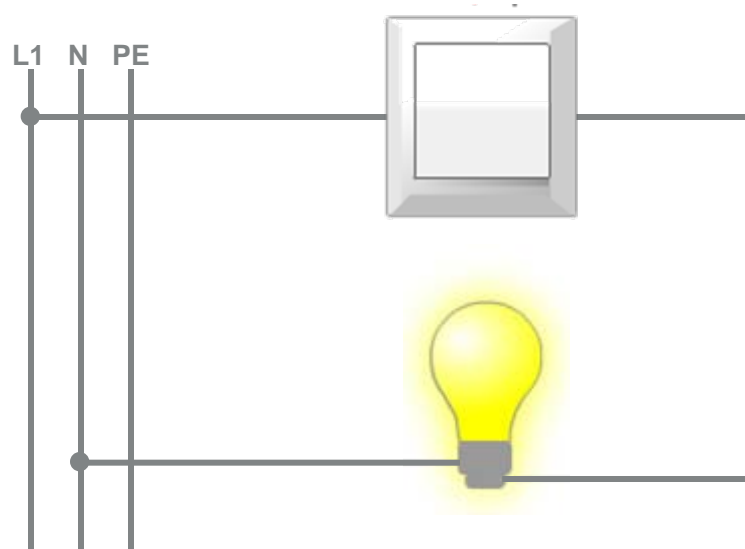
Power cables are only necessary for the actuators

For the KNX bus only a KNX power supply is needed

All KNX devices communicate by telegrams with each other

Functionality of a KNX fieldbus
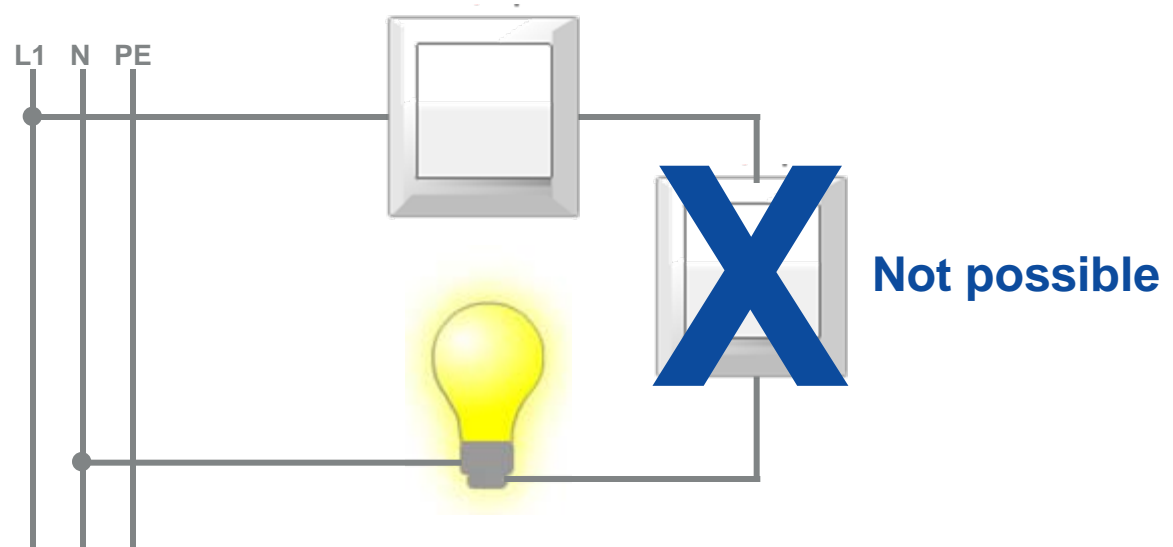
Example: Conventional light power circuit

➔ In a conventional light power circuit a switch closes the circuit and switches the light on

L1 N PE

Functionality of a KNX fieldbus

Example: Conventional light power circuit

➔ How to switch the same lamp in a circuit with two switches?

L1 N PE

X Not possible

➔ A light power circuit with two or three switches can be only implemented with special circuits

➔ For more than three switches relays must be used.
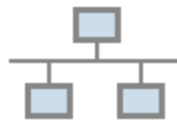
KNX transmission media
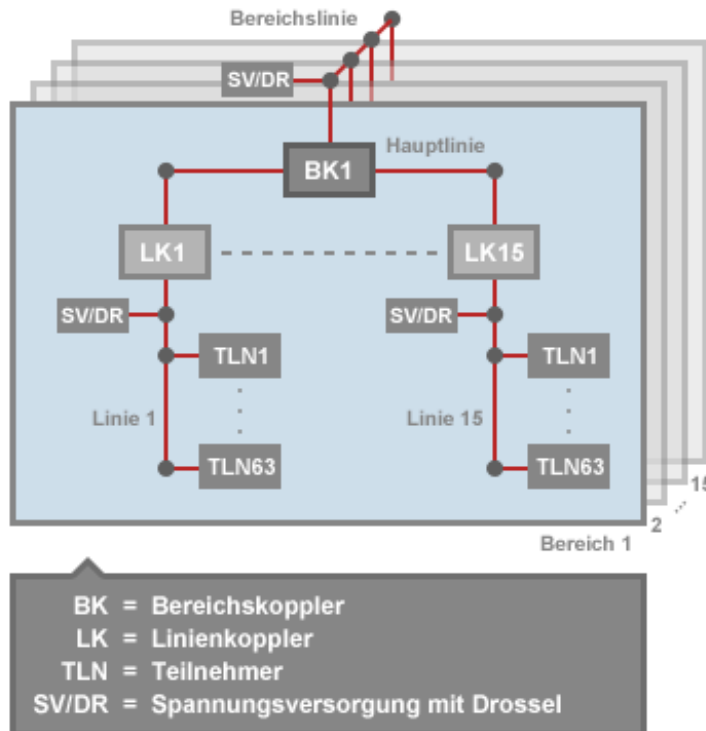
Twisted Pair (TP)

Powerline (PL)

Radio Frequency (RF)

Infrarot (IR)

Ethernet (IP)

KNX: The worldwide STANDARD for home & building control

KNX topology

- Up to 64 devices in a line
- Up to 15 lines in an area
- Up to 15 areas in a backbone

Bereichslinie

SV/DR

Hauptlinie

BK1

LK1 - - - - - - - - LK15

SV/DR   SV/DR

TLN1   TLN1

Linie 1   Linie 15

TLN63   TLN63

Bereich 1

BK = Bereichskoppler
LK = Linienkoppler
TLN = Teilnehmer
SV/DR = Spannungsversorgung mit Drossel

- Lines or areas may be coupled with TP or IP

- KNX participants need a unique address

- Each line requires a KNX power supply

KNX: The worldwide STANDARD for home & building control

Programming of KNX systems

- Applications and functions need to be programmed with the ETS

- The programming needs to be done only one time and will be saved in the KNX devices

- With the ETS, the "virtual" inputs and outputs of the devices, called communication objects linked by group addresses
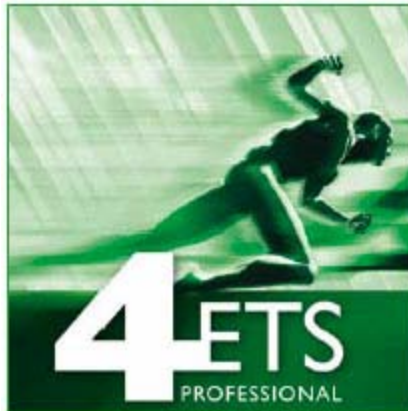
KNX: The worldwide STANDARD for home & building control

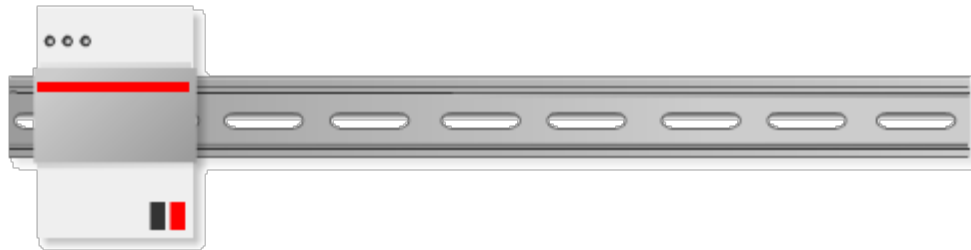➔ The most low voltage and KNX devices will be plugged on a DIN rail

Functionality of a KNX fieldbus
Example: Conventional light power circuit

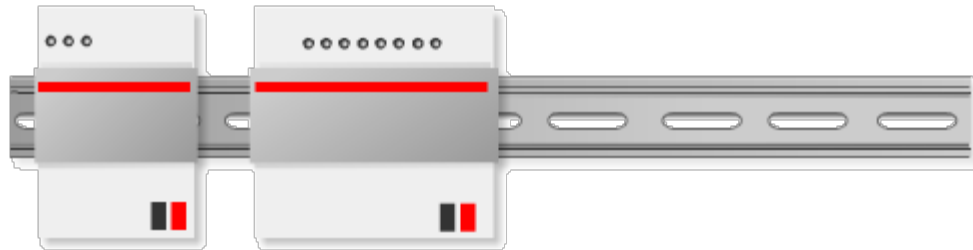➔ A KNX power supply builds the KNX fieldbus and offers the medium Twisted Pair (TP)

KNX: The worldwide STANDARD for home & building control

Example: Conventional light power circuit

➔ The switch itself is provided by a KNX switching actuator

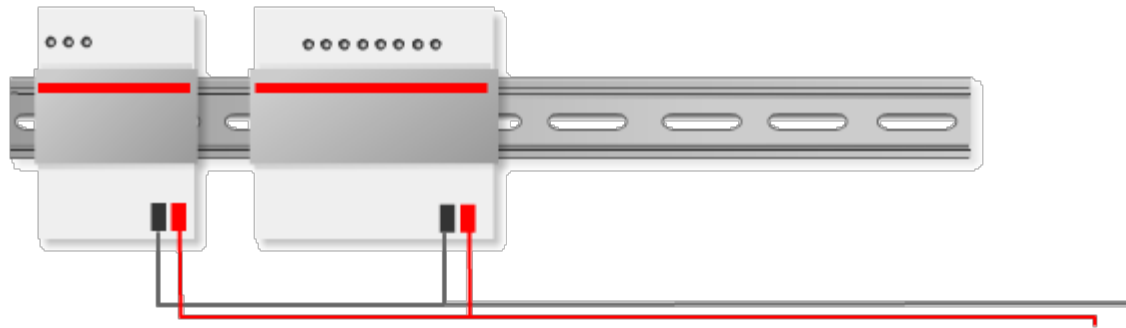**KNX: The worldwide STANDARD for home & building control**

Functionality of a KNX fieldbus
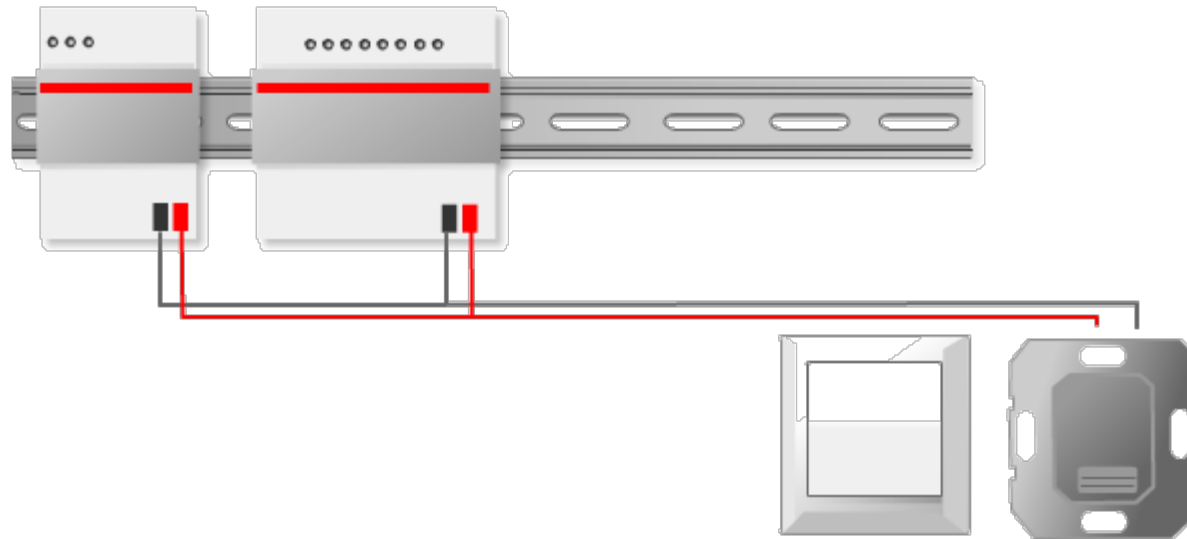## Example: Conventional light power circuit

➔ All KNX devices are connected to each other via the KNX TP cable

Functionality of a KNX fieldbus
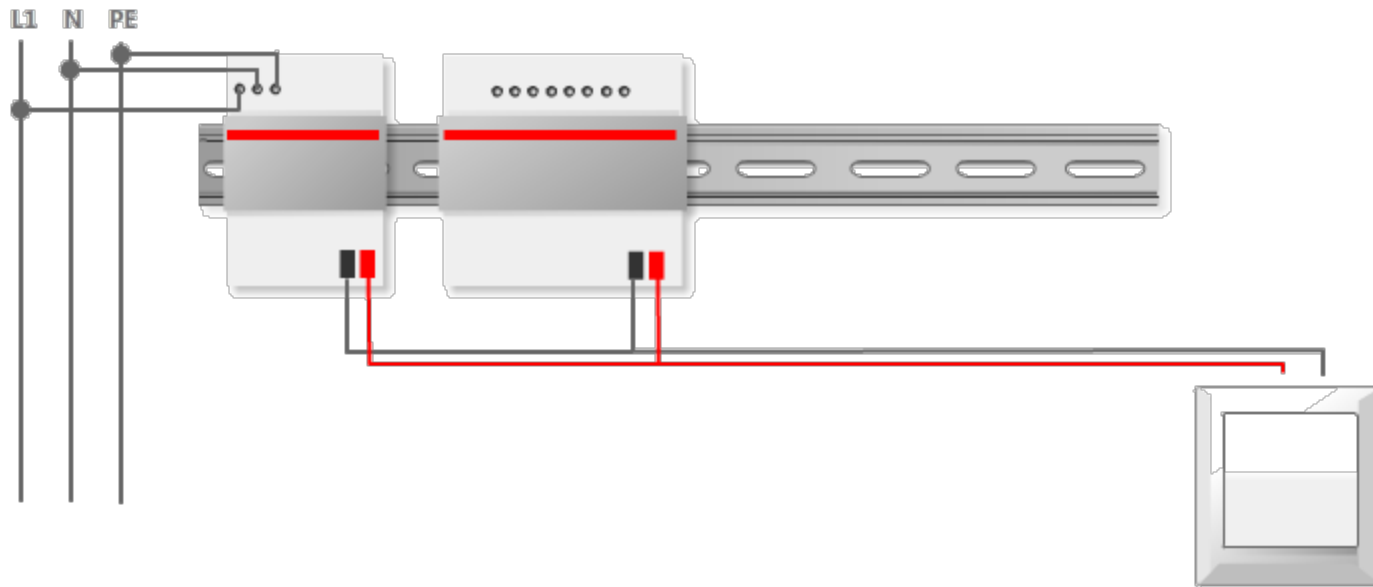
Example: Conventional light power circuit

➔ A switch including a KNX coupling unit serves as a sensor in order to switch on the light.

Functionality of a KNX fieldbus
Example: Conventional light power circuit

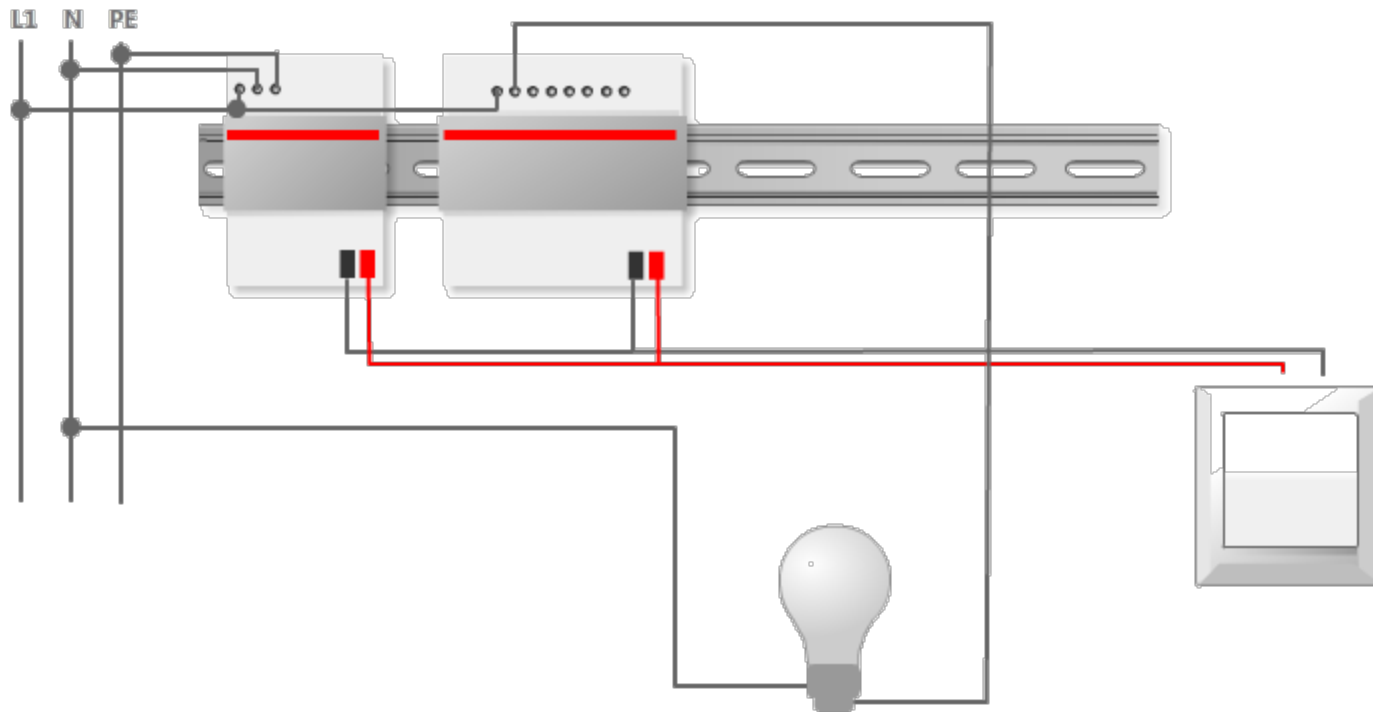➔ The KNX power supply has to be connected to the power

Functionality of a KNX fieldbus
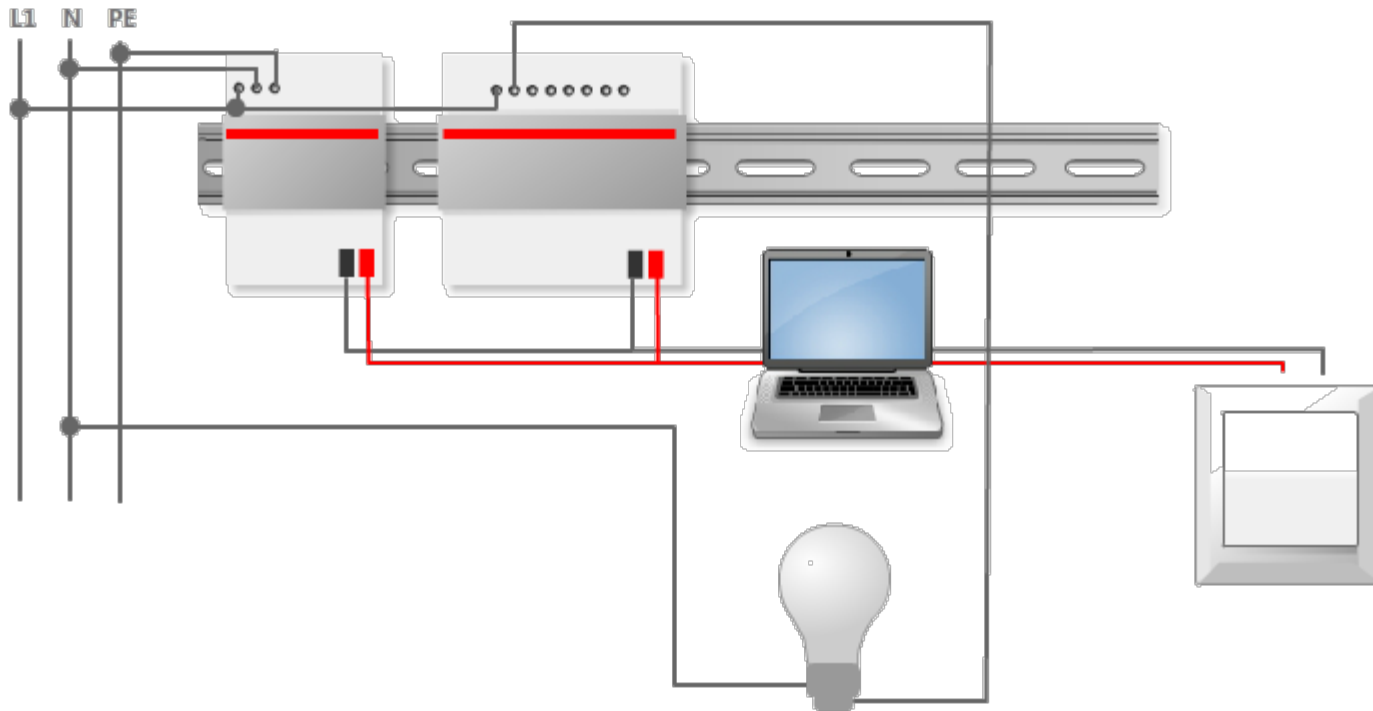## Example: Conventional light power circuit

➔ The light power circuit has to be wired with the switching actuator

Functionality of a KNX fieldbus
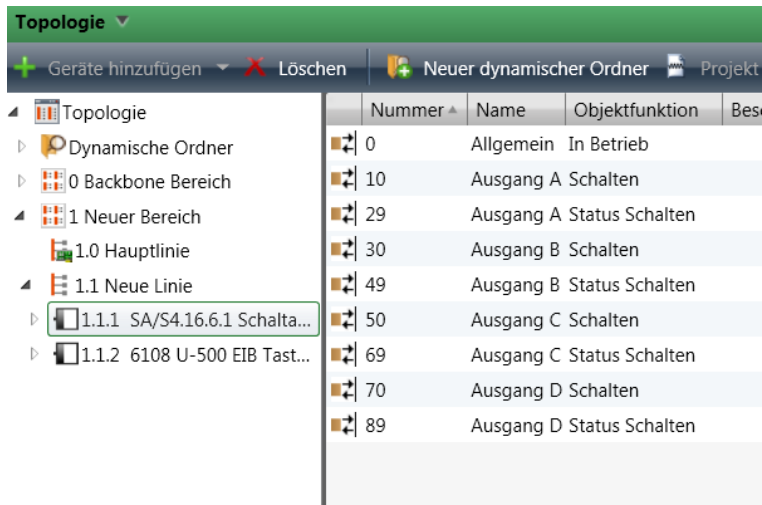## Example: Conventional light power circuit

➔ All KNX devices have to be programmed with the ETS

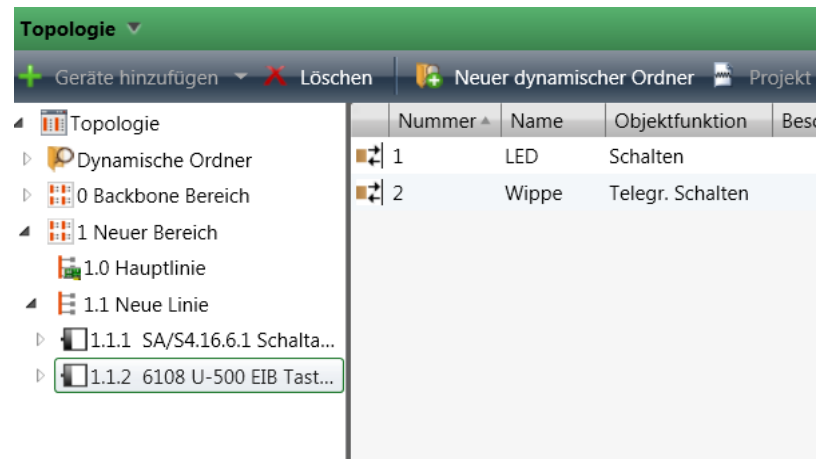**KNX: The worldwide STANDARD for home & building control**

Functionality of a KNX fieldbus
Example: Conventional light power circuit, programming

Group objects
KNX switching actuator

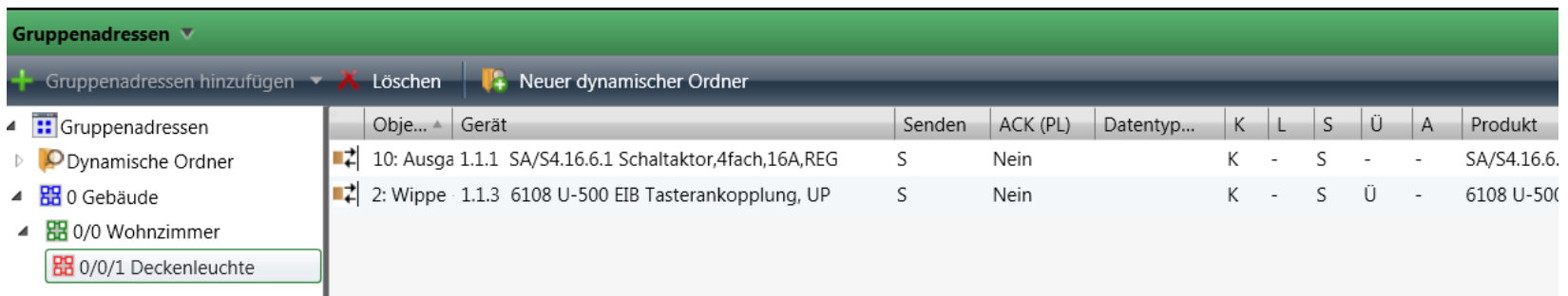| Nummer ▲	Name	Objektfunktion	Bes...
0	Allgemein	In Betrieb	
10	Ausgang A	Schalten	
29	Ausgang A	Status Schalten	
30	Ausgang B	Schalten	
49	Ausgang B	Status Schalten	
50	Ausgang C	Schalten	
69	Ausgang C	Status Schalten	
70	Ausgang D	Schalten	
89	Ausgang D	Status Schalten	

Topologie ▼

Geräte hinzufügen ▼   Löschen   Neuer dynamischer Ordner   Projekt

- ▲ Topologie
- ▷ Dynamische Ordner
- ▷ 0 Backbone Bereich
- ▲ 1 Neuer Bereich
  - 1.0 Hauptlinie
- ▲ 1.1 Neue Linie
  - ▷ 1.1.1 SA/S4.16.6.1 Schalta...
  - ▷ 1.1.2 6108 U-500 EIB Tast...

Group objects
KNX switch

Nummer ▲	Name	Objektfunktion	Bes...
1	LED	Schalten	
2	Wippe	Telegr. Schalten	

Topologie ▼

Geräte hinzufügen ▼   Löschen   Neuer dynamischer Ordner   Projekt

- ▲ Topologie
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  - ▷ 1.1.1 SA/S4.16.6.1 Schalta...
  - ▷ 1.1.2 6108 U-500 EIB Tast...

Linking of the group objects

Gruppenadressen ▼

Gruppenadressen hinzufügen ▼   Löschen   Neuer dynamischer Ordner

Obje... ▲	Gerät	Senden	ACK (PL)	Datentyp...	K	L	S	Ü	A	Produkt
10: Ausga	1.1.1 SA/S4.16.6.1 Schaltaktor,4fach,16A,REG	S	Nein		K	-	S	-	-	SA/S4.16.6.
2: Wippe	1.1.3 6108 U-500 EIB Tasterankopplung, UP	S	Nein		K	-	S	Ü	-	6108 U-500

- ▲ Gruppenadressen
- ▷ Dynamische Ordner
- ▲ 0 Gebäude
  - ▲ 0/0 Wohnzimmer
    - 0/0/1 Deckenleuchte

Functionality of a KNX fieldbus
Example: Conventional light power circuit

➔ By pushing the switch, a telegram is sent to the switching actuator, which switches the light on
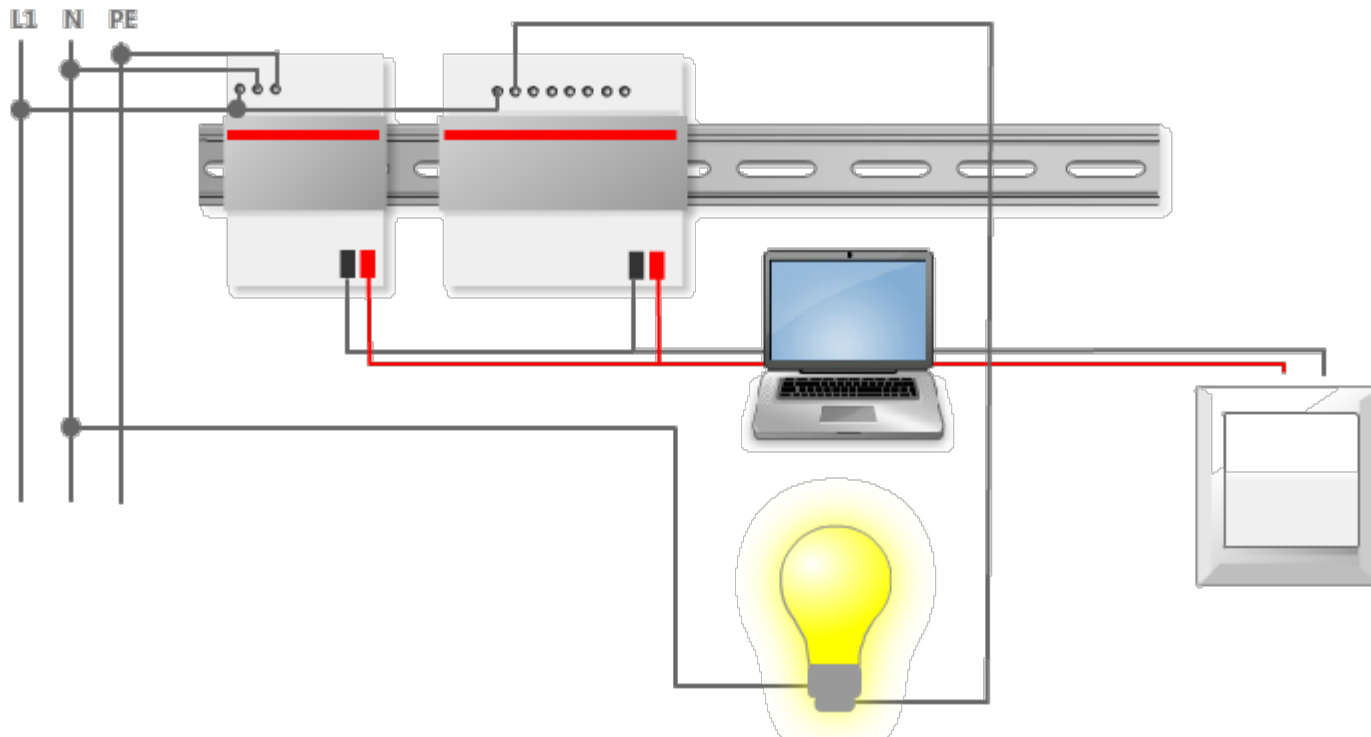
Advantages of a KNX fieldbus
Example: Conventional light power circuit

- Power circuits with many switches for the same lamp can be realized easily

  ➜ Simplification of the electrical installation

- A switching actuator can switch several power circuits and can control thereby different lamps. In dependence of the programming different light scenes can be realized

  ➜ More comfort for the user

- A KNX switch represents a sensor. The switching actuator can switch as well in dependence of any other KNX devices, e.g. such as a presence detector.

  ➜ More energy efficiency

Contact

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