



digitalSTROM planner manual

Author: digitalSTROM AG

Copyright © 2014 – digitalSTROM.com

All rights and technical changes reserved at all times.

A1121D003V009 / 20.10.2015

## Overview

### What is digitalSTROM?

digitalSTROM adds clear value to new and existing electrical installations. With digitalSTROM, electrical devices can be networked and controlled intelligently.

Comfort and security can be increased without incurring high costs.

Thanks to digitalSTROM, the end user is able to control both energy consumption and energy costs. digitalSTROM creates transparency and facilitates a more conscious use of energy.

It requires the installation of digitalSTROM Meters and an optional digitalSTROM Server in the distribution board (electrical installation). These components form, as it were, the collective brain of the digitalSTROM installation.

With its open interface, digitalSTROM offers the possibility of communicating with all electrical devices via the Internet. This enables end users to remotely control their devices via smartphone or computer and to monitor their energy consumption.

digitalSTROM provides a platform for service providers in various fields such as AAL (Assisted Ambient Living), energy management etc., which permits new kinds of services. digitalSTROM offers "the last mile", as it were, between the provider and the electrical devices.

## Connections

digitalSTROM can be connected to third-party systems via different network connections.

**LAN:** Systems that are connected via the same LAN network, such as digitalSTROM, can be detected and connected by the digitalSTROM Server, e.g. Multiroom sound systems such as Sonos® or the Philips Hue® colour lighting system.

**WLAN:** Systems that communicate with the digitalSTROM network via WLAN can also be detected and connected by digitalSTROM.

**Plan44-Bridge:** Systems and devices that communicate by radio via a Plan44-Bridge and are connected to digitalSTROM via LAN can be detected and connected by the digitalSTROM Server, e.g. room temperature sensor.

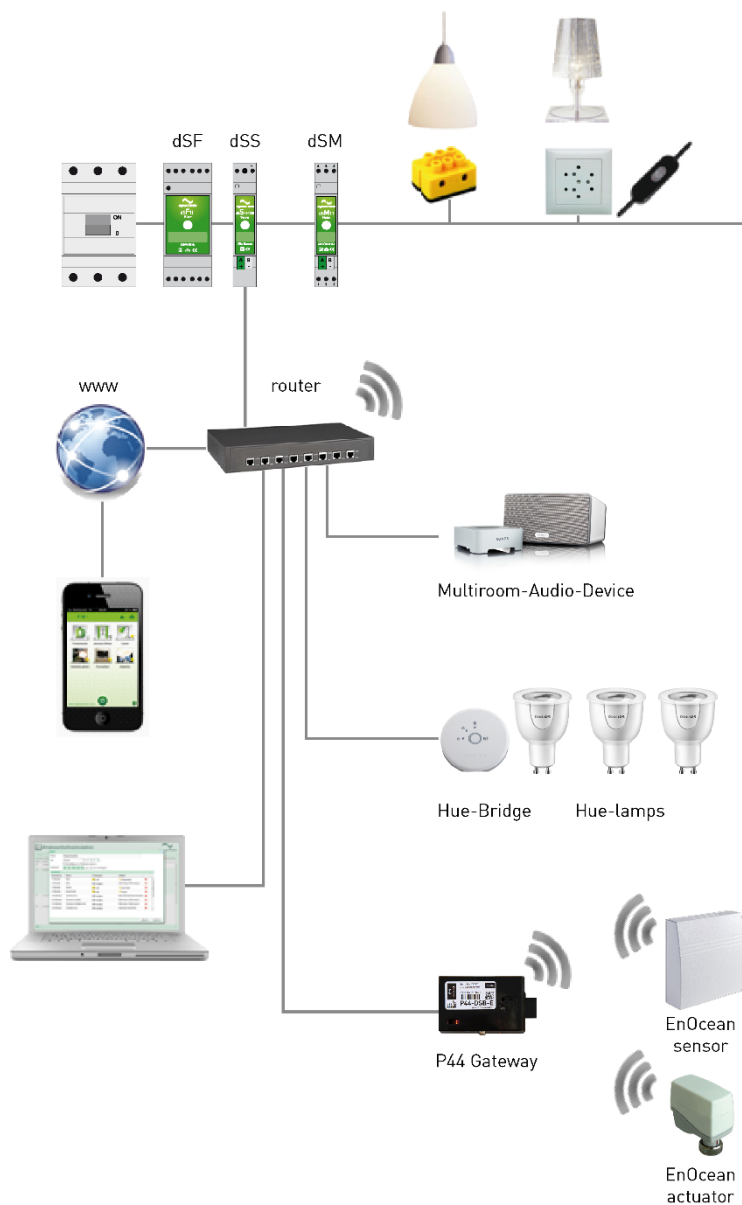


Abb. 1 *digitalSTROM Installation*

## Advantages of digitalSTROM for planners and electricians

Planning a digitalSTROM installation couldn't be simpler. Only phase (L) and zero (N) conductors are needed for wiring in the electrical boxes in the rooms. No jumper wires are needed. This means that for new buildings and properties undergoing complete renovation, the costs for planning and installing digitalSTROM are lower than for conventional bus systems.

Existing 230 V power lines are quite simply used by digitalSTROM in a new way and the extremely small size of the digitalSTROM components means they can be installed invisibly in the electrical boxes. The digitalSTROM components are simply installed in the existing push buttons, lights, shutters, etc. This makes retrofitting child's play with no mess, even in existing electrical installations. The existing light switches are replaced with standard push buttons and equipped with digitalSTROM push button terminal blocks.

digitalSTROM offers planners and electricians maximum flexibility. The function of the electrical installation can be adjusted at any time according to the customer's wishes, without the need to make changes to the wiring of the existing electrical installation.

Within the digitalSTROM installation it is of course possible to continue to use conventional light switches. If necessary, up to four wall push buttons can be equipped for digitalSTROM using a digitalSTROM push button block (1-way, 2-way or 4-way), e.g. for an existing switching point with several push buttons.

The push button functions of each push button can be programmed as desired and subsequently changed again. This makes flexible planning and installation of light switches, shutter push buttons, "Leave Home" push buttons etc. possible anywhere.

digitalSTROM is compatible with all conventional switch programmes and does not produce any electro smog. In addition, digitalSTROM installations are modular in design and can be extended by the addition of further digitalSTROM devices at any time.

## Table of Contents

<b>1</b>	<b>ABOUT THE DOCUMENT</b>	<b>8</b>
1.1	For whom is this document intended?	8
1.2	What requirements must be met for use?	8
1.3	digitalSTROM glossary	9
<b>2</b>	<b>DISTRIBUTION BOARD</b>	<b>12</b>
2.1	digitalSTROM Filter (dSF)	12
2.2	digitalSTROM Server (dSS)	15
2.3	digitalSTROM Meter (dSM)	17
2.4	Bus interconnection dS485	20
2.5	Plan44-Bridge	21
<b>3</b>	<b>PLANNING</b>	<b>22</b>
<b>3.1</b>	<b>Bases</b>	<b>22</b>
3.1.1	digitalSTROM colour scheme	23
3.1.2	digitalSTROM installation components	24
3.1.2.1	digitalSTROM terminal block (KM)	24
3.1.2.2	digitalSTROM relay terminal block (KL)	26
3.1.2.3	digitalSTROM Blind switch actuator (GR-HKL230)	27
3.1.2.4	digitalSTROM push button block (TKM)	27
3.1.2.5	digitalSTROM automation terminal block (AKM)	30
3.1.2.6	digitalSTROM GE-UMV200	31
3.1.2.7	digitalSTROM SW-UMR200	32
3.1.2.8	digitalSTROM indoor climate sensor (dS-iSens200)	33
3.1.3	digitalSTROM pluggable components	34
3.1.3.1	digitalSTROM line dimmer (SDM)	34
3.1.3.2	digitalSTROM line dimmer (SDS)	35
3.1.3.3	digitalSTROM inline adapter (ZWS)	36
3.1.4	Thermokon radio system components	37
3.1.4.1	Radio room temperature sensor	37
3.1.4.2	Radio actuator for room temperature control	38
3.1.5	Accessories	39
3.1.5.1	digitalSTROM DinClip200	39
<b>3.2</b>	<b>Room concept</b>	<b>40</b>
3.2.1	Factory settings and room configurations	41
3.2.2	Dividing a power circuit into different rooms	42
3.2.3	Merging devices from different power circuits in one room	43
3.2.4	Combination of rooms	44
3.2.5	Heating planning	45
<b>3.3</b>	<b>Conversions</b>	<b>46</b>
<b>3.4</b>	<b>New buildings</b>	<b>47</b>
<b>3.5</b>	<b>Connectable third-party systems</b>	<b>48</b>

<b>4</b>	<b>FREQUENTLY ASKED QUESTIONS .....</b>	<b>49</b>
<b>5</b>	<b>INDEX.....</b>	<b>50</b>

# 1 About the document

## 1.1 For whom is this document intended?

This document is intended for use by people who:

- plan digitalSTROM installations (electrical planners)
- install digitalSTROM components (electricians).

## 1.2 What requirements must be met for use?

It is assumed that the reader of this document has knowledge of digitalSTROM products.

Electricians must have the necessary technical knowledge and qualifications required for carrying out work on the electrical installations. The requirements are taught in the basic digitalSTROM training course and are described in the digitalSTROM planning handbook and digitalSTROM installation manual.

All local regulations must be strictly observed.



## 1.3 digitalSTROM glossary

Abbreviation	Term	Description
dSF	digitalSTROM filter	Conditions the 230 V grid for digitalSTROM communication.
dSS	digitalSTROM Server	Connects the digitalSTROM installation to a home network and to the Internet if required and extends the functionality of this system.
dSM	digitalSTROM Meter	One digitalSTROM Meter is required for each power circuit. It communicates with the digitalSTROM devices (e.g. digitalSTROM terminal blocks) via 230 V and measures the energy and performance in this power circuit.
dSFD	digitalSTROM device Filter	Makes it possible to filter any interference from non-digitalSTROM-ready consumers in such a way so that these devices can be used without interfering with digitalSTROM communication.
dSN	digitalSTROM power supply unit	24 V power supply for the digitalSTROM Server
dSID	digitalSTROM identification number	Unique identifier of the individual digitalSTROM components.
dS485	digitalSTROM 485 protocol	Interface between digitalSTROM Server and digitalSTROM Meter based on the RS-485 bus system

P44	Plan44- -Bridge	Interface to EnOcean sensors and actuators of third party manufacturers that are connected to the digitalSTROM system via wireless radio transmission, e.g. indoor climate controllers. Also see <a href="http://www.plan44.ch">www.plan44.ch</a> .
	EnOcean	Battery-free radio technology. In the digitalSTROM system the EnOcean radio protocol is used for actuators and temperature sensors. Also see <a href="http://www.enocean.com">www.enocean.com</a> .
	Ethernet	Technology that specifies the software and hardware for local data networks (LAN).

	Downstream communication	Communication from the digitalSTROM meters to the digitalSTROM components (e.g. digitalSTROM terminal block).
	Upstream communication	Communication from the digitalSTROM components (e.g. digitalSTROM terminal block) to the digitalSTROM meters.

	digitalSTROM devices	A device (lamp, push button, room thermostat, etc.) which is connected to the 230 V mains, and which can be controlled via digitalSTROM
--	----------------------	---

dS-KM	digitalSTROM terminal block	Terminal block with an integrated digitalSTROM chip. Used for switching/dimming.
dS-KL	digitalSTROM relay terminal block	Serves as a relay actuator..
dS-TKM	digitalSTROM push button block	Used to connect a standard wall push-button as a control point with 1-way, 2-way or 4-way operation.
dS-SDM	digitalSTROM line dimmer	Used for switching/dimming.
dS-SDS	digitalSTROM line dimmer	Used for switching/dimming.
dS-AKM	digitalSTROM automation terminal block	Used for monitoring up to four sensor signals (e.g. wind) on the basis of which other digitalSTROM devices can be controlled.
dS-SW-UMR	digitalSTROM relay universal module	Is used for the potential-free recording of mains and low voltage signals (e.g: doorbell systems), as well as for the switching of end consumers.
dS-GE-UMV	digitalSTROM 1-10V relay universal module	Is used to activate electrical ballasts of LED- and fluorescent lamps with analogue dim input (1-10 V or 0-10 V).
dS-GR-HKL230	digitalSTROM blind switch actuator with Hirschmann plug	Used for connecting lamella blind drives with an adjustable slat angle.
dS-ZWS	digitalSTROM inline adapter	Used as a mobile relay switching contact.
	dS-DinClip230	Enables the installation of the following digitalSTROM components on the top hat rail in the electrical power distribution board : dS-KL, dS-KM, dS-TKM, dS-AKM, dS-UMV200, dS-UMR200

	digitalSTROM Configurator	Software on the digitalSTROM Server for configuring a digitalSTROM installation. It is accessed via a web browser.
	digitalSTROM Server App	Within digitalSTROM, additional functions are referred to as <b>"Apps"</b> ( e.g. Timer, Event Responder, Presence Simulation, Energy Graph etc.).
	digitalSTROM App	This App (iOS/Android/Windows) can access the digitalSTROM installation.
	Room	Is a largely self-contained functional area. If push-buttons are pressed or presets activated within a room, this will affect the devices/actuators belonging to the room.
	Preset	Presets can be configured for one application area each, e.g. lighting preset, shading preset. The "read" preset, for example, dims the reading lamp and switches the ceiling lamp off
	Higher-level	Higher-level activities have general priority.

	Activities	The higher-level activity « <b>Leaving home</b> » then switches all consumers off.
	Power circuit	All energy consumers or socket outlets protected by the same overcurrent protection device (fuse).
	Blinds (Slat blinds)	Used as screens or as weather and sometimes as burglar protection. In addition to their position, you can also control the angle of the blades. In the factory settings of the grey digitalSTROM relay terminal block (shade) the blinds are shut in the Off preset.
	Awning	Shading systems made of fabric. During bad weather or absence they are usually retracted. In the factory settings of the grey digitalSTROM relay terminal block (shade) the awnings are shut in the Off preset.
	Shutters	Used as screens or as weather and sometimes as burglar protection. In the factory settings of the grey digitalSTROM relay terminal block (shade) the shutters are shut in the Off preset.

AHB	digitalSTROM user manual	Contains information (introduction, operation and configuration) for the digitalSTROM users.
PHB	digitalSTROM planning handbook	Contains information for planners of the digitalSTROM electrical installation.
IHB	digitalSTROM installation manual	Contains information for electricians of the digitalSTROM electrical installation.

HP	Horizontal Pitch	Unit according to DIN 43880. 1HP corresponds to 17.5 mm.
lx	Lux	SI unit for the lighting intensity.

## 2 distribution board

### The components of the digitalSTROM system

digitalSTROM can do more - electrical devices can be connected and easily orchestrated through the existing power lines in your home. This retrofit-friendly invention makes energy management, creating a homely ambiance and security child's play.

To enable the existing power lines of the electrical power circuits to be used for communication between the digitalSTROM Devices, different digitalSTROM components have to be installed in the distribution board.

This chapter describes the requirements to be observed for planning and the installation instructions for the installation of these components in the distribution board.

### 2.1 digitalSTROM Filter (dSF)

The installation of digitalSTROM Filters in the distribution board serves to condition the electrical grid to enable optimum communication between the components.

A maximum of three digitalSTROM Filters (dSF) are required per distribution board.

The whole length of the conductor of the connecting cables to the digitalSTROM Filter (loop L-N) should not exceed 2 m.

If not all the outer conductors are equipped with a digitalSTROM Meter, it is only necessary to provide a digitalSTROM Filter for the outer conductors, which are connected to a digitalSTROM Meter.

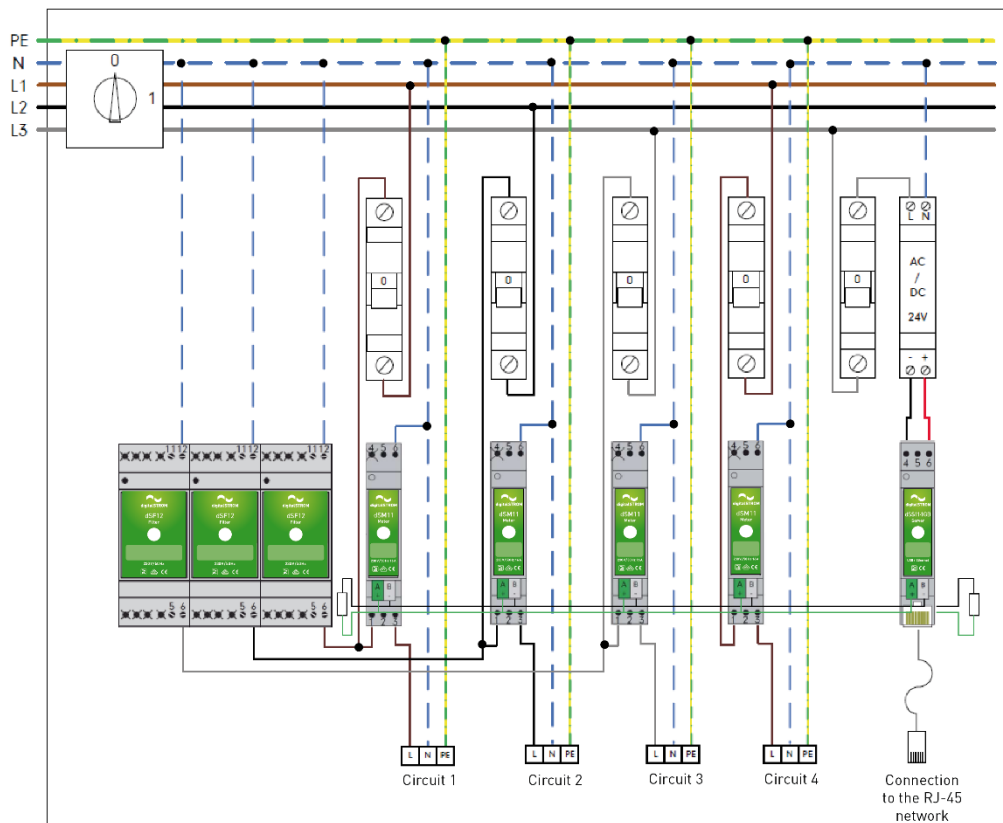


Abb. 2 Overview distribution board

### Input-side connection of the digitalSTROM Filter

It is absolutely necessary that the digitalSTROM Filter is connected on the input side of the digitalSTROM Meter (Fig. 3).

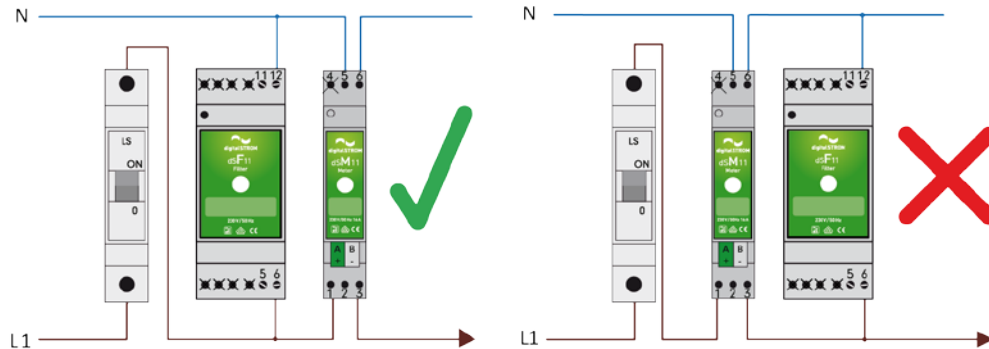


Abb. 3 Input-side connection of the digitalSTROM Filter

### Operation on a three-phase system

The digitalSTROM Filters can also be connected to an existing three-phase system, which also supplies other consumers.

However, this kind of connection is only suitable for the operation of a digitalSTROM system when the power supply is continuously available, i.e. when the power supply does not have to be temporarily interrupted, e.g. in order to switch other connected consumers on and off.

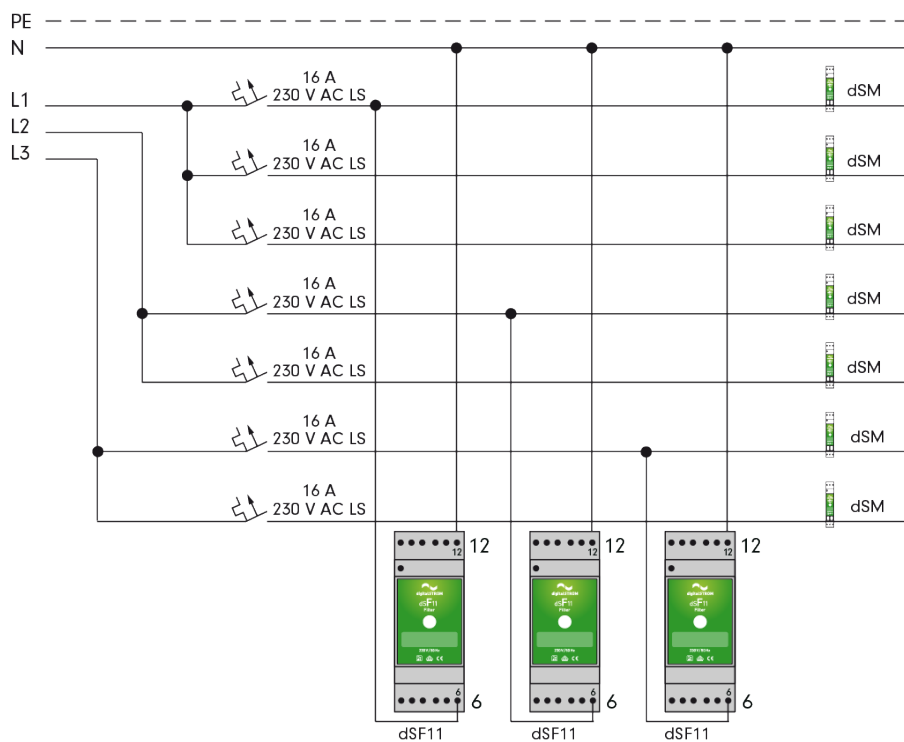


Abb. 4 Connection to a three-phase system

## Installation in a sub-distribution unit

To enable the use of the digitalSTROM system in a building with several sub-distribution units, (e.g. in a single-family residential building), digitalSTROM Filters need to be installed in all sub-distribution units.

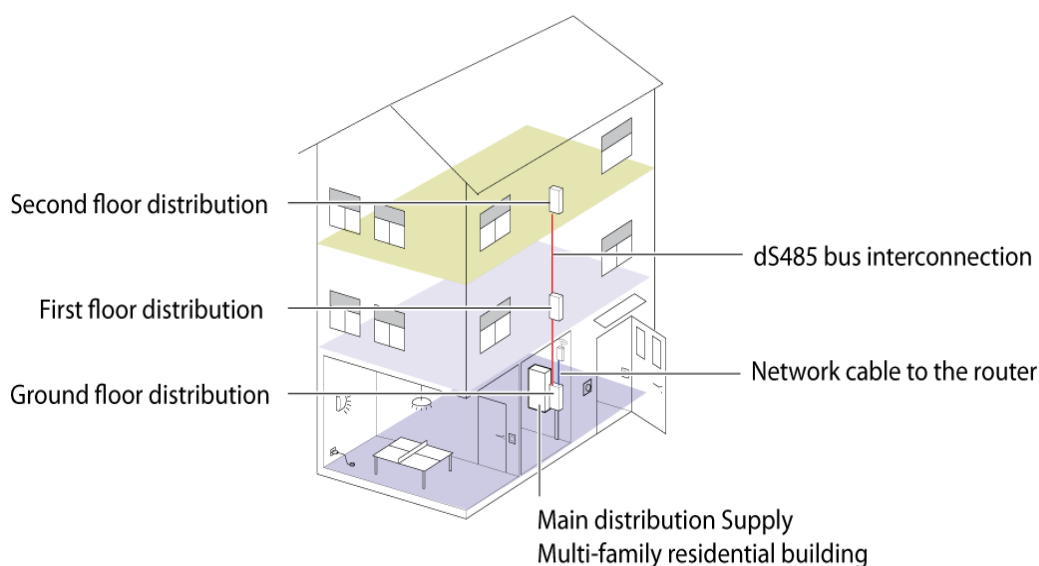


Abb. 5 *Example of a sub-distribution unit installation in a single-family residential building*

Distribution	Components	Comment
Second floor distribution	3 digitalSTROM Filters (dSF) 6 digitalSTROM Meters (dSM) dS485 bus interconnection	The six digitalSTROM meters are equally distributed to L1/L2/L3. This is why three digitalSTROM Filters are also required. Bus terminating resistors are mandatory.
First floor distribution	2 digitalSTROM Filters (dSF) 2 digitalSTROM Meters (dSM) dS485 bus interconnection to the 2nd	Since only two digitalSTROM meters are used (L1/L3), only two digitalSTROM filters (L1/L2) are necessary.
Ground floor distribution	1 digitalSTROM Server (dSS) 3 digitalSTROM Filters (dSF) 8 digitalSTROM Meters (dSM) dS485 bus interconnection to the 1st	Connecting the digitalSTROM Server to the network line (LAN) to the router. The The digitalSTROM meters are equally distributed to L1/L2/L3. This is why three digitalSTROM Filters are also required. Bus terminating resistors are mandatory.
Main distribution Supply Single family residential building	-	No installation of digitalSTROM components is necessary.

## 2.2 digitalSTROM Server (dSS)

The digitalSTROM Server is optional for operating the digitalSTROM system but is recommended for ease of use.

The installation of a digitalSTROM Server enables connection to the Internet or a local network. LAN network cables must be provided in the distribution board for this purpose. The connection can also be realised if necessary by means of power line connectors (PLC).

With the digitalSTROM Server, installed devices and additional functions can be easily managed and configured via the web-based digitalSTROM Configurator. The web-based digitalSTROM Configurator can be easily opened in a web browser on any computer, without requiring additional software to be installed.

To enable the digitalSTROM installation to be operated via the digitalSTROM App on a smartphone, the digitalSTROM Server must be permanently connected to a wireless network or to the my.digitalSTROM Account via the Internet. This makes access possible via smartphone also from outside the building.

In the web-based digitalSTROM Configurator it is also possible to install digitalSTROM Server Apps to enable, for example, the use of timer functions or for analysing the energy consumption in the individual power circuits.

Thanks to the connection to the Internet, the digitalSTROM Server can access available firmware updates for digitalSTROM Server and digitalSTROM Meter and install them automatically after user confirmation.

The digitalSTROM Server comes in two different designs: dSS11-1GB and dSS11E. digitalSTROM recommends the dSS11-E for digitalSTROM large-scale installations, on which more than 100 digitalSTROM terminal blocks are connected.

Please note that only one digitalSTROM Server (dSS11-1GB or dSS11-E) may be connected to the dS485 bus connection.

### dSS11-1GB

The dSS11-1GB is installed on the top hat rail in the electrical power distribution board and is connected to all digitalSTROM Meters via the dS485 bus.

Technical details:

- The dSS11-1GB has a housing width of 1 HP.
- The dSS11-1GB is powered by an external 24 V DC power supply. The power supply needs an output power of 10 W (including a supply for two USB devices on the digitalSTROM Server, 0.5 A/5 V per port).

## dSS11-E

The dSS11-E can be connected to the digitalSTROM system in two different ways:

- Variant 1:  
The dSS11-E is installed in the Multimedia distribution board and is connected to all digitalSTROM Meters via the dS485 bus.
- Variant 2:  
If you want to extend an existing digitalSTROM electrical installation with the dSS11-E and a dSS11-1GB is already installed in the electrical power distribution board, proceed as follows.
  - Install the dSS11-E according to the installation instructions. We recommend installing the dSS11-E in the multimedia distribution board.
  - Connect the dSS11-E to the network using an Ethernet cable via the router or with a switch.

Configure the dSS11-E as an additional digitalSTROM Server. You can adjust this in the digitalSTROM Configurator of the dSS11-1GB (<https://dss.local>). For this purpose use the extended view to call up the system settings menu in the system tab. Under the Use Additional digitalSTROM Server menu item you can configure the dSS11-1GB as a gateway. The dSS11-E is now the higher-level digitalSTROM Server.

Please note: If the dSS11-E (<https://dss.local>) is used as an additional digitalSTROM Server, the dSS11-1GB software switches off and in the digitalSTROM Configurator only the tab system and help will still be active. Please only use the digitalSTROM Configurator of the dSS11-E (<https://dsse.local>) from now on.

---



If your router does not support the automatic detection of network services in IP networks (Bonjour), you can access the digitalSTROM Server simply via the IP address.

---

Technical details:

- The dimensions of the dSS11-E are 175 mm (width), 104 mm (length) and 33 mm (height).
- The dSS11-E is provided with an appropriate 12 V power supply plug.
- The dSS11-E is not suitable for installing in the electrical power distribution board.



## 2.3 digitalSTROM Meter (dSM)

### General

The digitalSTROM Meters (dSM), like the circuit breaker, are installed into the distribution board.

The digitalSTROM Meter ensures communication to the individual devices in the power circuit. It also measures their performance.

The digitalSTROM system can be extended with additional power circuits at any time. To this end, additional digitalSTROM Meters are simply installed in the distribution board.

Within the installation, several digitalSTROM Meters (a maximum of 62 units) communicate using a standardised protocol on a dS485 bus interconnection.

A digitalSTROM Meter is capable of connecting a maximum of 128 digitalSTROM devices. Other, non-digitalSTROM-ready 230 V devices/consumers can still be used in the same power circuit. It must, however, be ensured that the maximum consumer current in the downstream power circuit does not exceed 16 amps.

If a floor heating distribution system is to be controlled, and wired indoor climate actuators (e.g. BL-KM200) are used, a dSM12 must be installed instead of the dSM11. No dSM12 is necessary for the integration of indoor climate sensors.

If several digitalSTROM Meters are installed, it is recommended to equally distribute them to all three outer conductors.

The maximum line length between the digitalSTROM Meter and the last digitalSTROM device is 50m.

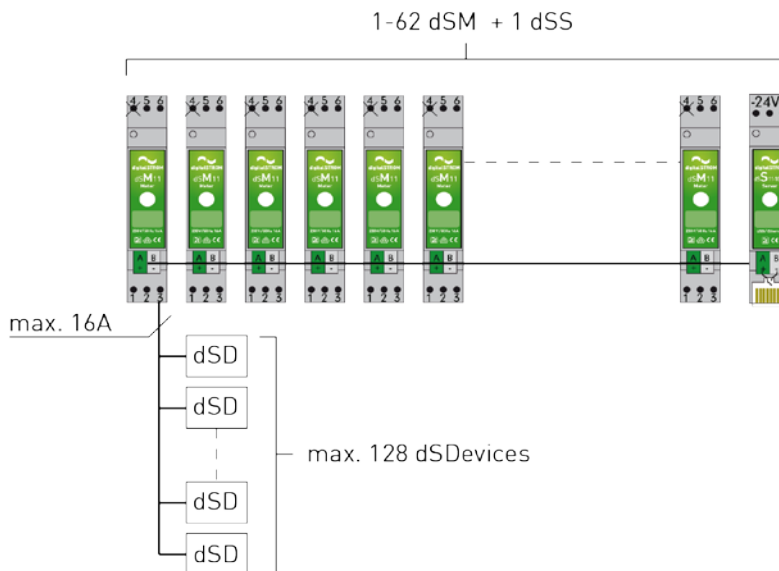


Abb. 6 *Maximum number of installed components*

The digitalSTROM Meters can only be operated with upstream digitalSTROM Filters (dSF).

A digitalSTROM Meter can (virtually) manage the downstream devices in up to 14 rooms. It is, however, recommended not to form more than four rooms per digitalSTROM Meter. From the fifth room onwards, the response time in the rooms 5 - 14 increases by 250 ms.

In order to allow sufficient convection between the devices (heat dissipation), it is recommended to observe minimum distances to other modules.

Technical details:

- The housing width of the digitalSTROM Meter is 1 HP.
- With vertical installation, it is recommended to maintain a minimum distance of 3 cm above and below the device as well as a clearance of 0.5 HP after every third device.
- With horizontal installation, a clearance of 0.5 HP should be provided after each digitalSTROM Meter.

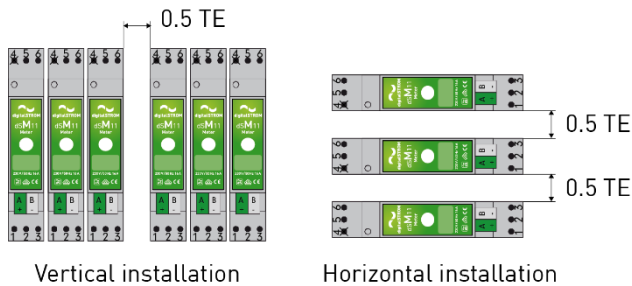


Abb. 7 Minimum distance

## Apartment Basis Address

To prevent digitalSTROM devices from neighbouring digitalSTROM installations from interfering with each other (crosstalk), each installation is configured with a unique identifier (Apartment Basis Address).

The basis address, which is configured in the digitalSTROM Server, determines the address of the digitalSTROM Server and thus the increasing sequential numbering of the connected digitalSTROM Meters.

The Apartment Basis Address which is valid for the digitalSTROM installation must be configured once in the web-based digitalSTROM Configurator on the digitalSTROM Server. The numbering of the digitalSTROM Meters is then automatically transmitted to the connected digitalSTROM Meters.

The freely selectable address is between 0 ... 62. This allows a maximum of 62 digitalSTROM power circuits (digitalSTROM Meters) to be operated in a building.

In a multi-family residential building with several independent digitalSTROM installations it is therefore especially important to ensure that the address ranges do not overlap.

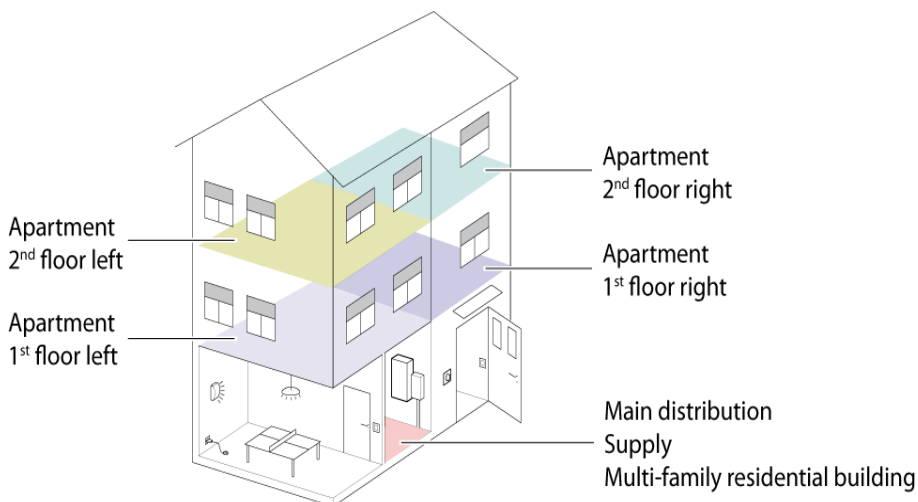


Abb. 8 Distribution of Apartment Basis Addresses

Distribution, Installation	Suggested address range	Comment
Main distribution Supply Multi-family residential building	-	No installation of digitalSTROM components
Apartment 1nd. floor left	0-14	The Apartment Basis Address of the digitalSTROM Server (first floor left) is configured with the value 0.
Apartment 1nd floor right	15-29	The Apartment Basis Address of the digitalSTROM Server (first floor right) is configured with the value 15.
Apartment 2nd. floor left	30-44	The Apartment Basis Address of the digitalSTROM Server (second floor left) is configured with the value 30.
Apartment 2nd floor right	45-60	The Apartment Basis Address of the digitalSTROM Server (second floor right) is configured with the value 45.

The following digitalSTROM Meters are available:

- dSM11
- dSM12

## 2.4 Bus interconnection dS485

The communication between the digitalSTROM Meters and the digitalSTROM Server takes place via a standardised dS485 bus interconnection.

Technical details:

- The maximum line length of the bus interconnection between the bus devices is 100 m.
- A terminating resistor of  $120\ \Omega$  must be connected at both ends of the dS485 bus interconnection. The required terminating resistors are included in the product packaging of digitalSTROM Meter and digitalSTROM Server.

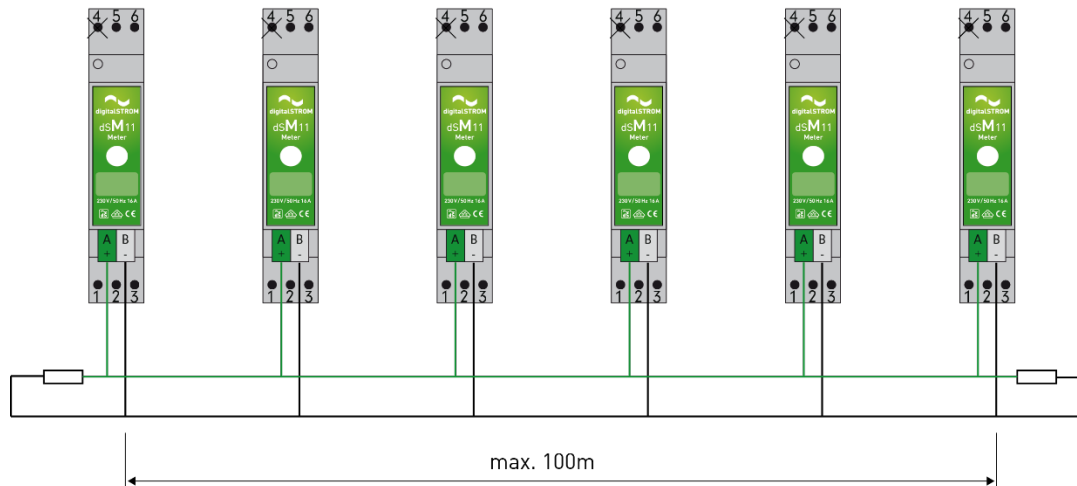


Abb. 9 Bus interconnection dS485

- The bus topology of the dS485 bus interconnection must be arranged in a line.
- The dS485 bus interconnection is capable of operating a maximum of 62 digitalSTROM Meters. Several digitalSTROM Servers cannot be operated on the same dS485 bus interconnection.
- For the dS485 connection a paired cable with a cable cross section of 0.8 mm must be used (e.g. cable type G51 for installations in Switzerland, or cable type I-Y(ST)Y for installations in Germany).

## 2.5 Plan44-Bridge

A Plan44-Bridge is necessary when individual devices communicate with the digitalSTROM network via an EnOcean radio protocol, e.g. with room temperature sensors.

The following must be installed in the distribution board in order to connect a Plan44-Bridge to the digitalSTROM network:

- Socket outlet with 230 VAC
- Network connection to the router RJ45

A Plan44-Bridge must be installed in order to connect room temperature sensors and actuators.

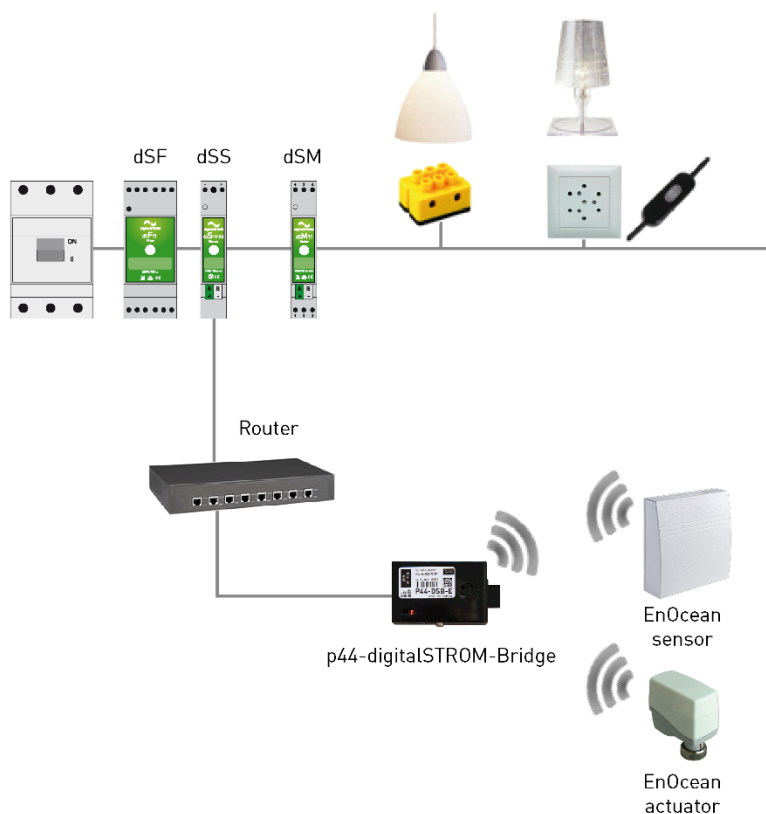


Abb. 10 *Plan44-Bridge*

## 3 Planning

This chapter describes basic information about digitalSTROM components and provides guidance to ensure the smooth and efficient planning of digitalSTROM installations.

### 3.1 Bases

The 3-part product designation allows the properties of the product to be quickly and easily recognised. Detailed information on the digitalSTROM products and their designations can be found in the digitalSTROM catalogue.

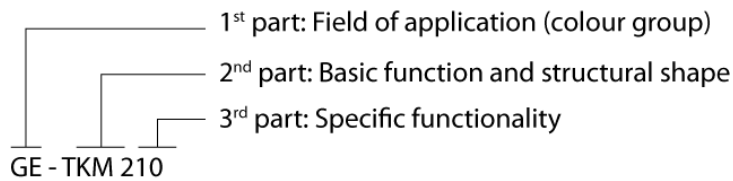


Abb. 11 *Product designation*

Here the example of the product designation GE-TKM210 (Tab. 1):

1. Part: GE (yellow) for the light application area (Fig. 12)
2. Part: TKM (push button block) for connecting a wall push button as a control point
3. Part: 210 for push button block with a dimmer output









*Tab. 1 Abbreviations of the product designation*

PBBM	Push Button Block M
TBM	Terminal Block M
KL	Terminal Block L
IA	Inline Adapter
LDS	Line Dimmer S
LDM	Line Dimmer M
ATBM	Automation Terminal Block M

### 3.1.1 digitalSTROM colour scheme

The application possibilities of digitalSTROM are very varied. To make orientation easier for planners and electricians and to make their work as uncomplicated as possible, the digitalSTROM devices are classified into different colour groups. Each colour group stands for a specific field of application.

This colour concept continues until the housing colour of the digitalSTROM terminal blocks. To make full use of the many possibilities of the digitalSTROM colour concept (e.g. controlling all digitalSTROM devices with the same digitalSTROM colour via a digitalSTROM Server App), the colour group should always be adapted to the use of the connected consumer.

Colour			Group	Examples
Yellow	GE		Light	Ceiling, wall and floor standing lamps
Grey	GR		Shade	Blinds, shutters, privacy protection
Blue	BL		Climate	Heating, ventilation, air conditioning
Cyan			Audio	Radio, CD player
Magenta			Video	TV, projector, DVD player
Red	RT		Security	Protection functions, fire and burglar alarms
Green	GN		Access	Doorbell, door opener
Black	SW		Joker	Can be used at will

#### Comments on joker (black)

The joker (black) area of application is a universal terminal block that allows digitalSTROM devices to be reconfigured to any other digitalSTROM colour (e.g. yellow for Light). To make full use of the many possibilities of the digitalSTROM colour concept, the colour group should always be adapted to the use of the connected consumer.

If a digitalSTROM device is configured for the joker (black) area of application, the digitalSTROM device will only respond to higher-level activities such as «**Leaving home**» or «**Deep Off**».

If a digitalSTROM push button block joker (black) is configured for the joker (black) area of application, it can be used as a direct trigger in a digitalSTROM Server App (e.g. Event Responder). Using the wall push button you can call up a variety of activities and use the same User Defined Actions as on your smartphone. Furthermore the digitalSTROM push button block joker (black) can also be configured as a trigger for higher-level activities such as «**Leaving home**» or «**Ring**».

The joker (black) area of application can be used to integrate consumers in a digitalSTROM system that cannot be covered by the available digitalSTROM colours, although they should respond to higher-level activities. Typically these are devices that require a constant power supply during operation, but are switched off during absence.

Note:

- With the SW-KL200 (relay switching actuator with the operation modes switch, save and wipe) it is not possible to control any awnings, shutters or blinds.
- With the SW-KL200 (relay switching actuator with the operation modes switch, save and wipe) it is not possible to control any awnings, shutters or blinds.

## 3.1.2 digitalSTROM installation components

### Shape and size of components

This chapter describes the basic shapes/sizes/functions of the digitalSTROM components that are each available in the different areas of application (yellow - Light or grey - Shade).

#### 3.1.2.1 digitalSTROM terminal block (KM)

The digitalSTROM terminal block is used for switching/dimming consumers and has a maximum switching or dimming capacity of 150 W/105 VA (capacitive/trailing edge control). The terminal block is suitable for installation in device boxes.

The terminal block is not suitable for use with inductive loads.

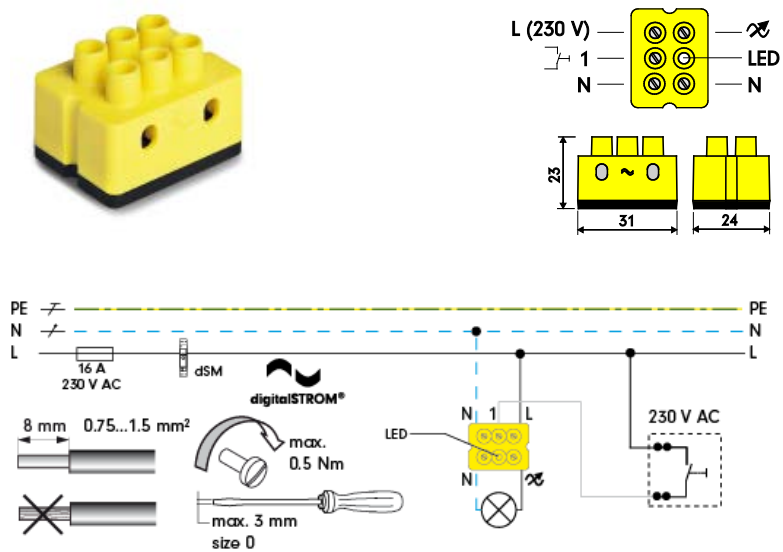
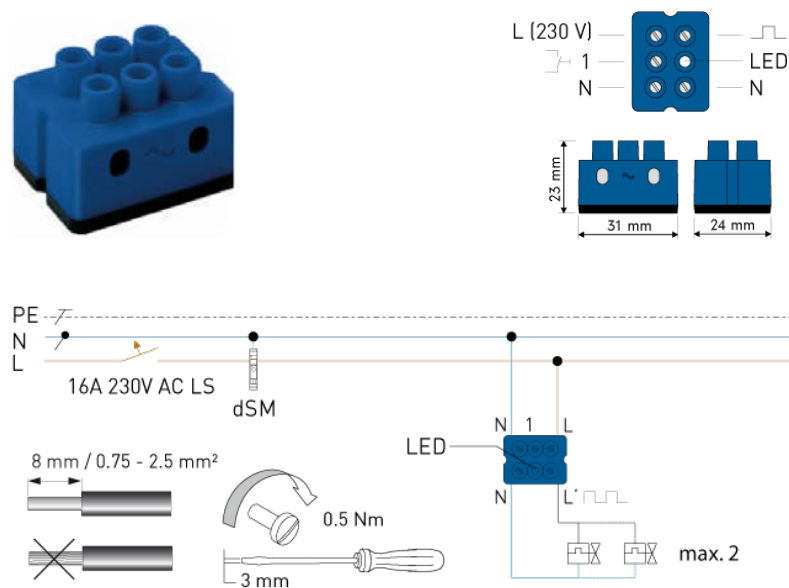
The following terminal blocks are available:

- GE-KM200 for light applications
- GN-KM200 for ringing (Sonnerie)
- BL-KM200 for electrical actuator control (e.g. floor heating distribution system)

The blue BL-KM200 terminal block (climate) is provided for the connection of thermal heating actuators or actuators and respond directly to the actuating values of a digitalSTROM installation with individual room temperature control. A maximum of 2 electrical valves can be connected.

You can find additional information in the corresponding installation instructions enclosed with the product.



Abb. 12 *digitalSTROM terminal block for Light*Abb. 13 *digitalSTROM terminal block climate*

### 3.1.2.2 digitalSTROM relay terminal block (KL)

The digitalSTROM relay terminal block is used as a relay switching actuator and has a maximum switching capacity of 1400 W/700 VA (capacitive/inductive).

The terminal block is suitable for installation in device boxes.

The following terminal blocks are available:

- GE-KL200 for light applications
- GR-KL200 only for shutters
- GR-KL210 only for awnings
- GR-KL220 only for blinds
- SW-KL200 (Joker) for different applications. This terminal block can send events (e.g. consumption event messages) to the digitalSTROM Server and execute an action by means of an upper and lower threshold (e.g. switching off standby consumers').

You can find additional information in the corresponding installation instructions enclosed with the product.

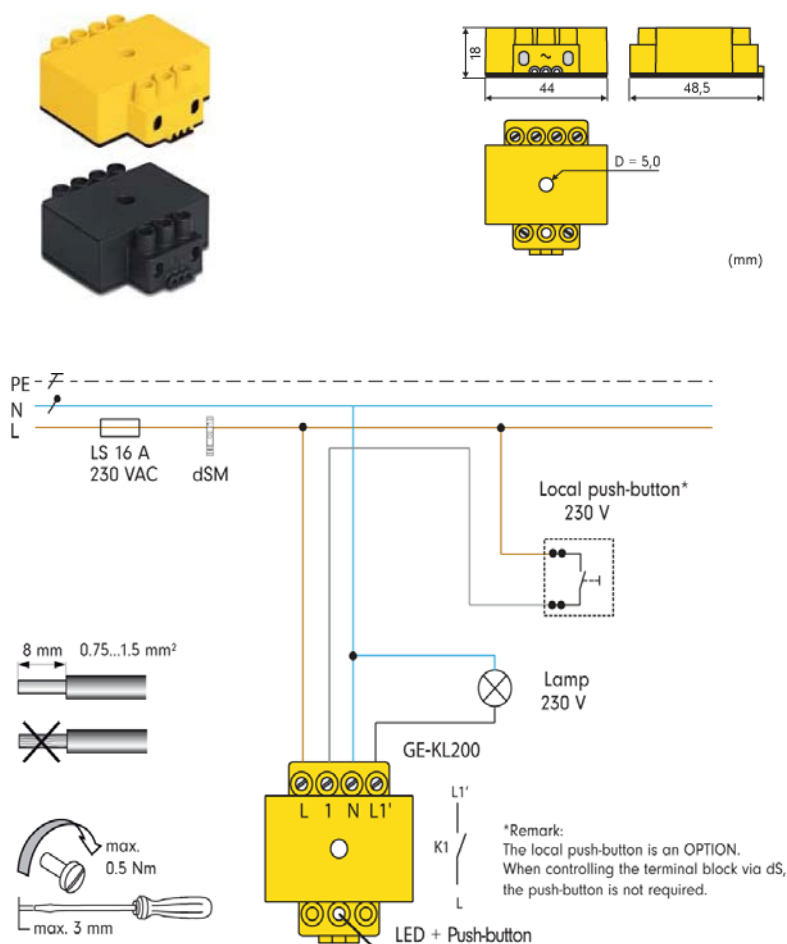


Abb. 14 digitalSTROM relay terminal block

### 3.1.2.3 digitalSTROM Blind switch actuator (GR-HKL230)

The GR-HKL230 terminal block with a Hirschmann plug is intended for connecting lamella blind drives with an adjustable slat angle and two mechanical limit switches. Connected consumers can be controlled by digitalSTROM commands sent via the 230 V cable.

You can find additional information in the corresponding installation instructions enclosed with the product.

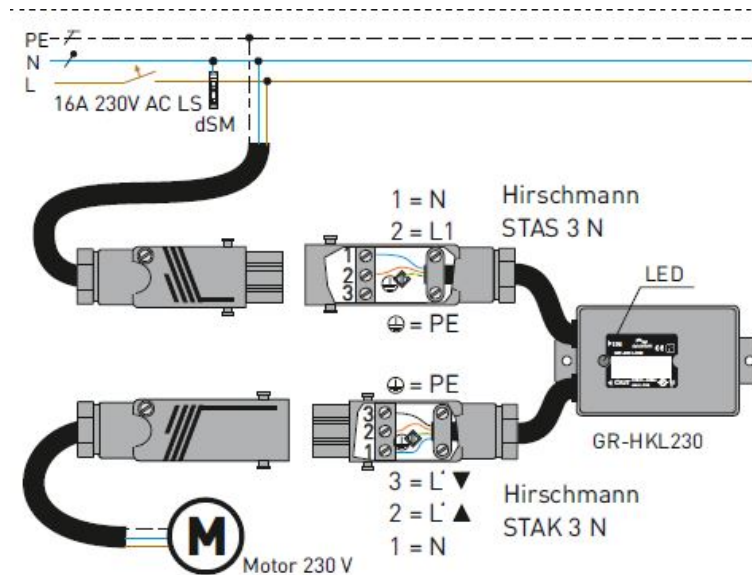


Abb. 15 *digitalSTROM GR-HKL230*

### 3.1.2.4 digitalSTROM push button block (TKM)

The digitalSTROM push button block is used to connect a standard wall push button as a control point. Depending on the digitalSTROM push button block, different wall push buttons can be operated (1-way, 2-way, 4-way operation).

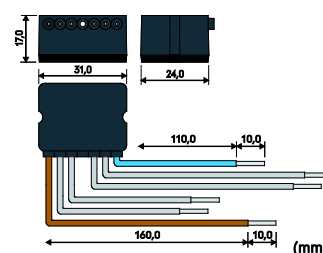
digitalSTROM push button blocks with one capacity output can be configured in different modes (device push button, area push button or room push button).

The terminal block is suitable for installation in device boxes.

The following terminal blocks are available:

- GE-TKM210 for 1-way push button inputs (with maximum 150W load output)
- SW-TKM200 for 4-way push button inputs (without load output)
- SW-TKM210 for 2-way push button inputs (without load output).

You can find additional information in the corresponding installation instructions enclosed with the product.



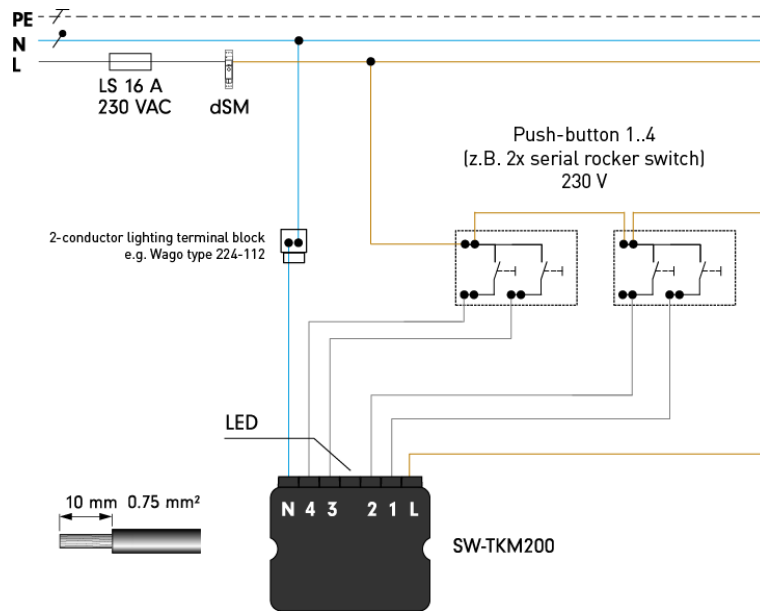


Abb. 16 *digitalSTROM push button block, universal*





### 3.1.2.6 digitalSTROM GE-UMV200

THE digitalSTROM GE-UMV200 is used to activate the electrical ballasts of LED- and fluorescent lamps with analogue dim input (1-10 V or 0 – 10 V). The digitalSTROM GE-UMV200 has four output channels and one input for a pushbutton. The connected devices can be completely switched off via a switching relay.

The digitalSTROM GE-UMV200 is suitable for installing on walls, in inline adapters and for flush-mounting in electronic boxes and junction boxes (see installation instructions).

- Fastening holes are available for the wall installation.
- Connection cables that are not permanently installed must be fastened in the cable grips of the housing cover.
- The housing covers can be removed for flush-mounting.

The dS-GE-UMV200 logs in automatically on the digitalSTROM Meter so that the dS-GE-UMV200 is operational immediately.

Please note that electrical ballasts almost always display reactive current-free load characteristics. In the case of some electronic ballasts with 0 – 10 V in the switched-off state (0 V), however, standby losses can occur in order to ensure the reduction of luminous flux. For this reason, check whether this completely switches off in the switched off state (0 V) before installing an electronic ballast.

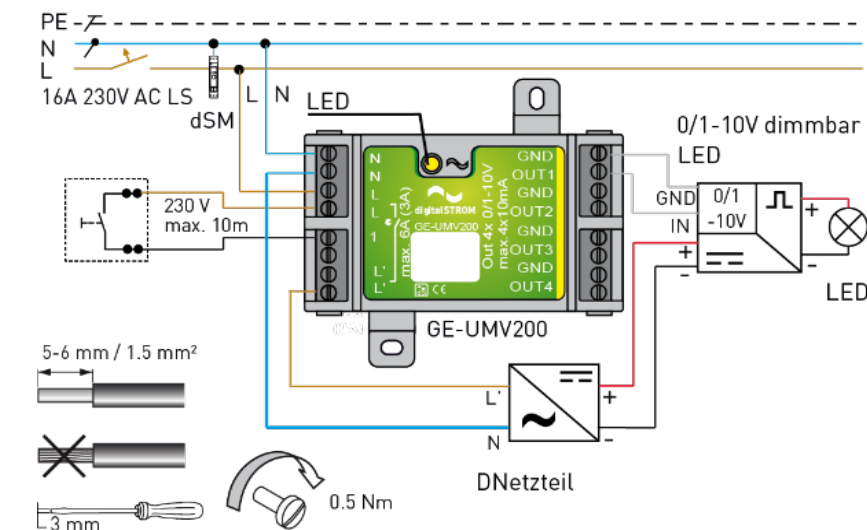


Abb. 19 digitalSTROM GE-UMV200

### 3.1.2.7 digitalSTROM SW-UMR200

The digitalSTROM SW-UMR200 is used for the potential-free recording of mains and low voltage signals (e.g. doorbell systems) as well as for the switching of consumers.

It contains two inputs and two potential-free change-over contacts.

The input conditions can be configured both as a push button and a sensor. The digitalSTROM SW-UMR200 thus offers the full scope of functions of the push button blocks (SW-TKM) to connect normal commercial wall push buttons, and of the automation terminal blocks (SW-AKM) to monitor up to two sensor signals. The switching contacts can be activated via the digitalSTROM system and can be freely configured.

The digitalSTROM SW-UMR200 is suitable for installing on walls, in inline adapters and for flush-mounting in electronic boxes and junction boxes (see installation instructions).

- Fastening holes are available for the wall installation.
- Connection cables that are not permanently installed must be fastened in the cable grips of the housing cover.
- The housing covers can be removed for flush-mounting.

The SW-UMR200 logs in automatically on the digitalSTROM Meter so that the SW-UMR200 is operational immediately.

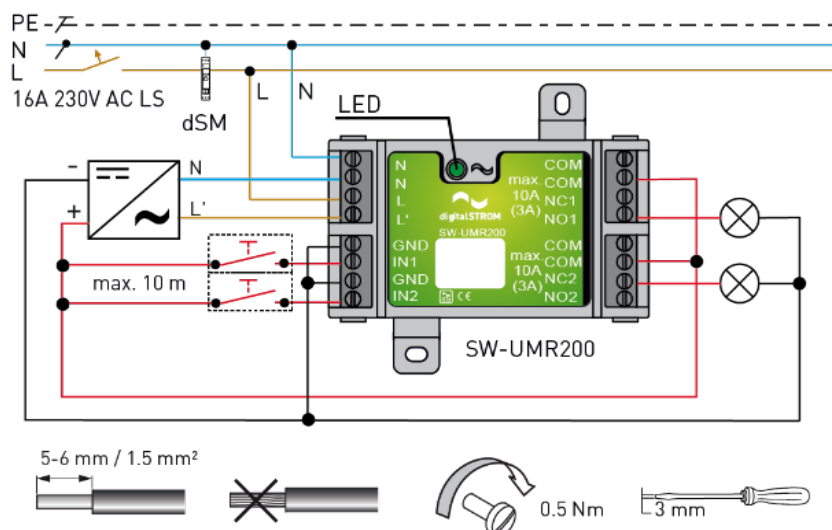


Abb. 20 *digitalSTROM SW-UMR200*



### 3.1.2.8 digitalSTROM indoor climate sensor (dS-iSens200)

The digitalSTROM indoor climate sensor records the room temperature and humidity and sends these measured values automatically to the digitalSTROM heating control. The digitalSTROM heating control can then regulate the heating performance according to the required configuration.

The choice of location is very important for the installation since influenced measured values can cause undesirable actions:

- No outer walls
- No direct sunlight
- Minimum distance from the floor

The following indoor climate sensors are available:

- dS-iSens200 with a temperature range from 0 to 40 degrees Celsius.

You can find additional information in the corresponding installation instructions enclosed with the product.

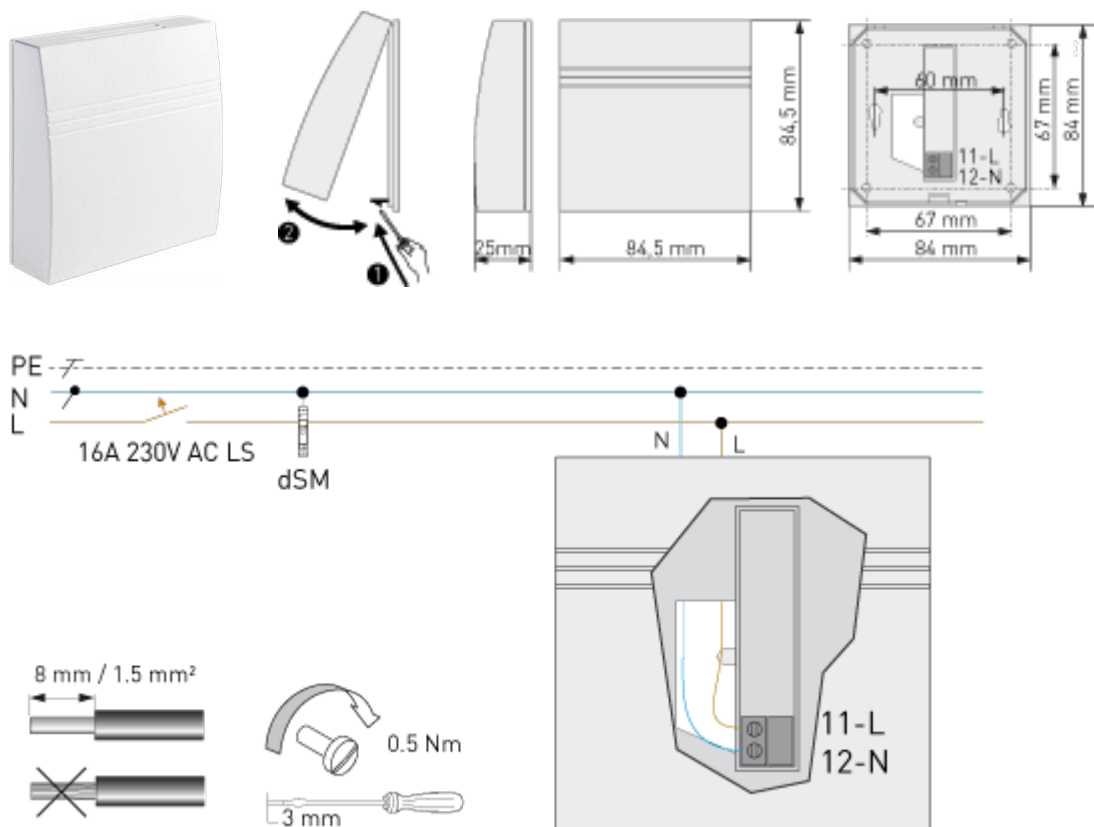


Abb. 21 *digitalSTROM indoor climate sensor*

### 3.1.3 digitalSTROM pluggable components

#### 3.1.3.1 digitalSTROM line dimmer (SDM)

The digitalSTROM cable dimmer can either be used as a light dimming actuator for switching/dimming with a maximum output of 150 W/105 VA (capacitive/trailing edge control) or as a safety panic push button. If the panic push button is pressed, all lamps in the factory settings switch on automatically and the shutters/blinds open.

The digitalSTROM line dimmer is suitable for use as a foot switch and is installed in the supply cable of a consumer.

The digitalSTROM line dimmer is not suitable for use with inductive loads.

The following terminal blocks are available:

- GE-SDM200 for light applications
- RT-SDM200 for alarm functions such as the panic push button

You can find additional information in the corresponding installation instructions enclosed with the product.

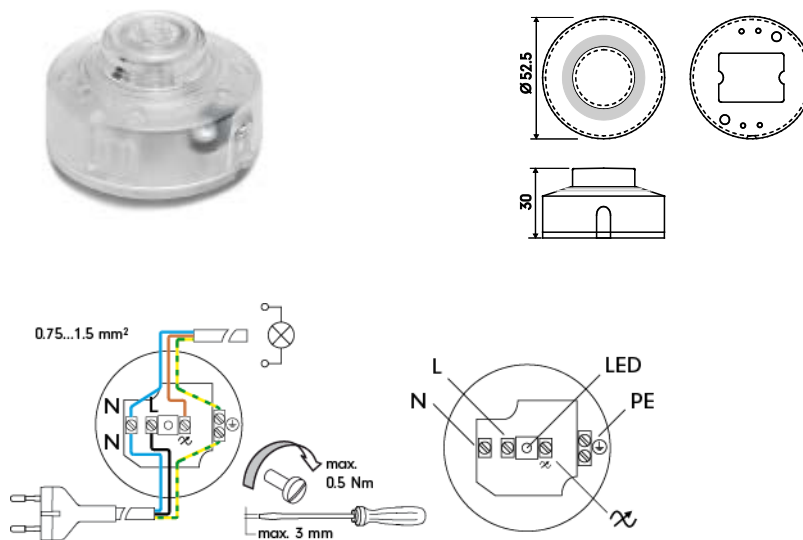


Abb. 22 *digitalSTROM line dimmer SDM*

### 3.1.3.2 digitalSTROM line dimmer (SDS)

The digitalSTROM cable dimmer is used for switching/dimming and has a maximum switching or dimming capacity of 150 W/105 VA (capacitive/trailing edge control).

The digitalSTROM line dimmer is suitable for use as a rocker switch and is pre-assembled with a plug and cable. Since there are two operating functions, a higher-level activity can additionally be configured. For example, pressing a panic push button in the factory setting switches on all lamps and opens shutters/blinds.

The digitalSTROM line dimmer is not suitable for use with inductive loads.

The following terminal blocks are available:

- GE-SDS200-CW (white) for light applications and 1 additional application according to choice
- GE-SDS200-CS (black) for light applications and 1 additional application according to choice

You can find additional information in the corresponding installation instructions enclosed with the product

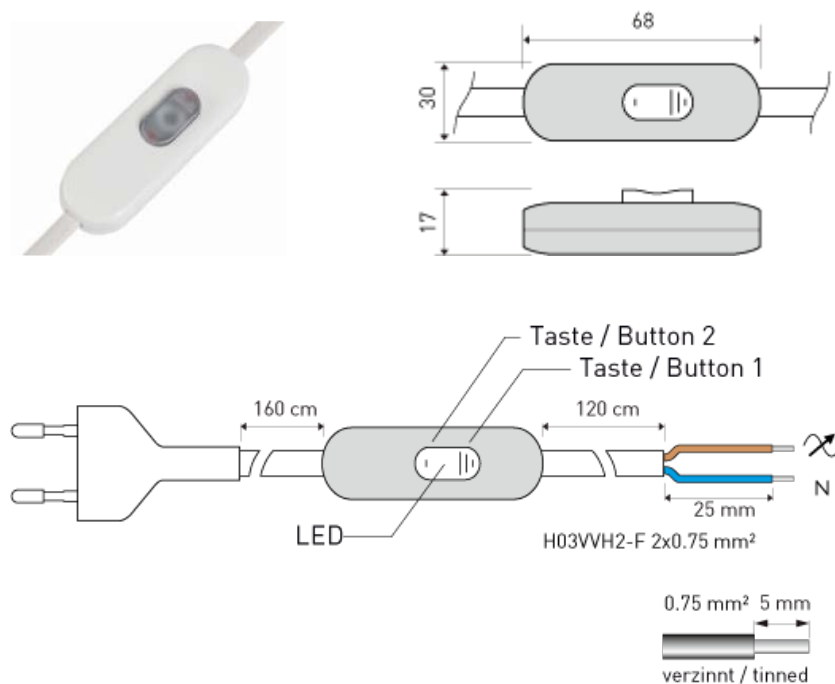


Abb. 23 *digitalSTROM line dimmer SDS*

### 3.1.3.3 digitalSTROM inline adapter (ZWS)

The digitalSTROM inline adapter is used as a mobile relay switching contact and has a maximum switching capacity of 2300 W/700 VA (capacitive/inductive).

The digitalSTROM inline adapter can be used in any socket outlet within the digitalSTROM installation and thus also temporarily for connected devices (e.g. Christmas lighting).

The following terminal blocks are available:

- SW-ZWS200 for light applications

You can find additional information in the corresponding installation instructions enclosed with the product.

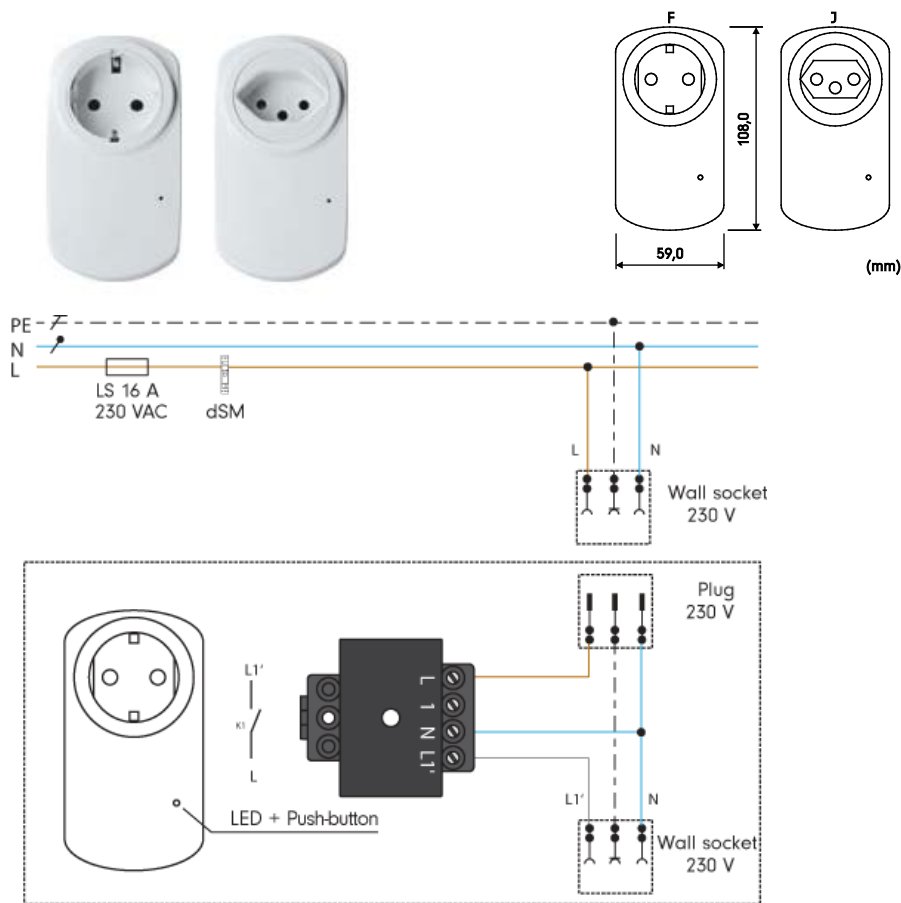


Abb. 24 *digitalSTROM inline adapter ZWS*

### 3.1.4 Thermokon radio system components

#### 3.1.4.1 Radio room temperature sensor

All products that use the manufacturer neutral EnOcean radio protocol can generally be used.

The transmission range of the room temperature sensor depends on the building materials used:

- Visual connections: Typically 30m in corridors, 100m in halls
- Plasterboard walls/wood: Typically 30m through a maximum of 5 walls
- Brick walls/aerated concrete Typically 20m through a maximum of 3 walls
- Reinforced concrete walls/ceilings: Typically 10m through a maximum of 1 ceiling

Other devices that also work with high-frequency signals (computers, audio/video systems, ballasts etc.), are potential sources of interference. The minimum distance to these devices should be at least 0.5m.

The room temperature sensor works with a solar cell as power supply. The following points should be noted here:

- A minimum lighting intensity of 150 Lux should be ensured during at least three to four hours per day (daylight or artificial light).
  - The lighting intensity should not be more than 1000 Lux continuously.
- Direct sunlight must be avoided since it can distort the measured values.

The following radio room temperature sensors are available:

- Thermokon EasySens SR04

You can find additional information in the corresponding installation instructions enclosed with the product.

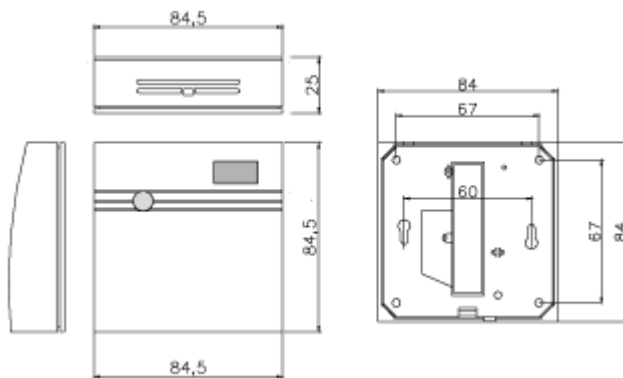


Abb. 25 Thermokon-EnOcean room temperature sensor SR04

### 3.1.4.2 Radio actuator for room temperature control

All products that use the manufacturer neutral EnOcean radio protocol can generally be used.

The transmission range of the room temperature sensor depends on the building materials used:

- Visual connections: Typically 30m in corridors, 100m in halls
- Plasterboard walls/wood: Typically 30m through a maximum of 5 walls
- Brick walls/aerated concrete Typically 20m through a maximum of 3 walls
- Reinforced concrete walls/ceilings: Typically 10m through a maximum of 1 ceiling

Other devices that also work with high-frequency signals (computers, audio/video systems, ballasts etc.), are potential sources of interference. The minimum distance to these devices should be 0.5m.

The following radio actuators are available:

- EnOcean EasySens SAB05

You can find additional information in the corresponding installation instructions enclosed with the product.

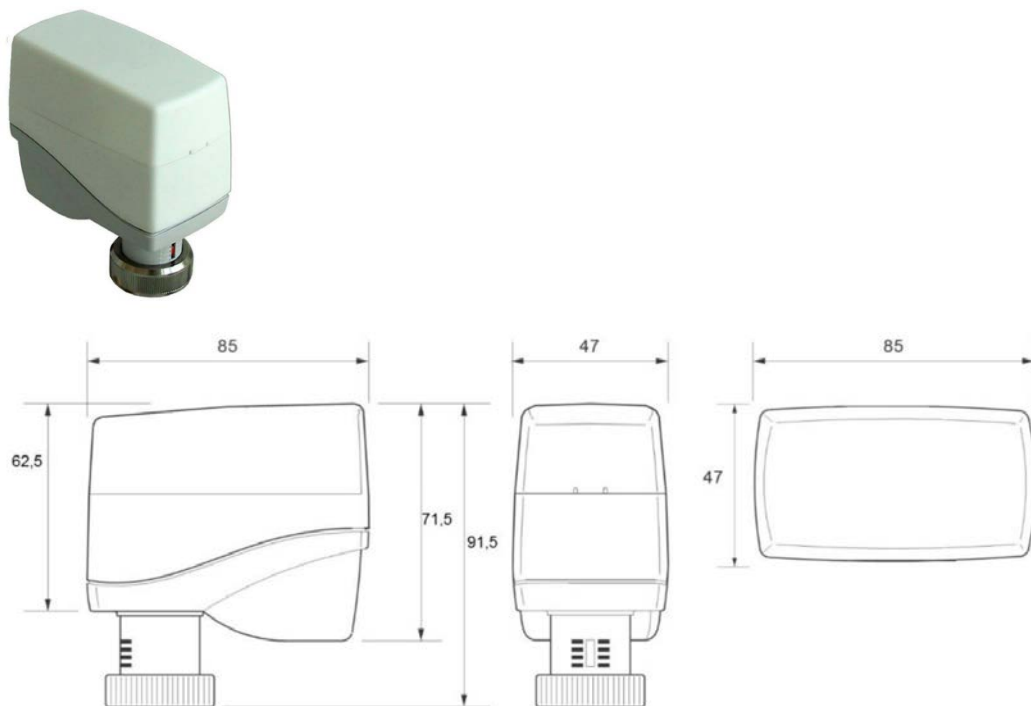


Abb. 26 Thermokon actuator for room temperature control SAB05

### 3.1.5 Accessories

#### 3.1.5.1 digitalSTROM DinClip200

The dS-DinClip200 facilitates the installation of the following digitalSTROM components on the top hat rail in the electrical power distribution board.



Abb. 27 *digitalSTROM-DinClip200*

The dS-DinClip200 is intended for the installation of the following components:

- 1 × digitalSTROM 1-10 V universal module (GE-UMV200)  
Attached by a simple click system.
- 1 × digitalSTROM relay universal module (SW-UMR200)  
Attached by a simple click system.
- 1 × digitalSTROM relay terminal block (KL)  
Attached by a screw fitting with a wing nut.
- 2 × digitalSTROM terminal blocks (KM)  
Attached by two cable ties.
- 2 × digitalSTROM push button block (KM)  
Attached by two cable ties.
- 2 × digitalSTROM automation terminal blocks (AKM)  
Attached by two cable ties.

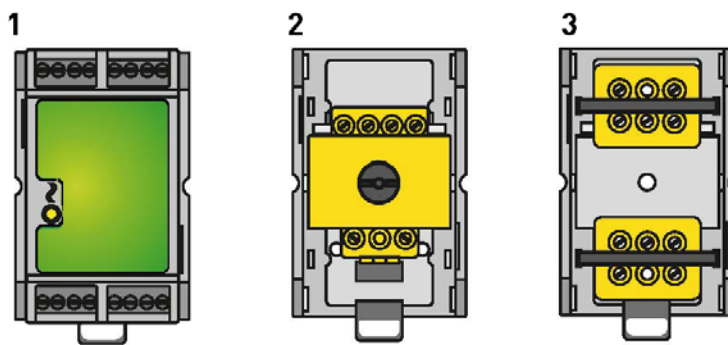


Abb. 28 *digitalSTROM-DinClip200 for installation of a GE-UMV200 or SW-UMR200 (1), one dS-KL (2), two dS-KM, dS-TKM or dS-AKM (3)*

## 3.2 Room concept

A room is a largely self-contained functional area within a digitalSTROM installation. If push buttons are pressed or presets are activated via an app or web-based Configurator within a room, this affects the digitalSTROM devices belonging to the room.

### Plug & Play

In the factory setting of the digitalSTROM Meter, a standard room is preconfigured for the associated power circuit. All digitalSTROM components that are connected to the digitalSTROM Meter are automatically assigned to this standard room by default (Fig. 29).

New digitalSTROM components that are connected in this room, such as a floor standing lamp, are automatically assigned to the standard room via Plug & Play and can be used without further configuration.

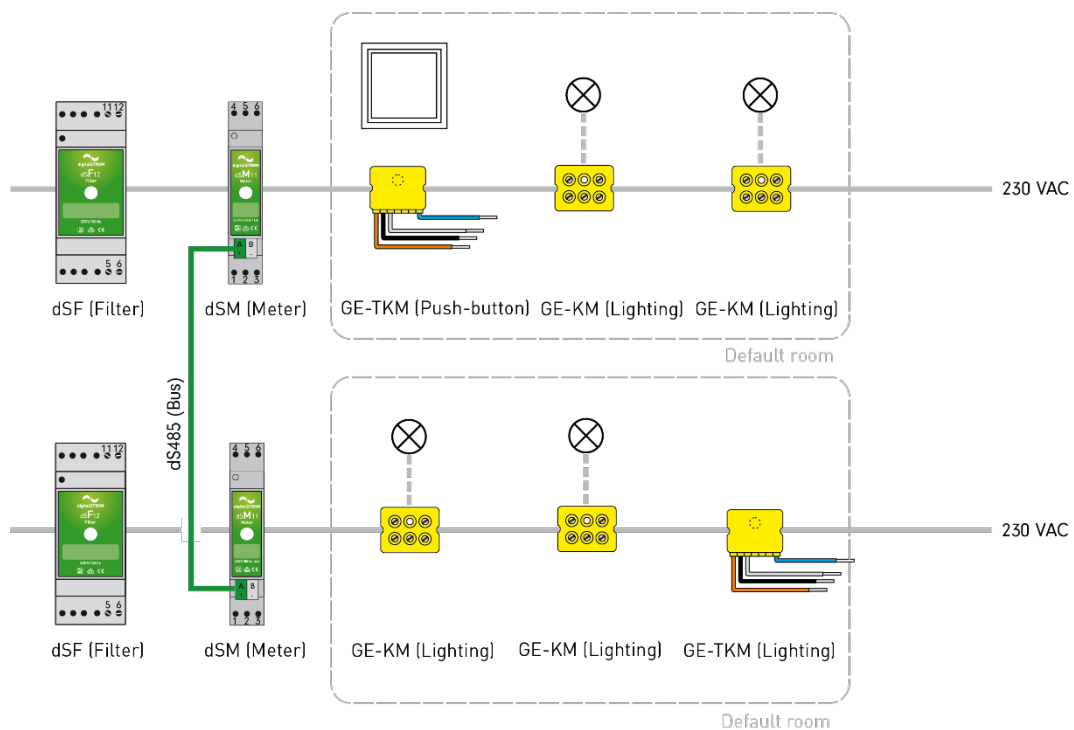


Abb. 29 *digitalSTROM Meter main rooms*



### 3.2.1 Factory settings and room configurations

The example below (Fig. 30) shows the basic configuration of a digitalSTROM installation consisting of four digitalSTROM Meters for power circuit living room (red), power circuit corridor (blue), power circuit office light (green) and power circuit office socket outlets (yellow).

The room concept offers simple and flexible configuration options that allow the functions of the digitalSTROM devices to be used independently of the electrical power circuits.

The rooms are configured in the web-based digitalSTROM Configurator, the user interface of the digitalSTROM Server. This tool allows you to create, merge or delete rooms simply by Drag & Drop.

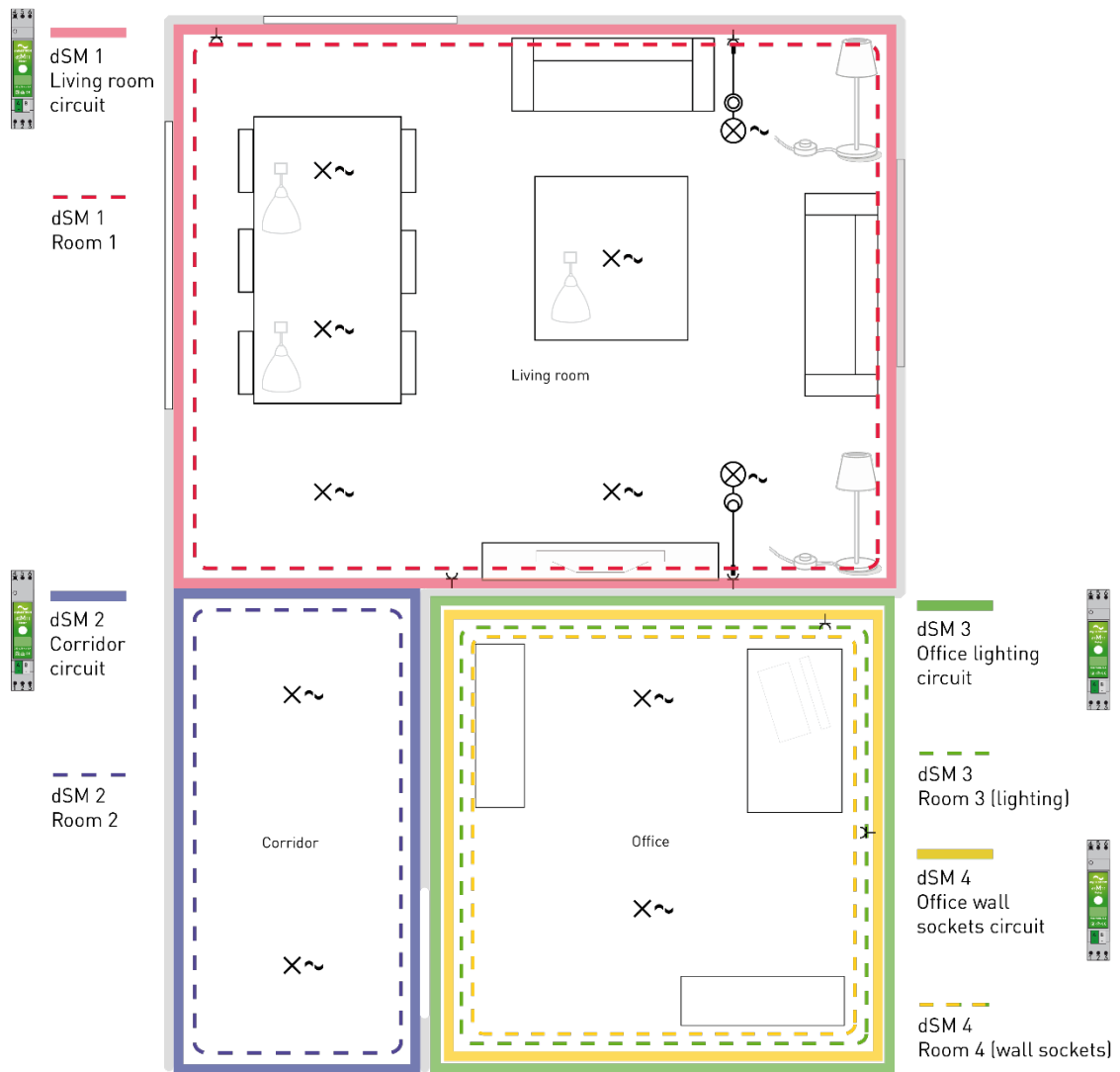


Abb. 30 *digitalSTROM Meter basic configuration for four power circuits*

### 3.2.2 Dividing a power circuit into different rooms

If a power circuit (living room) contains several living areas such as "Living" or "Dining", they can be separated by adjusting the basic configuration.

This simply requires creating an additional room for "Living" and renaming the standard room as "Dining" (Fig. 31). The digitalSTROM devices can then be assigned to the corresponding room according to their position in the digitalSTROM installation.

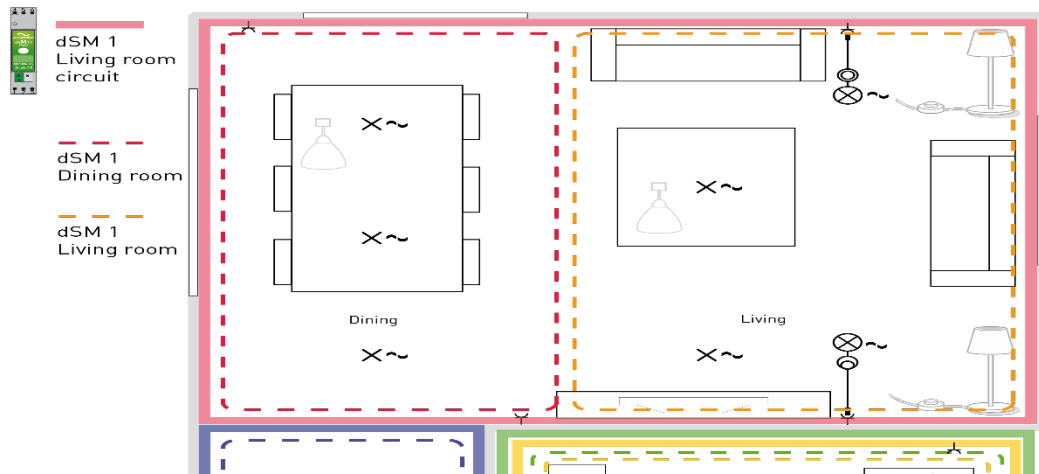


Abb. 31 *digitalSTROM Meter with separated power circuit*

### 3.2.3 Merging devices from different power circuits in one room

If a standard room (office) consists of several power circuits for light and socket outlets (3. dSM11 + 4. dSM11), the basic configuration divides this living room into two rooms (Fig. 32).

digitalSTROM now allows the two power circuits electrically separated by the installation to be merged again to form a logical room.

You simply need to assign all digitalSTROM devices to a room by drag & drop. It makes sense to rename this power circuit accordingly afterwards (room 3 light + socket outlet) and to delete the unused room (room 4 socket outlets).

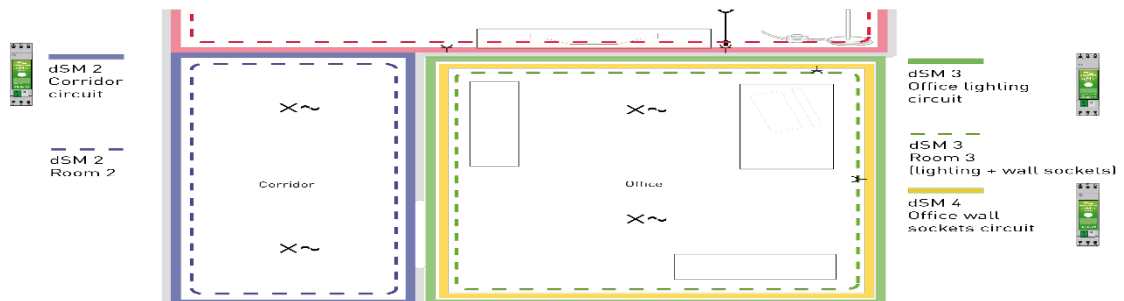


Abb. 32 Merging power circuits to one room

### 3.2.4 Combination of rooms

The possibility of freely assigning individual digitalSTROM devices to a room allows for even more flexible installation designs. This applies particularly in the case of conversions with preinstalled power lines in the power circuit.

A combination of separated and merged rooms is also possible.

For example, a single push button from the room "Living" could be assigned to the room "Corridor" and control the light in the room "Corridor" (Fig. 28).

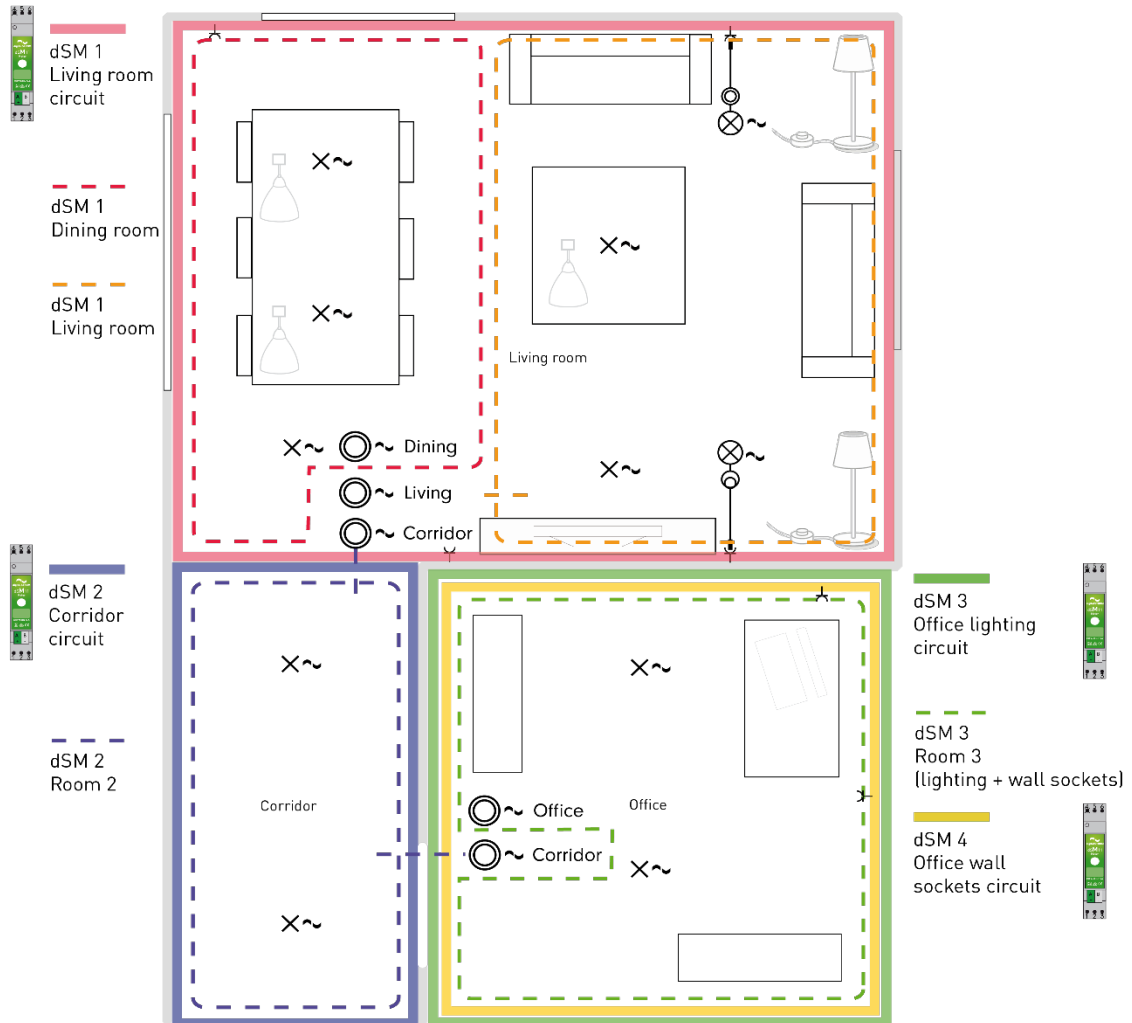


Abb. 33 Combination of separated and merged power circuits in the room concept

### 3.2.5 Heating planning

The digitalSTROM heating control is a room-based concept so that each single room can be controlled individually.

Certain presettings are required in order to use the heating control:

- A **hydraulic synchronisation** within the heating system must be performed. This determines the flow rate of the hot water through each radiator. This ensures that each room is supplied with the appropriate amount of heat in order to reach the required temperature and for each radiator to have the same temperature.
- The digitalSTROM heating control does not communicate with the control unit of the central heating. The central heating is responsible for providing sufficient hot water for all rooms of the apartment.

#### Note:

In the case of apartments with a heating system that has an outdoor temperature-regulated heating control, the appropriate flow temperature is determined from the measured value for the outdoor temperature by means of heating curves.

In the case of apartments that have an inside temperature-regulated heating control, the flow temperature is regulated via the reference room. Care must be taken to ensure that the temperature of the reference room is not influenced by external sources.

The *heating control* supports the following room concepts:

- Manual on/off switching of the actuators within the rooms
- Temperature control of the individual rooms by means of a room temperature sensor (PID controller)
- If a room does not have its own room temperature sensor, the temperature can then be controlled by another room with a sensor. At the same time, the temperature can also be reduced in comparison with the reference room by setting an offset.
- If there is no reference room, the temperature of the individual rooms can then be reduced by setting the absolute value position (actuating value).
- An external controller can be attached to the digitalSTROM heating control system for the use of complex heating algorithms.

The digitalSTROM heating control supports underfloor and wall heating systems as well as radiators. In this process, the PID controller (proportional-integral-derivative controller) ensures a stable room temperature for the required operating mode.

### 3.3 Conversions

Check the available space in the existing distribution board because of the convection of the digitalSTROM Server and digitalSTROM Filter (refer to chapter 2.1, 2.2, 2.3). If there is inadequate space, it may be necessary to provide an additional distribution board.

The use of a digitalSTROM Server requires a LAN network line for the connection to a local network or to the Internet. Alternatively, the network connection by a Devolo Powerline connection via the 230-V-Netzwerk can be recommended (<http://www.devolo.com>) or implemented via a glass fibre system from Casacom (<http://www.casacom.ch>).

In the case of conversions, make sure not to create more than four rooms per digitalSTROM Meter. If this is not possible, first create the much-used rooms, then the less-used rooms. This optimises accesses to the memory management of the digitalSTROM Meter.

#### Installation

The digitalSTROM products do not require any specific adjustments to the existing cabling outside of the distribution board. The devices are operated in the conventional 230 V AC network. Note, however, the recommendations for installation in the distribution board (convection) as well as the correct installation/wiring of the required digitalSTROM Filters.

The existing light switches must be replaced with standard push buttons. To be able to operate shutters, awnings or blinds, corresponding push buttons also have to be used.

## 3.4 New buildings

### Distribution

When planning new buildings, it is recommended to provide a separate digitalSTROM Meter for each room.

If you merge several rooms on one power circuit in new buildings, make sure that you do not plan more than four rooms per digitalSTROM Meter. If this is not possible, first create the much-used rooms, then the less-used rooms. This optimises accesses to the memory management of the digitalSTROM Meter.

### Installation

Plan the installation with large sockets to ensure there is enough space for the installation of the digitalSTROM components and wiring.

Make a list of all the applications and devices requested by the end consumer. This will serve as a basis for better assessing the required digitalSTROM components, their performance and the type of consumers (inductive, capacitive or ohmic).

For LED lights with external transformers, the use of the GE-KL200 terminal block is recommended due to the high start-up current. Electronic transformers of LED/low-voltage lights should be charged with 80% of the nominal rating.

The digitalSTROM system only works with push buttons. If you install light switches for rooms that are **later** added to the digitalSTROM system, use switches that can be converted to push buttons.

### 3.5 Connectable third-party systems

Multiroom sound systems such as Sonos® as well as the Philips Hue® colour lighting system can be connected to the digitalSTROM system via a router. Apps are available for installing these systems. For more information please visit the websites of the manufacturers.

[www.sonos.com](http://www.sonos.com)

[www2.meethue.com](http://www2.meethue.com)

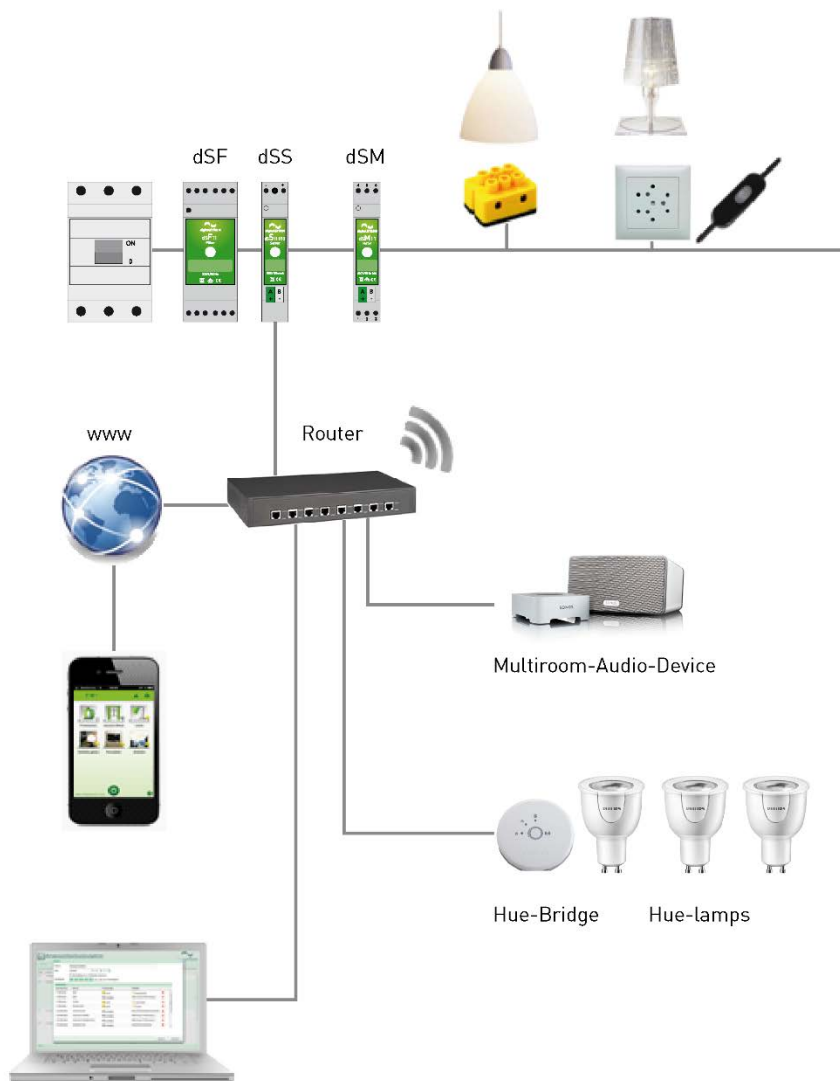


Abb. 34 Third-party systems connected via LAN



## 4 Frequently asked questions

Please visit the website <http://www.digitalstrom.com/support> or the websites of the respective product manufacturers. There you can find useful support information and also a continuously updated list of Frequently Asked Questions (FAQ).

## 5 Index

<b>A</b>	
Advantages .....	5
<b>B</b>	
Basis Address .....	18
<b>C</b>	
Colour scheme .....	23
Comment on joker .....	23
Component	
For installing .....	24
Components	
pluggable .....	34
Radio .....	37
Connections .....	4
Conversions .....	46
<b>D</b>	
digitalSTROM automation terminal block (AKM) .....	30
digitalSTROM components	
GE-UMV200 .....	31
SW-UMR200 .....	32
digitalSTROM Filter (dSF) .....	12
Input-side connection .....	13
Sub-distribution .....	14
Three-phase system .....	13
digitalSTROM inline adapter (ZWS) .....	36
digitalSTROM line dimmer (SDM) .....	34
digitalSTROM line dimmer (SDS) .....	35
digitalSTROM Meter (dSM) .....	17
Minimum distances .....	18
digitalSTROM push button block (TKM) .....	27
digitalSTROM relay terminal block (KL) .....	26
digitalSTROM sensor terminal (dS-iSens) .....	33
digitalSTROM Server (dSS) .....	15
digitalSTROM terminal block (KM) .....	24
Document .....	8
Requirements .....	8
Target group .....	8
dS485 bus interconnection .....	20
<b>F</b>	
FAQ .....	49
<b>G</b>	
Glossary .....	9
<b>N</b>	
New buildings .....	47
<b>P</b>	
Plan44-Bridge .....	21
Product designation .....	22
<b>R</b>	
Radio actuator for room temperature control .....	38
Radio room temperature sensor .....	37
Room concept .....	40
<b>S</b>	
System .....	12
<b>T</b>	
Third-party systems .....	48