SAFELOG

PLANNING, INSTALLATION AND COMMISSIONING INFORMATION

Wireless self-contained monitoring system
SAFELOG Wireless

EN

LIST OF ABBREVIATIONS

Consumers	luminaires, repeaters, conversion sets and emergency luminaire converters
SL	SAFELOG Line (wire-connected bus RS485)
SWX	SAFELOG Wireless (wireless bus SRD 868 MHz)
DS	Maintained mode. The consumer is constantly activated
BS	Non maintained mode. The connected consumer only lights up in the emergency mode

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1. Introduction

This document is for electrical planners and installers and is to help them in planning, installing and commissioning the SAFELOG Wireless system.

The SAFELOG Wireless system is for monitoring and controlling safety and exit sign luminaires as well as other SAFELOG compatible consumers. The SAFELOG TOUCH WIRELESS main control unit has an integrated test logbook according to DIN VDE 0108 10/89, which is saved in the system, but can alternatively be stored on a USB stick with a FAT32 file system.

There are two different ways available for communication between the SAFELOG TOUCH WIRELESS main control unit and the consumers:

1. A wireless solution only
2. A hybrid installation - that is one combining wireless luminaires and wire-connected BUS luminaires.

2. SAFELOG Wireless

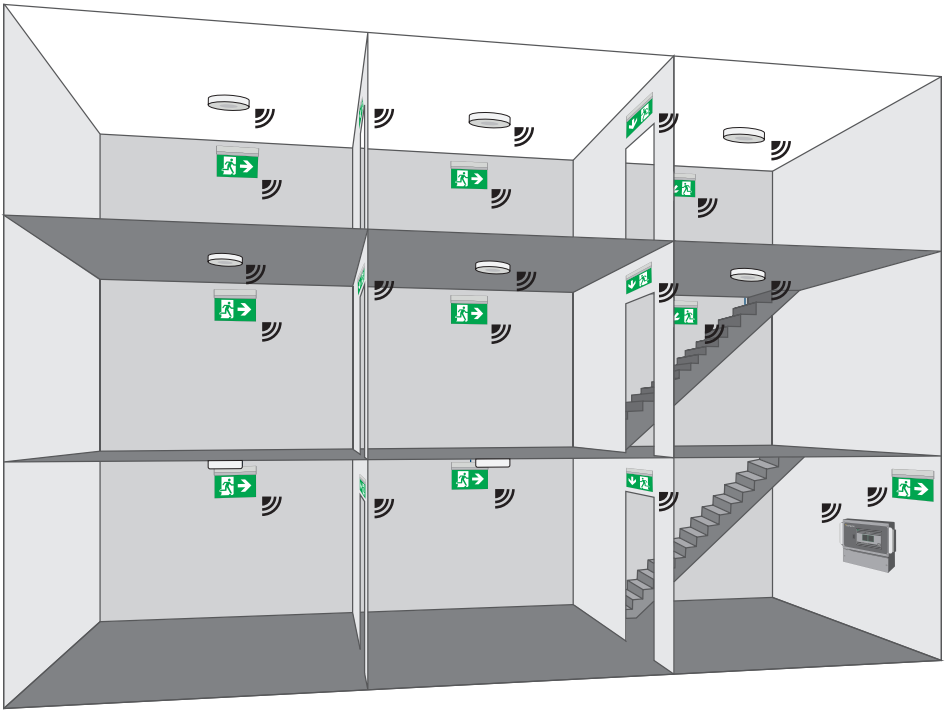

Figure 1: Diagram of a SAFELOG wireless installation

2.1 General information on the wireless system

The wireless system gives you the chance to supervise and control single battery consumers via a wireless network without any additional bus line.

The wireless system features the following characteristics:

- The SWX consumers only require a 230V/50Hz power supply.
  No additional bus wire is needed for the installation. The data is wireless-interchanged on the 868 MHz SRD band.

- The wireless system is based on the mesh network technology with which each SWX consumer is also a network node (repeater) relaying the data between the SWX consumers. This enables sizeable wireless networks to be developed despite limited transmitting power.
- The network is automatically set up immediately after connection to the power supply. No additional settings are needed at the consumer.
- The network is self-restoring and thus highly reliable. If a node or a connection is blocked or fails, the network automatically sets itself up again. The data is redirected and the network continues to be operable.
- Each of the aerials of the SWX consumers is fitted inside the products and thus they are not visible when the consumers are examined after mounting.
- The maximum possible spacing between two SWX consumers is 30m [1] given direct visual contact.
- Thanks to the multi-network function, up to 10 SAFELOG Wireless systems can be operated directly next to each other in the same project.
- Their allocation can be subsequently changed via the SAFELOG TOUCH WIRELESS main control unit or with the help of the analyser. In the process, each consumer is assigned to a SAFELOG main control unit or the network.

2.2 Planning of wireless systems

2.2.1 Basic principles and set-up of wireless systems

For a robust wireless network, consideration should be given in advance to important parameters such as number of consumers, range, interference sources and mounting points. Some information is provided below for your planning.

2.2.1.1 Basic fundamentals of wireless transmission

The wireless network range depends on various factors which will be gone into in more detail below:

[1] Only applies to consumers with plastic housing. For SWX consumers with metal housing the maximum possible spacing between wireless consumers given direct visual contact is 20 metres and for consumers with aluminum housing it is 10 metres.

2.2.1.1.1 Attenuation

The signal in an ideal wireless network is propagated without any interference. The most significant parameter between the transmitter and receiver is signal attenuation caused by certain materials (see Table 1, Page 9). There are two determining factors directly impacting on attenuation. One of them is the material type and the other the thickness of the material. It should also be noted that moisture in masonry attenuates the wireless signals.

2.2.1.1.2 Reflection and superimposition

Radio wave reflection can raise or lower the spacing of SWX consumers. Radio wave reflection allows SWX consumers to partially bridge distances which otherwise would not be directly obtainable. On the other hand, superimpositions can also attenuate deflected or reflected wireless waves. In unfavourable cases, superimpositions may result in a marked attenuation of the wireless signals.

2.2.1.1.3 Partitioning and shadow formation

Mounting a consumer in metal housings and on fire walls, lift shafts, staircases and utility areas is considered to be partitioning - something which adversely affects wireless transmission. Partitioning can be reduced either by moving the position of the consumer out of the wireless shadow or by fitting another consumer / repeater to relay the signal.

2.2.1.1.4 Effect of furniture and people

The way in which a property is fitted out with furniture is a further aspect which can impact on the signals and thus on the range of SWX consumers. Metal furniture, in particular, and glass cabinets with steamed glass produce attenuations in the same way as does a TV cabinet with a TV inside.

People in a room can also impair the range of wireless consumers .

2.2.1.1.5 Distance to interference sources

There has been a significant increase in the number and spread of various wireless services (DECT, GSM, Wireless LAN, Bluetooth) over the past few years. Do ensure when planning your SWX consumers that no consumer is mounted directly next to an interference source.

2.2.1.2 Set-up of a wireless network

A wireless network functions as a “mesh network”. In a “mesh network, each network node is connected with one or several other network nodes. The information and data is relayed from node to node. This set-up makes “mesh networks” highly reliable. In the event of a node or connection being blocked, the network – at specific intervals – automatically searches for alternative routes to bring the signal to its destination.

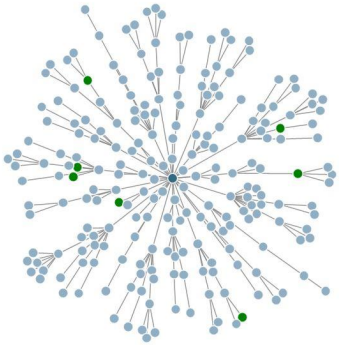

Figure 2: Mesh network

2.2.1.3 Consumers with SAFELOG Wireless

All SWX consumers have a router function in the wireless network. A router is responsible for network initialisation / network creation, channel selection, address allocation, appliance log-in and log-out and also serves the purposes of range extension and data exchange. Up to 1,000 SWX consumers can be monitored/managed in a wireless network.

2.2.2 Range planning

The range indoors between SWX consumers with plastic housings is a maximum of 30 meters, with metal housings a maximum of 20 meters, and with aluminum housings a maximum of 10 meters. The maximum range assumes direct line of sight between consumers.

If direct line of sight is not present, the maximum possible range is reduced.

The following table provides a rough overview of possible signal attenuations depending on the obstacle.

Based on the table, you have two options to determine the maximum allowable distance between two SWX consumers:

Material	Attenuation in %	Attenuation in dB	Attenuation rounded
Wood	10	0,46	0,5
Plasterboard	10	0,46	0,5
Glass	10	0,46	0,5
Pumice stone	10	0,46	0,5
Aerater concrete	20	0,97	1
Pressboard	30	1,55	1,6
Stone	30	1,55	1,6
Reinforced concrete	30 - 90	1,55 - 10	1,6 - 10
Brick	35	1,87	1,9
Interior wall	40	2,22	2,2
Exterior wall	60	3,98	4
Ceiling	70	5,23	5,2
Metal grid	90	10	10

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Table 1 – Attenuation factors in % / dB

A) Establishing with attenuation in %

You can proceed as follows in establishing the maximum spacing between two SWX consumers with the percentage attenuation taken into account:

A1) Straightforward planning with just a wooden wall

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [2)]	Wood	10%	**27 metres**

A2) Complex planning with an interior wall and a ceiling (two calculation steps)

Step 1

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [2)]	Interior wall	40%	18 metres

Step 2

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
18 metres	Ceiling	70%	**5,4 metres**

A3) Complex planning with a number of different interior walls (three calculation steps)

Step 1

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [2)]	Wood	10%	27 metres

Step 2

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
27 metres	Stone	30%	18,9 metres

Step 3

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
18,9 metres	Interior wall	40%	**11,3 metres**

[2)] Example of SWX consumers with plastic housing

A4) Practical example

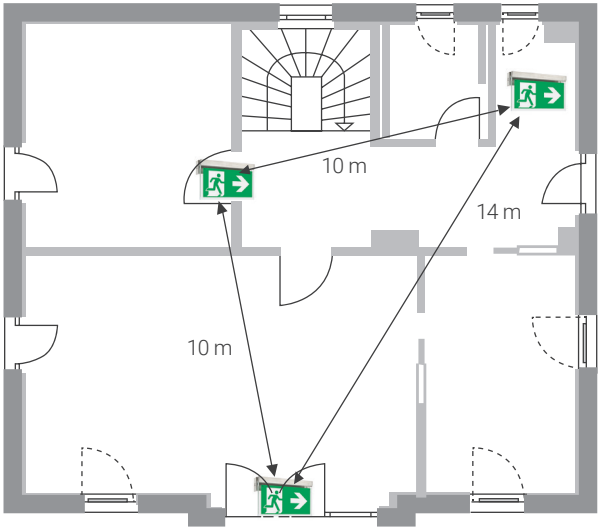

Figure 3: Practical example

A4) 1. Spacing of consumer 1 to consumer 2 is 10 metres acc. to plan.

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [3)]	Brick	35%	**19,5 metres**

Result: **Connection OK**

A4) 2. Spacing of consumer 1 to consumer 3 is 14 metres acc. to plan.
(two calculation steps)

Step 1

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [3)]	Brick	35%	19,5 metres

Step 2

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
19,5 metres	Brick	35%	**12,68 metres**

Result: **Connection not OK**

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[3)] Example of SWX consumers with plastic housing

A4) 3. Spacing of consumer 2 to consumer 3 is 10 metres acc. to plan. (two calculation steps)

Step 1

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [4)]	Brick	35%	19,5 metres

Step 2

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
19,5 metres	gypsum plasterboards	10%	**17,55 metres**

Result: **Connection OK**

Summary: As there is no assured direct connection from consumer 1 to consumer 3, the connection is routed via consumer 2.

B) Establishing with attenuation in dB

In establishing the maximum spacing between two SWX consumers with the dB attenuation taken into account, you need the following figure 3 (range conditional upon attenuation in dB) in addition to table 1 (attenuating factors in % / dB). Add the attenuating values in dB from table 1 as appropriate for the application instance and read-off the possible spacing from figure 3.

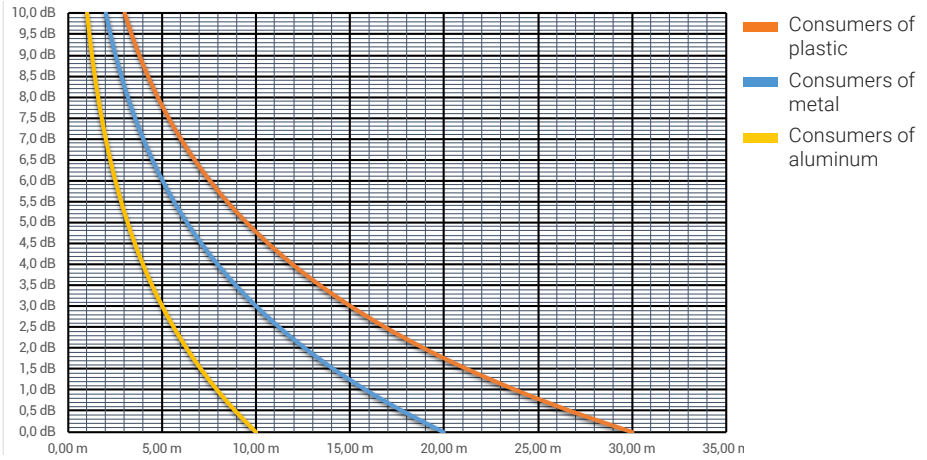

Figure 4: Range conditional upon attenuation in dB

[4)] Example of SWX consumers with plastic housing

B1) Straightforward planning with just a wooden wall

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [5)]	Wood	0,5 dB	**27 metres**

B2) Complex planning with an interior wall and a ceiling

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [5)]	Interior wall (2,2 dB) Ceiling (5,2 dB)	7,4 dB	**5,4 metres**

B3) Complex planning with a number of different interior walls

Max. spacing of consumers	Obstacle material	Attenuation	Max. spacing of consumers
30 metres [5)]	Wood (0,5 dB Stone (1,6 dB) Interior wall (2,2 dB)	4,3 dB	**11,3 metres**

2.2.3 Installation planning

Whilst the SAFELOG Wireless system is essentially a wireless system in which detailed planning of bus wiring the consumers is no longer needed, it still requires the general set-up to be planned.

2.2.3.1 Wireless system with SAFELOG TOUCH WIRELESS

The SAFELOG TOUCH WIRELESS main control unit has the wireless communication integrated between the main control unit and the SWX consumers. This means that the main control unit communicates directly with the consumers as the SWX consumers do one to the other.

Figure 5: SAFELOG TOUCH WIRELESS

[5)] Example of SWX consumers with plastic housing

2.2.3.2 Hybrid system with SAFELOG TOUCH WIRELESS

In addition to the wireless system, two wire-connected outputs for installing a maximum 250 consumers per output can be used at the SAFELOG TOUCH WIRELESS.

To this end, install the default RS485 bus wiring SAFELOG Line to the main control unit.

This hybrid installation thus permits connection of a total of 1,500 consumers (1,000 SWX consumers and 2 x 250 bus-linked consumers).

The set-up is diagrammatically shown as follows:

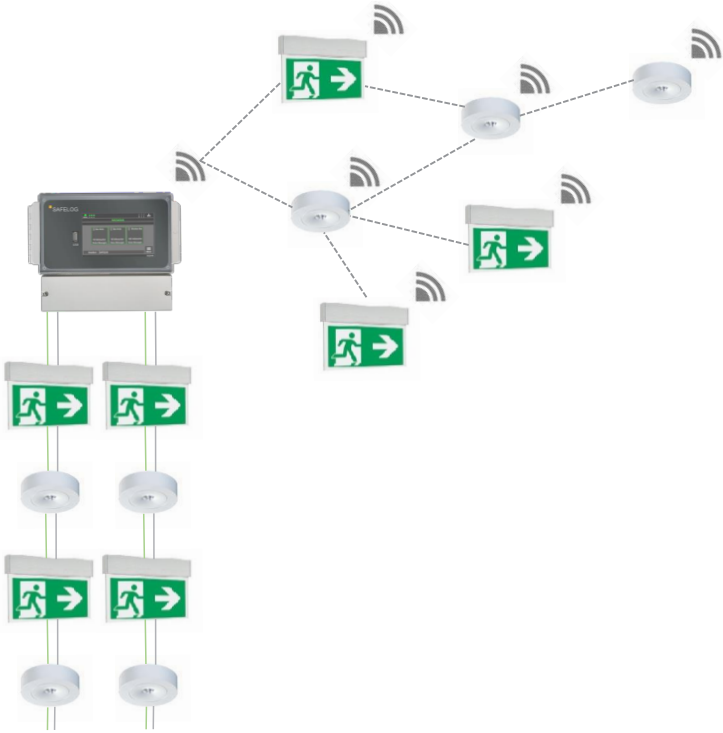

Figure 6: Hybrid system with SAFELOG TOUCH WIRELESS

2.2.3.3 Multi-network function with SAFELOG TOUCH WIRELESS

Every SAFELOG Touch Wireless system is provided at the factory with a unique network ID. This network ID enables several wireless networks in a project to be operated directly next to one another without the networks constantly affecting each other. This possibility is referred to below as the multi-network function.

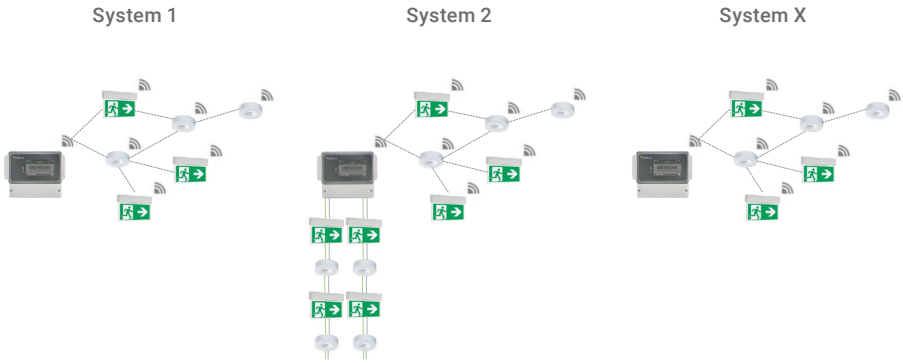

Figure 7: Multi-network function with SAFELOG TOUCH WIRELESS

In their initial state, the SWX consumers are not assigned to any ID. During the commissioning of the main control unit, the allocation of SWX consumers to the respective main control unit takes place simultaneously. It is advisable, in a multi-network installation, not to commission the systems simultaneously but one after the other.

If multiple wireless main control units and consumers are commissioned simultaneously, the consumer associates itself with the first received invitation from a wireless main control unit. Unintentionally assigned SWX consumers must first be removed from the wireless network either through the SAFELOG TOUCH WIRELESS main control unit or using the SAFELOG Wireless Analyzer before they can be integrated into the new wireless main control unit through the search (INVITE) function.

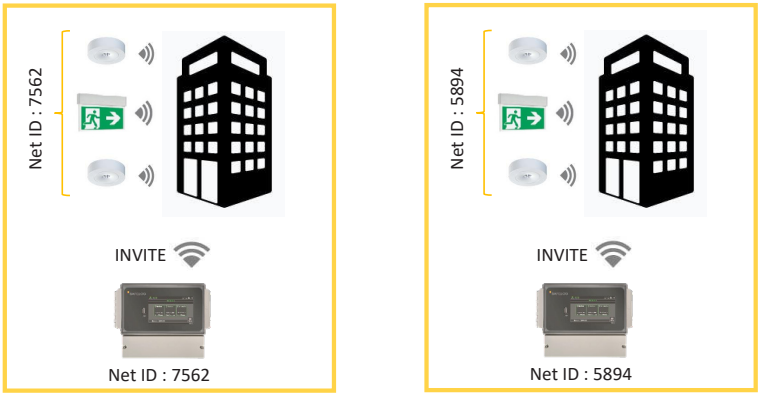

Figure 8: Net-ID

Figure 9: SAFELOG Wireless Analyzer

For more details, please refer to the SAFELOG TOUCH WIRELESS manual
→ **Refer to page 23 for the detailed instructions**.

2.2.3.4 SAFELOG TOUCH WIRELESS – line scheme

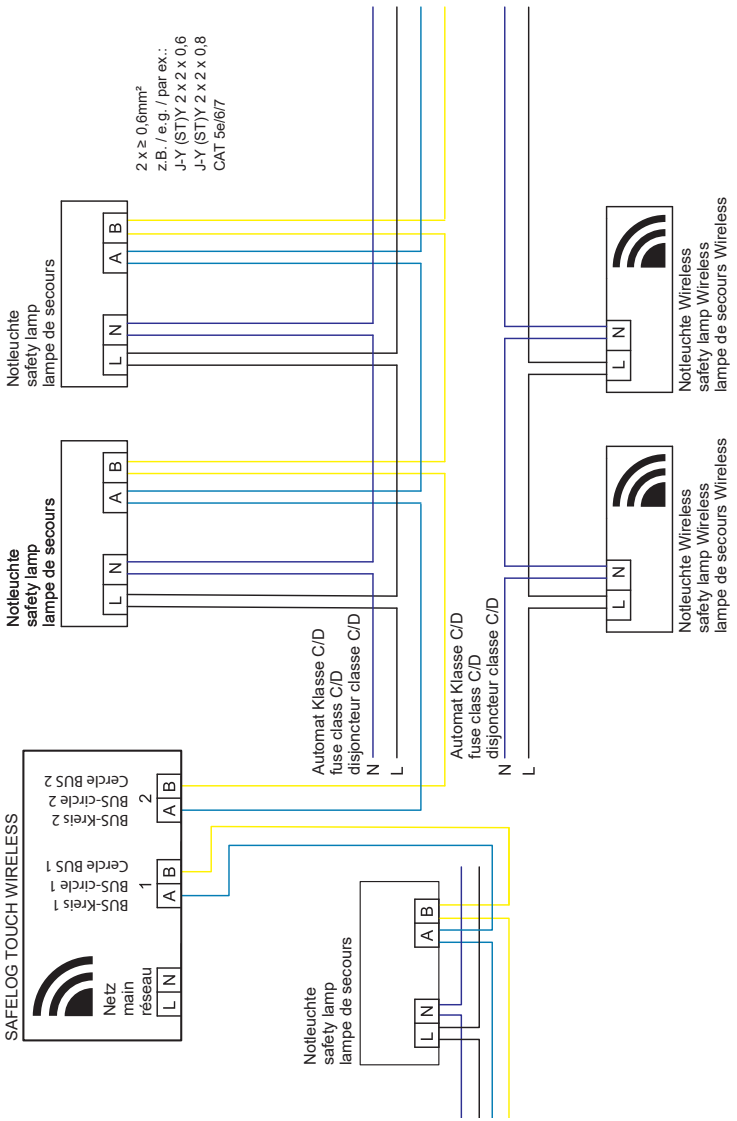

Figure 10: SAFELOG TOUCH WIRELESS – Line diagram of a hybrid installation

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2.3 Installation of wireless systems

2.3.1 Installation - Consumers

To mount the consumers, do firstly follow the mounting instructions and particularly those on installing SAFELOG consumers which are enclosed with the luminaire in question. After mechanically installing the luminaire and after its connection to the mains voltage, proceed with the bus addresses as follows:

The SAFELOG consumers have an installed BUS module, which was provided with an 8-digit hardware address (e.g., 00:AB:01:D1) at the factory. The hardware address of the consumer cannot be changed and is used for clear identification of the luminaire within the BUS installation. Each consumer is provided with four address stickers:

Sticker 1: Adhered to the electronic module – inside the consumer – during manufacturing.

Sticker 2: Adhered to the consumer - visible from the outside - during the final inspection of the consumer.

Sticker 3: Provided to facilitate installation. For this purpose, it is detachably adhered to the red notice which is enclosed with the consumer.

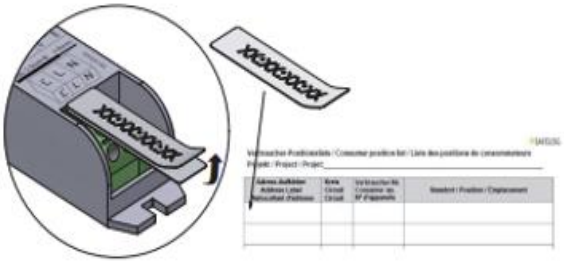

Figure 11: address sticker

For address sticker, for instance:

SAFELOG LINE (SL): 00:AB:01:D1

SAFELOG WIRELESS (SWX): 00:AB:02:11

When installing the consumer, remove the address sticker from the red notice and adhere it to the provided field in the included “Consumer position list”. Then note down the bus circuit, consumer number and location of the consumer next to the address sticker. Then also use this list for the next consumers to be installed.

List of consumer‘s positions

Project: Hospital, Any town

Address label	Circuit	Consumer no.	Position
00:AB:01:D1	2	1	Main entrance ground floor
00:AB:02:11	3	2	Left-hand corridor ground floor

2.3.2 Installation - Monitoring system

To install the bus monitoring system, do follow the notes in the instructions of the appropriate device. → **Refer to page 23 for the detailed instructions**.

2.4 Commissioning of wireless systems

Wireless systems are always to be commissioned in the following sequence:

1. Installation and permanent setting up of the power supply at all consumers.
2. With Item 1. fully dealt with, wait until the wireless network has completely set itself up (Item 2.4.1).
3. Incorporating and importing the consumers into the SAFELOG main control unit (Item 2.4.3).
4. Examination of the tracked consumers as to completeness.

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2.4.1 Initial set-up and set-up a new of wireless network

With the SWX consumers installed and power supplied to all consumers, the consumers then automatically set up a wireless network. No other steps are needed here.

Note: The wireless network can only fully set itself up when all consumers are continuously supplied with mains voltage with the number of connected consumers determining the following times which are possibly required for this set-up:

- **Up to 25 SWX consumers:** approx. 30 min.
- **Up to 50 SWX consumers:** approx. 40 min.
- **Up to 75 SWX consumers:** approx. 50 min.
- **and so on.**

As a result, it can take up to 12 hrs. for a wireless network with 1,000 consumers to be fully set up The network may remain instable during this time as it is occupied with establishing the best wireless connection routes. Time and time again, this can result in individual consumers being temporarily out of reach.

Moreover, do note that any change to the wireless network structure, such as removal, addition or positional change of consumers triggers the wireless network being set up anew. This, in an extreme instance, would again take up the above time.

2.4.2 General reaction of consumers in the wireless network

The wireless system in the SRD band is subject to maximum transmitting time restrictions. Moreover in contrast to the cable connection, the wireless connection is possibly subject to temporary quality variations. That is why in the wireless system some information / failures are intentionally reported after a significant delay. In the case of a large number of consumers, this may be up to 2.5 hours.

The situation is different regarding the reaction of operating commands triggered by the SAFELOG main control unit. These are relayed directly to the SWX consumers.

2.4.3 Link/connect the consumers to the SAFELOG central

Once you have provided the wireless network with the appropriate time for a full set-up, you can commission the SAFELOG main control unit and import the consumers into the system. To this end, follow the commissioning instructions in the operating manual.
→ **Refer to page 23 for the detailed instructions.**

After the system is commissioned, then compare the number of imported consumers in the system with your consumer position list. If they do not match, then check which consumers the system has not tracked.

Should the system not have tracked all the installed consumers, then firstly make sure you have provided the system with sufficient time to set up the network (see Item 2.4.1) and repeat, if necessary, the consumer search at the SAFELOG main control unit. As a next step, check if the consumers in question really function by examining them on the spot.

If the time for the network set-up was adequate and a visual check has shown them to be OK, then there is probably a problem with the wireless connection quality (weak signal). For precision-analysis of the connection quality, do contact your Service partner who can examine the wireless network illumination in the design project.

SAFELOG WIRELESS

SAFELOG BUS-WIRING

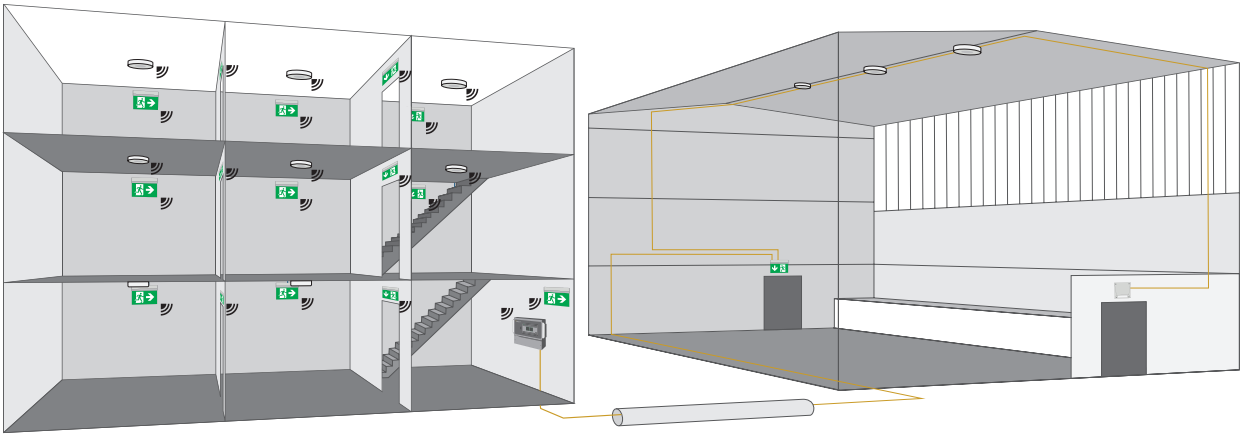

Figure 12: Schematic diagram of a SAFELOG hybrid installation

For further operation and programming, detailed instructions are available as follows:

1. As a file on the enclosed USB stick.

2. As download via the following link:
   https://www.safelog-touch.de/Safelog_Touch_EN.pdf
   Alternatively, you can start the download using the QR code shown:

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