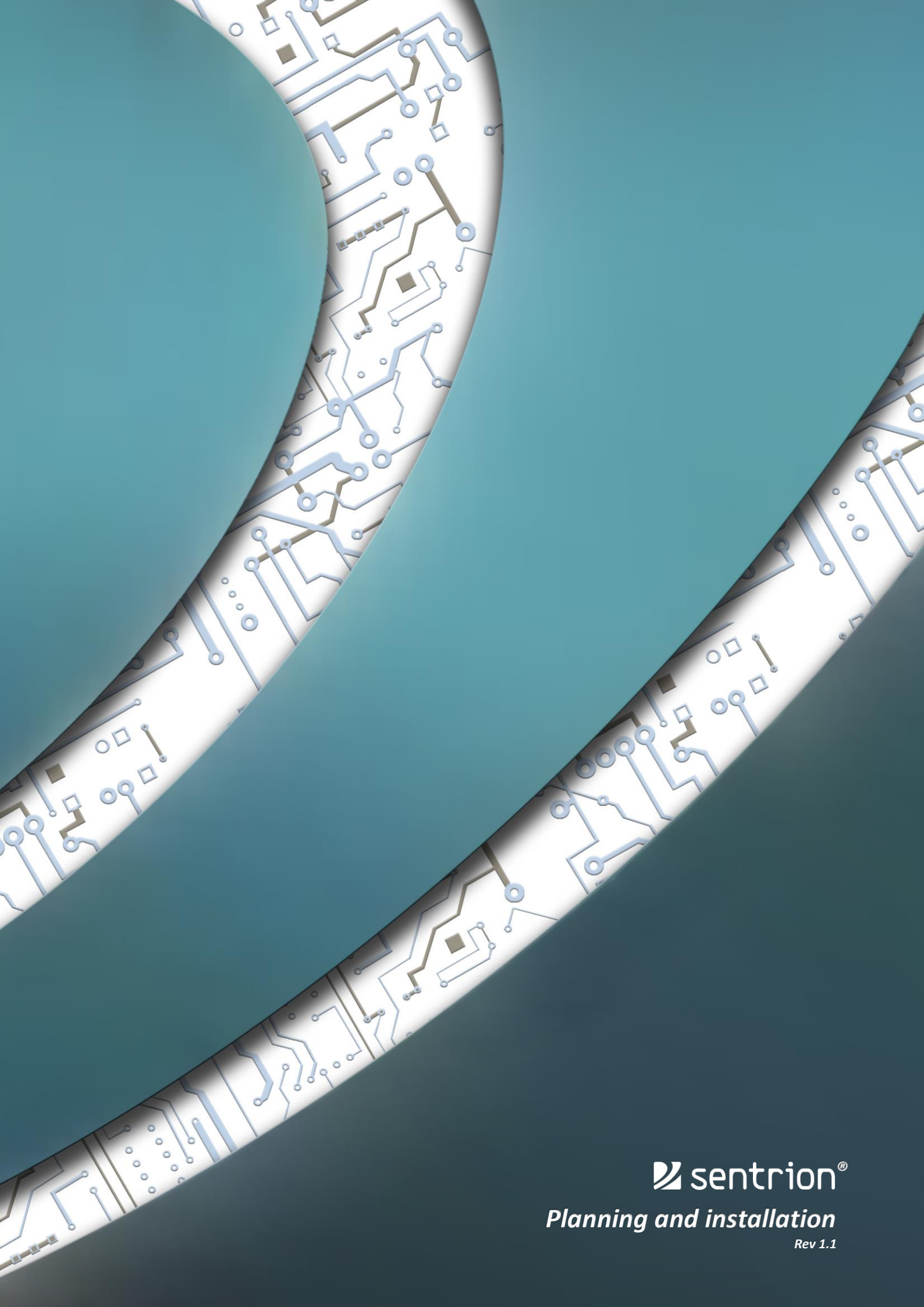

sentrion®

Planning and installation

Rev 1.1

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1 General

This document describes the integrated access control and burglar alarm system Sentrion and how its components should be installed.

Sentrion is a powerful system for integrated management of access control, burglar alarms, and duress/hold-up alarms. The system has built-in support for alarm transmission equipment as well as advanced access control functions. All system functions can be supervised and operated either with the help of a management system, using a control panel such as DSS Touch or DSS Ace, or the integrated web interface. The system is configured at installation using a management system or the integrated web interface but operates completely autonomously without any external connections.

The purpose of this document is to provide a comprehensive overview of the system components, how they function together and how installation of individual components and complete systems should be done. In addition, there is a chapter with information and examples to ease planning and installation of a complete Sentrion system that meets the desired requirements.

1.1 Sentrion manuals

The following manuals for Sentrion are available:

- *Sentrion Introduction and Administration.*
- *Sentrion Configuration.*
- ***Sentrion Installation and Planning.***
- *Sentrion Manager.*

1.2 Support

For technical support, please contact TLAB West AB.

E-mail: **sentrion-support@tlabwest.se**

Phone: +46(0)31 83 00 88

Web: www.tlabwest.se

2 System overview

2.1 Basics

The S4 and S4-DUO alarm panels are fully fledged burglar alarm and access control systems that are based on the same technical platform and software. The key difference between them is the total amount of peripheral devices (DSS devices) and other equipment that may be connected. In the diagrams below, these differences are clearly illustrated. The alarm panels are functionally completely compatible and can be combined within the same facility.

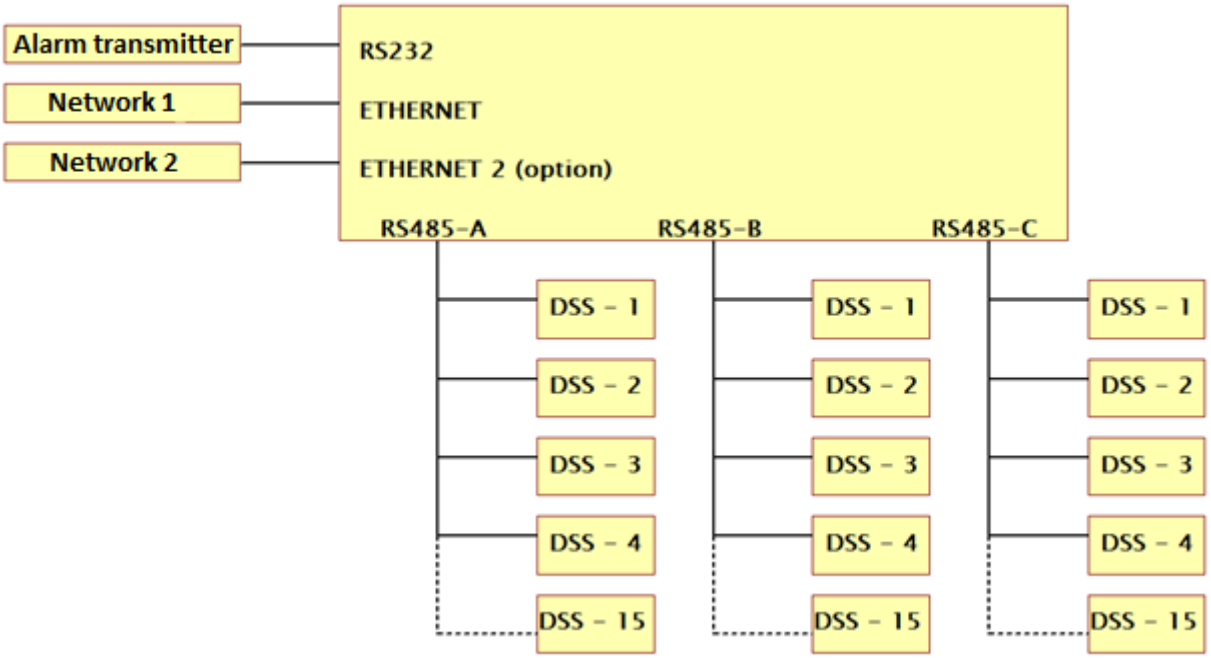
Configuration of the panels is done using the integrated web interface OR using a management system. All communication to the panels is encrypted (SSL/TLS). Alarms can, if so desired, be sent to the monitoring center via an alarm transmitter connected to the RS232 port (for models, see chapter *Peripheral Devices*).

All alarm points (inputs), signaling/controls (outputs) and card readers are connected to the DSS devices. The alarm panel (S4/S4-DUO) monitors and communicates with all DSS devices and is thus the central decisionmaker in the system.

All device lines connected to the RS-485 buses of the panels have a maximum cable length of 1200m.

2.2 Overview

2.2.1 S4

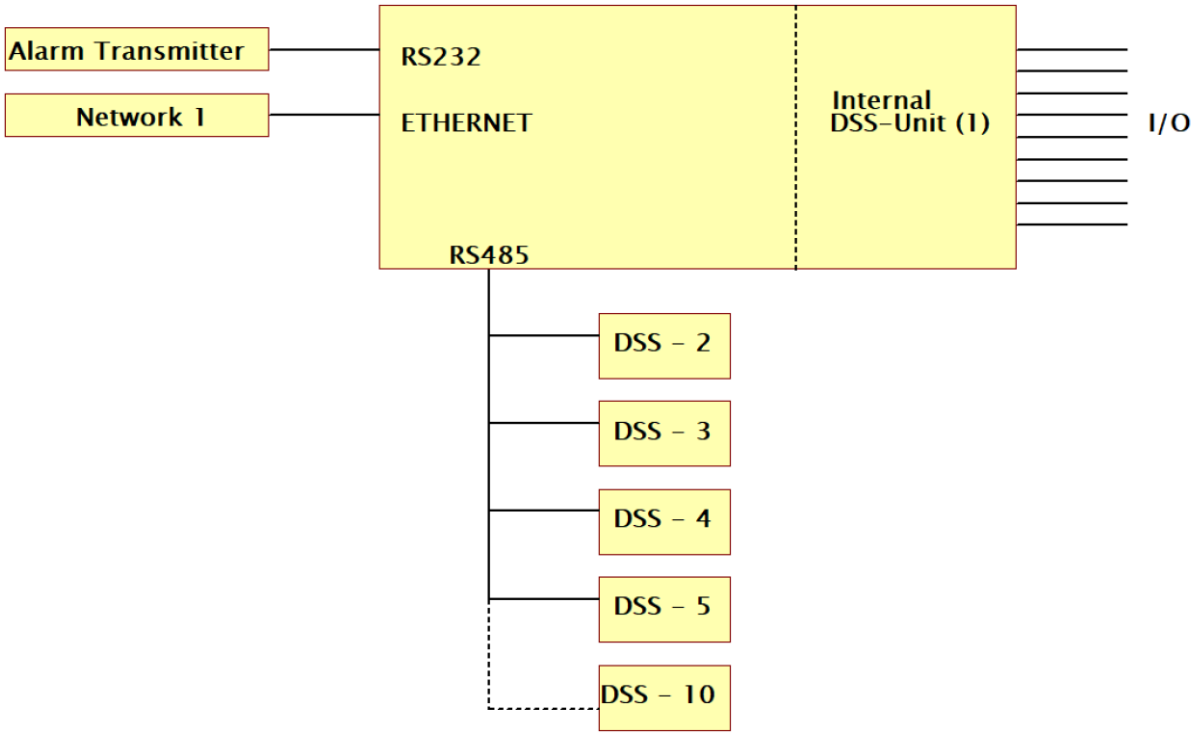


The S4 panel has three RS485 buses for communication with peripheral devices (DSS devices). Up to 15 DSS devices can be added to a device line connected to each one of these buses. No more than 4 of the 15 DSS devices on each device line should be expansion devices (see chapter *Peripheral Devices*).

Communication from browsers or management systems occurs via the built-in Ethernet port, if extra access security is desired the S4 may be equipped with another Ethernet-port (module Sx-TIF3-NIC).

Alarms may be sent to a monitoring center via an alarm transmitter connected to the RS232 port (see chapter *Peripheral Devices* for supported models).

2.2.2 S4-DUO



The S4-DUO panel has one RS485 bus for communication with peripheral devices (DSS devices). Up to 10 DSS devices can be added to a device line connected to this bus. There is also an internal DSS device integrated into the panel, which - if activated - occupies the first address on the device line and limits the number of external DSS devices to 9. This internal DSS device can be deactivated with a DIP-switch setting.

2.3 Network Communication

The alarm panels communicate with a management system or browser via standard Ethernet. This communication is always protected (SSL/TLS-encryption). It is however still recommended to review the security as the networks themselves can be all too open to the outside world. Suitable methods are:

- Secure the configuration and ensure availability of other network components (switches, routers)
- Replace encryption keys so they are unique for the facility
- Isolate the network for the security systems so that it is not connected to the general network (air gap)

2.3.1 Bandwidth

The alarm panels are tested for a bandwidth down to a minimum of 1Mb/s (megabit per second). Performance below this, or very slow response times, can adversely affect the management and monitoring of the system. Note that the local functions of each panel are not affected.

2.3.2 Ports

The alarm panels use the following network ports. These ports must be made available in local switches and routers for communication to be established.

Communication with web browsers:

- Port 443 (TCP) (inbound)

Communication with management systems:

- Sentrion protocol (Standard): 7569 (TCP), 7572 (TCP) (inbound)
- Sentrion protocol (Encrypted and Encrypted with authentication): 7579 (TCP), 7582 (TCP) (inbound)

Communication between alarm panels (remote functions, P2P for presence zones etc.):

- Sentrion protocol (Standard): 7569 (TCP), 7572 (TCP) (inbound)
- Sentrion protocol (Encrypted and Encrypted with authentication): 7579 (TCP), 7582 (TCP) (inbound)
- Port 7589 (UDP) (inbound/outbound)

Communication with configuration software (Sentrion Manager)

- Port 22 (inbound)

Debug information (available in Sentrion Manager)

- Port 8090 (UDP) (outbound, multicast)

2.4 Autonomy and logical components

2.4.1 Door environments

A door environment is a logical collection of inputs, outputs and card readers. The purpose of this is to easily gather everything that concerns one door into a single object. Door environments also form the basis for access assignment.

For door environments to be able to function as desired, all components (inputs, outputs and card readers) of the same door environment must exist on a device line connected to the same RS-485 bus. Normally these components are connected to a single DSS device, but it is possible to spread them out over several different DSS devices as long as these are connected to the same device line. Likewise, you can create more than one door environment using the components of a single DSS device, for example, two door environments on the same DSS-Door2, as seen later in this document.

All functions involving door environments operate completely autonomously in the alarm panel. There is no limit to how many door environments a panel may contain, although the number is indirectly limited by how many DSS devices (inputs, outputs and card readers) can be connected.

2.4.2 Interlocks

Interlocks (also called sluices) are a combination of several door environments where only one can be open at a time, i.e., while one of the door environments in the interlock is held open no other doors can be opened. Interlock functions can temporarily be overridden by the operator if it is necessary for a specific transport or other activity (the operator must be authorized).

All functions involving interlocks operate completely autonomously in the alarm panel. There is no limit to how many interlocks a panel can contain, although the number is indirectly limited by how many DSS devices (inputs, outputs and card readers) can be connected.

2.4.3 Elevators

An elevator in its simplest form is comprised of a card reader (in the elevator cab) and outputs (one per floor) that are activated when an authorized user enters their card/code in the card reader. Elevators can also be extended so that each floor is a fully fledged door environment that calls for the elevator and opens the elevator door upon access requests.

For an elevator to function as desired, all components involved (inputs, outputs and card readers) for the elevator and its floors should be connected to the same device line. This still allows a single S4 to support many floors using simpler elevator configurations.

All functions involving elevators operate completely autonomously in the alarm panel. There is no limit to how many elevators or floors a panel may contain, but the number is indirectly limited by how many DSS devices (inputs, outputs and card readers) can be connected.

2.4.4 Areas and sections

Burglar alarm functionality in the S4/S4-DUO is divided into *Sections* and *Areas*. A section could be anything from an individual input (with different levels of supervision) to a complete door environment or DSS device. There are many advantages with configuring door environments as sections, as it enables maximum integration of access control and burglar alarm features. Areas are what the user normally interacts with for arming and disarming purposes. A single area may contain many sections with different configurations and functionalities. S4 and S4-DUO also support overlapping areas where one or more sections are part of more than one area. The basic rule is that a section cannot issue an alarm (be considered armed) unless all areas it belongs to are armed.

Areas operate at the alarm panel level, i.e., sections from all DSS devices, no matter their placement, can be included in any area.

It is sections and areas that, depending on configuration, can send information to connected alarm transmitters for transmission to a monitoring center.

All functions involving areas and sections operate completely autonomously in the alarm panel. There is no limit to how many areas or sections a panel may contain, although the number is indirectly limited by how many DSS devices (inputs, outputs and card readers) can be connected. Any function that depends on more than one alarm panel requires working network communication (peer-to-peer) between the panels.

2.4.5 Anti-passback and presence zones

For facilities that require extra control over entry and exit or need to monitor what persons are within a specified area at critical times, the S4 and S4-DUO offer anti-passback and presence zone functionality. The two types of zones are functionally equivalent with the exception that anti-passback zones can also block entry for a person already considered to be in a particular area. Using this function, you can, among other things, prevent more than one person from entering an area with one person's card, or ensure that sufficiently many (or few) persons are in the same area at the same time.

Anti-passback and presence zones operate at the alarm panel level and can also be made global to operate across several panels using a management system. Information about passages between zones will be communicated directly between the panels (peer-to-peer communication).

All functions involving anti-passback and presence zones operate completely autonomously in the alarm panel. There is no limit to how many zones a panel may contain, although the number is indirectly limited by how many DSS devices (inputs, outputs and card readers) can be connected. Zones that are spread across more than one panel require working network communication (peer-to-peer) between the involved panels.

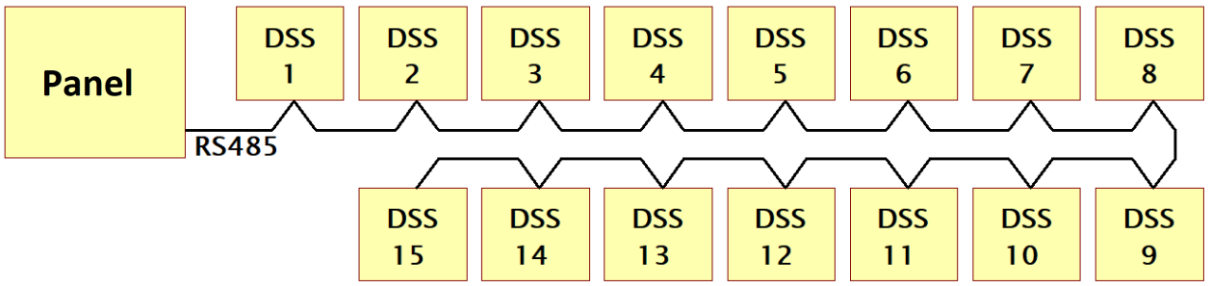
3 System components and examples

3.1 Device lines

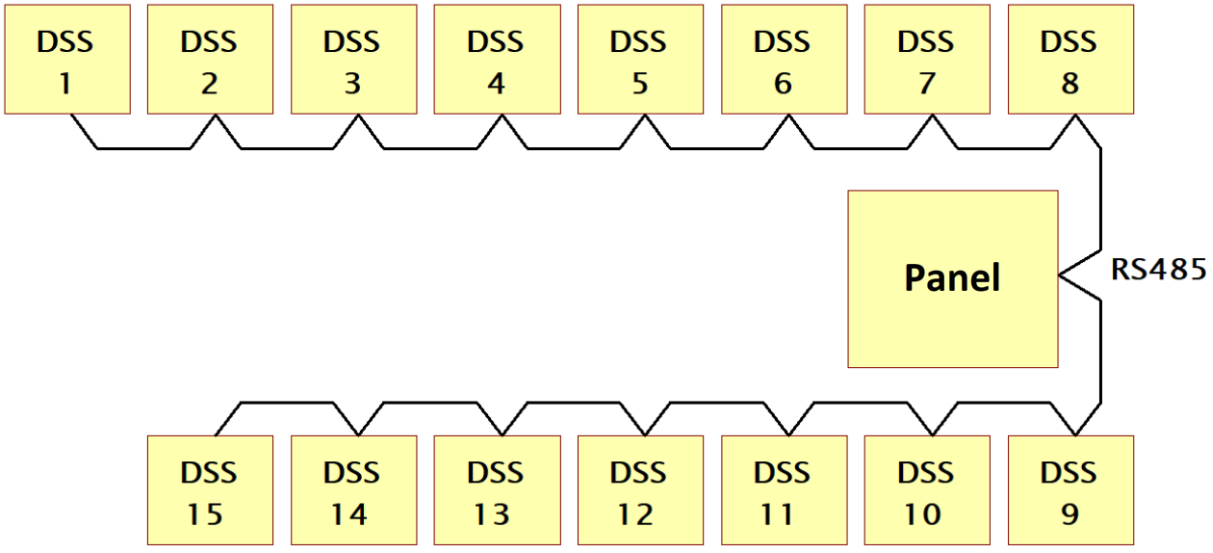
S4 and S4-DUO panels provide RS-485 buses for connecting device lines to communicate with peripheral devices, such as DSS devices. The S4 has three buses, and the S4-DUO has one. The rules and requirements for device lines connected to these buses are as follows:

- Protocol: RS-485
- Maximum length: 1200m
- Support for straight, split, and branched device lines
- A maximum number of 15 devices per device line (10 devices for S4-DUO)
- There are no special wiring requirements, but FLAQQBR or other twisted-pair wire is recommended
- No termination is required
- All devices on the same device line (including the panel) should have the same 0V/-

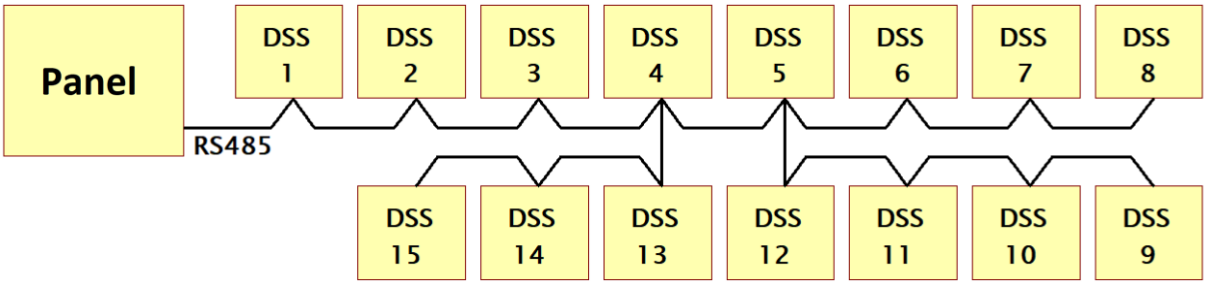
As the rules above show, there is a large degree of freedom and simplicity to planning the RS485 device lines, but you should be aware that the distribution of voltage/current may be a source for issues (see *Power supply* below for more information). Below are some examples of how these device lines can be set-up. Please note that in these examples the device lines are drawn as a single line even though they actually consist of two wires.



Under the best of circumstances, all devices are laid out as a single long straight device line (max 1200m)



Same principle as the previous example, all devices are on a single long device line but with the panel placed in the middle



Here there is a device line out to DSS 1-8, but also two branches, one to 13-15 and one to 9-12. This type of branched "star" connection is allowed as long as the total device line length does not exceed 1200m.

3.1.1 Communication security

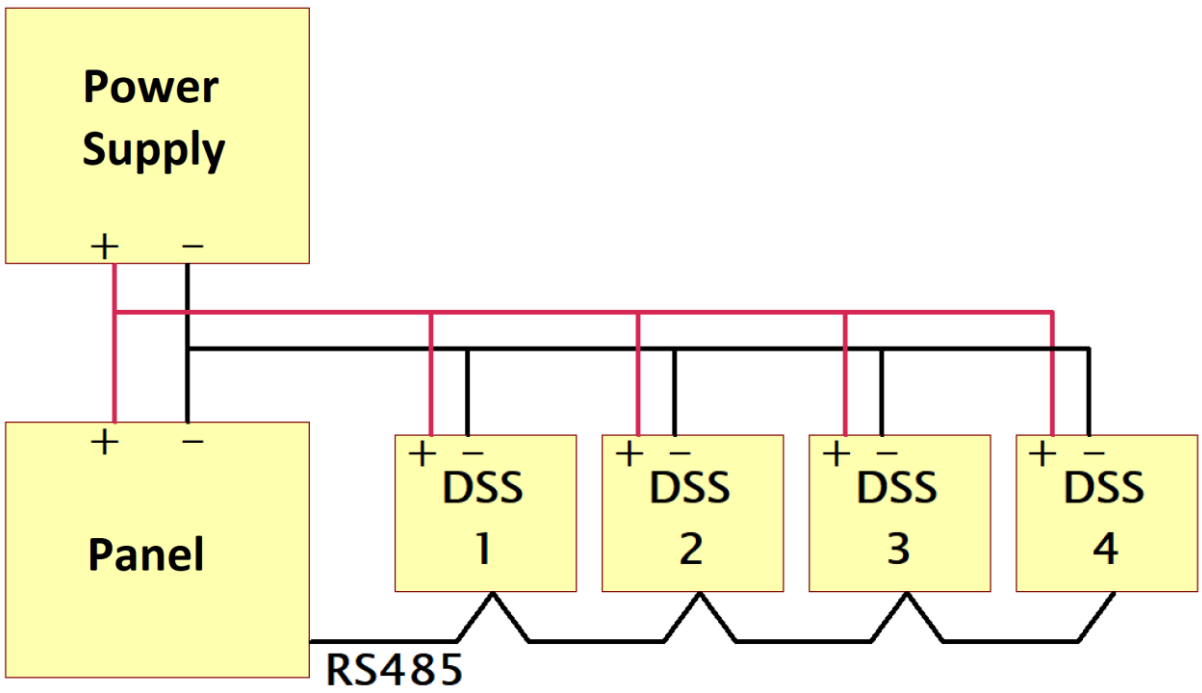
All communication over RS-485 is continuously monitored and a communication fault is raised if a DSS device does not respond in time. Security can be increased in two additional ways:

Scrambling provides improved protection against eavesdropping on the communication. Scrambling is activated on the DSS device level.

Substitution detection means that an operator must approve the replacement of a DSS device. The alarm panel will not resume communication with the substitute device until an operator has confirmed that the replacement is authorized by issuing a command in the web interface or a management system. Substitution detection is activated on the DSS device level.

3.2 Power supply

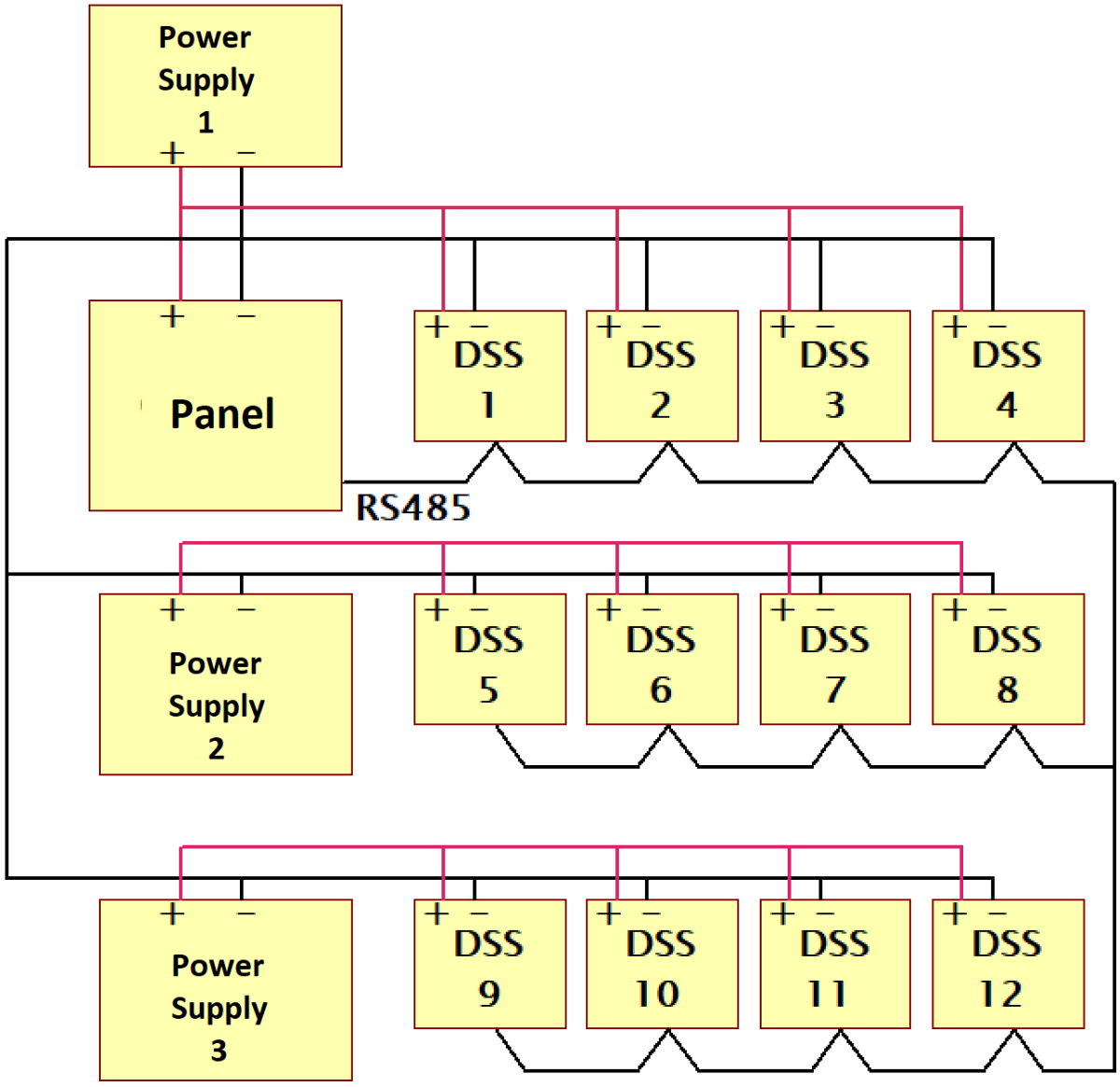
As described in the previous chapter, ALL devices on the same device line must use a common 0V/- for their power supply. If a single power supply is used for all equipment connected to one panel this is not an issue. Such a solution may look as follows:



All devices are connected to the same power supply

In larger or more distributed facilities, problems are more likely to emerge with this solution. The problem may be that major voltage-drops occur in certain parts of the facility or that the power supply simply cannot deliver

the required current. The solution is to supplement the installation with additional power supplies. When such a solution is implemented, it is extremely important to ensure that all parts are given a common 0V/- potential. A correct solution may look as follows:



The panel is communicating with 12 DSS devices. These are supplied by three power supplies. Number 1 supplies DSS 1-4, no. 2 supplies 5-8 and no. 3 supplies 9-12. Note that 0V/- is connected between the three power supplies to ensure functionality. This connection is mandatory to ensure functionality!

3.3 Inputs

All inputs on all DSS devices may be configured for different behaviors via the software. Configurable properties include:

- Type - i.e., unsupervised/digital, single level supervision, dual level supervision or triple level supervision. Please note that the terms *supervision* and *balancing* are used interchangeably in both texts and software.
- Levels - i.e., the resistor values used
- Normally open/Normally closed - i.e., should alarms occur when the circuit closes or opens

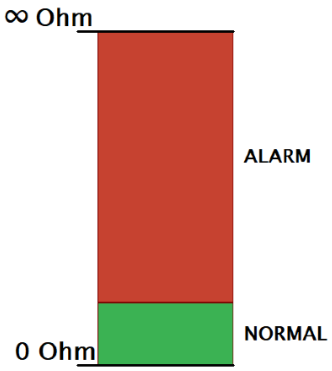
An input on a DSS device is conceptually a multimeter where the DSS device continuously measures the resistance on the connected loop. The resistance is then interpreted against the values set in the configuration.

The default is that single and dual level supervision inputs use 5k6 resistors. If one or more inputs need other supervision levels or resistors, these must be configured in the software. All DSS inputs are intended to measure resistance in the 0-20kΩ range, with a minimum resistor value of 1kΩ. Do not deviate from these recommendations without consulting support.

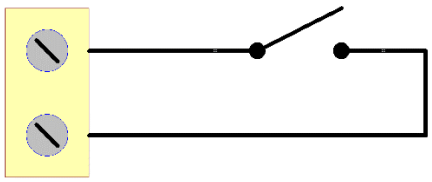
3.3.1 Digital inputs

A digital (or unsupervised) input can only handle two levels. NORMAL and ALARM. The levels that correspond to NORMAL and ALARM are adjusted in the software.

Measurements from the input are interpreted as follows:



When the measured resistance passes the threshold between NORMAL and ALARM, the input will change status. A normal connection of a digital input looks as follows:

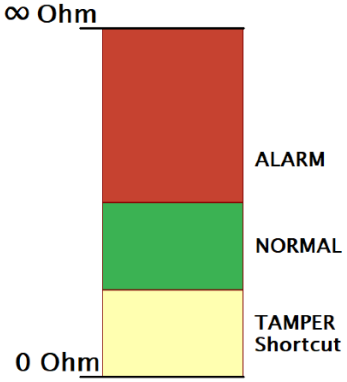


Digital inputs are often used for functions that do not require special monitoring, such as push buttons in a door environment or other function inputs. It is not recommended that digital inputs be used for alarm functionality.

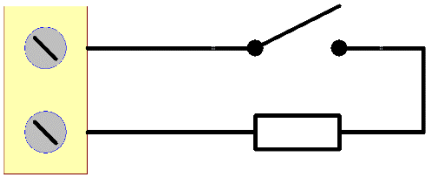
3.3.2 Single level supervision inputs

A single level supervision input gives some protection from manipulation, as it has three levels: TAMPER (short), NORMAL and ALARM. The ALARM and NORMAL levels are adjusted in software.

Measurements from the input are interpreted as follows:



When the measured resistance passes the threshold between TAMPER and NORMAL or NORMAL and ALARM, the input will change status. A normal connection of a single level supervision input looks as follows:

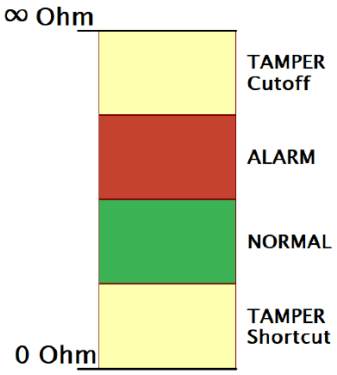


Single level supervision inputs are often used for functions that do not require very high security. Using single level supervision inputs for alarm functionality is not recommended.

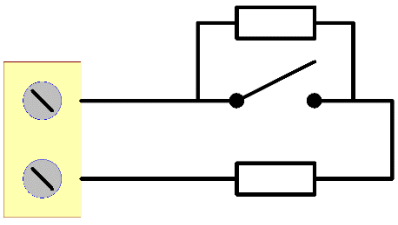
3.3.3 Dual level supervision inputs

Dual level supervision inputs are recommended for all alarm functionality. They provide good protection as they are monitored for both shorts (below the NORMAL level) and cuts (above the ALARM level).

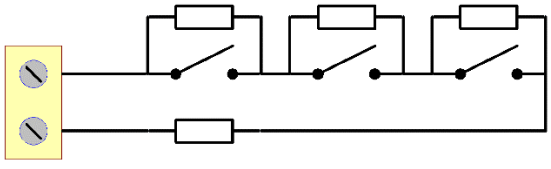
Measurements from the input are interpreted as follows:



When the measured resistance passes the threshold between any of the regions in the example the input will change status. A normal connection of a dual level supervision input looks as follows:



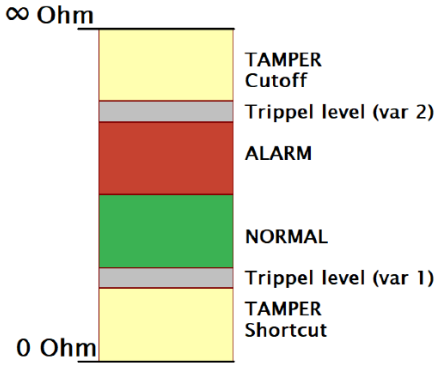
It is also possible to place several sensors on the same input. Please note that if this is done the input thresholds must be adjusted accordingly and there is only ONE event for ALARM. You will not be able to determine which of the sensors has been affected. Such a connection may look as follows:



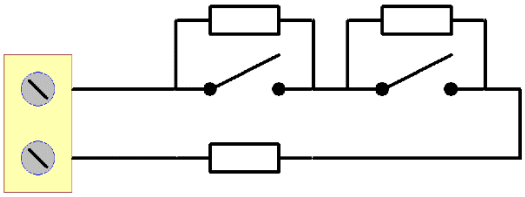
3.3.4 Triple level supervision inputs

Triple level supervision inputs make it possible to detect two resistance levels in addition to NORMAL, TAMPER (short) and TAMPER (cut). They are therefore typically used for detectors that can provide two separate signals, such as motion detectors with masking protection. Triple level supervision makes it possible to determine which signal was sent while still monitoring the input for NORMAL and TAMPER.

Measurements from the input are interpreted as follows:



Note that there are two options for implementing the third level, either above the ALARM level or below the NORMAL level. Which of these is more appropriate depends on the specific situation. The connection should be made as follows:



As the example shows, it is the same arrangement as a dual level supervision input with two breakers, but the configuration must be adjusted to obtain the third level. If 5k6 is used as a loop resistor (bottom), 2k2 across the ordinary sensor (top left) and 10k across the sensor for masking protection (top right) then the measurements will be interpreted as follows:

NORMAL mode (both breakers closed)	5k6
ALARM mode (right breaker open)	7k8
Masking protection (left breaker open)	15k6
Both ALARM & masking protection	17k8

If you analyze these values, the following can be observed:

- The total resistance does not exceed 20k (OK)
- The minimum resistor used does not reach below 1k (OK)
- The masking protection is detectable as separate from a normal alarm (OK)

When configuring this input, the following values are appropriate:

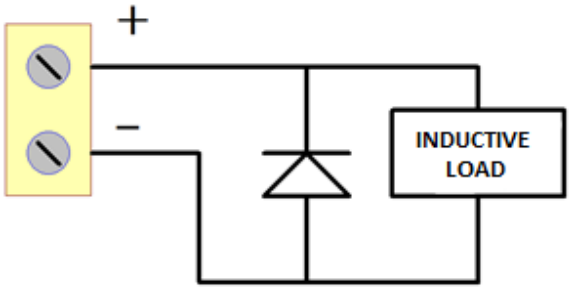
Threshold TAMPER (cut)/NORMAL	4k
Threshold NORMAL/ALARM	6k7
Threshold ALARM/TAMPER (short)	20k
Triple level	12k

As the configuration above shows, the triple level is set as an extra value between TAMPER (cut) and ALARM or, alternatively, between NORMAL and TAMPER (short).

3.4 Outputs

DSS devices have two types of outputs: relay outputs and open collector outputs (OC). The relay outputs are either dry contact relays or voltage relays. The voltage used by voltage relay outputs and OC outputs is always the same as that of the power supply to the DSS device. Current limitation is built in.

When external devices are connected to voltage outputs you should be observant of whether these devices constitute an inductive load that can send out *counter EMF* (*counter-electromotive force)* on the powerlines. A typical example of such a device is an electric strike. To prevent other equipment from being damaged a protective diode should ALWAYS be installed if you suspect that counter EMF can occur. A protective diode is connected according to the following diagram:



A suitable diode is, for example, the 1N4001

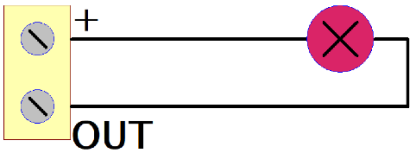
Maximum current for these output types is:

Open Collector	100mA (be alert to the starting currents of the connected load)
Relay – Dry contact	1A / 30V (AC/DC)
Relay – Voltage output	1A (internal automatic circuit breaker)

3.4.1 Open Collector

Open Collector (OC) is a transistor output that connects the output to 0V (-, lowering) when it activates. The output is normally used to directly drive smaller loads, such as indication lights. If higher loads (such as locks) are connected, intermediate relays must be used.

The output may be connected according to the following diagram:



On a DSS device there is always a power output terminal in close proximity to the OC output terminal. The voltage is the same as the supply voltage of the device. The load is connected between the power output terminal and the OC output terminal. The OC output terminal acts as 0v/- for the connected load. In the example above, the red light will turn on when the output is activated.

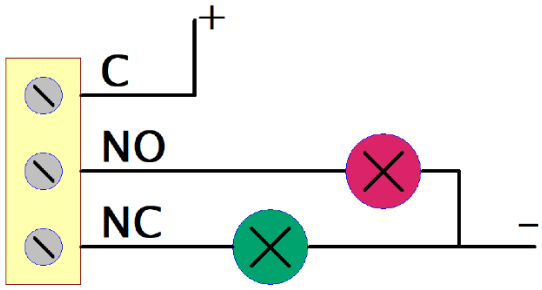
3.4.2 Dry contact (relay)

A dry contact relay output is commonly used when you wish to control external equipment without creating a galvanic connection to it. Examples include motor locks or other devices using different power sources. A relay output of the dry contact type always has three terminals:

C	Common terminal
NO	Normal Open terminal - in contact with C when the output is active
NC	Normal Closed terminal - in contact with C when the output is passive

Consequently, either C and NO or C and NC (but never NC and NO) are connected depending on the output's status.

The output can be connected according to the following diagram:

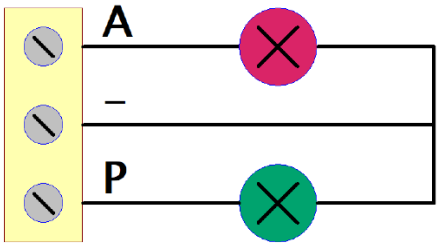


Here, external power is connected to C (Note: not exceeding 30V AC/DC). Loads (in this case, lights) have been connected, one between NO and the external power 0V and one between NC and the external power 0V. When the output is passive, the green (bottom) light will be on, and the red light (top) will be off. When the output is active, the green light (bottom) will be off, and the red light (top) will be on.

3.4.3 Voltage output (relay)

A voltage relay output connects the supply power of the DSS to one of two terminals depending on the state, active or passive, of the output. A common 0v/- terminal is mounted between them. This type of output is suitable for use when you are connecting an electric strike or other equipment that is powered by the DSS device.

The output can be connected according to the following diagram:



Here, a red light (top) is connected between A (active) and 0V/- and a green light (bottom) is connected between P (passive) and 0V/-. This results in the red light turning on when the output is active and the green light turning on when the output is passive. In this specific example the red light could, for instance, represent an electric strike on a normal door.

3.5 Card readers and locks

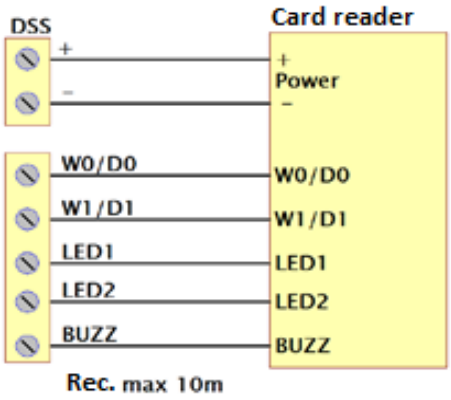
The DSS device family supports two different types of card reader interfaces: Weigand and RS-485. Over RS-485 either the OSDP or the Idesco RS-485 protocol is used. See the table below for information on what features the different DSS models support. Note that these interfaces do NOT have any connection to what type of access cards are used or how these are configured. These parameters are handled by the card reader, and to some extent, the configuration in the alarm panel.

The DSS device family can also control locks connected via RS-485/OSDP. Please note that connecting locks requires the use of Encrypted OSDP which means that any other readers or locks connected to the same interface must also use Encrypted OSDP.

It is not possible to combine RS-485/OSDP devices and Wiegand devices on the same DSS device.

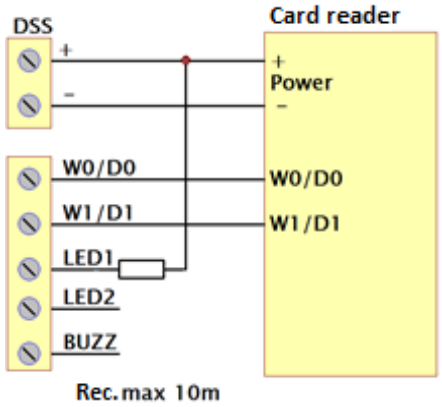
3.5.1 Wiegand

Wiegand is a semi-parallel interface used between DSS devices and card readers, that mainly allows single-direction traffic from the card reader to the DSS device. You should keep in mind that Wiegand is an unsecure interface that is easy to intercept and manipulate. Card readers using the Wiegand interface are connected according to the following diagram:



Note that the cable length between the DSS and card reader in this case is recommended to be a maximum of 10m. However, this depends heavily on the cable type and the card reader, as well as the external environment. What power supply is used is dependent on the card reader's properties. LED1 and LED2 control the LEDs in the card reader. Usually, LED1 is used for GREEN indication and LED2 for RED indication.

If the card reader doesn't have all indication inputs, then at least LED1 should be used to let the DSS device detect that a reader has been connected. Certain types of Wiegand readers lack these indication inputs completely (typical examples include vehicle readers and other long-range readers). For these to work properly with DSS devices, at least one indication signal must be connected to voltage via a resistor. See the following example:

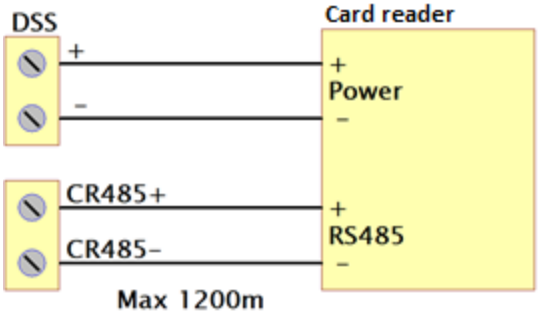


An appropriate resistor is the 5k6

For the keypad on a card reader using the Wiegand interface to function correctly with the DSS device, it must be configured by the manufacturer to send keypad data as 8-bit complement.

3.5.2 OSDP

OSDP is an RS-485 based protocol for communication with, for example, card readers and locks. This protocol exists in two variants (OSDP and Encrypted OSDP). These two variants offer the same functionality, but Encrypted OSDP encrypts the communication to further improve security. OSDP readers are connected according to the following diagram:



For an OSDP-connected card reader to function with DSS, it must be configured for 9600 bps serial communication. When using OSDP devices, several units (with different addresses) can be connected to the same RS485 channel. DSS devices use the first and second addresses (0 and 1) for card readers and the third and fourth addresses (2 and 3) for locks.

3.5.3 Securing card readers

When installing card readers there are a number of actions that can be taken to improve the communication security between the DSS and the card reader as well as between the card reader and the card.

3.5.3.1 Communication between DSS device, readers, and locks

When making the choice between using Wiegand or OSDP it is important to be aware that Wiegand is a completely open and unencrypted protocol that is easy to manipulate. It offers no security features for protecting card data or PIN codes and should not be used in high security installations. The only way to protect a Wiegand interface is to physically protect the wiring.

Using the OSDP interface will greatly increase security since even the first generation OSDP protocol offers features for communication control and tamper protection. If even higher security is desired, readers supporting the second generation OSDP protocol (Encrypted OSDP) may be used. This protocol offers the same functionality as OSDP but also adds an encryption layer to all communication. If locks are used, then Encrypted OSDP is required, and this also applies to any card readers using the same interface. It is not possible to mix OSDP and Encrypted OSDP on the same DSS unit.

When installing a new Encrypted OSDP device, it must be paired with the DSS device before communication can be established. This is accomplished by putting the unit in installation mode (see manufacturer's documentation for the exact procedure) and then executing the command *Reset Exchanged Hardware* on the device node from Sentrion. The command may also be referred to as *Reset hardware locking*. Communication between Sentrion and the Ëncrypted OSDP unit is then reestablished. If the unit has previously been paired with a different Sentrion or other system, a factory reset (see manufacturer's documentation) may be required to enter installation mode.

To facilitate diagnostics additional information may be attached to the communication fault when communication cannot be established with an Encrypted OSDP device. Examples of such additional information include:

- *Wrong key* – The unit is already configured with an unknown encryption key. It must be factory reset before it can be paired with the DSS device.
- *Installation mode* – The unit is in installation mode and must be paired with the DSS device to initiate secure communication.
- *Initalizing secure channel…* - The DSS device is connecting to the unit.

3.5.3.2 Communication between reader and card

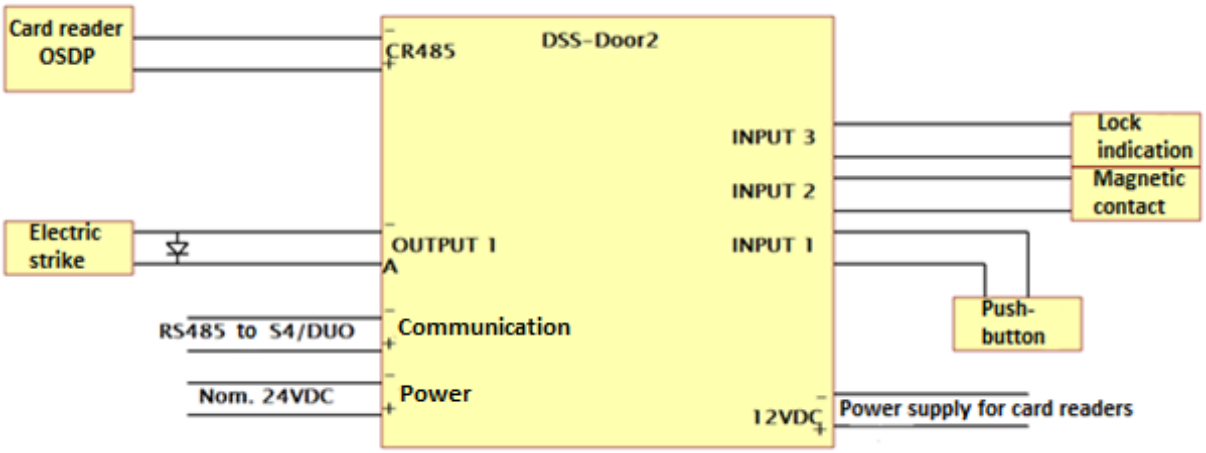
This part of the communication process does not involve the DSS device itself since it is controlled by the card reader. Currently the most commonly used card type on the market is MiFare (13.56Mhz), which offers several different levels of security. Please consult your card reader / card supplier to discuss the best solution for you.

3.6 Application examples

In this chapter, some common configurations are described. Because of the flexibility of the Sentrion system it is simply not possible to visualize every single combination in this document.

3.6.1 Simple door

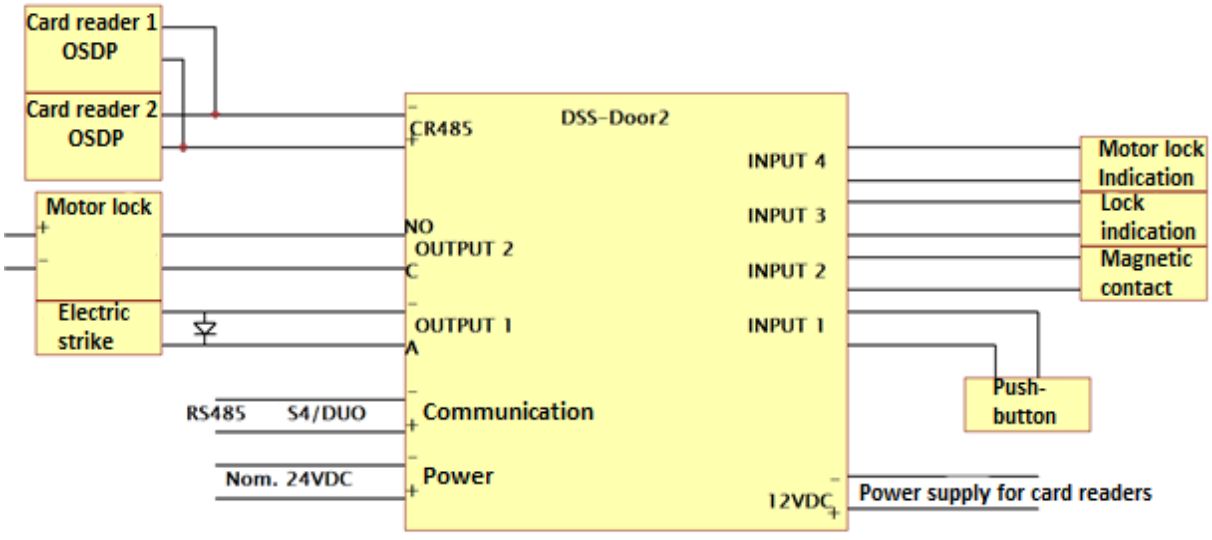
This example describes a simple door connected to a DSS-Door2 with an OSDP card reader:



In the example above, a simple door environment is shown. The card reader used is a model with an OSDP-connection but could just as well be a card reader using the Wiegand interface. Depending on the voltage and current requirements of the card reader it may be advantageous to use the current-limited 12VDC output of the DSS-Door2. The physical connections used for the door are an output for controlling the electric strike, an input for the open (REX) button, an input for a magnetic contact (shows when the door is out of its frame), and an input for lock indication (shows when the lock is unlocked). For clarity purposes, no information on the supervision of inputs is included in this example. See the section on supervision for more information.

3.6.2 Door with dual locks (electric strike and motor lock)

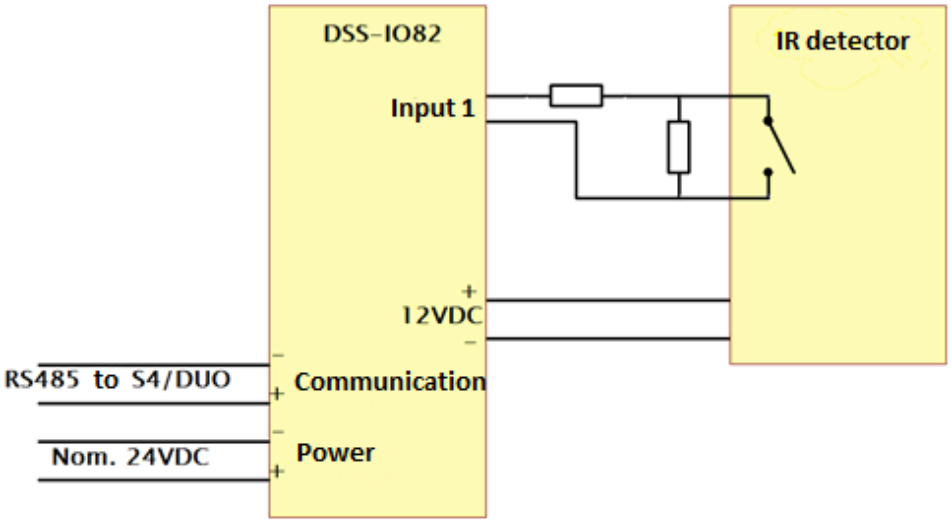
As door environments can differ greatly; here is an example of a more complicated variant. The difference from the previous example is that this has been expanded upon with another card reader as well as an input and an output to control a motor lock mechanism. This is a relatively common set-up for a front entrance that is locked using only an electric strike combined with a push-button for exit during the day. During the night, security is elevated by also using a motor lock, as well as requiring card/code identification for exit.



The card reader used is a model with an OSDP-connection but could just as well be a card reader using the Wiegand interface. Depending on the voltage and current requirements of the card reader it may be advantageous to use the current-limited 12VDC output of the DSS-Door2.

3.6.3 Powered detectors

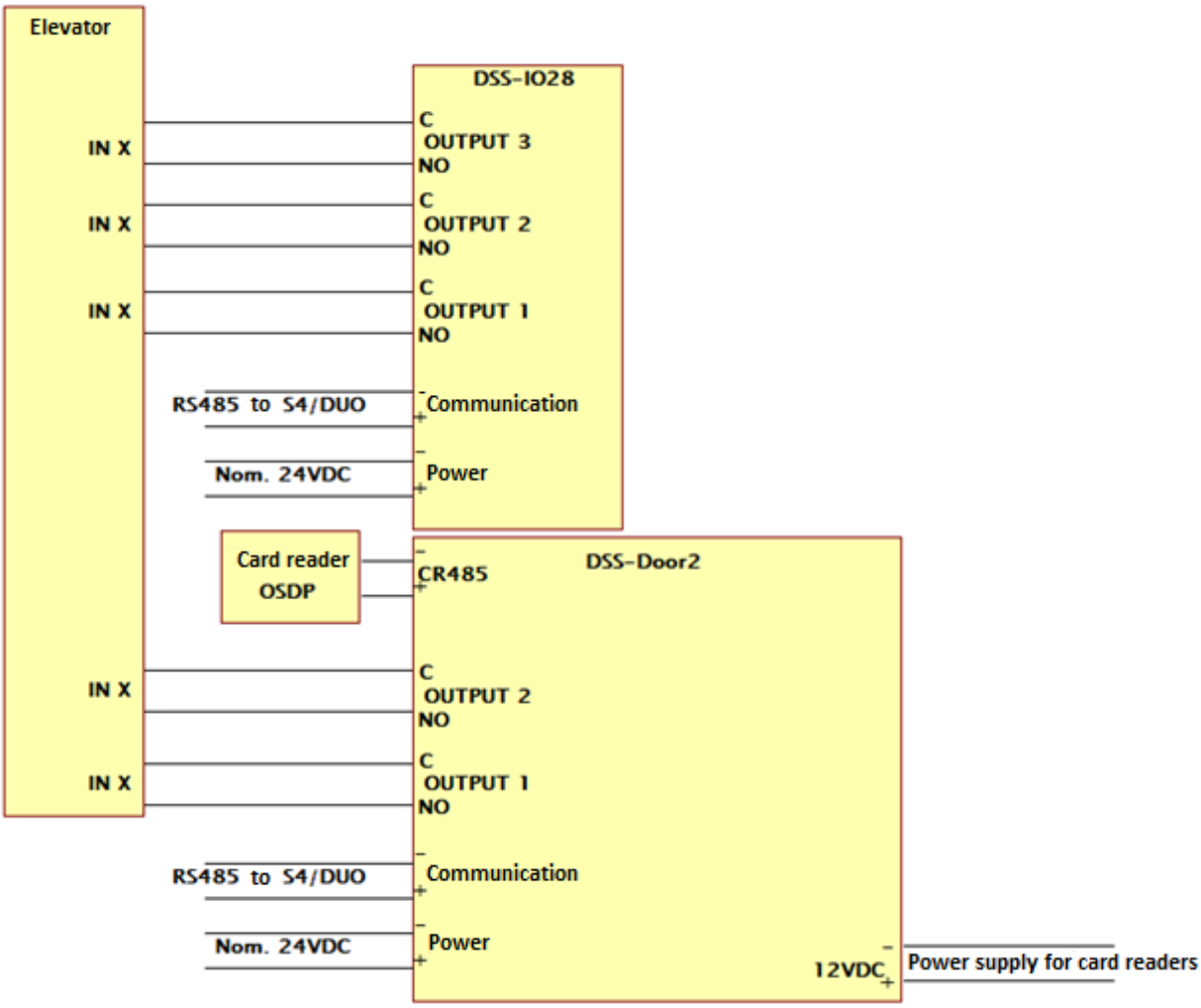
Detectors that require a power supply, such as motion detectors (PIR), can be connected to different DSS models. Here is an example using the DSS-IO82, which is very suitable for this purpose.



In this example, the motion detector is powered from the 12VDC output of the DSS-1O82, which suits the situation well as the output is limited to a maximum of 500mA. The signal from the motion detector is connected using dual level supervision on the first input of the DSS-IO82. As the DSS-IO82 has 8 inputs, the remaining ones may be used for other alarm functions.

3.6.4 Elevators

As described in previous chapters, elevators can vary in complexity from the relatively simple to the very complicated. In this example we describe a very simple elevator with five floors.

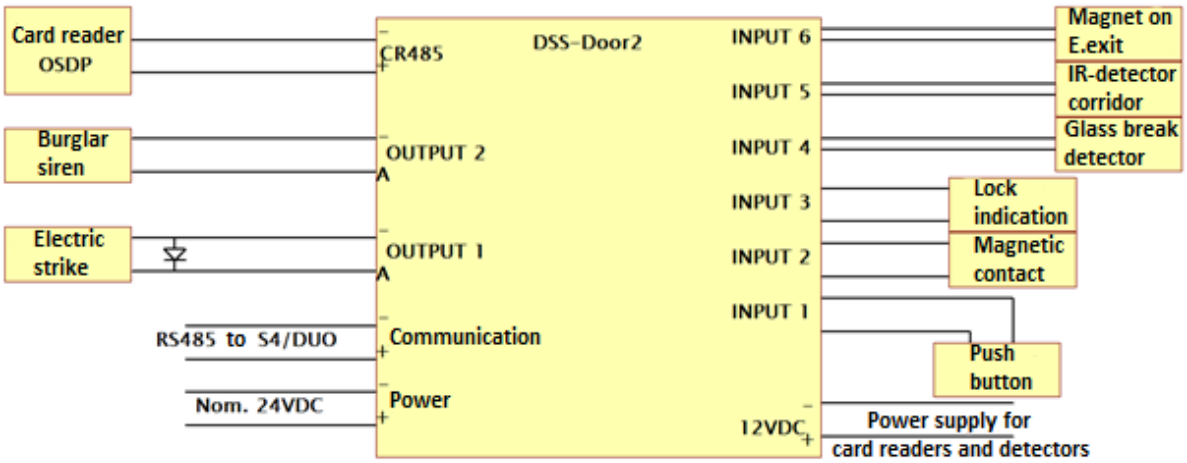


The card reader is mounted inside the elevator cab. It is of the OSDP type as these are well suited since the cable distance from the DSS to the reader can become lengthy in an elevator. Five outputs, two on DSS-Door2 and three on DSS-IO28 are connected to the elevator machinery controller. When users present a card (and possibly code) to the card reader – the system will only activate the outputs that the user is authorized for at that time. The elevator machinery is also programmed to only allow access to the activated floors via the keypad in the elevator car.

A requirement for this set-up is that both DSS devices used must be connected to the alarm panel on the same RS485 device line.

Combined door control and burglar alarm

As mentioned in a previous example (Simple door), several inputs and outputs remain unused when a DSS-Door2 is used for a simple door. This extra capacity can be used for other purposes, such as controlling another door environment or connecting other alarm sensors near the door. This example shows just that:



As shown in the example, not only are door signals connected to the DSS-Door2 but also other detectors as well as a siren. Since the DSS-Door2 can deliver 12DC with 750mA, it is quite capable of supplying power to all the devices requiring a 12V supply. Input supervision is not shown in this example for clarity purposes.

4 Alarm panel equipment

4.1 General overview

The purpose here is to provide a detailed description of the alarm panels S4 and S4-DUO including their connectors, physical measurements and currents.

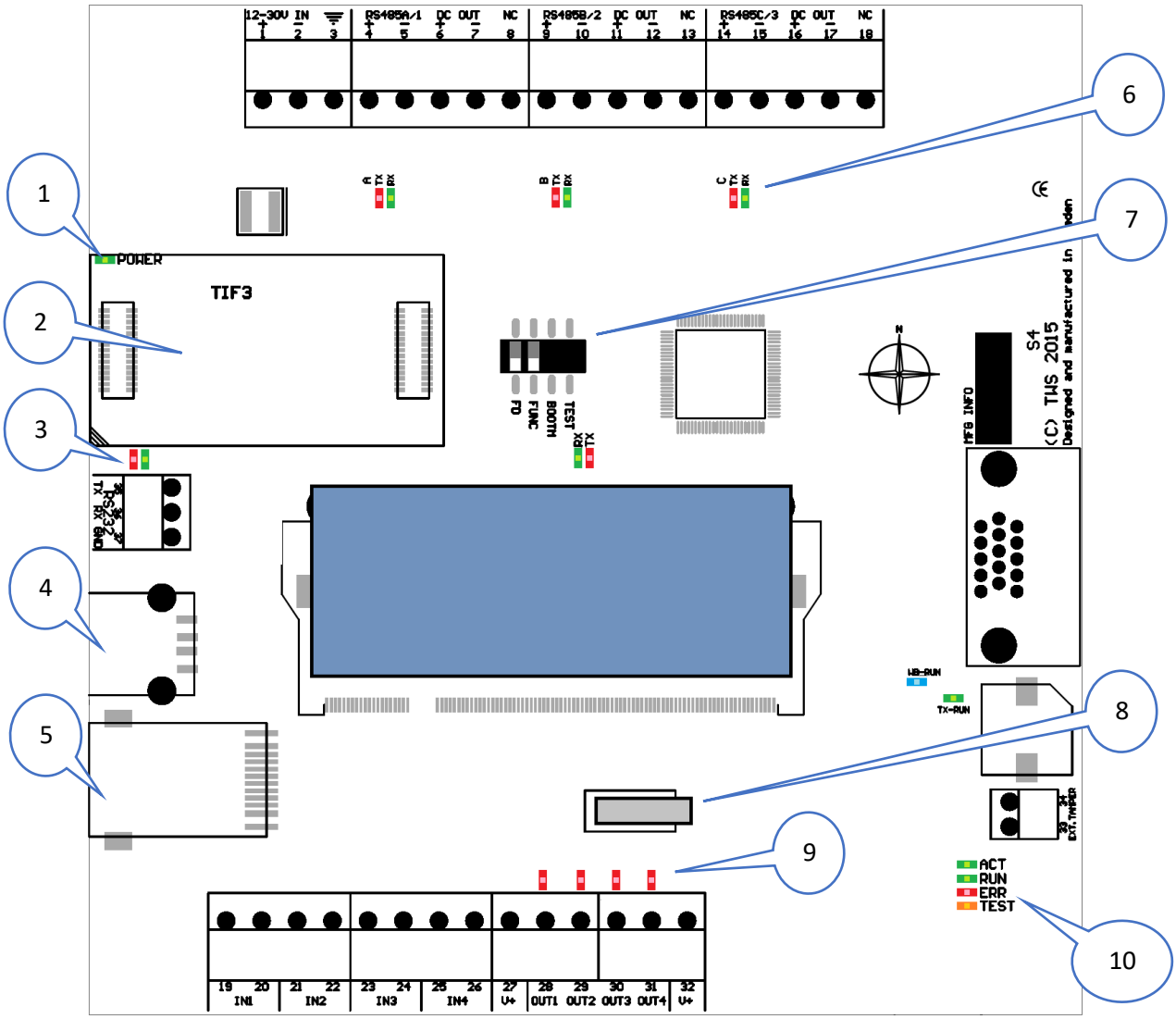
4.1.1 Factory reset

There is a physical setting using a DIP switch (see placement below) on both S4 and S4-DUO alarm panels for performing factory resets. By setting the FD switch to ON and cycle the power(24V), the panels will reset all data to factory settings. This also includes IP address (defaults to 192.168.0.222). During this process, which takes a few minutes, the panel will beep several times. The process is finished when the RUN LED flashes green. **Afterwards, return the FD switch to OFF.**

4.2 S4

The S4 alarm panel provides a compact installation with easily accessible connectors. All terminal blocks are pluggable, and the PCB contains several LEDs to easily view its current status.

4.2.1 Overview



S4 panel (PCB) diagram.

1. LED for power supply
2. Module slot for additional network card (Sx-TIF3-NIC)
3. LEDs for RS232 communication (RED-TX, GREEN-RX)
4. USB slot (for future use)
5. Ethernet port (RJ45)
6. LEDs for communication on the RS485 buses (3 groups, RED-TX, GREEN-RX)
7. DIP switch for factory reset
8. Tamper switch (when installed in Sx-ENC4)
9. LEDs for outputs (RED-Active)
10. LEDs for system status

4.2.2 Connections

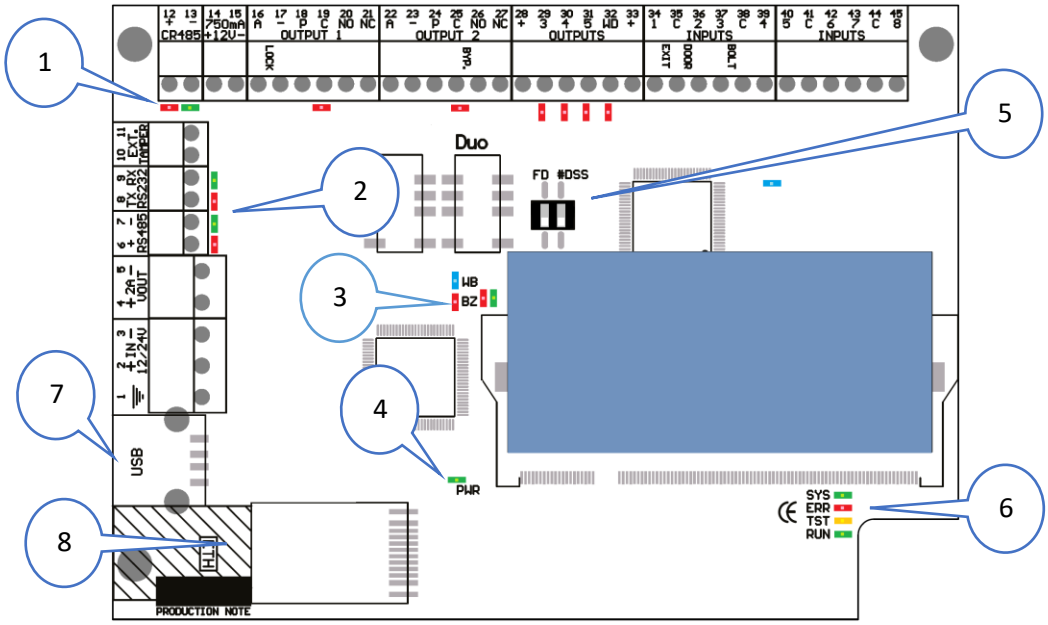
Terminal	Function	Terminal	Function
1	Supply voltage +	20	IN1 (not for alarm, max length 3m)
2	Supply voltage -	21	IN2 (not for alarm, max length 3m)
3	Protective earth (important for EMC and protection)	22	IN2 (not for alarm, max length 3m)
4	RS485A + (DSS)	23	IN3 (not for alarm, max length 3m)
5	RS485A - (DSS)	24	IN3 (not for alarm, max length 3m)
6	Voltage out + (max 2A)	25	IN4 (not for alarm, max length 3m)
7	Voltage out - (max 2A)	26	IN4 (not for alarm, max length 3m)
8	No connection	27	Voltage + for OC outputs (max 200mA)
9	RS485B + (DSS)	28	OUT1 (not for alarm, max length 3m)
10	RS485B - (DSS)	29	OUT2 (not for alarm, max length 3m)
11	Voltage out + (max 2A)	30	OUT3 (not for alarm, max length 3m)
12	Voltage out - (max 2A)	31	OUT4 (not for alarm, max length 3m)
13	No connection	32	Voltage + for OC outputs (max 200mA)
14	RS485C + (DSS)	33	Input for external tamper sensors
15	RS485C - (DSS)	34	Input for external tamper sensors
16	Voltage out + (max 2A)	35	RS232-TX (for alarm transmitter, max 1m)
17	Voltage out - (max 2A)	36	RS232-RX (for alarm transmitter, max 1m)
18	No connection	37	RS232-GND (for alarm transmitter, max 1m)
19	IN1 (not for alarm, max length 3m)		

Note: All currents and voltages are described in a later chapter. Inputs and outputs on S4 panels are not intended for sections/alarm outputs.

4.3 S4-DUO

The S4-DUO alarm panel enables very compact installations with easily accessible connectors. All terminal blocks are pluggable, and the PCB contains several LEDs to easily view its current status. The S4-DUO panel is both an alarm panel and a DSS device. Connections can be divided into two groups (see picture below): to the left are the panel's own connections and on the top are the connections for its internal DSS device. The internal DSS device can be disconnected by setting the DIP switch #DSS to ON.

4.3.1 Overview



DUO central (PCB) diagram

1. LEDs for the internal DSS device (card reader communication, outputs 1-5)
2. LEDs for RS232 (alarm transmitter) and RS485 (DSS) communication
3. LED for buzzer (for indication when locating the device, reboots, factory reset, etc)
4. LED for power supply
5. DIP switch for factory reset and disconnecting the internal DSS
6. LEDs for system status
7. USB port (for future use)
8. Ethernet port (RJ45)

4.3.2 Connections

Connections for alarm panel functions:

Terminal	Function	Terminal	Function
1	Protective earth (important for EMC and protection)	7	RS485 - (DSS)
2	Supply voltage +	8	RS232-TX (Alarm transmitter)
3	Supply voltage -	9	RS232-RX (Alarm transmitter)
4	Voltage out + (max 2A)	10	Input for external tamper sensor
5	Voltage out - (max 2A)	11	Input for external tamper sensor
6	RS485 + (DSS)	32	Output (OC) for watchdog function

Connections for DSS functions:

Terminal	Function	Terminal	Function
12	RS485 + (Card reader OSDP)	29	OUT3 OC lowering
13	RS485 - (Card reader OSDP)	30	OUT4 OC lowering
14	12VDC out + (max 750mA)	31	OUT5 OC lowering
15	12VDC out - (max 750mA)	33	Voltage + for OC outputs (max 200mA)
16	OUT1 A (Voltage when active)	34	IN 1 (Supervision configured using software)
17	OUT1 - (Voltage -)	35	Common IN1/IN2
18	OUT1 P (Voltage when passive)	36	IN 2 (Supervision configured using software)
19	OUT1 C (Dry contact C/NO/NC)	37	IN 3 (Supervision configured using software)
20	OUT1 NO (Dry contact C/NO/NC)	38	Common IN3/IN4
21	OUT1 NC (Dry contact C/NO/NC)	39	IN 4 (Supervision configured using software)
22	OUT2 A (Voltage when active)	40	IN 5 (Supervision configured using software)
23	OUT2 - (Voltage -)	41	Common IN5/IN6
24	OUT2 P (Voltage when passive)	42	IN 6 (Supervision configured using software)
25	OUT2 C (Dry contact C/NO/NC)	43	IN 7 (Supervision configured using software)
26	OUT2 NO (Dry contact C/NO/NC)	44	Common IN7/IN8
27	OUT2 NC (Dry contact C/NO/NC)	45	IN 8 (Supervision configured using software)
28	Voltage + for OC outputs (max 200mA)		

Note: The internal DSS device on the S4-DUO is very similar to the DSS-Door2. The difference is that S4-DUO lacks Wiegand support but has an extra OC output and two extra inputs. It is therefore useful to study connection examples for the DSS-Door2 as these are comparable to the S4-DUO DSS unit.

All currents and voltages are described in a later chapter.

5 Peripheral equipment

5.1 Alarm transmitters

Alarm transmitters tested with the S4/S4-DUO and used in this manual are the Chiron IRIS Touch 440/640, Dualtech DALM3000/5000 as well as the AddSecure Airborne DC Medium (Safetel) and AddSecure Edge RT7020.

For these units, the following instructions only deal with the physical connection between the S4/S4-DUO and the alarm transmitter.

S4/S4-DUO supports communication with alarm transmitters via RS232. Traffic between the S4/S4-DUO and alarm transmitter is two-way and thus the S4/S4-DUO can activate an event if the alarm transmitter does not respond to messages. This also allows the alarm transmitter to monitor the S4/S4-DUO, but it is up to each alarm transmitter manufacturer to implement support for this.

For communication between alarm transmitters and monitoring centers, mobile networks and/or Ethernet are used. For more information on installation or configuration of an alarm transmitter, please consult the alarm transmitter's documentation. Alternatively, contact the manufacturer of the alarm transmitter, or the distributor of your chosen communication solution.

It is recommended to always use the latest firmware for the S4/S4-DUO, as well as for your respective alarm transmitter.

Sentrion offers support for all configuration alternatives (A-D) for security grade 4 according to EN 50131-1 Table 10.

- A: 1 alarm transmitter (ATS 5 or ATS 6) + 2 mains powered sirens
- B: 1 alarm transmitter (ATS 5 or ATS 6) + 1 battery powered siren
- C: 2 alarm transmitters (one of which is ATS 5 or higher and one is ATS 4 or higher)
- D: 1 alarm transmitter (ATS 6)

Power for alarm transmitters should be supplied according to their respective manufacturers' recommendations.

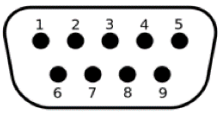
5.1.1 AddSecure DC

The AddSecure DC alarm transmitter has a terminal block that connects with S4/S4-DUO as follows:

S4/S4-DUO	AddSecure DC
TX	RX
RX	TX
GND/0V	GND

5.1.2 Chiron IRIS Touch 440/640

On older Chiron IRIS Touch 440 models, the RS232-connection is comprised of a D-Sub 9 (female) installed beside the RJ11 port. A D-Sub 9 (male) with cabling should be used for connection. The cabling of the D-Sub (male) should be interpreted as per the following:



2 – Corresponds to TX

3 – Corresponds to RX

5 – Corresponds to 0V

Newer IRIS models (NG models) provide a terminal block for connecting the unit. Some models have dual RS232 ports, but the first port should always be used (RX1/TX1).

Connection with the S4/S4DUO should be set up as follows:

S4/S4-DUO	IRIS 440 (older)	IRIS 440NG/640NG
TX	RX	RX1
RX	TX	TX1
GND/0V	0V	0V

5.1.3 Dualtech DALM

The Dualtech DALM includes a cable for RS232 signaling. This cable is connected to the S4/S4-DUO as follows:

S4/S4-DUO	Dualtech DALM
TX	YELLOW
RX	BROWN
GND/0V	GREEN

5.1.4 AddSecure Edge RT7020

The AddSecure Edge alarm transmitter has a COM1 terminal that connects with S4/S4-DUO as follows:

S4/S4-DUO	AddSecure Edge RT7020
TX	RX
RX	TX
GND/0V	GND

5.2 Power Supplies

5.2.1 Swansons GARI

S4 and S4-DUO support communication with power supplies in the Swansons GARI series when connected as DSS devices on an RS-485 device line. For more information about supported models and their corresponding characteristics, please contact Swansons support. For planning and configuration purposes, there are no differences in how these units are connected compared to other DSS devices.

5.2.2 Milleteknik

S4 and S4-DUO support communication with certain models of Milleteknik power supplies when connected as DSS devices on an RS-485 device line. For more information about supported models and their corresponding characteristics, please contact Milleteknik support. For planning and configuration purposes, there are no differences in how these units are connected compared to other DSS devices.

5.3 I/O modules

In this section you will find descriptions of the available I/O modules. In the chapter *Technical data,* there are tables and examples of voltages and currents, as well as supervision and output functions.

5.3.1 General indications

Every DSS device contains a number of LEDs for different status indications. Depending on the form factor and characteristics of each device type the LEDs are located in different positions. The general indications are as follows:

- LEDs that indicate communication are always RED (transmitting) and GREEN (receiving). Due to rapid flashing during normal operations, these indications are often perceived as constantly on.
- LEDs that indicate supply voltage are always GREEN.

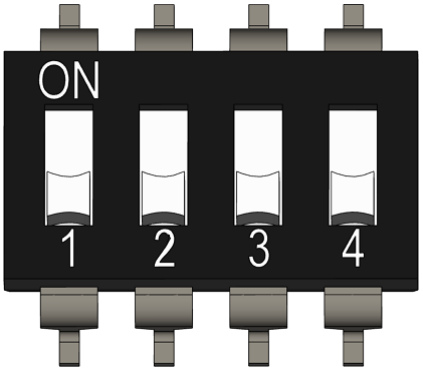
- LEDs that indicate outputs are always RED and light up when the output is active (Please note: Not all devices have LEDs for their outputs).
- LEDs that indicate internal status are always BLUE. During normal operations they pulse slowly.

5.3.2 Tamper protection

Every DSS device (except for the DSS19 series) is equipped with tamper protection that detects when its enclosure is opened. This tamper protection comes in two variants, IR based or mechanical. It is important to ensure that cables are not placed over the IR-sensor or the mechanical switch as this can impair their function. Mechanical switches may require adjustment (bending the arm of the switch or stretching the springs) if the device is installed on a surface that does not fit its enclosure. If more than one device is placed in the same enclosure, tamper detection from one of the devices is enough.

5.3.3 Setting the address on DSS devices

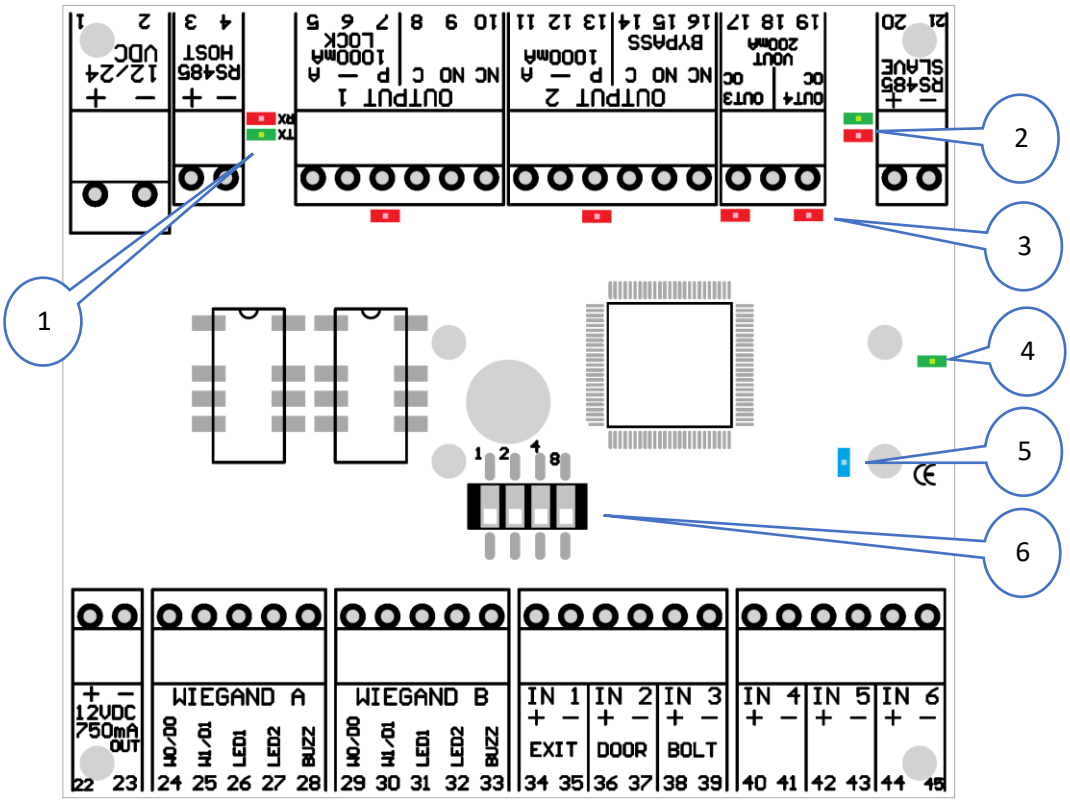
All DSS devices except the DSS19 series and DSS-ACE are addressed using a DIP switch on the PCB. This DIP switch may appear different depending on the device model, but it is ALWAYS the first four switches that are used for setting the address.



To give a device an address, set the corresponding switches according to the table below. Please note that the devices are addressed from 0 to 14, but when configuring the devices in the web interface or in a management system 1-15 is used.

Address	SW 1	SW 2	SW 3	SW 4
0 (first)	OFF	OFF	OFF	OFF
1	**ON**	OFF	OFF	OFF
2	OFF	**ON**	OFF	OFF
3	**ON**	**ON**	OFF	OFF
4	OFF	OFF	**ON**	OFF
5	**ON**	OFF	**ON**	OFF
6	OFF	**ON**	**ON**	OFF
7	**ON**	**ON**	**ON**	OFF
8	OFF	OFF	OFF	**ON**
9	**ON**	OFF	OFF	**ON**
10	OFF	**ON**	OFF	**ON**
11	**ON**	**ON**	OFF	**ON**
12	OFF	OFF	**ON**	**ON**
13	**ON**	OFF	**ON**	**ON**
14	OFF	**ON**	**ON**	**ON**
15 (Not valid)	**ON**	**ON**	**ON**	**ON**

5.3.4 DSS-Door2

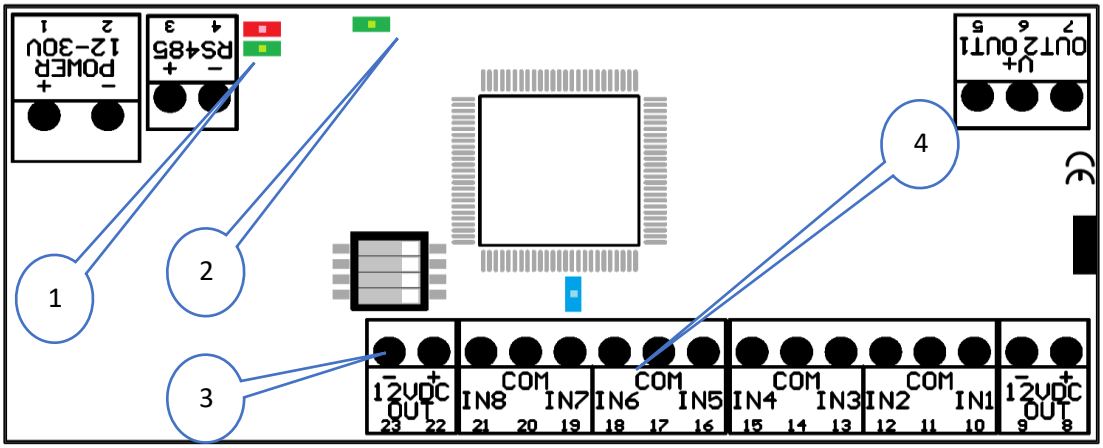


1. LEDs indicating communication with alarm panel
2. LEDs indicating communication with card reader (OSDP)
3. LEDs for outputs (4)
4. LED for supply voltage
5. LED for device status
6. DIP switch for setting device address

DSS-Door2 is a device primarily intended for access control (connections for card readers and doors), but it is also excellent for alarm purposes. When used for access control, the suggested default use for certain connectors is printed on the PCB (as shown in the diagram above and the table below). This makes configuring the system faster and easier.

Terminal	Function	Terminal	Function
1	Supply voltage +	24	WIEGAND-A W0/D0
2	Supply voltage - (0V)	25	WIEGAND-A W1/D1
3	RS485 + (comm. with alarm panel)	26	WIEGAND-A LED1
4	RS485 - (comm. with alarm panel)	27	WIEGAND-A LED2
5	OUTPUT 1 A	28	WIEGAND-A BUZZ
6	OUTPUT 1 -	29	WIEGAND-B W0/D0
7	OUTPUT 1 P	30	WIEGAND-B W1/D1
8	OUTPUT 1 C	31	WIEGAND-B LED1
9	OUTPUT 1 NO	32	WIEGAND-B LED2
10	OUTPUT 1 NC	33	WIEGAND-B BUZZ
11	OUTPUT 2 A	34	INPUT 1
12	OUTPUT 2 -	35	INPUT 1
13	OUTPUT 2 P	36	INPUT 2
14	OUTPUT 2 C	37	INPUT 2
15	OUTPUT 2 NO	38	INPUT 3
16	OUTPUT 2 NC	39	INPUT 3
17	OUTPUT 3	40	INPUT 4
18	Common + (OUTPUT 3/4)	41	INPUT 4
19	OUTPUT 4	42	INPUT 5
20	CR485 + (comm. with card reader OSDP)	43	INPUT 5
21	CR485 - (comm. With card reader OSDP)	44	INPUT 6
22	12VDC + OUT	45	INPUT 6
23	12VDC - OUT		

5.3.5 DSS-IO82

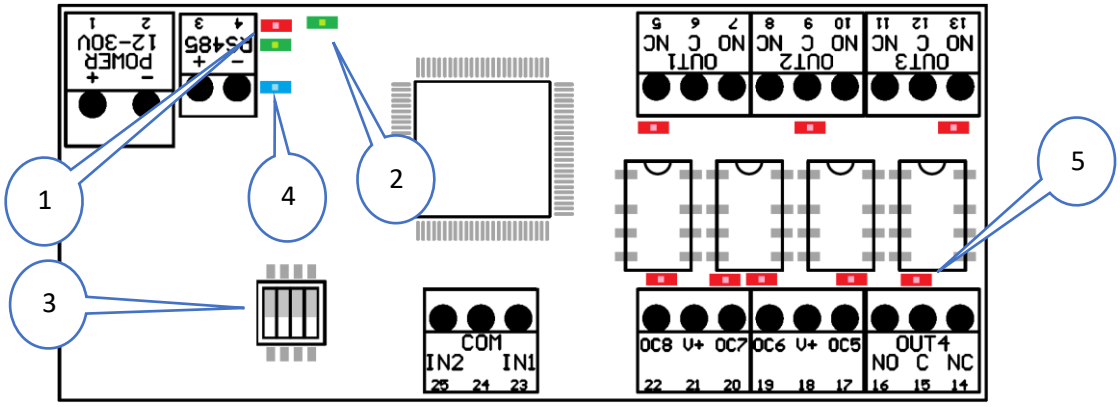


1. LEDs for indicating communication with alarm panel
2. LED for indicating supply voltage
3. DIP switch for setting device address
4. LED for device status

DSS-IO82 is a device primarily intended for use as an input card for connecting multiple alarm points, but it is excellent for other uses as well. When it is used as an input card it makes manipulation of the inputs near-impossible, as the inputs can be supervised, and their status is encrypted. The encryption is handled automatically and requires no configuration during planning or installation. DSS-IO82 can also supply 12VDC power to external devices.

Terminal	Function	Terminal	Function
1	Supply voltage +	13	INPUT 3
2	Supply voltage – (0V)	14	COMMON INPUT 3/4
3	RS485+ (communication with alarm panel)	15	INPUT 4
4	RS485- (communication with alarm panel)	16	INPUT 5
5	OUTPUT 1	17	COMMON INPUT 5/6
6	Common + (OUTPUT 1/2)	18	INPUT 6
7	OUTPUT 2	19	INPUT 7
8	12VDC+ OUT	20	COMMON INPUT 7/8
9	12VDC- OUT	21	INPUT 8
10	INPUT 1	22	12VDC+ OUT
11	COMMON INPUT 1/2	23	12VDC- OUT
12	INPUT 2		

5.3.6 DSS-IO28

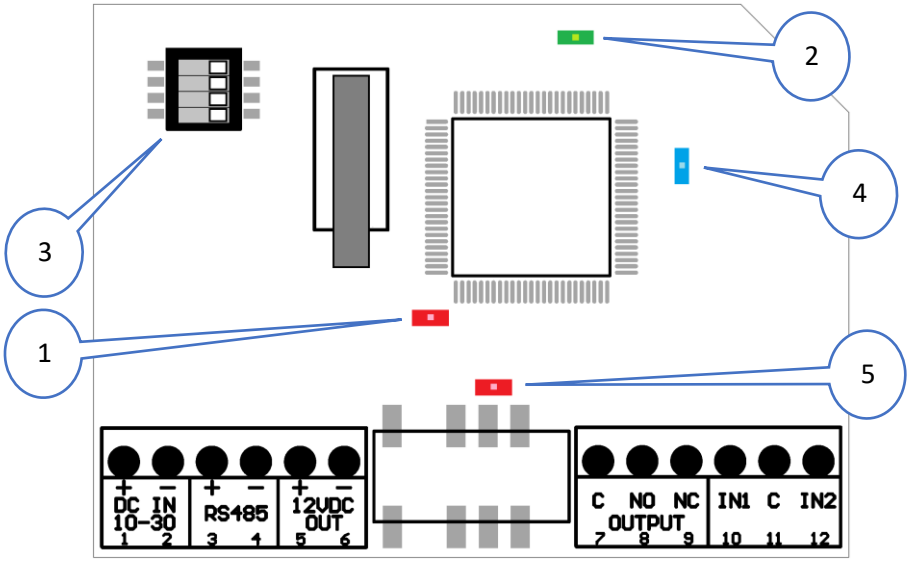


1. LEDs for indicating communication with alarm panel
2. LED for indicating the supply voltage
3. DIP switch for setting device address
4. LED for device status
5. LEDs for indicating output status (8)

DSS-IO28 is a device primarily intended for use as an output card for connecting multiple outputs, but it is excellent for other uses as well. To obtain more relay outputs, connect the OC outputs to suitable relay modules, such as the Linjator E6348738 module.

Terminal	Function	Terminal	Function
1	Supply voltage +	14	OUTPUT 4 NC
2	Supply voltage – (0V)	15	OUTPUT 4 C
3	RS485+ (communication with alarm panel)	16	OUTPUT 4 NO
4	RS485- (communication with alarm panel)	17	Common + (OUTPUT 5/6)
5	OUTPUT 1 NC	18	OUTPUT 5
6	OUTPUT 1 C	19	OUTPUT 6
7	OUTPUT 1 NO	20	OUTPUT 7
8	OUTPUT 2 NC	21	OUTPUT 8
9	OUTPUT 2 C	22	Common + (OUTPUT 7/8)
10	OUTPUT 2 NO	23	INPUT 1
11	OUTPUT 3 NC	24	COMMON INPUT 1/2
12	OUTPUT 3 C	25	INPUT 2
13	OUTPUT 3 NO		

5.3.7 DSS-IO21



1. LED for indicating communication with alarm panel
2. LED for indicating supply voltage
3. DIP switch for setting device address
4. LED for device status
5. LED for indicating output status

DSS-IO21 is a device primarily intended as an input/output card when older PID based systems are being replaced. The device is designed to fit in enclosures for IC20 and MSS2000 systems. It can also supply 12VDC power to external devices.

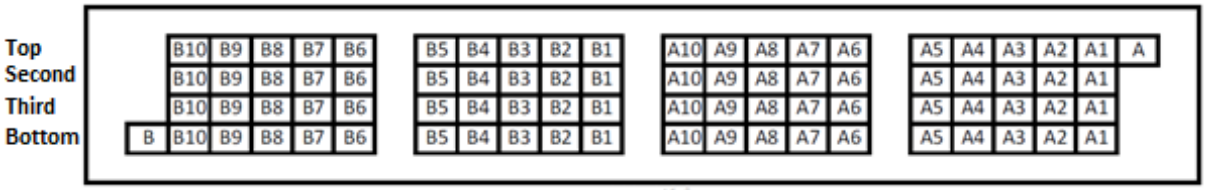
Terminal	Function	Terminal	Function
1	Supply voltage +	7	OUTPUT 1 C
2	Supply voltage – (0V)	8	OUTPUT 1 NO
3	RS485+ (communication with alarm panel)	9	OUTPUT 1 NC
4	RS485- (communication with alarm panel)	10	INPUT 1
5	12VDC+ OUT	11	COMMON INPUT 1/2
6	12VDC- OUT	12	INPUT 2

5.3.8 DSS19

DSS19 is a concept that is comprised of two products: DSS19-R and DSS19-IO85. DSS19-R is a 19" rack unit that can be equipped with up to 20 DSS19-IO85 cards divided into two groups (A and B). This makes it possible to set up extremely compact and centralized installations, well suited for sites with very high security requirements.

5.3.8.1 DSS19-R

DSS19-R is installed in a standard 19" rack and can be mounted at an optional depth relative to the rack frame (front, middle, or back). The rear of the DSS19-R contains 82 RJ45 sockets. Of these 82 sockets, 2 are used for power supply (one for group A, one for group B), and each installed DSS19-IO85 card then uses 4 sockets for inputs, outputs, and card reader communication. Please note that the colors differ between standard cables 568A and 568B. The most common cable on the market is the 568B.



Seen from behind

Pwr & 485
A (1-10)
1 RS485+
2 RS485-
3 DC+
4 DC-
5 DC+
6 DC-
7 DC+
8 DC-
B (1-10)
1 RS485+
2 RS485-
3 DC+
4 DC-
5 DC+
6 DC-
7 DC+
8 DC-

All numbers refer to CABLE numbering

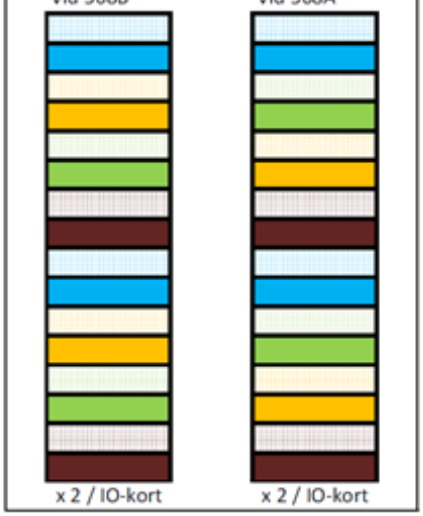
A1-10 och B1-10
Top RJ45
1 In 1 +
2 COM -
3 In 2 +
4 In 3 +
5 COM -
6 In 4 +
7
8
Second RJ45
1 In 5 +
2 COM -
3 In 6 +
4 In 7 +
5 COM -
6 In 8 +
7 CR RS485+
8 CR RS485-
Third RJ45
1 Out 1 - C
2 Out 1 - NO
3 Out 1 - NC
4 Out 2 - C
5 Out 2 - NO
6 Out 2 - NC
7 Out 3 - C
8 Out 3 - NO
Bottom RJ45
1 Out 3 - NC
2 Out 4 - C
3 Out 4 - NO
4 Out 4 - NC
5 Out 5 - C
6 Out 5 - NO
7 Out 5 - NC
8

All numbers refer to CABLE numbering

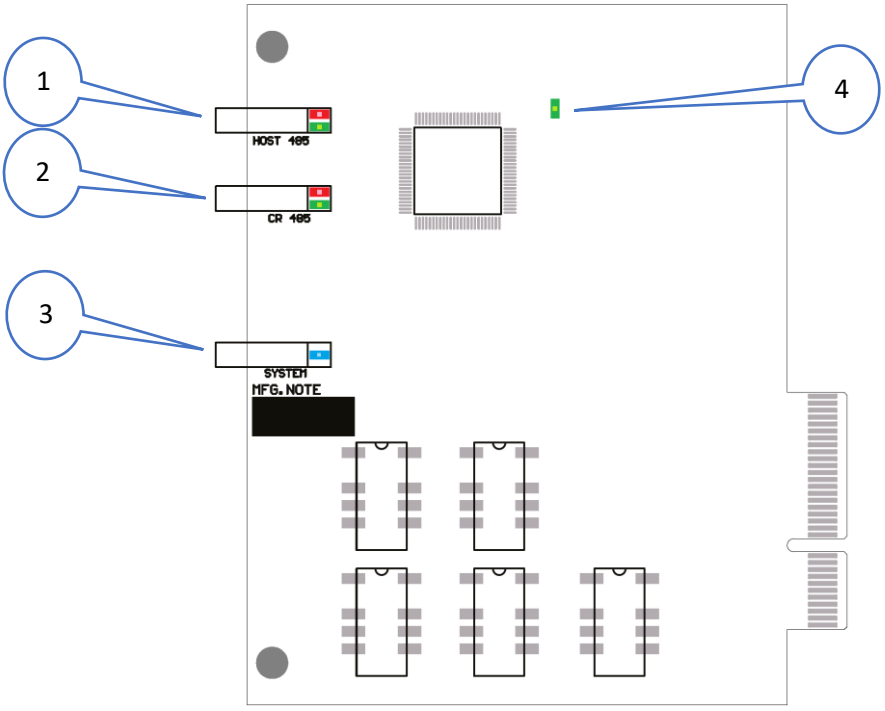
Color in standard RJ45 (568B)		
Nr in contact	Color	Nr in cable
5	White/Blue	1
4	Blue	2
1	White/Orange	3
2	Orange	4
3	White/Green	5
6	Green	6
7	White/Brown	7
8	Brown	8

Color in standard RJ45 (568A)		
Nr in contact	Color	Nr in cable
5	White/Blue	1
4	Blue	2
1	White/Green	3
2	Green	4
3	White/Orange	5
6	Orange	6
7	White/Brown	7
8	Brown	8

Suitable order in tripod termina(Krone)



5.3.8.2 DSS19-IO85

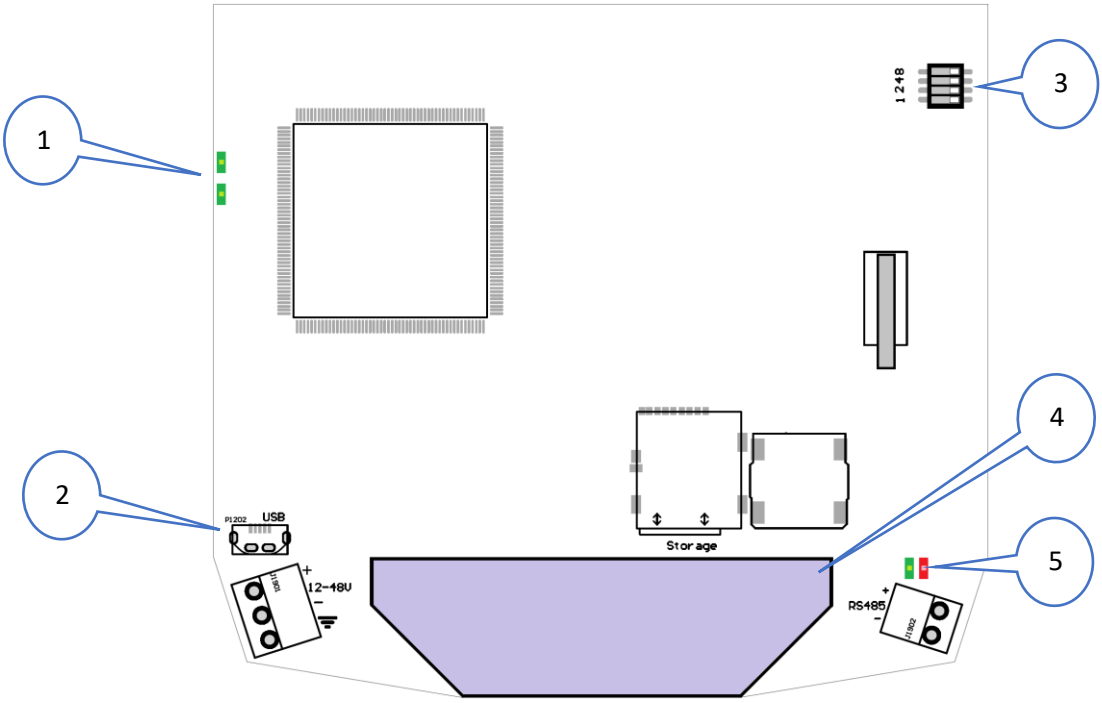


1. LEDs for indicating communication with the alarm panel (a light guide makes it visible from the front)
2. LEDs for indicating communication with the card readers (a light guide makes it visible from the front)
3. LED for device status (a light guide makes it visible from the front)
4. LED for supply voltage

DSS19-IO85 is a device for installing in the hot swap enabled DSS19-R. The device has no switches for addressing or any connection terminals as everything is connected via the backplane of the DSS19-R. The address of each card is set automatically by its position in the DSS19-R rack.

5.4 Control panels

5.4.1 DSS-Touch

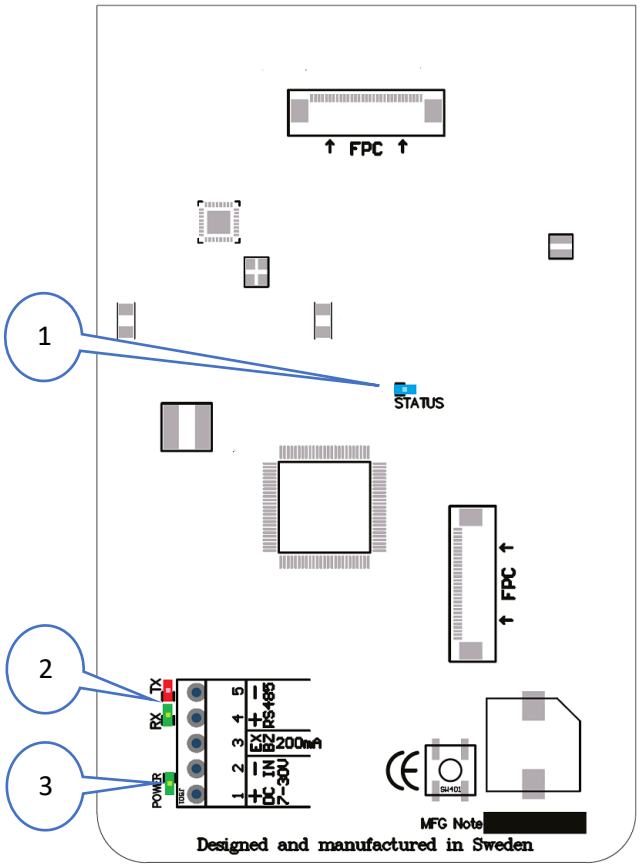


1. LED for supply voltage
2. USB port for configuration and firmware updates
3. DIP switch for setting device address
4. Antenna for card reader
5. LEDs for indicating communication with the alarm panel

DSS-Touch is a touchscreen-based control panel for managing burglar alarms. The device has a built-in card reader supporting several MiFare variants (UID, sector, DESFire), support for natural sound (not just buzzer), and a simple and intuitive user interface. The USB port is used to configure card reading and to upgrade the firmware. The space represented by the purple area in the diagram above should be kept free of wires as the range of the built-in card reader antenna can otherwise be negatively affected. Installing the device on a metal surface may also negatively affect the range of the card reader antenna.

Terminal	Function
1	Supply voltage +
2	Supply voltage - (0V)
3	Protective earth (optional)
4	RS485+ (communication with alarm panel)
5	RS485- (communication with alarm panel)

5.4.2 DSS-ACE



1. LED for system status
2. LEDs for indicating communication with alarm panel
3. LED for supply voltage

DSS-ACE is a rugged control panel for managing burglar alarms. It has a built-in card reader supporting several MiFare-variants (UID, sections, DESFire). The keypad is backlit and uses color to indicate status for extra clarity. The display uses a monochrome OLED panel that is easy to read under any circumstances. The device address is entered using the keypad. To set the address, please follow these steps:

1. Remove the device from the mounting and disconnect power and communication
2. With the device unmounted (tamper active), press and hold the GREEN ring button and reconnect the power
3. The configuration menu will now be displayed on the screen

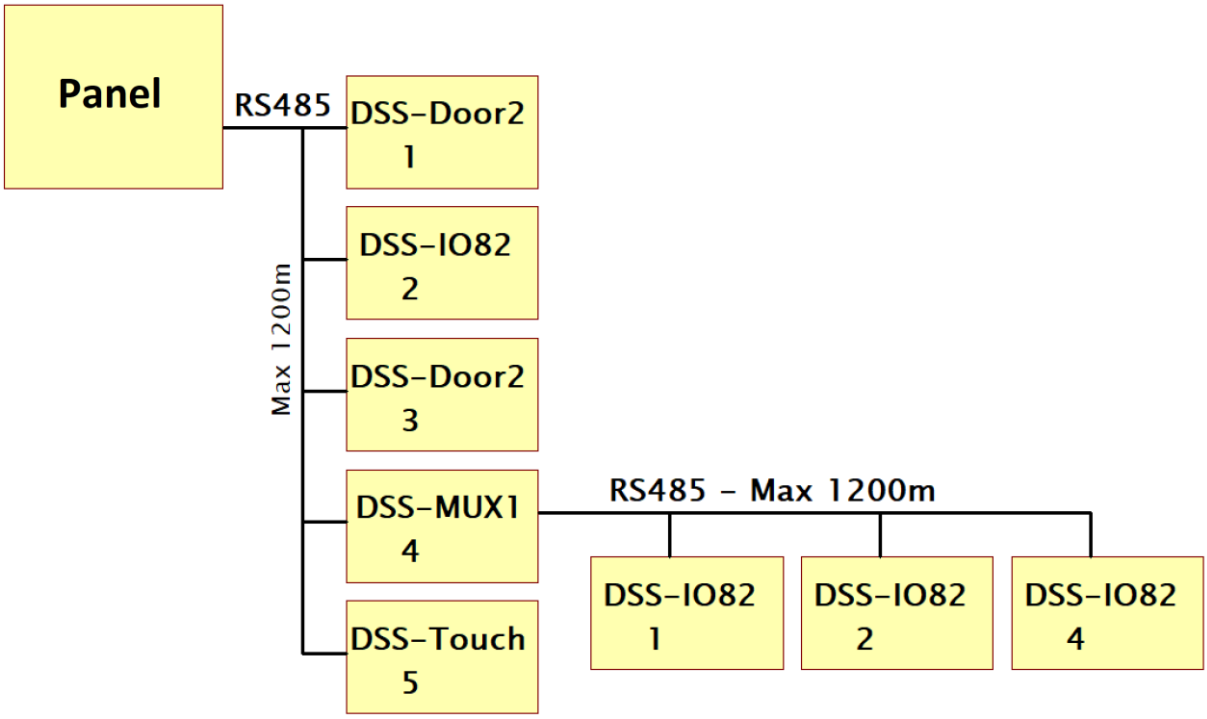
Terminal	Function
1	Supply voltage +
2	Supply voltage – (0V)
3	OC output for external buzzer
4	RS485+ (communication with alarm panel)
5	RS485- (communication with alarm panel)

5.5 Device line extension modules

Device line extension modules are used when you want to add more than 15 DSS devices to an RS485 device line. This type of extension is possible on all S4 buses but **NOT on an S4-DUO bus**. Device line extension may also be required if you need longer cable lengths than the allowed 1200m.

A device line extension module functions as a logical repeater for an additional 15 addresses. It occupies a single address on the line connected to the alarm panel and provides 15 addresses on its own device line. Lines can only be extended a single level. You cannot add an extension module to a device line provided by another extension module.

A normal installation may look like this:



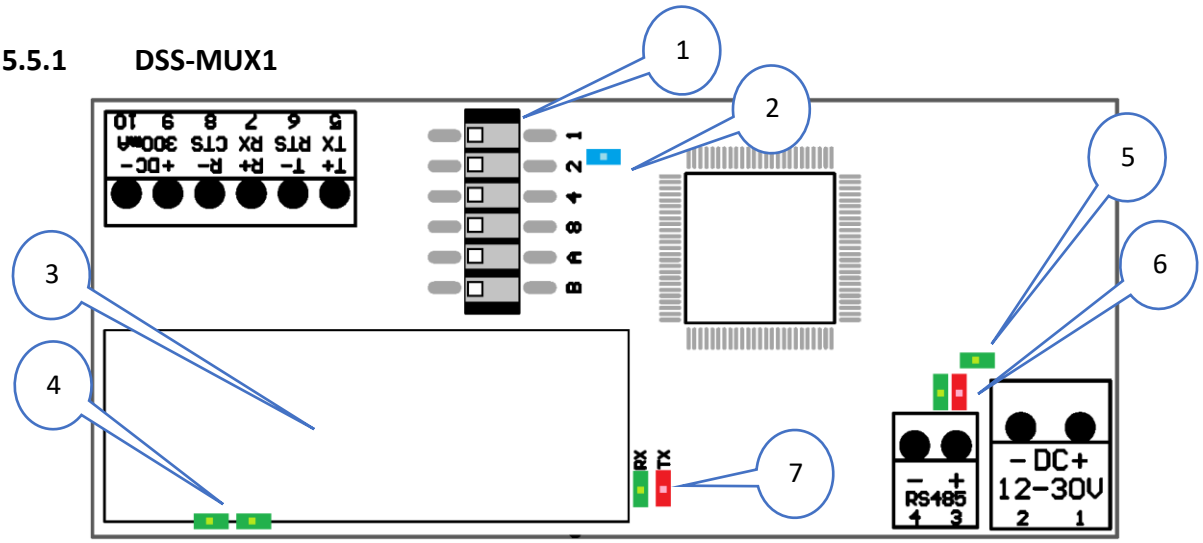
In this example, the alarm panel (S4) device line contains 5 DSS devices, one of which is a device line extension module (DSS-MUX1). The device line connecting these DSS devices to the alarm panel is limited to 1200m and a maximum of 15 DSS devices. Downstream from the DSS-MUX1 the extension line allows for another 1200m and 15 additional DSS devices.

To avoid the risk of slow response times in the system, there are certain recommendations to consider when extension modules are used:

- A maximum of 4 extension devices can be used per device line (i.e., a maximum of 12 modules per S4)
- Extension lines should not be used for door control
- Control panels should not be connected to extension lines

If you need to deviate from these recommendations, please contact support for consultation.

5.5.1 DSS-MUX1



1. DIP switch for addressing and configuration
2. LED for system status
3. Communications module
4. LEDs for supply voltage to the communications module
5. LED for supply voltage
6. LEDs for indicating communication with alarm panel
7. LEDs for indicating communication with the expansion line

DSS-MUX1 is an extension device that provides one extension device line. At delivery, the unit is equipped with a galvanically coupled communication module for RS485 (TIF2-485) that can be replaced with an isolated communication module (TIF2-485I).

The configuration switches A and B (located next to the addressing switches) are used to control device behavior. Valid configurations are:

A	B	Function
OFF	OFF	Standard – DSS devices downstream of the DSS-MUX1
ON	OFF	DC1-mode – DC1 devices downstream of the DSS-MUX1

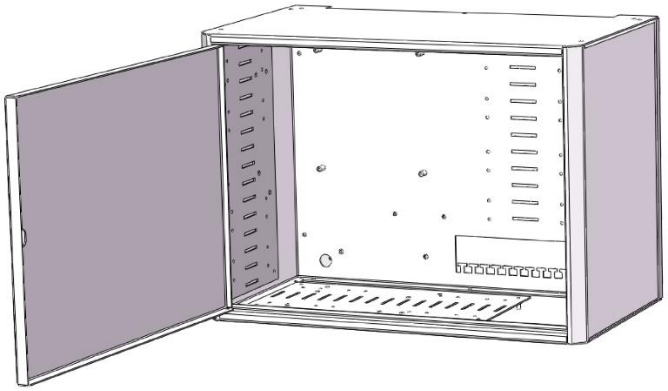
Connectors:

Terminal	Function	Terminal	Function
1	Supply voltage +	6	T-/RTS from comm. module (see resp. module)
2	Supply voltage - (0V)	7	R+/RX from comm. module (see resp. module)
3	RS485+ (communication with alarm panel)	8	R-/CTS from comm. module (see resp. module)
4	RS485- (communication with alarm panel)	9	Voltage out + (max 300mA)
5	T+/TX from comm. module (see resp. module)	10	Voltage out - (max 300mA)

6 Enclosures

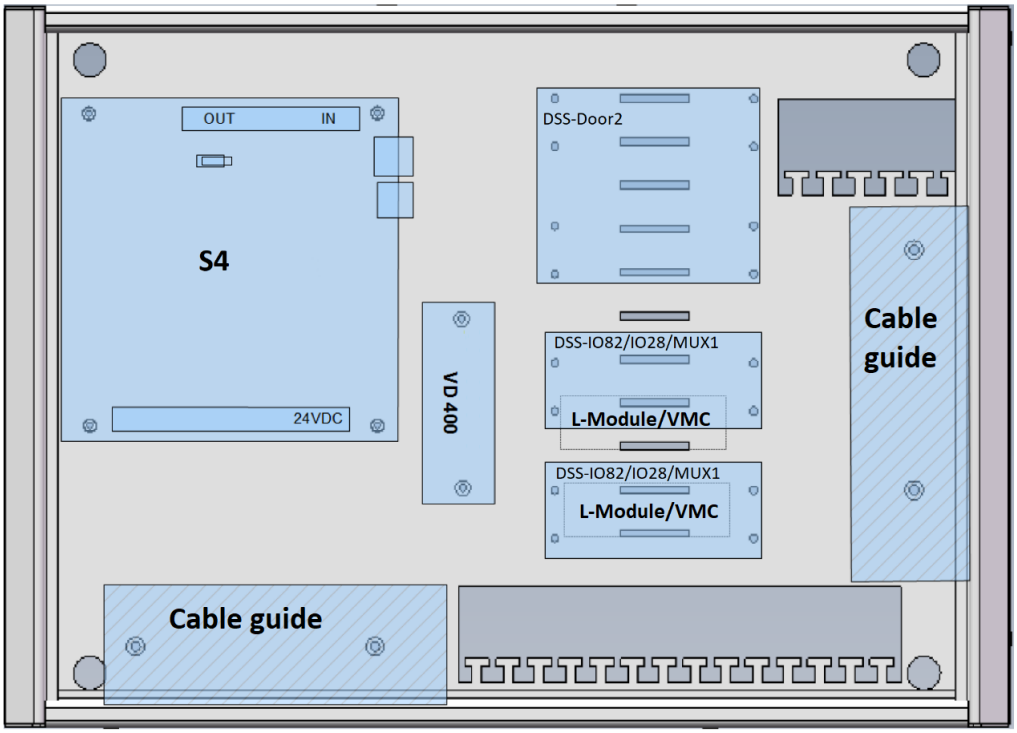
6.1 Sx-ENC-SSF

Sx-ENC-SSF is an enclosure that can be installed on a wall or mounted in a 19” rack (with rails). The enclosure can hold alarm panels as well as DSS devices, alarm transmitters and more. This enclosure should be used if an SSF/EN-grade set-up is required.



Sx-ENC-SSF

Inside the enclosure, devices may be mounted directly to the rear wall, but also on mounting plates attached to the right, left, and bottom walls of the enclosure. DIN rails may be attached to the top wall of the enclosure to provide additional mounting points.

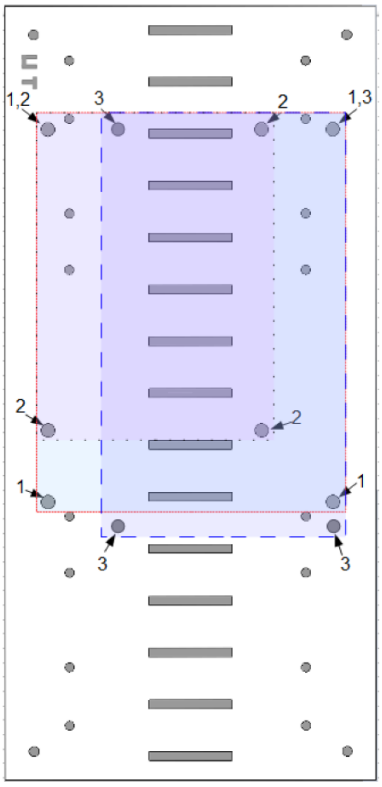


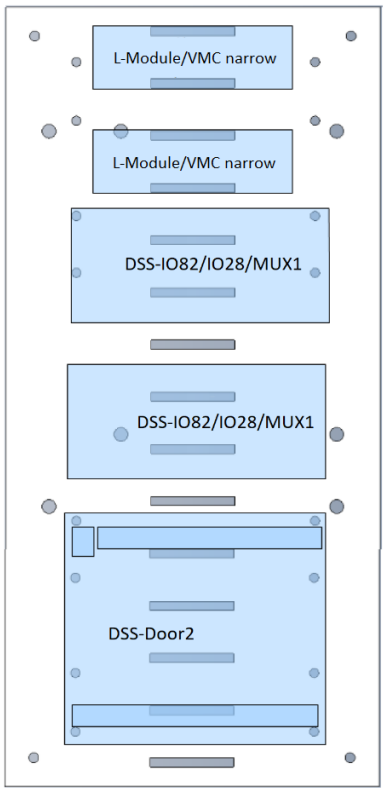
The enclosure as seen from the front with installed devices

The following devices may be mounted to the rear wall of the enclosure:

- One alarm panel (S4)
- One seismic detector
- Up to two DSS-Door2 units
- Up to four DSS-IO82, DSS-IO28, or DSS-MUX1 units. These positions can also be used for mounting L-modules (a.k.a. VMC modules)

Mounting plates located on the inside walls of the enclosure (left, right, and bottom) can be populated as follows:





- 1 Chiron IRIS 440NG (pos 1 in image above)
- 1 Chiron IRIS 640 (pos 2 in image above)
- 1 DALM (pos 3 in image above)
- 2 DSS Door2
- 5 DSS-IO82, DSS-IO28, or DSS-MUX1 (L-Module/VMC Module wide)

The Sx-ENC-SSF enclosure is delivered with the following standard accessories:

- Lockable door and mounted wall spacers.
- Mechanical tamper switch mounted to a metal arm for door and wall tamper detection (removal from mounting).
- 2 cable channels
- 3 mounting plates
- 2 M3 screws for door tamper switch (unless wall tamper is used)

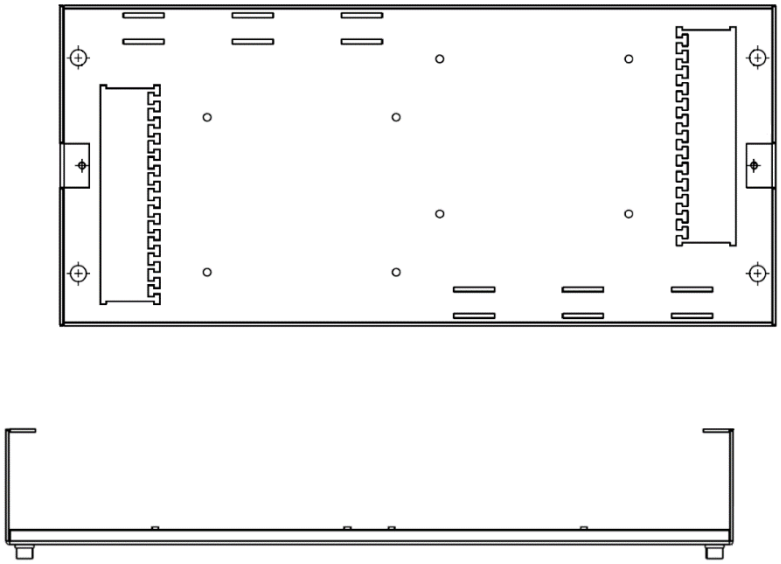
The enclosure may be further populated with additional components (depending on use scenario):

- Nylon spacers for mounting of DSS devices (Richco LMSP-2-01, 3,2 mm).
- M3 screws for mounting Sentrion units, mounting plates, and seismic detectors.
- VD 400 seismic detector (E-Nr. 6332500)
- Nylon spacers for mounting Chiron IRIS 440/640. 4 included in IRIS packaging (KSS CS-0305, 4,8 mm)

For dimensions and weight, see the table in the *Technical data* chapter.

6.2 Sx-ENC4

Sx-ENC4 is an enclosure that can be installed on a wall or mounted in a 19” rack. The enclosure is used when the user wants to mount several alarm panels in the same enclosure.



Sx-ENC4 shown from two angles

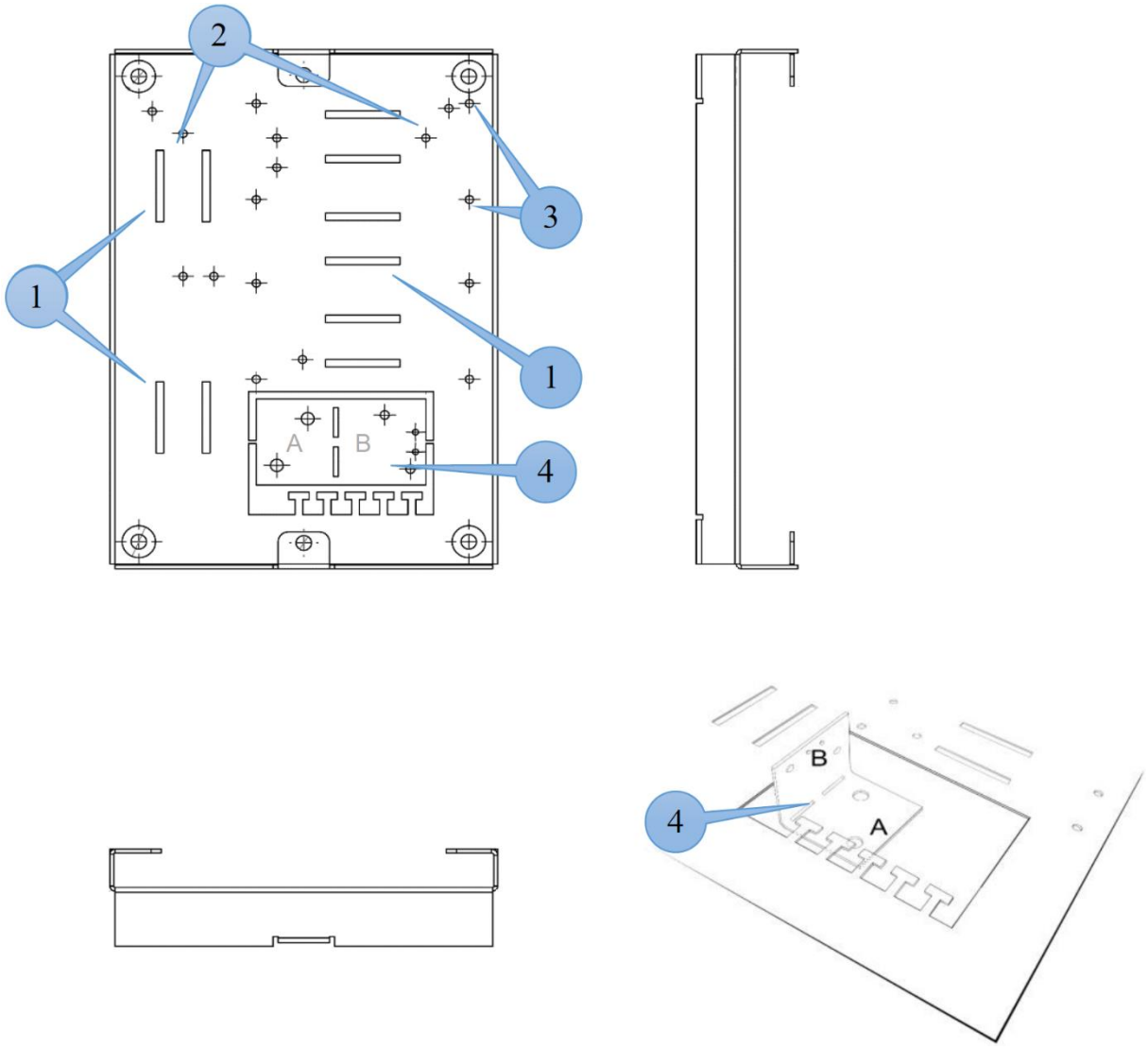
The enclosure may contain up to 4 alarm panels (S4). These are mounted in two positions in dual layers. In this enclosure, 3 small VMC modules may also be attached along each long edge of the base plate.

The Sx-ENC4 enclosure is delivered with the following standard accessories:

- Lid and base
- Bolts, nuts and washers for rack mounting
- Spacers for enabling dual layer mounting of alarm panels

6.3 DSS-ENC-METAL

DSS-ENC-METAL is an enclosure used for mounting several DSS models or an S4-DUO alarm panel. This enclosure should be used when an SSF/EN-grade set-up is required but can also be used to great effect in any situation.



DSS-ENC-METAL viewed from different angels

In this enclosure, the following devices may be mounted (depending on the combinations the number of devices may vary):

- S4-DUO (Fills the enclosure except for *position left 1* in the above diagram)
- DSS-Door2 (Mounted on *position 3 right* above *position 1 right*. Suitable spacers [RND 610-00233, 3,2 mm (ELFA 301-00-989) or Richco LMSP-2-01, 3,2 mm] are not included)
- Up to 4 DSS-IO82, DSS-IO28 or DSS-MUX1 units (mounted on *position 1*)
- L-Modules/VMC modules (all slots)
- Seismic detector (VD400) (mounted on *position 2*, horizontally or vertically, not included)

As shown in the diagram above, the metal plate next to the cable management opening (4) can be removed, bent to the correct angle, and used as part of the mechanism for detecting removal from mounting (tamper) for the enclosure. The included micro switch fits this metal plate and can be connected to any input on a DSS device or the external tamper input on an S4-DUO alarm panel.

6.4 DSS-Door-PLASTIC

The enclosure DSS-Door-PLASTIC is the plastic enclosure delivered with certain models of DSS-Door2 (see table *Products with and w/o enclosures* in the *Technical data* chapter for more information). This enclosure is specifically designed for the DSS-Door2 but can also be used to mount up to 2 DSS-IO82, DSS-IO28, DSS-MUX1, or L-modules/VMC modules.

The enclosure measures 120x120x30mm.

6.5 DSS-IO-PLASTIC

The enclosure DSS-IO-PLASTIC is the plastic enclosure delivered with certain models of DSS-IO82, DSS-IO28, and DSS-MUX1 (see table *Products with and w/o enclosures* in the *Technical data* chapter for more information). This enclosure is specifically designed for these DSS units but can also be used to mount one L-module/VMC module.

The enclosure measures 120x70x30mm.

7 Technical data

The tables below show physical device data (measurements, weights, etc.) and what products are delivered with enclosures:

Products (without enclosures)

					Temp. storage (°C)		Temp. op. (°C)		
Product	**Width**	**Height**	**Depth**	**Weight(g)**	**Min**	**Max**	**Min**	**Max**	**Env.cl.**
S4	140	150	30	190	-10	+50	-10	+40	II
S4-DUO	135	98	24	180	-10	+50	-10	+40	I
DSS-Door2	90	80	15	69	-10	+50	-10	+40	II
DSS-IO82	40	85	20	41	-10	+50	-10	+40	II
DSS-IO28	40	85	20	42	-10	+50	-10	+40	II
DSS-IO21	60	44	20	23	-10	+50	-10	+40	II
DSS19-R	130	468	155		-10	+50	-10	+40	-
DSS19-IO85	20	107	130		-10	+50	-10	+40	-
DSS-Touch	106	107	26	166	-10	+50	-10	+40	II
DSS-Ace	94	161	21	166	-25	+60	-25	+60	III
DSS-MUX1	40	85	20	33	-10	+50	-10	+40	II

Note: All measurements are in mm

Enclosures

Product	**Width**	**Height**	**Depth**	**Weight (g)**	**Mtrl**	**Colour**
Sx-ENC-001	420	300	220	8600	Metall	White
Sx-ENC4	492.2	220	88		Metall	White
DSS-ENC-001	155	215	45	900	Metall	White
DSS-DOOR-PLASTIC	120	120	30		ABS	White
DSS-IO-PLASTIC	70	120	30		ABS	White

Note: All measurements are in mm

Products (with and without enclosures)

Product	**Requires enclosure**	**Delivered in enclosure**
S4-001	X	
S4-002		Sx-ENC-SSF
S4-003		Sx-ENC-SSF
S4-DUO		DSS-ENC-METAL
DSS-Door2-003		DSS-DOOR-PLASTIC
DSS-Door2-004		DSS-ENC-METAL
DSS-IO82-003	X	
DSS-IO82-004		DSS-IO-PLASTIC
DSS-IO28-001	X	
DSS-IO28-002		DSS-IO-PLASTIC
DSS-IO21-001	X	
DSS-MUX1-001	X	
DSS-MUX1-002		DSS-IO-PLASTIC
DSS-Touch(1		
DSS-Ace(1		
DSS19-R(2		
DSS19-IO85(2		

1) Delivered in plastic enclosure
2) DSS19-R is the enclosure for DSS19-IO85

The table below shows key specifications for all Sentrion alarm panels and DSS devices. Please check the relevant chapters above for details regarding inputs, outputs, and card readers.

Product	VinMin	VinMax	IinMin[1]	IinMax[1]	PinMax	In digital	In superv.[2]	Out OC[3]	Out relay[4]	CR OSDP[5]	CR Wie[5]	12V Out[6]
S4	10,8	29	69	75	2,50	4	-	4	-	-	-	-
S4-DUO	10,8	29	92	181	6,00	-	8	3	2	2	-	750mA
DSS-Door2	10,8	29	23	87	3,00	-	6	2	2	2	2	750mA
DSS-IO82	10,8	29	33	44	1,50	-	8	2	-	-	-	500mA
DSS-IO28	10,8	29	25	62	2,00	-	2	4	4	-	-	-
DSS-IO21	10,8	29	24	36	1,20	-	2	-	1	-	-	250mA
DSS-MUX1	10,8	29	27	27	0,90	-	-	-	-	-	-	-
DSS-Touch	10,8	29	63	82	2,70	-	-	-	-	-	-	-
DSS-ACE	10,8	29	22	56	1,80	-	-	-	-	-	-	-

1. Measurements are made at 27VDC, and do not include external units
2. Supervised inputs have a maximum recommended resistance of 20kΩ for Normal/Alarm mode
3. Open Collector outputs are lowering with a maximum load of 100mA regardless of voltage.
4. Relay outputs with dry contacts may carry a load of max 30V/1A, outputs with voltage function max 1A regardless of voltage
5. For modules with both ODSP and Wiegand support, a maximum of 2 readers may be used. Both readers are expected to use same interface
6. External use has approx. 80% efficiency, e.g. 500mA on external 12V gives a load corresponding to 312.5mA at 24Vin