

# THE SANTON FIREFIGHTER SAFETY SWITCH

FOR PHOTOVOLTAIC INSTALLATIONS



**THE SUN PROVIDES ENERGY,**

**SANTON PROVIDES SAFETY**



IT IS AS CLEAR AS DAY THAT PV SYSTEMS ARE AMONG THE MOST INTERESTING OPTIONS WHEN IT COMES TO GENERATING ENERGY. THE SUN SHINES EVERY DAY, PROVIDING A STEADY FLOW OF ENERGY. THE BEST LOCATION FOR PLACING PV PANELS IS IN DIRECT SUNLIGHT, FOR EXAMPLE ON THE ROOF, AND SINCE EVERY HOUSE OR BUILDING HAS A ROOF, THIS IS THE MOST COMMON SOLUTION. THE COMBINATION OF CONSTANT DIRECT CURRENT (DC) FLOW AND THE POSITIONING OF THE MODULES CAN, HOWEVER, CAUSE SIGNIFICANT DIFFICULTIES IN CASE OF A FIRE. DC CAN CAUSE THE ELECTRIC ARCS RESPONSIBLE FOR MORE THAN 80% OF ALL ACCIDENTS INVOLVING ELECTRIC FAILURES. FOR SITUATIONS SUCH AS THOSE, SANTON HAS DEVELOPED THE FIREFIGHTER SAFETY SWITCH.

#### **ALL CABLES ARE WITHOUT POWER**

The Firefighter Safety Switch gets installed as close as possible to the DC generator. The switch interrupts the current flow between the DC generator and the power inverter, causing the building to lose DC voltage and allowing firefighters to proceed to the interior without danger.

#### **REMOTE CONTROL**

The Firefighter Safety Switch isolates an entire system with one simple action. A centrally installed operating panel controls the motorised switch(es). Once the button has been pushed, all switch(es) will be turned off within seconds.

#### **FIRE ALARM INTEGRATION**

In case of a fire drill or emergency, the fire alarm system is activated first. Because the Firefighter Safety Switch can be integrated into the fire alarm system, no additional actions are necessary to switch off the PV panels.

#### **SWITCHING ON/OFF**

The Firefighter Safety Switch can be switched off easily. When the switch is in its 'OFF' position, the entire PV system is released and the cables leading to the power inverter are idle. The simple ON/OFF mechanism allows for remote-controlled operation.

#### **SAFETY KEY**

Anybody can switch off the Firefighter Safety Switch, yet only authorised personnel can reactivate the switch using the safety key. This constitutes an additional safety measure for minimising the risk during fire drills or fire.

#### **X-TYPE DC SWITCH INSIDE**

The Firefighter Safety Switch features among the most commonly used DC switches on the solar market- the X-type. The Santon 'Snap-Action' spring mechanism with its response time of only 3 milliseconds reduces the electric arc risk. In combination with the self-cleaning contact, this increases the durability and safety.

#### **EASY INSTALLATION**

The new Firefighter Safety Switch was developed for ensuring the easiest conceivable installation. The IP65 box provides maximum space for connecting a string cable with the switch. Three different configurations are available, allowing installers to select the version best suited to their respective needs.

### FIREFIGHTER SAFETY SWITCH

Install the switch as close as possible to the PV panels or the location where the cable enters the building in order to minimise the length of live cabling.



### JUNCTION BOX

Combining individual string cables into lead cables to the inverter. Can optionally include fuses, overvoltage protection and arc fault detection (see page 7).



### FIRE ALARM

An external alarm can be connected to the remote control of the operating panel, which activates the switching off of the safety switch.



- String / lead cable +
- String / lead cable -
- Control cable operating panel
- Control cable fire alarm system

### OPERATING PANEL

Remote control for all switch interruptions. Located near the building entrance or near the central fire alarm control centre in order to guarantee quick switching off in case of emergency.



### PV INVERTER

String cables running into the inverter which convert the solar panels' DC current into an AC current suitable for the external power grid.



# SAFETY SWITCH & OPERATING PANEL

## X-TYPE CONSTRUCTION

- For optimal access to the switch connections. Creates clearly ordered wiring from the jack to the connection

## POSITION DISPLAY

- Position flag indicator outside the box; easily visible from a distance

## CABLE GLANDS

- 12 x cable glands M16 for string connection (max. 3 strings at 6 mm<sup>2</sup> each) three times + and – in, 3 times + and – out
- 2 x cable glands M20 for control signals (in and out)

## UPS

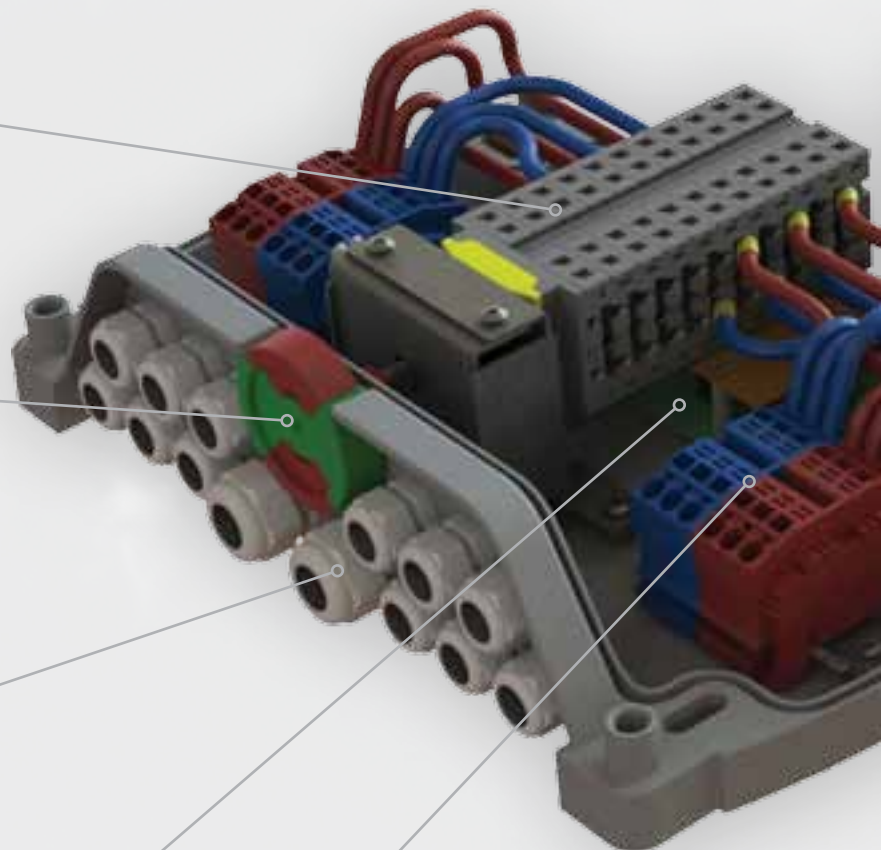
- The specially developed UPS can turn off the switch in case of power failure and release the DC flow of the PV system

## SPRING TERMINALS

- The Express version (FSS-A300-FTU) has pre-wired spring terminals for easy installation

## OPTIONAL

- The Retrofit version comes pre-wired with string cables leading out of the box for purposes of easy integration in already-installed solar systems
- Remote triggering by fire alarm system or via power inverter control system





### BOX

- Upper lid covers cable wiring and pinholes
- Lower box part specially developed for enabling easy switch access
- Pinholes located outside O-ring of IP65 box



### COMPONENTS

- Green LED display for SAFE (0 = OFF)
- Red (optional white) LED display for ACTIVE (I = ON)
- Key-controlled switch for turning off
- Push button for switching off

### BOX

- Upper cable wiring lid and pin holes
- Pinholes located outside sealing of IP65 box

# CONFIGURATIONS

## BASIC IEC

FSS-A300-FU

The box design enables easy installation and optimal access to switch connections.



## EXPRESS IEC

FSS-A300-FTU

Developed for quick installation and easy string connections.

- Pre-wired on spring terminals



## RETROFIT IEC

FSS-A300-FRU

Ideal for integrating into existing PV systems.

### Comprises:

- Pre-wired cables directly on switch poles
- Optionally cables can be equipped with solar connectors (MC4)



## MOTORISED 6-POLE DC SWITCH IN A BOX (+/- 30KW)

### Maximum voltage:

10A/1000V DC  
25A/800V DC  
32A/750V DC

- Position display visible from a distance
- UPS unit for switching off during power failures

### Maximum number of strings:

3 strings

- 12 x M16 cable glands for string connections

### Poles:

6 poles

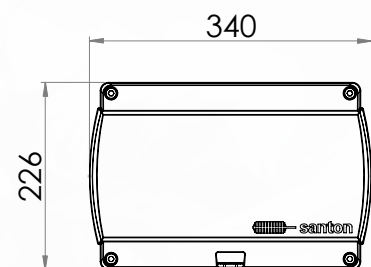
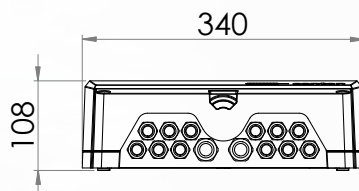
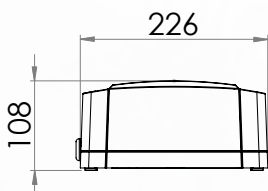
### Protection degree:

IP65

- 2 x M20 cable glands for control signal cabling

### DC switch disconnect according:

IEC 60947-1 & 3

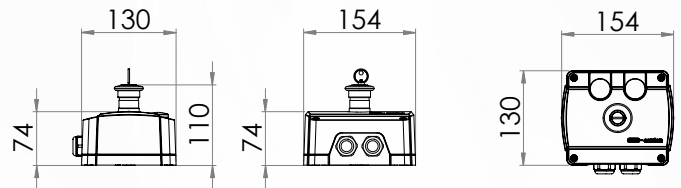


## USER PANEL



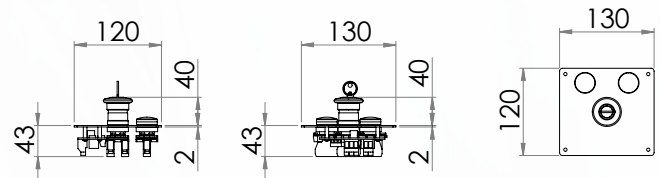
### FSS-B5 IEC

A general purpose operating panel. Suitable for indoor and outdoor installation.



### FSS-B6

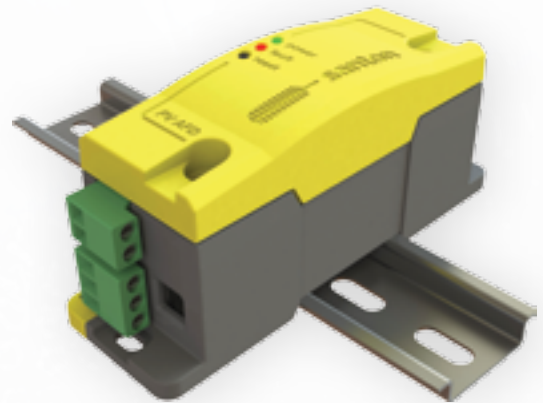
A specially designed operating panel, suitable for integration into new panels and for wall mounting.



## SANTON ARC FAULT DETECTION UNIT

- For home and professional use
- Detection of arc faults
- For DIN rail and wall mounting
- Visible and acoustic arc indication
- Developed acc. UL1699B
- Supplied loose or in PV boxes

The Santon Arc fault Detection Unit (ADU) enables you to recognise dangerous electric arcs. In combination with the Santon switchgear solutions, the ADU can recognise and prevent electric arcs before dangerous situations arise. (available in June 2012)



### TECHNICAL SPECIFICATIONS

<b>Operating voltage:</b>	24V DC (+/- 10%)
<b>Current consumption:</b>	0.2A
<b>Durability:</b>	> 10 years
<b>Operating temperature:</b>	-20°C to +70°C
<b>Storage temperature:</b>	-40°C to +85°C
<b>Category:</b>	PV AFD - Type 1 (UL1699B)

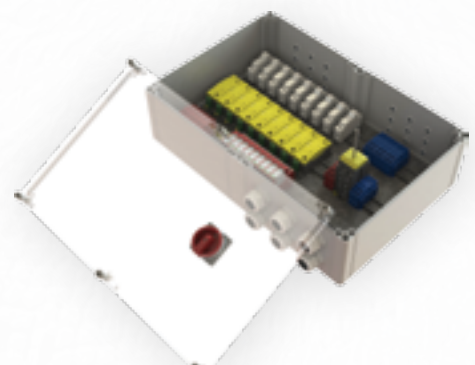
### STRING CABLE CONNECTION

<b>Maximum rated voltage:</b>	1000V DC
<b>Maximum rated current:</b>	40A
<b>Number of poles:</b>	1 pole
<b>Recommended cable size:</b>	6 mm <sup>2</sup>
<b>Maximum cable size:</b>	10 mm <sup>2</sup>

## SANTON JUNCTION BOXES (OPTIONAL)

- Santon's custom-made solutions
- Combining individual string cables into lead cables
- Optional with large number of functions
- Boxes made of resistant IP65 plastic or steel

The Santon junction boxes can be adjusted to your system's requirements. The junction boxes can be equipped with overvoltage suppressor, fuses, short-to-ground detection, arc fault detection or with all of the above. In combination with the Santon switchgear solutions, junction boxes can be operated manually or automatically based on fault detection.



- Maximizing firefighter safety
- Specially designed for solar industry
- Independent string disconnection
- Different configurations for maximum safety
- For small and large installations
- For home and professional use
- Based on proven Santon Packet DC Switchgear
- Integration with fire alarm system
- Emergency switches from 10 Amp to 32 Amp  
and up to 1000V DC
- Cost-efficient solution



EN-ISO 9001:2008

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