



Selectric DC Isolators for PV Array

Part No.	Description
SSRI-16A-DC	IP66 16A 600-1500V DC Isolator Switch, 4 Pole
SSRI-25A-DC	IP66 25A 600-1500V DC Isolator Switch, 4 Pole
SSRI-32A-DC	IP66 32A 600-1500V DC Isolator Switch, 4 Pole

DC Isolators

DC switching has to be considered with care because on disconnection an arc can occur that is more arduous than that produced with an AC load because there is no zero point on DC. (no sine wave) The nature of this arc means that design considerations have to be made within the switch in order to quench this phenomenon; that not only includes significant contact gaps with high speed of operation, but also thermal transmissive materials.

The UK wiring regulations BS 7671 Chapter 53 Section 537 covers the requirement for Isolation and Switching, whilst Section 712 contains specific requirements relating to the installation of PV power supply systems including those with AC modules.

If a switch is not rated or classified as a disconnecter or switch-disconnector then BS 7671 does not allow for its use in an electrical circuit as a safety isolation switch. EN 60947-3 is listed in BS 7671 Table 53.2 as an appropriate standard covering product isolation, emergency switching and functional switching. Selectric designs and manufactures its range of switch-disconnectors (more commonly referred to as isolators) to EN60937-3 and so meet the requirements stipulated under BS 7671

Photovoltaic installations should be fitted with DC isolators in accordance with IEC 60364-7-712 Low voltage electrical installations - Requirements for special installations or locations. Solar photovoltaic (PV) power supply systems

Utilisation Categories

The designation of the utilisation category is made up of three parts:

1. The prefix AC or DC, which indicates the nature of the current.
2. The two digit number, which indicates the type of application the unit is suitable for:
 - 3 - Squirrel-cage motors: starting, switching off motors during running
 - 20 - Connecting and disconnecting under no-load conditions.
 - 21 - Switching of resistive loads, including moderate overloads.
 - 22 - Switching of mixed resistive and inductive loads, including moderate overloads.
 - 23 - Switching of motor loads or other highly inductive loads.
3. The suffix A or B, relates to whether or not the disconnecter is specifically intended for selectivity by means of an intentional time delay with respect to other circuit breakers in series on the load side under short-circuits conditions. (i.e. whether or not I_{cw} required)
 - A - Protection of circuits with no rated short-time withstand current. (i.e., no delay)
 - B - Protection of circuits with a short-time withstand current (For this category of circuit breaker, the value of short-circuit current (I_{cw}) that can be withstood for a specified time is also required)

In PV installations there are both DC and AC switching requirements. For the DC switching then the system falls typically within two categories below (for which the relevant standard is EN 60947-3)

- DC-21 Switching of resistive loads, including moderate overloads
- DC-22 Switching of mixed resistive and inductive loads, including moderate overloads
- DC-PV1 Switching of single PV string(s) without reverse and over-currents
- DC-PV2 Switching of several PV strings with reverse and over-currents

PV Installation Isolation

PV installations consist of the DC side, the Inverter and the AC side with isolation required for both the PV-array to the inverter and for the AC supply from the load, particularly where the system is connected to the Distributed Network.

DC Isolator Selection

BS 7671 states that a method of isolation must be provided on the DC side of a PV installation and this can be provided by a switch-disconnector as classified under EN 60947-3. The switch must isolate all live conductors (typically double pole to isolate PV array positive and negative conductors). BS 7671 specifies that isolators that are in compliance with EN 60947-3 are appropriate for use in PV systems.

DC Isolator rating

The isolator rating must consider the maximum voltage and current of the PV string being switched and these parameters then adjusted in accordance with the safety factors stipulated in current standards. This should then be the minimum required rating of the isolator

$$\text{Voltage} = N_s \times V_{oc} \times 1.15$$

$$\text{Current} = N_p \times I_{sc} \times 1.25$$

N_s - Number of panels connected in series

N_p - Number of strings connected in parallel

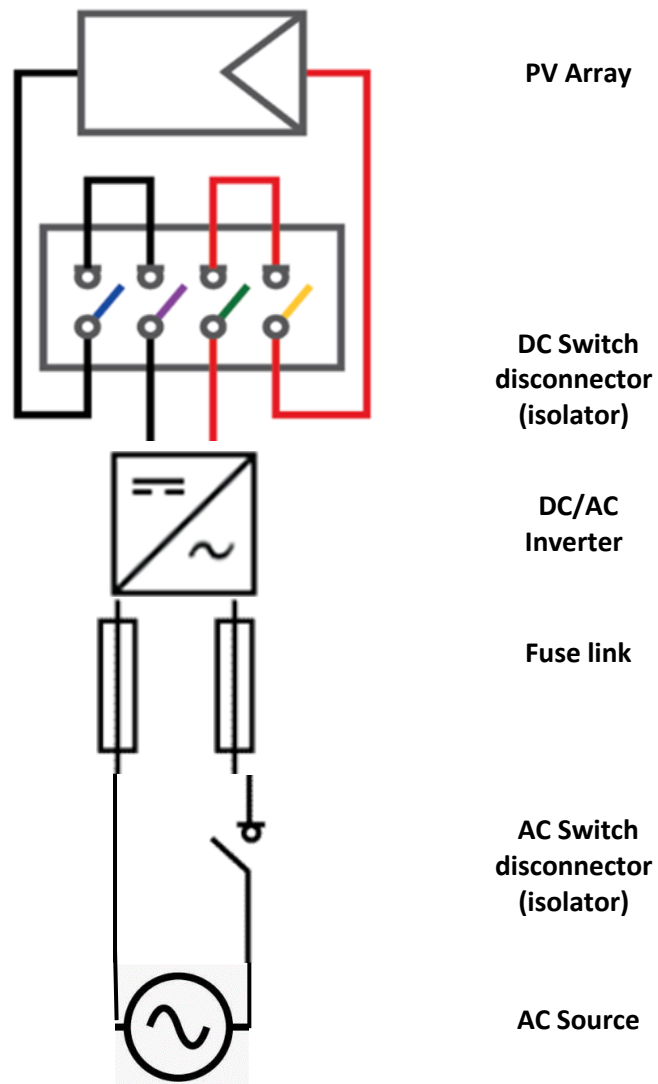
V_{oc} – Open-Circuit Voltage (from module manufacturer's data)

I_{sc} – Short-Circuit Current (from module manufacturer's data)

The isolator should also be suitable for use in the appropriate application which in PV installations is normally considered to be either DC-21A, DC-21B, DC-22A or DC-22B. Normally isolation of the DC supply from the inverter would not be a regular occurrence and therefore generally ratings for DC-21B or DC-22B would, as a minimum, be necessary; although category A types would be better still due to their capability of a higher number of switching operations, and therefore a longer guaranteed life.

The Selectric PV isolators are switch-disconnectors that meet the requirements for utilisation as both a switch and a disconnector, so they can be used to make and break current whilst also giving on-load isolation. they comply with the standard EN 60947-3 Low-voltage switchgear and controlgear - Switches, disconnectors, switch-disconnectors and fuse-combination units categories:

- DC-21B Switching of resistive loads, including moderate overloads
- DC-PV2 Switching of several PV strings with reverse and overcurrent's



Switch Configurations

	A2 2-pole	A2+A2 2-pole	A4 4-pole	A4B 4-pole Input – top Output - bottom	A4O 4-pole Input – bottom Output - bottom	A4U 4-pole Input – top Output - top
Contacts						
Switching example						
Isolator Wiring arrangement						
Use insulated jumpers provided to set desired isolator wiring arrangement					Insulated Jumper 	
DC to AC Inverter						

DC-PV2 & DC21B Ratings						
Rated operational Current I _e (A)						
U _e		600V	1200V	1500V	Part No	Contacts
2p	A2	16A	9A	3A	SSRI-16A-DC	
2p	A2	25A	11A	4A	SSRI-25A-DC	
2p	A2	32A	13A	5A	SSRI-32A-DC	
2p + 2p	A2 + A2	29A	9A	3A	SSRI-16A-DC	
2p + 2p	A2 + A2	36A	12A	5A	SSRI-25A-DC	
2p + 2p	A2 + A2	55A	13A	6A	SSRI-32A-DC	
4p	A4	16A	9A	3A	SSRI-16A-DC	
4p	A4	25A	11A	4A	SSRI-25A-DC	
4p	A4	32A	13A	5A	SSRI-32A-DC	
4p	A4B, A40, A4U	16A	16A	16A	SSRI-16A-DC	
4p	A4B, A40, A4U	25A	25A	20A	SSRI-25A-DC	
4p	A4B, A40, A4U	32A	32A	23A	SSRI-32A-DC	

Terminal Size	SSRI-16A-DC	SSRI-25A-DC	SSRI-32A-DC
	∅ – 4mm	∅ – 4mm	∅ – 4mm
Cut back insulation	12mm	12mm	12mm
Terminal tightening torque Nm	1.7	1.7	2.0

Disposal Information

Should you want to dispose of this item please do not put it with the household waste. Used electrical and electronic equipment and batteries must be made available for separate collection. Electrical products may contain toxic materials such as lead or cadmium. Separate collection allows materials to be recovered and recycled. Private households may return their used electrical and electronic equipment to designated collection facilities free of charge. Facilities are usually available at the municipal waste site, your electrical retailer, or your local authority may provide separate collection from the household. By disposing of this product correctly you will be providing positive help to the environment.



SAFETY FIRST

- BEFORE STARTING ANY ELECTRICAL WORK ALWAYS SWITCH OFF AT THE MAINS
- IF IN DOUBT CONSULT A QUALIFIED ELECTRICIAN

Get Switched On



Selectric UK Head Office & Distribution Centre

LGA Europe Limited, Cow Lane
Oldfield Road, Salford
Manchester, M5 4NB, England