MANUAL

Sunways DC Load Break Switches

DCL 04
DCL 05
DCL 10

sunways
Photovoltaic Technology

The Sunways DC Load Break Switches comply with the DIN VDE 0100-712 standard and are obligatory for all PV systems planned from 1 June 2006. They have been developed for use with Sunways Solar Inverters of the NT series.

In all switches rotary switches are used to achieve the required DC isolation. This ensures that the voltage between the solar generator and the Solar Inverter can be switched off during repairs and maintenance work. Thanks to their load switching capacity, the switches can also be actuated while the system is running, e.g. in an emergency.

DCL 04 and DCL 05

The devices act as generator connection boxes for the strings connected in parallel with a common output to the Solar Inverter.

Use the DCL 04 model for the NT 2600, NT 4000 and NT 5000 Solar Inverters with up to 3 strings. For the NT 6000 Solar Inverter use the DCL 04 or DCL 05 model, depending on the solar generator design.

Please note the maximum DC current of 16 or 25 A respectively.

DCL 10

The DCL 10 model should be used for the NT 8000 and NT 10000 Solar Inverters with three MPP multitracking inputs. It can switch all three strings separately.

Solar Inverter	Switch
NT 2600	DCL 04
NT 4000	DCL 04
NT 5000	DCL 04
NT 6000 (max. 16 A DC)	DCL 04
NT 6000 (max. 25 A DC)	DCL 05
NT 8000 / NT 10000	DCL 10

Application

With the Sunways DC load break switches you can isolate a photovoltaic system on the direct-current side, even while the full load or short-circuit current flows in the PV system. The DC load break switches disconnect the positive and negative pole simultaneously. Depending on the switch type, up to 3 PV strings can be connected. The Sunways DC Load Break Switches can be actuated at any time during operation.

If the switching knob is turned to position 1, the PV generator voltage is connected to the Solar Inverter. If the switching knob is turned to the position 0, the Solar Inverter is isolated again.

Delivery scope

The delivery scope includes the respective switches and additional cable glands as required (DCL 04, DCL 05, 4 each), 4 cover locks, 4 securing lugs (for knocking in) and 4 sealing plugs (for installation through the housing bottom).
Four M16 sealing caps are included if only two of the three strings are connected to the DCL 10. Fasteners such as screws and dowels are not included.

Sicherheitshinweise, Normen und Richtlinien

The installation of the DC main switch must only be conducted by a qualified electrician while observing the relevant safety precautions and norms. The following directives to be mentioned:

DIN VDE 100	Erection of Low-Voltage Systems
IEC60364-7-712	International Standard on the Erection of PV Systems
VDI6012	VDI Guideline: Local energy systems in buildings - Photovoltaic
BGV A1	Safety Regulations of Employer's Liability Insurance Association; General
BGV A2	Safety Regulations of Employer's Liability Insurance Association; Electrical Systems and Operating Equipment

Technical data for Sunways DC Load Break Switches

Switch type

DC load break switch:	DCL 04	DCL 05	DCL 10
Applications:	NT 2600...NT 6000 (max. 16 A DC)	NT 6000 (max. 25 A DC)	NT 8000/NT 10000
Function:	2-pin switch and connection box for parallel connection of up to 3 strings	2-pin switch and connection box for parallel connection of up to 3 strings	6-pin switch and connection box for 3 separate strings

Parameters

DC load break switch:	DCL 04	DCL 05	DCL 10
Operating temperature	-25 to +40°C	-25 to +40°C	-25 to +40°C
max. switching current	16 A (DC)	25 A (DC)	10 A (DC) / Eingang
max. switching voltage	900 V (DC)	900 V (DC)	900 V (DC)
Max. current through the input terminals	10 A / terminal	10 A / terminal	16 A / terminal
Max. no. of strings/ output	1	1	3
Protection class	II	II	II

Housing

DC load break switch:	DCL 04	DCL 05	DCL 10
Outside dimensions (WxHxD) incl. cable glands	180 x 200 x 140 mm	180 x 200 x 140 mm	255 x 205 x 205 mm
Weight	1,5 kg	1,5 kg	2,0 kg
Max. cable cross-section:			
in input terminal	2,5 ... 16 mm²	2,5 ... 16 mm²	2,5 ... 16 mm²
in output terminal	6 mm²	6 mm²	6 mm²
Cable glands	8 x M16	8 x M16	12 x M16
Max. cable diameter	10 mm	10 mm	10 mm
Protection type	IP 54	IP 54	IP 54

Installation

1. After unpacking, check whether all parts listed above are present and in proper condition. The switch knob and cover are mounted loosely and can be removed immediately for installation.

2. Check whether the PV generator, DC cable, switch and Solar Inverter match. The maximum permissible DC voltage for all switches is 900 V (open-circuit voltage of string at -10 °C) and the maximum permissible DC current (sum of all string currents at +70 °C) is:

DC load break switch **DCL 04**	16 A per input
DC load break switch **DCL 05**	25 A per input
DC load break switch **DCL 10**	10 per input

3. Determine the installation location and the type of installation of the switch. The cable glands of the switches must face downward. You can install the switches either with the lugs from the outside or from the inside using the oblong holes or the round holes on the DCL 10. When fastening from the outside, press the lugs into the corner holes at the rear of the switch and knock in the pins flush with a hammer. When fastening from the inside, break out the oblong holes in the housing bottom and be sure to reinstall the included sealing cover after completing installation

4. Mark the string cables of the PV system with the respective line number and the polarity.

5. The subsequent switch installation must be carried out in the de-energised state. If necessary, the string cables must be disconnected on the module side.

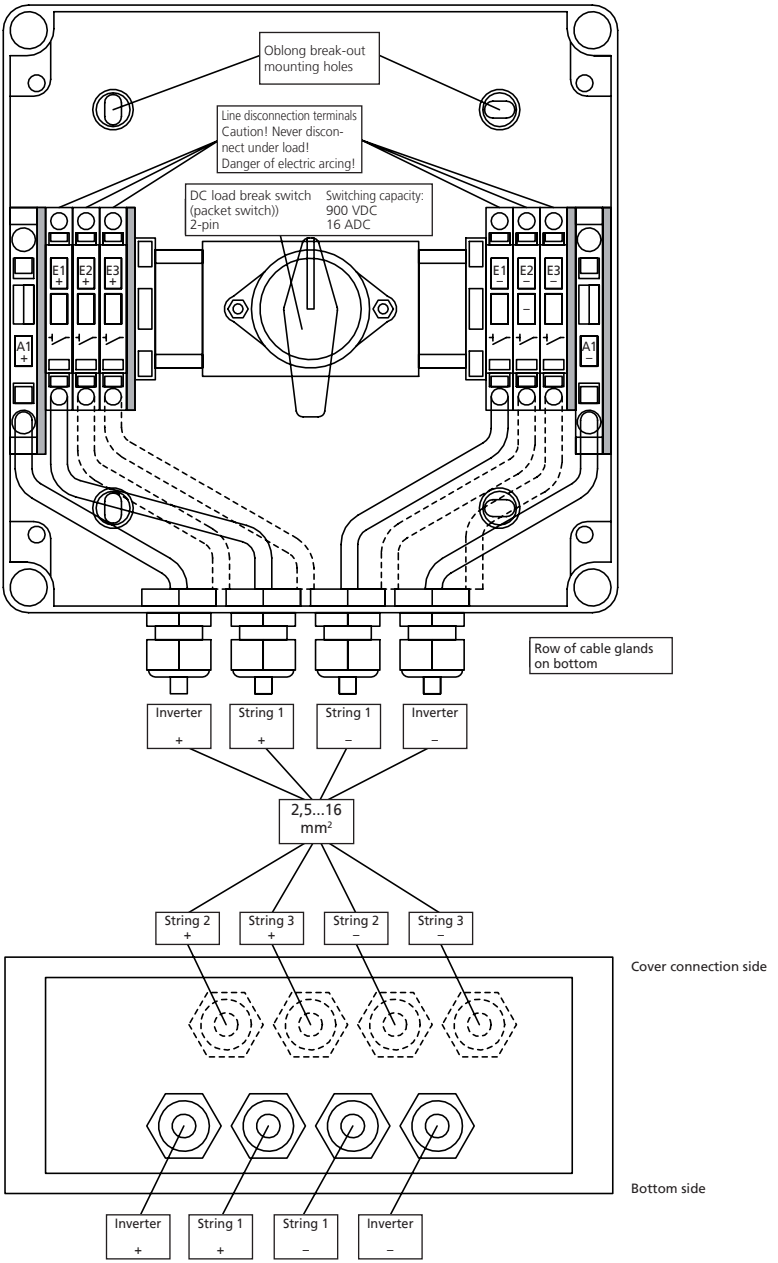
6. The cable glands can accept cables between 3 and 10 mm in diameter through the two-part, removable tapered sealing ring. As a result, DC cables up to 16 mm² can be routed in. Make sure earth-fault and short-circuit-resistant DC cables are used. When installing the DC cables in the switch, the minimum bending radius must be observed. The DC cables are connected to tension spring terminals. To this end you should strip the cable ends approx. 10 mm and open the respective terminal with a suitable straight-blade screwdriver. Then guide in the cable end as far as possible, remove the screwdriver and check the cable for firm seating.

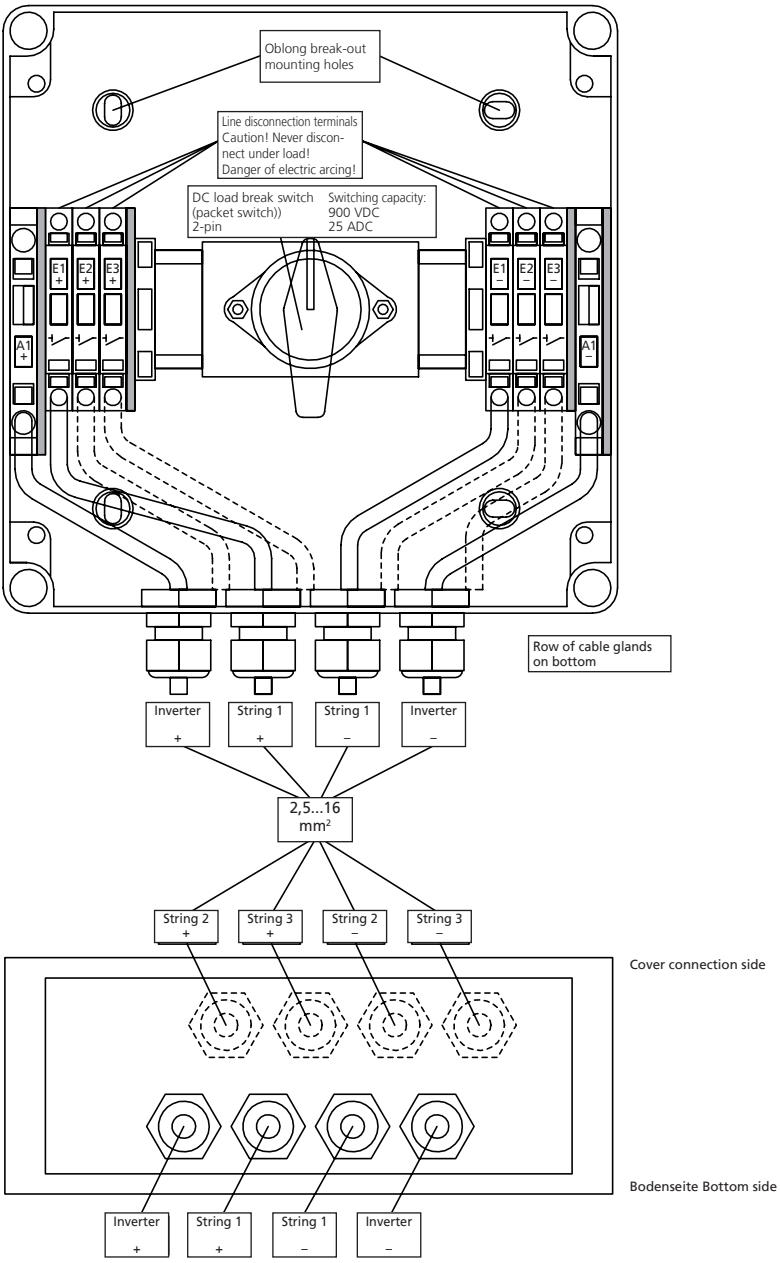
DCL 04, DCL 05: Cables with cross-sections between 2.5 and 4 mm² can be inserted in the input-side separating terminals (string connection). On the output side towards the Solar Inverter, cables with cross--sections up to 6 mm² can be inserted.

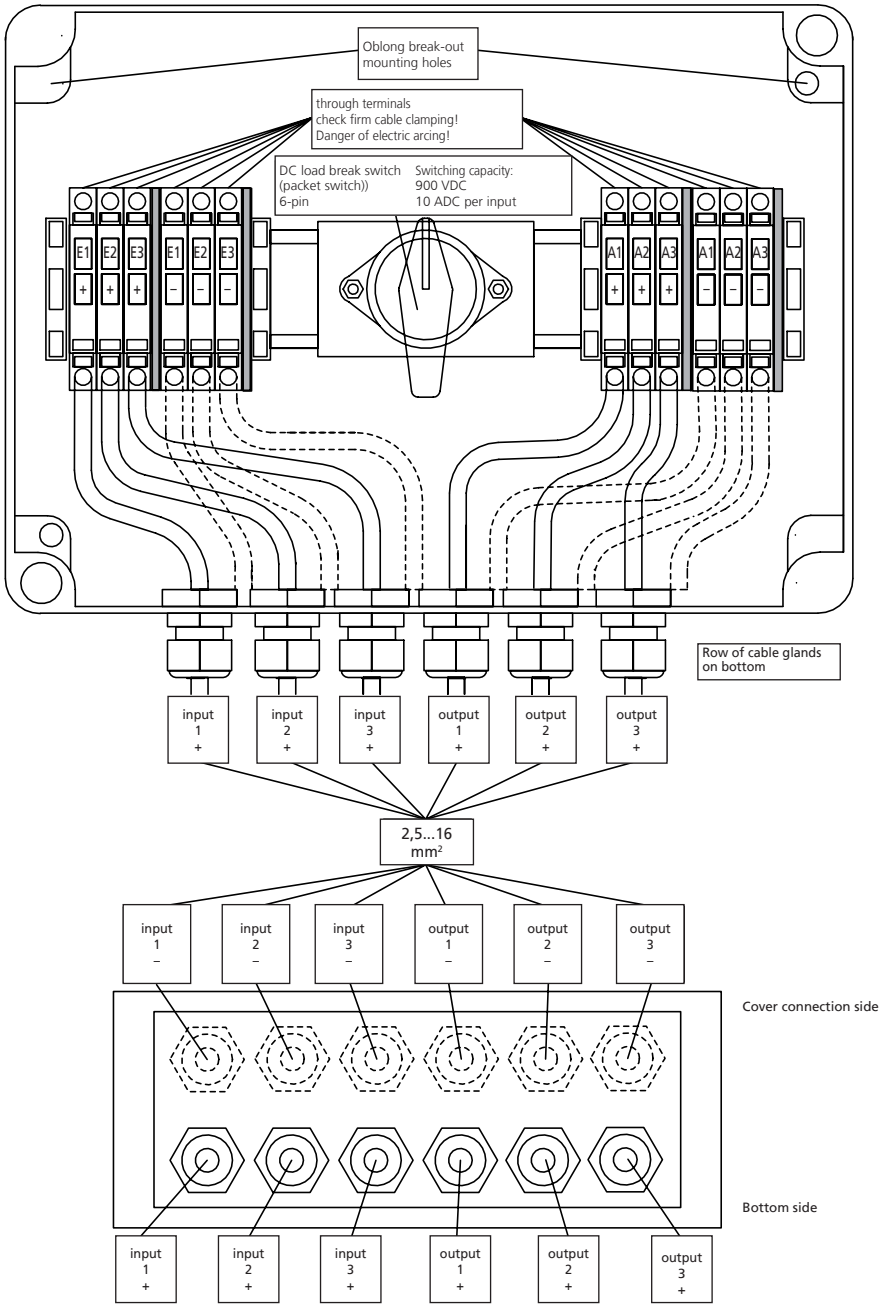
DCL 10: With this model, cables with a cross-section of up to 6 mm² can be connected on both the input and the output side.

7. The wiring of the individual terminals and their assignment are shown in the attached switch illustration. Please make sure that the cables are strain-relieved before you tighten the cable glands.
It is best to make a loop with each cable after the housing entrance before connecting it to the terminal.

8. After completing the switch installation, close the cover and screw it on, mount the knob and isolate the photovoltaic system as part of commissioning.


Oblong break-out mounting holes
Line disconnection terminals Caution! Never disconnect under load! Danger of electric arcing!
DC load break switch (packet switch)) 2-pin
Switching capacity: 900 VDC 16 ADC
E1 +
E2 +
E3 +
A1 +
E1 –
E2 –
E3 –
A1 –
Row of cable glands on bottom
Inverter +
String 1 +
String 1 –
Inverter –
2,5...16 mm²
String 2 +
String 3 +
String 2 –
String 3 –
Cover connection side
Bottom side
Inverter +
String 1 +
String 1 –
Inverter –


Oblong break-out mounting holes
Line disconnection terminals
Caution! Never disconnect under load!
Danger of electric arcing!
DC load break switch (packet switch))
2-pin
Switching capacity:
900 VDC
25 ADC
E1 +
E2 +
E3 +
A1 +
E1 –
E2 –
E3 –
A1 –
Row of cable glands on bottom
Inverter +
String 1 +
String 1 –
Inverter –
2,5...16 mm²
String 2 +
String 3 +
String 2 –
String 3 –
Cover connection side
Bodenseite Bottom side
Inverter +
String 1 +
String 1 –
Inverter –


Oblong break-out
mounting holes
through terminals
check firm cable clamping!
Danger of electric arcing!
DC load break switch
(packet switch))
6-pin
Switching capacity:
900 VDC
10 ADC per input
E1
E2
E3
E1
E2
E3
A1
A2
A3
A1
A2
A3
Row of cable glands
on bottom
input 1 +
input 2 +
input 3 +
output 1 +
output 2 +
output 3 +
2,5...16 mm²
input 1 –
input 2 –
input 3 –
output 1 –
output 2 –
output 3 –
Cover connection side
Bottom side
input 1 +
input 2 +
input 3 +
output 1 +
output 2 +
output 3 +

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SD430312A version 09/09 EN

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