



PRODUCT & APPLICATION NEWS NO. 4 - OCTOBER 2007

# DC-Switch

**Danfoss Solar Inverters come with integrated DC-switch to guarantee safe disconnection of DC current as standard.**

With the integrated DC-switch, there is no need to worry about dangerous electric arcing. Simply turn the DC-switch off and all DC current is disconnected in the inverter. The integrated solution ensures that no extra cabling is

required. Functionality has not changed, neither have the dimensions of the inverter. This means a safe, easy to mount inverter, which takes up no more space than the inverters without a DC-switch.

## Benefits & Advantages

### For the installer

- Easy installation
- No extra box
- No extra cabling
- Safe when servicing

### For the owner

- Proven technology
- Does not take up extra space
- Intuitive and easy to operate

### Competitive advantage

- Long life mechanical switch
- Integrated solution
- Same installation dimensions as the inverter without a DC-switch



## Behind the news – technical information

The standard VDE 0100-7-712 stipulates that PV systems must have easy and safe access to a separation of PV and inverter. Consequently, new PV systems must be designed and assembled with this in mind.

The standard was instituted to prevent the occurrence of dangerous electrical arcs. Arcing may occur when performing an uncontrolled separation of DC current at high voltages.

### Facts:

**As opposed to AC current, which switches off current at every zero-crossing, a DC current cannot be switched off using the same principles. Due to the fact that the current path between two points of contact is self-perpetuating via an 'ionised path of air', a very hot light, also called an electric arc, is radiated when separating the two contact points. Therefore the principle used employs high switching speed and large distance between contacts.**

Disconnection of DC currents at high voltages can be performed in many ways, and a lot of parameters must be considered when choosing the appropriate technology. Some of these considerations include safety, physical size, easy operation, reliability, price, lifespan, etc. Danfoss Solar Inverters has chosen to integrate a dedicated DC-switch into the inverter range.

This switch is based on a well proven and well documented principle of switching, where a very high switching speed is one of the key elements. The switch is constructed to ensure safe disconnection regardless of handling and is, moreover, certified to the requirements of both TÜV and KEMA. The switch has a special DC mechanism which ensures it has the required high switching speed. The speed is independent of operation (in accordance with EN 60947 part 3, par 2.12). Therefore the correct switching speed and, switching capacity is always guaranteed.

One of the advantages of using a mechanical switch rather than an electrical solution to disconnect DC currents, is that the mechanical inertia provides the user with an accurate sense of the current being switched off completely, when turning the button to the 'off' position.

Danfoss Solar Inverters has integrated the DC-switch into the existing designs to achieve an elegant and safe result. Correct and proper mounting of the DC-switch is ensured by integrating the switch during production. Inverters with an integrated DC-switch take up no more space than inverters without, and are mounted and connected as usual. By using inverters with an integrated DC-switch, installers will save time on the additional cabling, mounting and use of space an external DC-switch requires. However, for existing systems where an upgrade is required, an external DC-switch can be supplied. PV systems with DC-switches, where DC current is easily and conveniently disconnected make servicing of inverters safe, and servicing work is performed without having to worry about electrical arcing.



*Indoor inverter with DC-switch front view.*



*Triplelynx inverter with DC-switch.*



*Outdoor inverter with DC-switch side view.*

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