Raycap

Strikesorb Technology for the Protection of Wind Turbines

Strikesorb® Lightning Protection Solutions for Wind Tu

Requirements for Surge Protective Devices (SPD) to be used in wind turbine applications

- **Withstand lightning currents**
  The SPD will be exposed to locations where it must withstand lightning currents following a 10/350 waveform.
- **Long lifetime**
  The SPD should have a lifetime longer than the expected 20-year lifetime of a wind turbine. The SPD should never fail, even in harsh lightning environments, where exposure to direct lightning is much higher than average.
- **Continuous and efficient protection of the equipment**
  Under any condition, the SPD should always protect the equipment. This means that it should not disconnect itself from the power lines to self-protect, leaving the equipment unprotected. Further, it should provide a very low protection level that protects the equipment efficiently while maintaining it in good condition over its expected lifetime.
- **Optimized solutions available**
  The SPD line should be optimized in terms of available size and cost, according to the requirements of the installation.
- **Maintenance-free**
  In wind turbine applications the SPD should not have to be inspected frequently, as this requirement will result in increased maintenance costs.
- **Compliant to global regulations**
  As wind turbines can be supplied to any country around the world, the SPDs integrated inside of them should comply with and be certified according to all relevant local and international standards.

Strikesorb Modules

Strikesorb Electrical Specifications*		
Strikesorb Modules		**30-A**
Surge Protective Device (SPD) Type	per UL 1449 4th Edition	Ty
	Class per IEC 61643-11	
Nominal Operating AC Voltage [U_n]		120V
Maximum Continuous Operating AC Voltage [U_c]		150V
Nominal Discharge Current [I_n]	per UL 1449 4th Edition	
Maximum Surge Current Capacity [I_{max}]	per NEMA LS-1	
Maximum Impulse Current [I_{imp}]	per IEC 61643-11	5 kA 10/350µs
SCCR (Over current protection)	per IEC 61643-11	
SCCR (Over current protection)	per UL 1449 4th Edition	42kA
Voltage Protection Rating (VPR)	per UL 1449 4th Edition	700V
Voltage Protection Level [U_p]	per IEC 61643-11	700V

**Information in this chart is subject to change at any time without notice.*

rbine Applications

Key benefits of Raycap's unique and enhanced Strikesorb surge protection technology

- **Maximum lightning current of up to 25 kA 10/350**
  Strikesorb is available in three versions with an impulse discharge current rating (I_{imp}) from 7.5 kA up to 25 kA.
- **More than 20 years of lifetime and an excellent product warranty**
  Strikesorb is a proven technology that has been in existence for 20-plus years, having more than 10 years of use in the wind generation industry. More than 20 million modules have been installed in mission-critical applications, with a failure rate of practically zero. Strikesorb modules have a 10 year warranty.
- **Direct installation on power lines enables uninterrupted and optimized equipment protection**
  The most important aspect of the Strikesorb technology is its ability to safely withstand significant amounts of energy before and after its end of life, as the failure mode of the device is a short circuit of very low impedance. Therefore, it can sustain very high short circuit currents until the upstream fuse or circuit breaker trips. The high short circuit current rating and connecting terminals of Strikesorb enable its direct installation onto the power lines. This results in low residual voltage to the equipment with no requirement for long connecting cables, series fuses or circuit breakers, which may trip and leave the load unprotected.

  Strikesorb will never leave the equipment unprotected. In case of a catastrophic event, either a lighting current that exceeds the Strikesorb specifications or a prolonged temporary overvoltage (TOV) condition, the Strikesorb module will not disconnect from the power system.
  Instead, it will take the current, tripping the upstream circuit breaker while protecting the equipment from this or following events.
- **Very low protection level**
  Strikesorb offers by design the lowest voltage protection level among different technologies. Its design features in combination with an in-line installation result in very low protection levels which in turn protects sensitive and mission-critical equipment exposed to harsh environments.
- **Several sizes cover all locations**
  All possible locations inside the wind turbine can be protected by the most efficiently-sized SPD. The size of SPD needed depends on the lightning current withstand capacity and the short circuit current rating of the modules. This allows optimized panel designs and well engineered solutions with in-line connections to power lines.
- **Maintenance free operation**
  Strikesorb modules do not rely on internal disconnecters or dedicated low rated fuses, so they do not require a maintenance plan.
- **Dual certification (UL/IEC)**
  Strikesorb has UL (per UL 1449) and VDE (per IEC 61643-11) markings that allow the panels in which it is integrated to be compliant to all relevant US and international standards. When integrating Strikesorb SPDs into products, users never need to worry about the compliance of their products in any country across the world.

30-B	30-C	30-D	40-V1	40-A	40-B	40-C	40-D	40-E	40-F	40-G	80-A	80-B	80-C	80-D	80-E	80-F
pe 2 Component Assembly			Type 2 Component Assembly								Type 2 Component Assembly					
Class I+II			Class I								Class I					
240V	277V	400V	60V	120V	240V	277V	400V	480V	600V	1000V	120V	240V	277V	400V	480V	600V
275V	350V	480V	75V	150V	300V	350V	480V	600V	750V	1200V	150V	300V	350V	480V	600V	750V
20 kA 8/20 µs			20 kA 8/20 µs								20 kA 8/20 µs					
60 kA 8/20 µs			140 kA 8/20 µs								200 kA 8/20 µs					
7.5 kA 10/350 µs			12.5 kA 10/350 µs								25 kA 10/350 µs					
50kA (with 630A CB)			50kA (with 1600A CB)								50 kA (with1600 A CB)					
(800A CB) | 100kA (600A Fuse)			200kA (1000A Fuse) | 85kA (Any CB)								200 kA (4000 A Fuse) | 65 kA (Any CB)					
1200V	1500V	1800V	400V	600V	1200V	1200V	1800V	2000V	2500V	4000V	600V	900V	1200V	1500V	1800V	2000V
1200V	1600V	2200V	300V	700V	1200V	1300V	1800V	2200V	2800V	4400V	1000V	1200V	1400V	1600V	2000V	2500V

For additional information on Raycap protection technology visit us at: raycap.com

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