

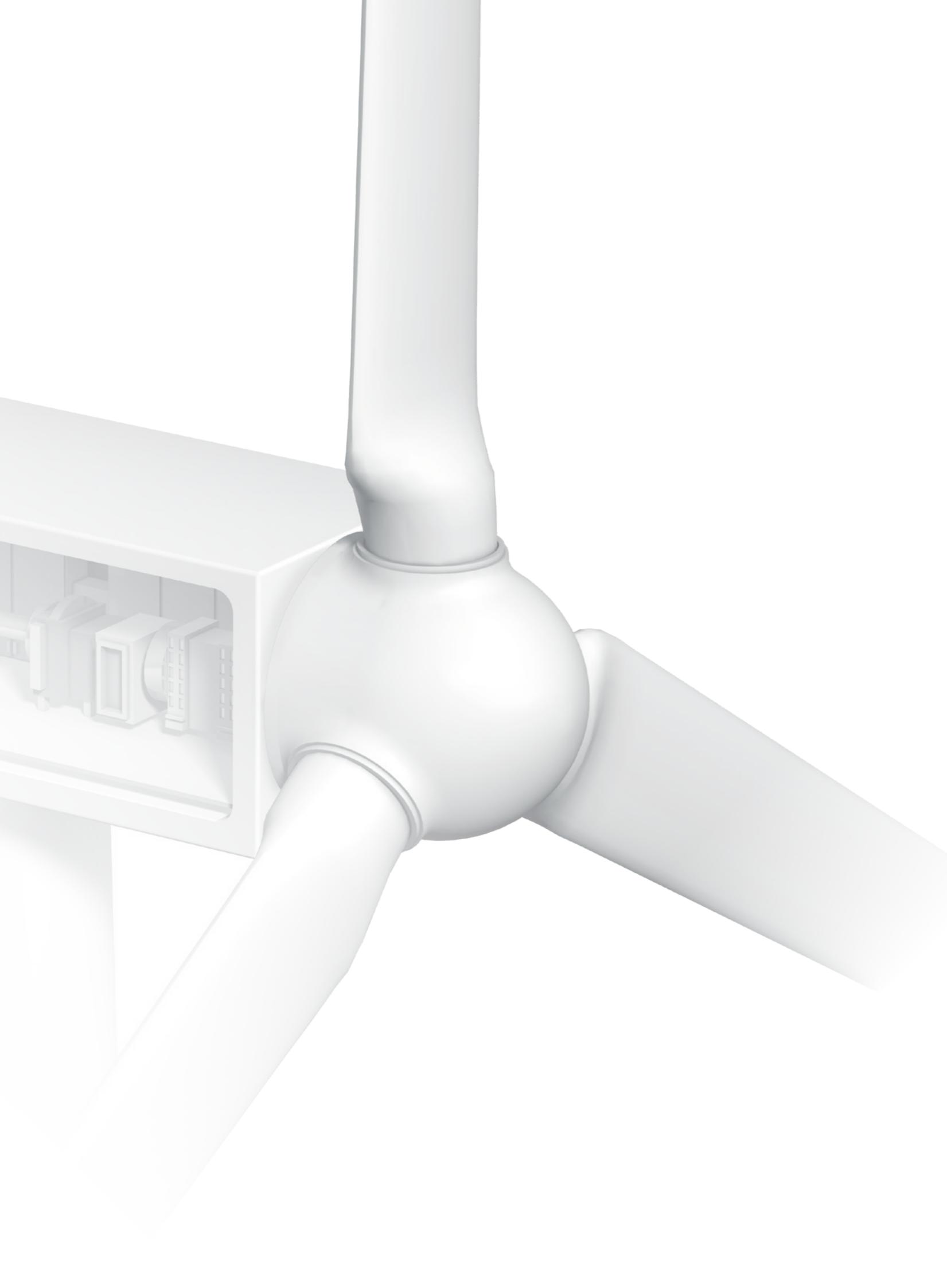
# Maximising system availability

## VARITECTOR surge protection solutions

Lightning and surge protection



Weidmüller 



## VARITECTOR surge protection

### Solutions for wind energy generation

In the first half of 2018, the electricity generation from renewable energy resources exceeded coal energy generation for the first time with over 118 billion kWh. According to the estimates of the BDEW, the share of renewables was 36.3 percent. The main reason for the increase was the strong growth in wind and photovoltaics.<sup>1</sup>

The wind industry is one of the most demanding industries in terms of system availability and operational reliability. For offshore wind turbines, high availability is essential as losses resulting from downtime are even higher. That's why reliable protection solutions have to protect all systems against damages caused by lightning and overvoltage.

VARITECTOR surge protection solutions deliver the best protection throughout all kind of systems that ensures the safe operation of wind turbines. Energy generation and transmission, measurement and signalling and even data communication lines are reliably protected.



#### Energy Protection VPU I, VPU II and VPU III

Surge protection products effectively reduce the interference coupling that can occur from transient surge voltages, even significantly below the limits prescribed by insulation coordination according to EN 60664-3/DIN VDE 0110-3.



#### Energy Protection VPU II ADV

All products of the VPU AC series have optical signaling. Variants with a pre-warning display enable uninterrupted protection. The remote signaling output indicates the pre-warning status.



#### Instrumentation & Control VSPC & VSSC

Overvoltage coupling along the conductor path may disturb or destroy sensitive signal inputs. It is important to provide protection in the immediate vicinity of I&C devices. Weidmüller's broad product range for the I&C sector offers products in a two-piece, pluggable design and modular terminals for tension clamp or screw connection.



#### Data Protection VDATA, VSPC & VSSC

“Data transmission” is the transfer of characters, numbers, statuses and measurements, between different, decentralised units. „Decentralised units“ are controls, computers, measurement sensors and actuators. Appropriate overvoltage protection is essential for such sensitive areas.

## Best application fit

Tailored solutions based on standard products



Our all-round solutions for  
maximising system availability

Damage by lightning effects on wind turbines in the past decade have shown that in northern Europe about 4-8% of wind turbines a year experience a lightning current-related disorder. From these lightning related disorders, about 30% arise from a direct lightning strike and 70% of due to indirect lightning damage. To ensure a reliable lightning protection, the wind turbine is divided into lightning protection zones to ensure that the individual components like rotor blades, hub, electronic systems, bearings, etc. are adequately protected.

When designing the protection concept, the international standards IEC 61400-24 and the guidelines of DNV GL should be considered.



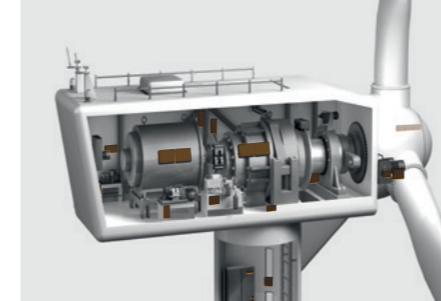
Reliable power protection  
**VARITECTOR PU**



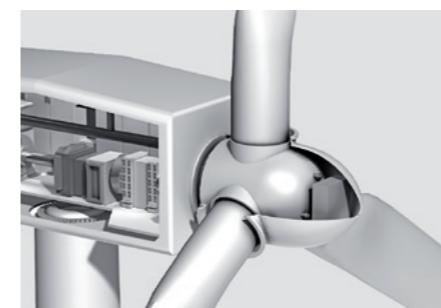
Plugable signal protection  
**VARITECTOR SPC**



Terminal design signal protection  
**VARITECTOR SSC**



Nacelle including generator, top box and additional equipment



Hub with sensitive pitch control system

### Nacelle

The nacelle unit of a wind turbine contains multiple systems that require dedicated protection concepts. Generator lines need to be protected with powerful 400/690 V protection units e.g. with a 3 pole 400/690 V VPU type I and II classified protection unit. Sensor box equipment requires power line protection for 230 V supply as well as signalling and data line protection e.g. for the incoming signals from the weather station. VPU 280 V power components, VSPC for measurement signals and VDATA for ethernet lines ensures that the equipment is safely protected.



Bottom segment with bottom box and inverter

### Hub

The hub contains the sensitive electronics of the pitch control systems. Malfunction of these systems could cause a total breakdown of the turbine. Protection concepts for the power supply, monitoring systems and data communication systems have to ensure a complete protection and system availability. VPU 280 V, VSPC and VDATA deliver total protection solutions for these kind of elements.

### Bottom box

The bottom box equipment is connected to the top box equipment via long wires dependent upon the turbine type. This requires protection of power lines as well as signal lines at both ends. The same is true for the power lines between generator and inverter. VPU 400/690 V products and VSPC protect the lines reliably and if needed, with real time status monitoring included.

# Availability at the highest stage

## Reliable and future-proof protection

The continuous increase in limit values within the standards, put great emphasis on the need for all-round, reliable surge protection. In response to these growing requirements the VPU, VSPC and VSSC lightning and surge protection series offer standard exceeding protection for all kinds of applications. Based on a combined varistor/gas discharge technology the VPU series is a future orientated series of products that protect your energy grid and power supply at the highest level. However, you will not just be protecting your plant, but also your planning processes. Conformity with standards for at least five years means that you can minimise your planning iteration steps and the redesigns associated with them.

Many intelligent product features help installers during installation and maintenance specialists during their

servicing of the lightning and surge protection system. Equipped in this way, the VPU series provides a long-lasting, safe and future-proof lightning and surge protection solution for your system.

Our pluggable VSPC surge protection is characterised by the highest protective functions with compact dimensions. The arrestors of the modules can be removed, measured or exchanged during running operation impedance-neutral – without interrupting the measuring circuit. These features make this product the ideal secure protection mechanism for interfaces within instrumentation and control circuits.

### Advantage Status Indication (ASI)

The VPU AC II Y series is equipped with ASI – Advanced Status Indication technology. The yellow status signal indicates that the product is approaching its performance limit due to frequent overvoltages. Your system is still protected because the arrester units are redundant with two varistors. If a varistor fails, full protection is still available. This status window and at the remote signaling contact. Only when showing the red status the arrester is completely disconnected from the power grid.



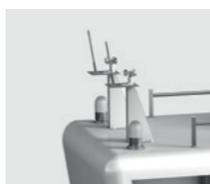
### Pitch system, blade sensors and rotor blade heating

Type	Order No.
VPU II 1+1 R 280V/40kA	2639340000
VSPC 4SL 24VAC R	8951600000
VSPC BASE 4SL FG R	8951760000
VDATA CAT 6	1348590000



### Aircraft warning light

Type	Order No.
VPU AC II 1+1 R 300/50 Y	2639340000



### Weather station

Type	Order No.
VSPC 4SL 24VAC R	8951600000
VSPC BASE 4SL FG R	8951760000
VSPC 2SL 24VAC R	8951640000
VSPC BASE 2SL FG R	8951780000



### Voltage supply in the nacelle

Type	Order No.
VPU II 3 R 280V/40kA	2639330000



### Signal, bus and control lines

Type	Order No.
VSPC 4SL 24VAC R	8951600000
VSPC BASE 4SL FG R	8951760000



### Generator

Type	Order No.
VPU II 1 1000V/40kA AC	1473440000



### Voltage supply in the tower base

Type	Order No.
VPU AC II 3 R 300/50 Y	2639330000



### Transformer low-voltage side

Type	Order No.
VPU AC I 3+1 R 440/25 LCF	2619260000



### Inverter and main supply

Type	Order No.
VPU AC I 3+1 R 440/25 LCF	2619260000
VPU AC II 3 R 750/35	2591320000



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Order No.: 2639660000/08/2019/TCTC