HANDBOOK

LIGHTNING AND SURGE PROTECTION OF A WIND TURBINE SYSTEM

Surge Protection Device

Insulation Monitoring Device

hakel®
THE QUEEN OF POWER

LIGHTNING AND SURGE PROTECTION OF A WIND TURBINE SYSTEM

1 Control cabinet protection (230V)

Description	Nominal voltage: U_N
PIIIM 275/3+1	275V

2 Rotor protection

Description	Nominal voltage: U_N
PIIIM 275/3+0	275V
PIIIM 440/3+0	440V
PIIIM 440/690/3+0	690V

3 Stator protection

Description	Nominal voltage: U_N
PIIIM 440/690/3+0	690V

4 HUB protection

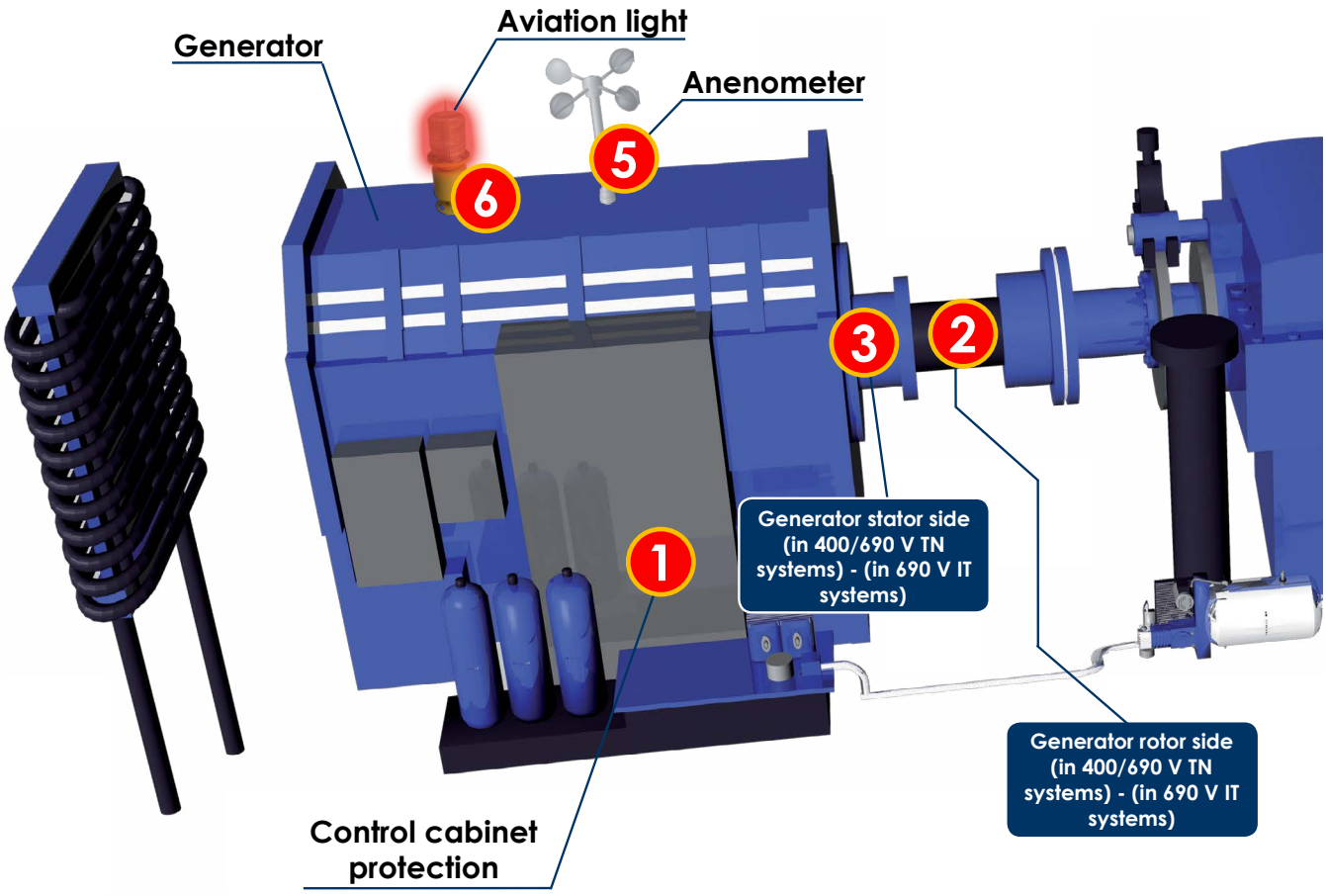
Description	Nominal voltage: U_N
PIIIM 275/3+1	275V
DTE 1/24	24V
DTE 1/48	48V

5 Obstruction lighting protection

Description	Nominal voltage: U_N
PIIIM 275/1+1	275V

6 Anenometer

Description	Nominal voltage: U_N
DTE 1/24	24V



SURGE ARRESTERS - VARISTOR

PIIIM is surge arrester type 2 according to EN 61643-11 and IEC 61643-1. Complete device consists of a base part and pluggable module. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 (according to IEC 1312-1 and EN 62305) for equipotential bonding and elimination of transient overvoltage that originate during atmospheric discharges or switching processes. The combination of PIIIM + B20M is suitable for use in TNS and TT systems.

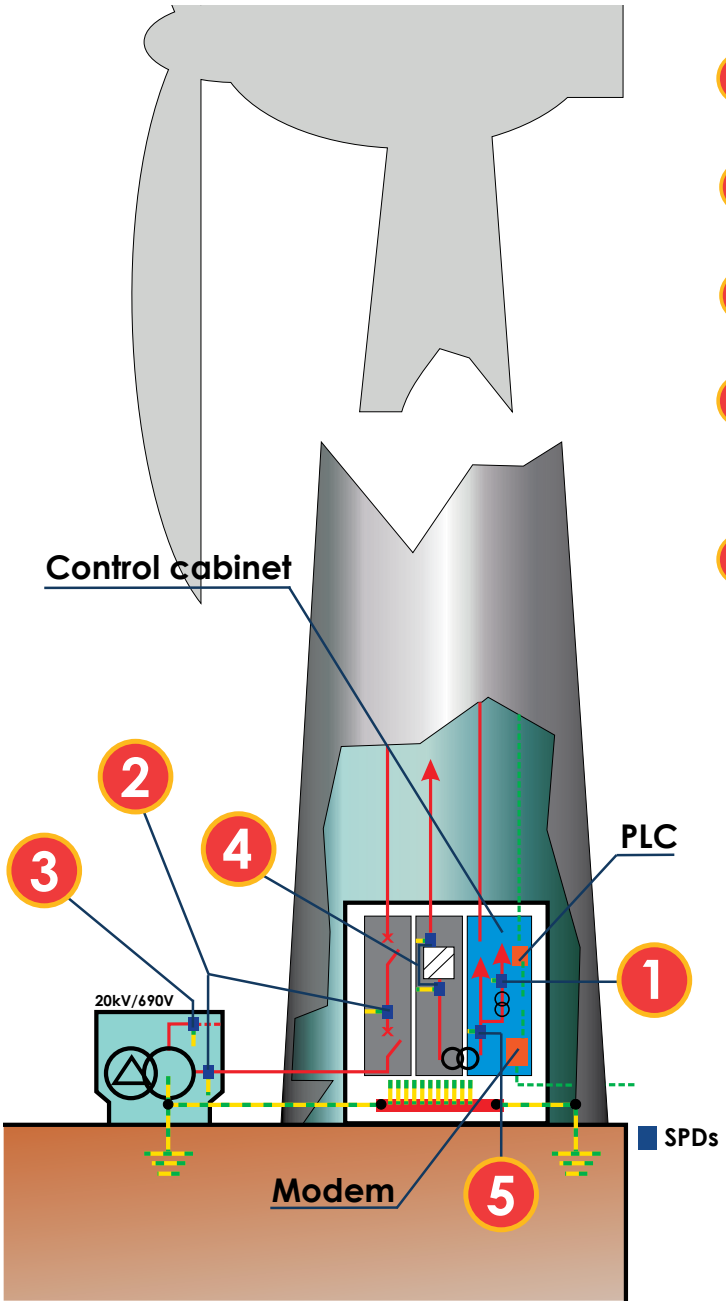
The main use of PIIIM arrester is in all kinds of industry, residential and administration buildings.They are to be placed into the secondary switchboards or into the control box.

With the growing awareness of the global warming and the limits to our fossil based fuels, the need to find better renewable source of energy is becoming apparent. The use of wind energy is a rapidly growing industry. Such installation are generally located on open and elevated terrain and as such present attractive capture points for lightning discharges. If reliable supply is to be maintained it is important that sources of over-voltage damage are mitigated. HAKEL Ltd. provides an extensive range of surge protection devices suited to both direct and partial lightning currents.

DTE is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The nominal current of individual protected lines I_N < 0,1A.

These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 6V-170V. Maximum discharge current is 10kA (8/20). For the protection of telephone lines it is recommended to use a type with nominal voltage U_N=170V (with code mark "T").

Installment in wind-mill



1 Control cabinet protection (24V/48V)

Description	Nominal voltage: U_N
DTE 1/24	24V

2 Heading protection

Description	Nominal voltage: U_N
PIVM 440/690/3+0	690V

3 Control braker protection

Description	Nominal voltage: U_N
PIIIM 275/3+1	275V

4 Inverter protection for rotor power supply

Description	Nominal voltage: U_N
PIIIM 275/3+0	275V
PIIIM 440/3+0	440V
PIIIM 440/690/3+0	690V

5 Control cabinet protection (230V)

Description	Nominal voltage: U_N
PIIIM 275/3+1	275V

SURGE ARRESTERS - VARISTOR

PIIIM is surge arrester type 2 according to EN 61643-11 and IEC 61643-1. Complete device consists of a base part and pluggable module. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 (according to IEC 1312-1 and EN 62305) for equipotential bonding and elimination of transient overvoltage that originate during atmospheric discharges or switching processes. The combination of PIIIM + B20M is suitable for use in TNS and TT systems.

The main use of PIIIM arrester is in all kinds of industry, residential and administration buildings.They are to be placed into the secondary switchboards or into the control box.

LIGHTNING ARRESTERS - VARISTOR

PIVM is modular lightning arrester type 1 + type 2 according to EN 61643-11 and IEC 61643-1. Complete device consists of a base part and pluggable module. These arresters are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 0 – 1 (according to IEC 1312-1 and EN 62305) for lightning current equipotential bonding and elimination of switching surges that originate in power supply systems entering the building.

The PIVM is mainly intended for use in TNC systems. For TNS and TT systems it is necessary to combine these arresters with lightning arrester B25, B25M or B50 which are intended for equipotential bonding between N and PE.

The main use of PIVM7 arrester is in structures of LPL III – IV according to EN 62305, e.g. residential houses with cable supply and subdistribution boards of big industrial structures.

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