

**PROTEC Z HV**

**Surge Suppressors**

# TECHNICAL DATA

## Application

The Protec Z family is a range of surge suppressors for protection of medium voltage motors, generators and transformers against transient switching surges. Protec Z surge suppressors alter circuit parameters in such a way that transient over voltages due to switching are suppressed so as to maintain

A LV version also available (see separate product brochure).

the voltage at the machine terminals within the IEEE ratings. They are recommended for use in systems incorporating vacuum, SF6 and metal vapour contactors and breakers.

Protec Z surge suppressors are supplied in compact and standard versions for MV applications.

## Ratings

| Attribute                     | Unit | MM3C-3,3kV | MM3C-6,6kV | PM3/MM3-4,2kV | PM3/MM3-7.2kV | PM3/MM3-12.5kV |
|-------------------------------|------|------------|------------|---------------|---------------|----------------|
| Nominal rated voltage         | kV   | 3,3        | 6,6        | 4,2           | 7,2           | 12,5           |
| Rated voltage range           | kV   | 2,2 - 3,6  | 5,3 – 7,3  | 2,2 – 4,6     | 5,8 – 7,9     | 10 – 13,8      |
| THD (V)                       | %    | 10         | 10         | 10            | 10            | 10             |
| BIL                           | kV   | 45         | 45         | 75            | 95            | 95             |
| Rated frequency               | Hz   | 50/60      | 50/60      | 50/60         | 50/60         | 50/60          |
| Ambient temperature - minimum | °C   | -25        | -25        | -40           | -40           | -40            |
| Ambient temperature - maximum | °C   | +55        | +55        | +55           | +55           | +55            |
| Altitude                      | masl | Up to 2000 | Up to 2000 | Up to 2000    | Up to 2000    | Up to 2000     |

## Specification

|                                     |       |                      |                      |                                    |                                    |                                    |
|-------------------------------------|-------|----------------------|----------------------|------------------------------------|------------------------------------|------------------------------------|
| Rated capacitance                   | µF    | 3 x 0,1              | 3 x 0,1              | 3 x 0,2                            | 3 x 0,2                            | 3 x 0,2                            |
| Capacitance tolerance               | %     | -10/+10              | -10/+10              | -5/+5                              | -5/+5                              | -5/+5                              |
| Resistance per phase                | Ω     | 30                   | 30                   | 30                                 | 30                                 | 30                                 |
| Tangent Delta                       |       | $20 \times 10^{-4}$  | $20 \times 10^{-4}$  | $20 \times 10^{-4}$                | $20 \times 10^{-4}$                | $20 \times 10^{-4}$                |
| Dielectric type                     |       | all-film             | all-film             | all-film                           | all-film                           | all-film                           |
| Bushings:                           |       |                      |                      |                                    |                                    |                                    |
| Impulse test voltage                | kV    | 45                   | 45                   | 75                                 | 95                                 | 95                                 |
| Dry test voltage <sup>1</sup>       | kV    | 20                   | 20                   | 28                                 | 38                                 | 38                                 |
| Wet test voltage <sup>1</sup>       | kV    | 13                   | 13                   | 28                                 | 28                                 | 28                                 |
| Minimum creepage                    | mm    | 55                   | 55                   | 190                                | 305                                | 305                                |
| Installation location               |       | Machine terminal box | Machine terminal box | Machine (MM) or Panel (PM) Mounted | Machine (MM) or Panel (PM) Mounted | Machine (MM) or Panel (PM) Mounted |
| Fusing                              |       | No internal fusing   | No internal fusing   | No internal fusing                 | No internal fusing                 | No internal fusing                 |
| Routine tests:                      |       |                      |                      |                                    |                                    |                                    |
| Sealing                             |       |                      |                      |                                    |                                    |                                    |
| Voltage withstand terminal-terminal | kV dc | 14,2 for 10 s        | 28,4 for 10 s        | 18,1 for 10 s                      | 31 for 10 s                        | 53,8 for 10 s                      |
| Voltage test terminal-ground        | kV dc | 14,2 for 10 s        | 28,4 for 10 s        | 18,1 for 10 s                      | 31 for 10 s                        | 53,8 for 10 s                      |
| Tangent delta                       |       | Yes                  | Yes                  | Yes                                | Yes                                | Yes                                |
| Capacitance                         |       | Yes                  | Yes                  | Yes                                | Yes                                | Yes                                |

## Reliability

|                          |  |  |
|--------------------------|--|--|
| Maintenance requirements |  | No maintenance required. Recommend 12 monthly visual inspection and 24 month capacitance verification. |
| Performance verification |  | Via health indicator and/or PD monitor (optional feature)  |

|                       |  |           |           |           |           |           |
|-----------------------|--|-----------|-----------|-----------|-----------|-----------|
| Expected service life |  | >15 years | >15 years | >15 years | >15 years | >15 years |
|-----------------------|--|-----------|-----------|-----------|-----------|-----------|

## Construction

| Attribute                      | Unit  | MM3C-3,3kV      | MM3C-6,6kV      | MM3-4,2kV       | MM3-7.2kV       | MM3-12.5kV      |
|--------------------------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Phases                         |       | Three phase     | Three phase     | Three phase     | Three phase     | Three phase     |
| Enclosure fabrication          |       | Welded          | Welded          | Welded          | Welded          | Welded          |
| Enclosure material             |       | Stainless steel | Stainless steel | Stainless steel | Stainless steel | Stainless steel |
| Primer                         |       | Epoxy           | Epoxy           | Epoxy           | Epoxy           | Epoxy           |
| Finish                         |       | PUR RAL 7032    | PUR RAL 7032    | PUR RAL 7032    | PUR RAL 7032    | PUR RAL 7032    |
| Connection                     |       | YN              | YN              | YN              | YN              | YN              |
| Bushing quantity               |       | 3               | 3               | 3               | 3               | 3               |
| Bushing type                   |       | Ceramic         | Ceramic         | Ceramic         | Ceramic         | Ceramic         |
| Insulation                     |       | Fluid           | Fluid           | Fluid           | Fluid           | Fluid           |
| Fluid type                     |       | M/DBT (NON-PCB) | M/DBT (NON-PCB) | M/DBT (NON-PCB) | M/DBT (NON-PCB) | M/DBT (NON-PCB) |
| Fluid volume                   | litre | 3               | 3               | 7               | 7               | 6               |
| Weight                         | kg    | 7               | 7               | 19              | 19              | 22              |
| Overall Dimensions (W x H x D) | mm    | 280 x 230 x 110 | 280 x 230 x 110 | 415 x 430 x 135 | 415 x 495 x 135 | 520 x 520 x 105 |

## Standards

|                           |    |   |                   |                   |                   |                   |
|---------------------------|----|---|-------------------|-------------------|-------------------|-------------------|
| Routine tests             |    | IEC 60871-1: 2005   | IEC 60871-1: 2005 | IEC 60871-1: 2005 | IEC 60871-1: 2005 | IEC 60871-1: 2005 |
| Temperature category      | °C | -25/D (-25/+55)   | -25/D (-25/+55)   | -25/D (-25/+55)   | -25/D (-25/+55)   | -25/D (-25/+55)   |
| Quality Management System |    | IEC 9001:2008   |                   |                   |                   |                   |
| Certification Body        |    | Bureau Veritas  |                   |                   |                   |                   |
| In compliance with        |    | IEC 60871-1: 2005; VDE 0560 part 410; ANSI/IEEE 18; NEMA CP-1 |                   |                   |                   |                   |
| Marks                     |    | CE  | CE                | CE                | CE                | CE                |

## Options

|                          |  |     |     |     |     |     |
|--------------------------|--|-----|-----|-----|-----|-----|
| Pressure switch          |  | Yes | Yes | Yes | Yes | Yes |
| Partial discharge sensor |  | No  | No  | No  | No  | No  |
| Health indicator         |  | No  | No  | No  | No  | No  |

## Shipping

|                  |  |     |     |     |     |     |
|------------------|--|-----|-----|-----|-----|-----|
| Anti-static link |  | Yes | Yes | Yes | Yes | Yes |
|------------------|--|-----|-----|-----|-----|-----|

## Features

- Robust, high grade stainless steel enclosure.
- Enhanced THD (V) withstand.
- Designed for multi-ranging applications.
- Permits integrity test of functional components.
- Option for over-pressure protection.
- Option for integrated partial discharge sensor.
- Option for visual health indicator.
- Recognised quality system certification.

## Benefits

The Protec Z offers complete protection to the insulation systems of motors, generators and dry type transformers against long and short damage from over voltage spikes caused by contactors and breakers. In particular, insulation between turns and coils close to the line terminals are not exposed to excessive voltages resulting from non-uniform voltage distribution caused by steep fronted transients.

The Protec Z provides insulation coordination at all practical surge magnitudes and rise times. Multiple pre- and re-strikes in the switchgear are eliminated, resulting in significant life extension of machines.

In addition, the Protec Z + PD option permits measurement and monitoring of partial discharge activity.

## Installation

The Protec Z must be installed in accordance with the latest NTSA Protec Z application and installation manual.

## Warranty

The Protec Z surge suppressors are backed by a twelve month factory warranty.

## NOTE

NTSA reserves the right to apply continuous research and development which may result in improvements affecting any aspect of specification or appearance at any time.

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