PROTEC Z LV +

The universal solution for transient switching protection and lightning protection for LV motors, generators, transformer LV secundaries, VSD and UPS equipment

NTSA has developed the ultimate solution for protecting the above equipment both from lightning and transient switching spikes.

Previous attempts concentrated on trying to combine the lightning and transient switching into one device. Drawing upon NTSA's deep knowledge of both aspects we developed an optimized and universal solution.

The lightning section is totally integrated with in the transient switching section and this results in optimal grading between the Class 1 device and the PROTEC Z LV unit, ensuring total surge protection for the machinery that is thus protected both for current and TSSP (Transient switching surge protection) overvoltage spikes.

Description of the transient switching section

The wholesale use of vacuum and SF 6 breakers and contactors in industry particularly on LV motors, generators, transformer secundaries, VSD and UPS equipment has led to many failures of these devices and control mechanisms. Vacuum breakers and contactors have the propensity to generate spikes up to 5 times the line to line voltage. The spikes have a rise time from 0.1 to 2 microseconds. A typical frequency spectrum between 100-300 kHz is common in these applications. The PROTEC Z LV is uniquely able to protect the initial windings of the motors, generators, transformer secundaries and the control cards of the UPS and VSD units.

At operating frequency of 50-60 Hz the PROTEC Z LV TSSP section acts as a quasi-open circuit, with few mA flowing

When the spike “signature” as described above is presented to the filter it will conduct the spike to the device earth, thus preventing the spike to cause damage to the equipment.

The filter is uniquely tuned to protect against these destructive spikes. Moreover the filter also has an integral “clip” device to ensure that the IEEE winding ageing limit is never exceeded. This is particularly important for motors, generators and transformer LV secundaries.

The filter is operative from -40 to +70 degrees Celsius. It can withstand THD (V) up to 10%. The design is such that it can be directly mounted on the motors, generators and transformer secundaries without any provision for machine vibration effects. IP65 is allowed for to IEC specification publication 529

The flexible cable of 1000 mm can be shortened but not extended. These cables need to be connected to the incoming phases to the machine or device. The phase sequence does not have to be observed in order to connect this filter.

The filter earth wire needs to be connected to machine or device earth.

Types of filters

The transient switching filter is available in one type ranging from 440V – 1150 V 50/60 Hz application

Options

Branding and barcoding can be negotiated with NTSA

Normal warranty on the filter is 1 year from delivery date to the customer. Increased warranty can be negotiated with NTSA

Testing of the filter

The filter needs to be taken out of service by disconnecting the leads and shorting these individually to earth, so that the possible remnant charge on the capacitor phases is totally neutralized. Test with a capacitance meter in the micro Farad range and confirm that the capacitance between the earth stud and each phase is between 0.45 and 0.6 micro Farad. If the reading is outside these values, replace the filter.

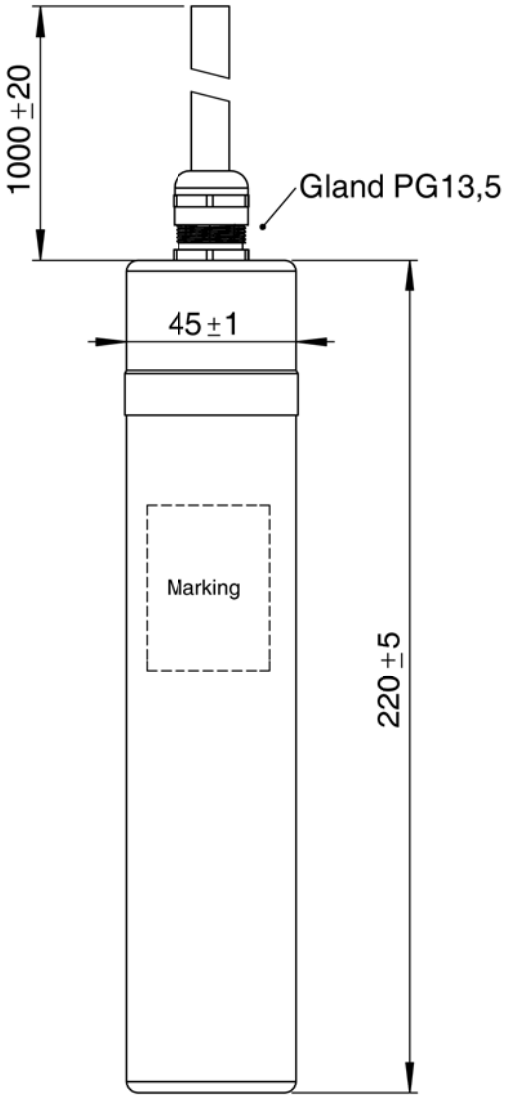
Technical notes for the various applications:

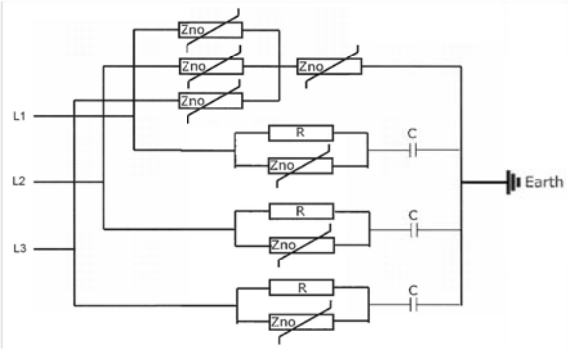
- The filter needs to be installed **in front of the VSD** and after the vacuum breaker.
- Dry transformers where the HV side is switched with vacuum breaker will benefit from a PROTEC Z HV filter available from NTSA
- In application with LV generators, the filter needs to connected to the alternator output before the breaker
- Ensure that the filter earth, machine earth and general earth are properly connected with the correct cross sections and per local regulations.
- Machine earth is defined as follows: **Motor**, motor earth connection. **Generator**, alternator earth. **VSD and UPS**, the respective earths. **Transformer LV secundaries**, the general transformer earth.

PROTEC Z LV plus lightning protection combination specification sheet		
Item	**Specification**	**Unit**
Application	LV Generator, motor, transformer, VSD, UPS protection	
Use	Transient switching AND lightning protection combination	
Span of combination	0.1-350	microsecond
Voltage transient protection	Yes	
Current transient protection	Yes	
Explosion Proof	Yes – In the sense that no internal components will be emitted out of the aluminium vessel and that any internal components will extinguish in the epoxy material	
Vibration proof	Yes	
IP rating	65	
Temperature range	-40 to +70	degrees Celsius
Capacitor type	Dry type	
Weight of filter	0.75	kg
THD (V)	10	%
Transient voltage spikes protection VCB/C	1 to 5 max 6	pu
Dimensions of filter	OD 45 x Length 220	mm
Cable 3 phase	1000 UL approved cable	mm
Per phase protection	Yes	
Versions 3 phase	400 – 1150	Volt
Frequency	50/60 +50 to -50 %	Hz
Barcoding	On request	
Warranty	1 years against any component failure when operated within the specs	
Mounting	Any direction	
Box for transient filter	Aluminium	
Estimated life span of unit	10	years
Specifications	IEC 60831/1-2 UL approved cables	
Manufactured to	ISO9001 and ISO 14001	
CE Mark	YES	
Certification	BUREAU VERITAS	

Unless otherwisse specified apply the following tolerances	
to 6	±0,1
above 6 to 30	±0,2
above 30 to 100	±0,3
above 100 to 300	±0,5
above 300 to 1000	±0,8
above 1000 to 2000	±1,2
above 2000 to 4000	±2
above 4000	±3

Cable





Marking

NTSA
DEFINED POWER PROTECTION

www.ntsa.co.za

PROTEC Z LV

400 - 1150 V 50/60 Hz

-40° / +70°C

IEC 60831/1-2

IP 65 Dry

Date

CE

TECHNICAL DATA:

- Case: Aluminium can
- Filling: filled with epoxy resin
- Connection: cable 4x2,5mm^2 (Diameter cca 13mm)
- Protection: IP65
- Safety: without fuse

material	protection	standard	issue	

changes	1	2	3	4	5	6	7	8	9	10
request.										
date										
signature										

	date	signature	name
design.	24.1.14	B. Križan	
approved			
stand.			

Capacitor KNI2036

identification No.

RRN-289/13R2

scale	page
	1

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