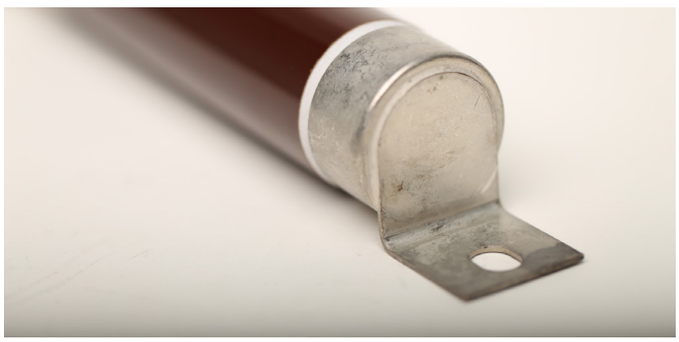
METROSIL®
PROTECTION BUILT-IN

METROSIL SURGE DIVERTERS TYPE VSD

INTRODUCTION

Surge diverters type VSD have been designed to provide effective protection of motor and transformer insulation against voltage surges, which may sometimes result from the operation of switchgear.



They are suitable for systems having working voltages from 3.3 to 11kV rms. Each diverter consists of a spark gap assembly in series with a number of Metrosil non-linear resistors housed in a ceramic body. The Metrosil resistors and spark gaps have been specially developed to provide optimum protection under severe switching surge conditions and are individually tested for selective assembly.

APPLICATIONS

VSD surge diverters are intended for use on power distribution switching applications where switching is infrequent but stored energy levels are high. VSDs are particularly suited to the protection of all types of transformers, generators, motors (especially if there is a likelihood of switching in the stalled or accelerating condition) and any device or load where impulse voltage withstand level is low or not known.

TYPES

VSDs are available with standard end caps or with a flying lead. Figure 1 below shows the design and dimensions of Metrosil surge diverters type VSD.

MAINTENANCE

No maintenance is necessary on VSD diverters. It is recommended that diverters be replaced when the main operational components of the switchgear are changed or if there has been some severely abnormal switching condition or switchgear failure.

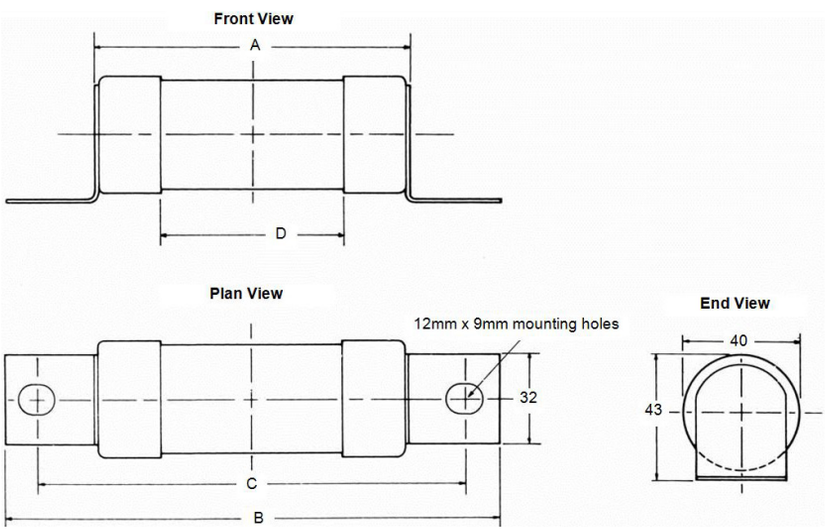


Figure 1 - Design and Dimensions (mm) for VSD Surge Diverters
Refer to Table 1 Overleaf for Type Specific Dimensions A to D

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All properties quoted in this table are typical values and do not constitute a specification

Type	Dimensions				System Working Voltage ac	Minimum Sparkover Voltage ac	Maximum Impulse 1.2/50µsec Sparkover Voltage	Residual Voltage at 30A	Maximum Current Rating	Maximum Energy Rating
	A	B	C	D						
	mm	mm	mm	mm	kV rms	kV rms	kV	kV	A	kJ
VSD/S3	130	195	172	85	3.3	5.5	11	8	30	2.7
VSD/S6	200	265	242	155	6.6	11	22	16	30	5.4
VSD/S11	200	265	242	155	11	18	36	26.5	30	9

Table 1 - Dimensions, Performance and Selection

RESPONSE TIME

Modern switchgear in conjunction with modern equipment and cables can produce transient switching overvoltages with a faster rate of rise than the standard 1.2/50µsec impulse wave used for impulse spark over tests. Spark gaps used for limiting these overvoltages are subject to statistical scatter and an increasing mean value of sparkover as the rate of rise of voltage increases. The gaps used in the VSD diverters have been designed to minimise both the statistical scatter and the increase in mean sparkover value at the higher rates of rise.

The graph in Figure 2 shows the results of the impulse voltage tests on a VSD/S6 diverter. The curve shows that in the case of the VSD/S6, the overvoltage is clipped at a maximum of 130% of the 100%, 1.2/50µsec sparkover voltage. These results indicate a very satisfactory response of the VSD diverter to transient voltages with rates of rise greater than that for the associated 1.2/50µsec 100% sparkover test wave.

CURRENT RATING

For all VSD types the surge current rating is limited to 30A and no de-rating is required dependant upon the number of surge events.

ENERGY RATING

The maximum energy rating figures are shown in Table 1 and assume a cooling period of approximately 3 hours between sequential surge events.

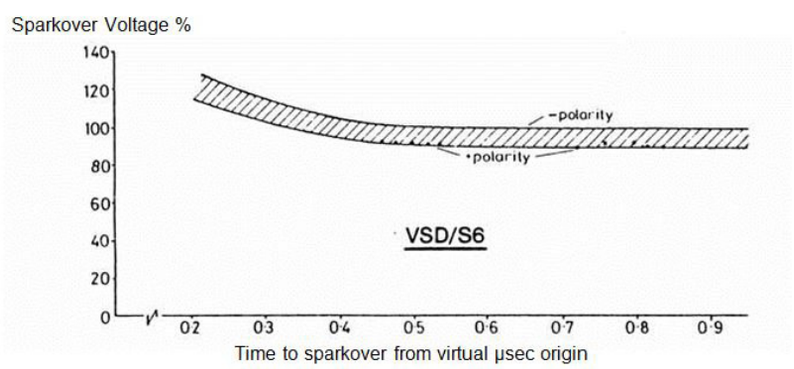

Figure 2 - Sparkover Voltage % of IEC 1.2/50 Wave 100% Sparkover Level

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