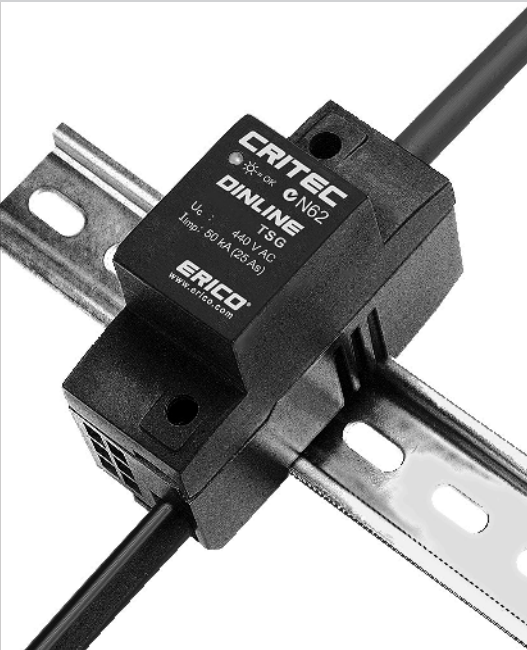


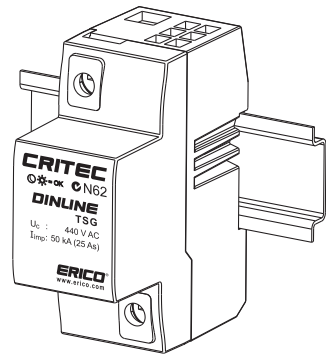
CRITEC®

TSG SURGE DIVERTER

INSTALLATION INSTRUCTIONS




ERICO®



WARNINGS

- Prior to installation, ensure that the Triggered Spark Gap (TSG) has a suitable voltage and frequency rating for connection to the local power distribution.
- Hazardous voltages may exist inside the device. The TSG should be installed (and replaced) only by qualified personnel in accordance with all relevant Electrical Safety Standards.
- The TSG must be installed behind an enclosure or panel; ensure this does not cause the TSG temperature rating to be exceeded.
- Do not "Megger" or "Flash Test" circuits with TSG units installed.
- All instructions must be followed to ensure correct and safe operation.
- Diagrams are illustrative only, and should not be relied upon in isolation.

SPECIFICATIONS

U_c	440 V	ac
U_n	240 V	ac 50/60 Hz
I_{imp}	50 kA (25 As) or (10/350)	μ sec)
I_{peak}	130 kA (8/20)	μ sec)
U_{res}	1.5 kV (3kA 8/20)	μ sec)
kA_{eff}	43 kA at U_n	
Operating current	<2.2 mA	
Operating temp.	-40 °C to +80 °C	
Enclosure	IP 20	
Width of enclosure	36 mm	
Wire size	2.5 mm (stranded)	2 - 50 mm 2
Biconnect terminal	Yes	
Enclosure size	DIN 43880	
Mounting	DIN 46277 Part 3	
	EN 50022 / BS 5584 (TS35)	
Safety	Designed to IEC 61643-1	
EMC	Designed to AS 4251.1 : EMC - Generic emissions	
Generic immunity	AS 4252.1 : EMC -	
	 C-tick	

INTRODUCTION

The CRITEC TSG is a single pole surge diverter. The unit is an enhanced spark gap which incorporates a triggering mechanism to provide a lower sparking or initiation voltage than a conventional spark gap. This allows the unit to provide a lower U_p than conventional spark gaps. The diverter also incorporates follow current control which ensures reliable operation of the spark gap with AC mains voltage present.

MOUNTING

TSGs are designed to clip on to 35 mm top hat DIN rails (to Standard EN50022). Unless otherwise mechanically restrained, use horizontal DIN rails with the TSG fixing clip to the bottom. In other words, so that the label text is the correct way up when viewed from the front.

Units must be installed behind an enclosure or panel to provide the appropriate degree of electrical and environmental protection.

Use only enclosures that:

- Do not cause the TSG temperature to exceed 80 °C
- Provide adequate electrical and safety protection
- Prevent ingress of water and moisture
- Allow the TSG Status Indicator to be inspected

A spark gap, by nature involves a spark which generates hot plasma gas and a pressure wave, and makes a loud, sharp sounding noise when activated. **This is normal during a transient event.** Plasma shields are installed on the output venting ports of the CRITEC TSG. This restricts the hot plasma of the spark from exiting the unit and removes mounting restrictions that may be required if the TSG had more traditional open style venting.

CONDUCTOR SIZES

Each TSG terminal is designed to accept wire sizes from 2.5 mm 2 - 50 mm 2 (stranded). Insulation should be stripped back 16 mm before fixing into the terminal. The TSG has a biconnect terminal, providing the option of connecting directly to bus bar. Bus bar connection can be made in combination with cable being clamped in the terminal.

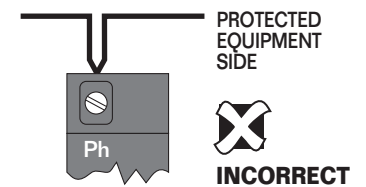
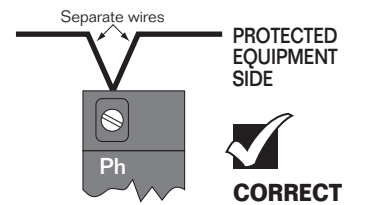
Do not use excessive force when tightening the terminal.



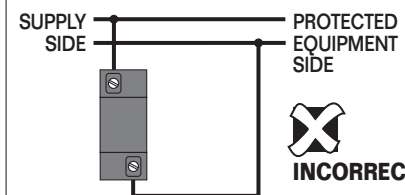
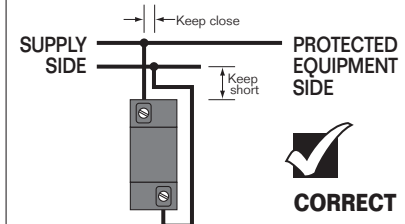
CONDUCTOR LENGTH

To optimise transient performance, attempt to connect the units using the "preferred" method as depicted in the following diagrams (right). Take care not to run parallel "protected" and "unprotected" wiring. Where this is not possible, use the non preferred "T" connection method as depicted. With this connection method, the "T" length should be kept as short as practicable (less than 100 mm) and wires should be bundled together. The "T" conductor should not be less than 10 mm 2 .

PREFERRED CONNECTION METHOD



NON-PREFERRED CONNECTION METHOD



ISOLATION AND FUSING

Overcurrent and short circuit protection must be provided to protect the TSG and associated wiring if a fault develops. The overcurrent protection should be installed in such a manner as to provide a means of isolating the TSG from the mains supply. This is an important safety consideration and is required in the event that any future maintenance or testing is needed.

A simple spark gap, whilst being very efficient at clamping a surge, has inherent problems extinguishing itself when AC mains voltage is present. This affects its follow current control performance. Without proper follow current control, the life and reliability of a spark gap can be reduced significantly. The ERICO TSG has integrated follow current control, so that it minimises the effects of mains follow current after a transient event. Even so, careful co-ordination with upstream fusing is necessary, taking into account the AC mains voltage and the impedance of the AC supply.

Table 1 summarises the minimum requirements for upstream fusing or circuit breakers. (F1 or F2) to prevent nuisance tripping or operation of fusing when the TSG activates.

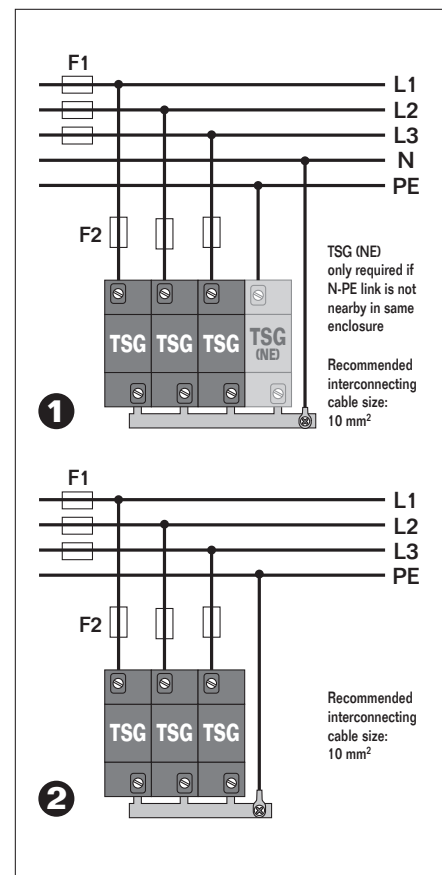
Max kA of supply (F1)	Minimum circuit breaker (F1 or F2)	Minimum fuse size †	Typical supply current *
10 kA	100 A	40 A	500 A
15 kA	100 A	63 A	750 A
20 kA	125 A	80 A	1000 A
43 kA	160 A	100 A	2000 A

† Min 10kA interrupt capacity.
* 240 Vac 50/60 Hz supply with 5% impedance transformer supply.

The typical installation diagram (right), shows the preferred connection methods for these surge protection devices. F1 is the upstream fusing which supplies power to downstream circuitry. This needs to meet the criteria set out in Table 1.

F2 is only required when F1 is greater than 400A, to provide adequate protection for the TSG. In this case, choose a fuse size for F2 as per the requirements of Table 1.

TYPICAL INSTALLATION

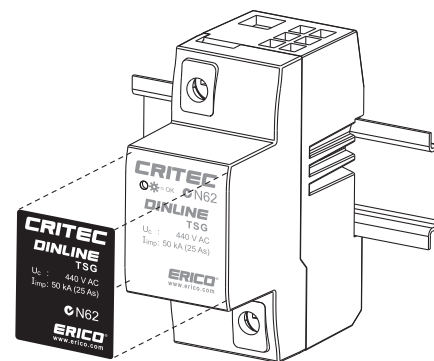


STATUS INDICATION

A characteristic of all transient and surge protection devices is that they degrade in proportion to the magnitude and number of incident surges to which they have been subjected. Status indication should be periodically monitored to determine if replacement is required.

A single Status Indicator is provided on the front panel. When power is applied and full surge capacity is available, the Status Indicator will be illuminated. Should the indicator fail to illuminate, the TSG should be replaced as optimum protection is no longer provided. Note that the Status Indicator will not operate (regardless of capacity) if power is not available.

If the TSG is used in a configuration where power is not available across the lines being protected, such as between neutral and earth, then the Status Indicator will not operate. If this is the case, a label is supplied with the unit to cover the front panel and Status Indicator. Apply this label to the product when the TSG is installed in this situation.



MAINTENANCE AND TESTING

Before removing any TSG from service, ensure that power is isolated from the device. Replacement of a TSG should only be undertaken strictly in accordance with all relevant Electricity and Safety Standards by suitably qualified personnel.

The TSG should be inspected periodically, and also following any periods of lightning or transient activity. Check the status indicator for units wired across AC mains, and replace any units where the status has extinguished when power is applied to the unit. This indicates that the unit can no longer provide optimum protection.

TSG units are designed for optimum performance under severe transient activity. To provide this performance, they are assembled with precision components that do not offer any serviceability.

Do not attempt to open or tamper with the TSG units in any way as this may compromise performance and will void warranty.

Do not "megger" or perform other types of electrical tests that apply voltages greater than the voltage rating of the TSG. The TSG will attempt to limit these voltages thereby affecting the test result. Where these tests must be performed on the circuit, remove the TSG first.

EXTENDED WARRANTY

This product has a limited warranty to be free from defects in materials and workmanship for a period of five (5) years from the date of dispatch from the Manufacturer. The Purchaser acknowledges that lightning is a natural event with statistical variation in behaviour and energy levels which may exceed the product ratings, and 100 % protection is not offered and cannot be provided for. Therefore, the Manufacturer's liability is limited to the repair or replacement of the product (at the Manufacturer's sole option) which, in its judgement has not been abused, misused, interfered with by any person not authorised by the Manufacturer, or exposed to energy or transient levels exceeding the Manufacturer's specification for the product. The product must be installed and earthed (where applicable) in strict accordance with the Manufacturer's specification and all relevant Electricity and Safety Standards. The Manufacturer and Purchaser mutually acknowledge that the product, by its nature, may be subject to degradation as a consequence of the number and severity of surges and transients that it experiences in normal use, and that this warranty excludes such gradual or sudden degradation. This warranty does not indemnify the Purchaser of the product for consequential claim for the damages or loss of operations or service or profits. Customers should contact their nearest ERICO agent to obtain a Product Repair Authorisation Number prior to making any claim under this warranty. This is only a summary of the warranty given by the Manufacturer. The full text of the warranty is set out in the Manufacturer's Conditions of Quotation and Sale. The above limited warranty is additional to the rights which arise in respect of the sale of industrial and technical products and services to knowledgeable buyers under the Australian Trade Practices Act 1974 as amended.



ERICO SIX POINT PROTECTION PLAN

The CRITEC TSG forms an important part of the much larger ERICO lightning, surge and transient protection philosophy (ERICO "Six Point Plan"). The level of protection and the degree of attention dedicated to each of the six points will require careful consideration for each site. The degree of protection required is determined by the individual site location/exposure with the aid of risk management principles.

For further advice on your protection needs please contact your local ERICO office

Six Point Protection Plan		
	1	Capture the lightning strike with purpose-designed air terminals at preferred points.
	2	Conduct the strike to ground safely via a purpose-designed down-conductor.
	3	Dissipate the lightning energy into the ground with minimal rise in ground potential.
	4	Eliminate ground loops and differentials by creating a low impedance, equipotential grounding system.
	5	Protect equipment from surges and transients on incoming power lines to prevent equipment damage and costly operational downtime.
	6	Protect equipment from surges and transients on telecommunications and signal lines to prevent equipment damage and costly operational downtime.