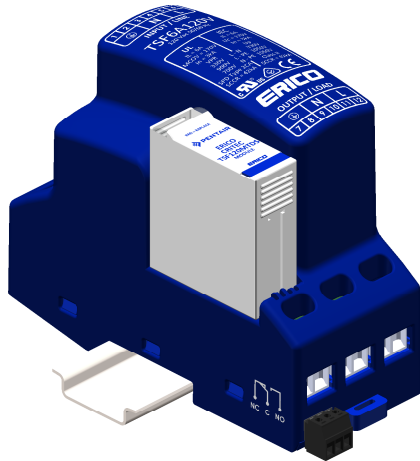


# Transient Surge Filter

## ERICO CRITEC TSF Series



Model Number	Plug-In Module
TSF6A24V	TSF24MDS
TSF6A120V	TSF120MTDS
TSF6A240V	TSF240MTDS
TSF20A120V	TSF120MTDS
TSF20A240V	TSF240MTDS

**Table 1: Model and Plug-in Module Part Number**

### 1. Preparation



**Electrical shock or burn hazard.** Installation of this Transient Surge Filter should only be made by qualified personnel. Failure to lockout electrical power during installation or maintenance can result in fatal electrocution or severe burns. Before making any connections to the electrical panel, be sure that power has been removed from all associated wiring, electrical panels, and other electrical equipment.



1. The installation of this surge filter should be installed in accordance with all applicable codes, such as the National Electrical Code (NEC®), or the Canadian Electrical Code.
2. Check to make sure line voltage does not exceed surge filter voltage requirement. Prior to installation ensure that the TSF is of the correct voltage, current, and frequency rating for your application.
3. The ground / earth terminal must be connected to a low impedance earth for correct operation.
4. Do not perform a "Dielectric Withstand" or use a Mega-Ohm Meter (Megger) to test circuits that are protected with TSF units. Damage may occur to the TSF units.
5. Follow all instructions to ensure correct and safe operation.
6. Do not attempt to open or tamper with TSF units in any way as this may compromise performance and will void warranty.

#### WARNING:

1. Pentair products shall be installed and used only as indicated in Pentair product instruction sheets and training materials. Instruction sheets are available at [www.erico.pentair.com](http://www.erico.pentair.com) and from your Pentair customer service representative.
2. Pentair products must never be used for a purpose other than the purpose for which they were designed or in a manner that exceeds specified load ratings.
3. All instructions must be completely followed to ensure proper and safe installation and performance.
4. Improper installation, misuse, misapplication or other failure to completely follow Pentair's instructions and warnings may cause product malfunction, property damage, serious bodily injury and/or death, and void your warranty.

#### SAFETY INSTRUCTIONS:

All governing codes and regulations and those required by the job site must be observed. Always use appropriate safety equipment such as eye protection, hard hat, and gloves as appropriate to the application.

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### 2. Introduction

Transient Surge Filters (TSF) are designed for simple installation onto 35mm DIN rails. They can be selected for use on distribution systems with nominal RMS voltages of 120V or 240V at frequencies of 50/60Hz. The TSF6A24V unit is suitable for 12V and 24Vac/dc signaling and control systems.

### 3. Quick Installation Overview

Install in the following manner:

1. Ensure that power is removed from the area and the circuits that will be connected.
2. Snap lock the TSF module to the DIN rail.
3. Install the appropriate upstream overcurrent protection (refer to Section 8)
4. Connect wiring to the indicated input and output terminals.

### 4. Protection Concepts

The terminals on the TSF units are labeled "INPUT/LINE" (unprotected side) and "OUTPUT/LOAD" (protected side) assuming that the source of the transients is on the input side of the TSF module.

To optimize effectiveness of the TSF protection, the unprotected and protected wiring should be separated. Wiring from the exposed transient source to the TSF should be considered unprotected and kept approximately 12" (300mm) from all other wiring wherever possible. Wiring on the equipment side of the TSF should be considered protected.

The separation of protected and unprotected wiring is recommended to minimize the risk that transients on unprotected wiring may cross couple onto protected circuits and diminish the level of protection available from the TSF module.

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## ERICO CRITEC TSF Series

**NOTE:** The terminals on the TSF units are labeled Ground / Earth 1,2 (unprotected side) and 7,8 (protected side), Neutral 3,4 (unprotected side) and 9,10 (protected side), and Line 5,6 (unprotected side) and 11,12 (protected side).

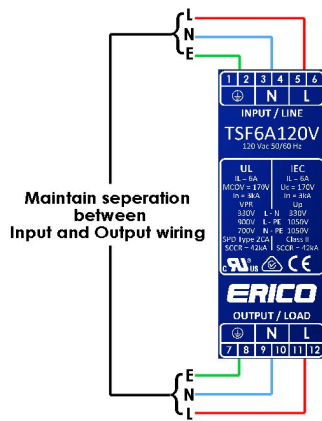


Figure 1: Wiring Diagram

### 5. Mounting

TSF's are designed to clip onto 35mm DIN rails (standard EN50022). Unless otherwise mechanically restrained, use horizontal DIN rails with the snap fit design of the TSF to mount the unit with the label text in the correct orientation.

**NOTE:** TSF's must be installed in an enclosure or panel which:

- prevents the TSF unit ambient temperature from exceeding 104°F (40°C).
- provides adequate electrical and safety protection
- prevents the ingress of moisture and water
- allows the plug-in module visual indication flag to be inspected

### 6. Ground Fault Circuit Interruption (GFCI)

Where GFCI protectors (RCD's/ELCB's) are used, it is preferable that the TSF modules be installed prior to these devices (i.e. upstream). If this is not done, nuisance tripping of the GFCIs may occur during transient activity.

### 7. Conductor Termination

Each TSF terminal is designed to accept wire sizes from 14 AWG to 10 AWG (2.5mm<sup>2</sup> - 6mm<sup>2</sup>) solid or stranded conductors. The wire insulation should be stripped back .28-.31 in. (7-8mm) before terminating into the terminal.

**NOTE:** Do not use greater than 7 in-lb (1.0 Nm) of torque when tightening the terminals.

### 8. FUSING AND ISOLATION

Overcurrent protection must be installed in the upstream circuit of every TSF to provide protection to the unit itself, the load and the wiring in case of fault situations. The overcurrent protection device and the wire size used should be determined according to table 2.

For installations in accordance with the National Electrical Code (NEC) and UL®1449, use the fuse specified in column A. For installations in accordance with the International Electrotechnical Commission (IEC) 60364 and 61643, use the circuit breaker specified in column B.

TSF PN:	Wire Size	Overcurrent Protection Device	
		A	B
TSF6A24V TSF6A120V TSF6A240V	14-10 AWG (2.5mm <sup>2</sup> -6mm <sup>2</sup> )	7.5A Class CC Time Delay <sup>1</sup>	6A Circuit Breaker <sup>3</sup>
TSF20A120V TSF20A240V	10 AWG (6mm <sup>2</sup> )	25A Class CC Fast Acting <sup>2</sup>	16A Circuit Breaker <sup>4</sup>

Table 2: Fuse Rating and Wire Size

(1&2) Bussmann FNQR7-1/2 and Mersen ATMR25 are required for UL 1449 certification.  
(3&4) Clipsal 4CB106/10 and Clipsal 4CB116/10 were used for IEC 61643-11 testing

### 9. Status Indication

TSF modules have a visual indicator flag on the plug-in module. Should the plug-in module reach end-of-life the visual indicator flag provides user-feedback. Refer to figure 2 for visual flag indicator. The TSF module should be replaced, as optimum protection is no longer provided. Refer to Table 1 for replacement module part number information.

### 10. Maintenance & Testing

The convenient plug-in module and separate base design facilitates replacement of a failed plug-in surge module without needing to undo installation wiring. In the event you are removing the TSF module, ensure that the power has been removed from the TSF module before removing a TSF module from service. Replacement of a TSF module should only be undertaken by qualified personnel.

**NOTE:** TSF units should be inspected periodically, and also following any periods of lightning or transient voltage activity. Check the visual indicator flag and replace the plug-in module if the flag has been activated as in Section 9 Status Indication.

### 11. Remote Alarm Contact

The TSF has a form C alarm contact for remote indication of protection status. Refer to figure 3 for remote alarm plug-in information. The alarm contacts are rated at 3A @ 125VAC. Use 16 AWG wires to connect to the M2 contact screws.

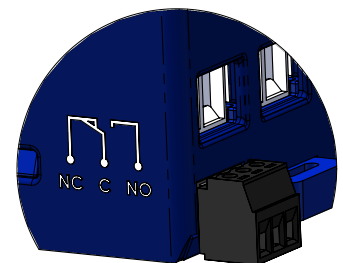
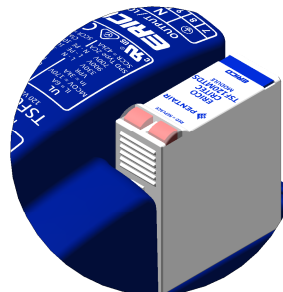


Figure 2: Visual Indicator Figure 3: Remote Alarm Contacts

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