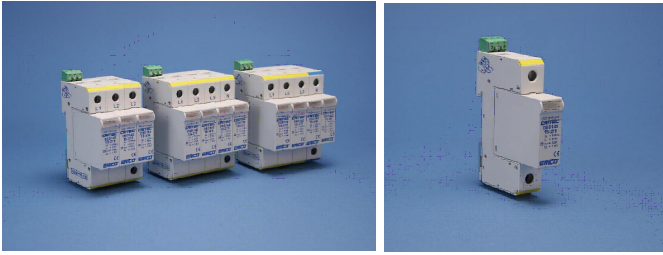


# TDS Series



**Product Series**  
**TDS150-1SR-xxx**  
**TDS1100-1SR-xxx**  
**TDS350-xxx-xxx**  
**TDS50 120/240**

## 2. Introduction

The Transient Discriminating Surge Diverter (TDS) series has been designed to provide one mode of protection to single-phase power distribution systems (TDS150 or TDS1100), multi-modes in a split phase distribution system (TDS50) or in a three-phase distribution system (TDS350).

Units can be connected (L-N), (L-G) or (N-G) depending on the type of power distribution system.

Multiple TDS units can be used to provide multi-modes of protection or to protect three-phase distribution systems. TDS units are available with maximum continuous operating voltages ( $U_c$ ) of: 170V, 275V, 320V and 610V for the protection of distribution systems with nominal RMS voltages of 120Vac, 220Vac, 240Vac and 480Vac, respectively. TDS units may also be used to protect DC power systems - ref. Table 1.

## 3. Quick Installation Overview

Please follow the sequence indicated:

1. First, ensure that power is removed from the area and the circuits to be connected.
2. Install earth leakage protection (RCD) if appropriate or where required by national codes and authorities having jurisdiction. Note: When connecting surge protection L-G it is preferable to install the device before the RCD to avoid "nuisance tripping" which may occur when the SPD operates.
3. Connect wiring to the two primary terminals indicated.
4. Connect the alarm terminals if remote monitoring is required.
5. Apply power and observe correct operation of the TDS and status indication is not tripped.

## 4. Mounting

TDS's are designed to clip to 35mm (top hat) DIN rails (standard EN50022) set in the horizontal position with the TDS securing clips towards the bottom of the rail and the label text facing the correct way up.

**Note:** TDS modules must be installed in an enclosure or switch board panel in such a way that :

## 1. Preparation

**⚠ DANGER** **Danger:** Electrical shock or burn hazard. Qualified personnel should only install this product. Failure to lockout electrical power during installation or maintenance can result in fatal electrocution or severe burns. Before making any connections to this electrical panel please ensure that power has been removed from all associated wiring, electrical panels, and other electrical equipment.

### ⚠ CAUTION **Caution Notes:**

1. The installation of this Transient Discriminating Surge Diverter (TDS) should follow all applicable national electrical codes.
2. Check to ensure that the power frequency line voltage does not exceed the maximum continuous operating voltage ( $U_c$ ) of the TDS.
3. Prior to installation, ensure that the TDS is of the correct voltage, current, and frequency.
4. The ground (earth) terminal must be connected to a low impedance earth ( $<10$  ohms) for correct operation.
5. Do not perform a "Flash Test" or use a Megger to test circuits that are protected with these TDS units. This may damage the TDS(s) and affect the insulation readings being performed.
6. Follow all instructions to ensure correct and safe operation and observe nationally recognized codes of authorities having jurisdiction.
7. Do not attempt to open or tamper with the TDS unit in any way as this may compromise performance and will void warranty.

#### DANGER

ELECTRICAL SHOCK OR BURN HAZARD. HAZARDOUS VOLTAGES EXIST INTERNAL TO THE TDS. THIS UNIT SHOULD BE INSTALLED AND SERVICED ONLY BY QUALIFIED PERSONNEL IN CONFORMANCE WITH ALL GOVERNING CODES AND INSTRUCTIONS. FAILURE TO LOCKOUT ELECTRICAL POWER DURING INSTALLATION OR MAINTENANCE CAN RESULT IN FATAL ELECTROCUTION, SEVERE BURNS, OR OTHER INJURIES. BEFORE WORKING WITH OR MAKING ANY CONNECTIONS TO THIS DEVICE, BE SURE THAT POWER HAS BEEN REMOVED FROM ALL ASSOCIATED WIRING, ELECTRICAL PANELS, AND OTHER ELECTRICAL EQUIPMENT.

1. The power supply to the TDS should always be turned (and locked) OFF before the unit is accessed for any reason.
2. Prior to installation, ensure that the TDS is of the correct voltage, current, phasing, and frequency for the applicable rating of the power distribution system.
3. This unit must be installed on the load side of the main over-current protection.
4. Diagrams are for reference only. Schematics are representative of typical applications and are only to be used for reference.

#### 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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- The location of this enclosure prevents the temperature of the TDS unit(s) from exceeding its maximum specified rating.
- Adequate electrical and safety protection is provided by the enclosure to all exposed terminals.
- The location and type of enclosure meets the specified environmental requirements and prevents the ingress of moisture and water.
- The indicator status of the TDS can be readily inspected.

### 5. Electrical Connection

When connecting the TDS on the input side of the distribution panel wiring, it is usual to wire the TDS L-N (L1, L2, L3 to N on 3 phase systems). When connecting the TDS to the output side of the panel wiring, it is usual to wire it L-PE/PEN.

- On TN-C networks, three TDS units are required. L1, L2, L3 should be protected to PEN.
- On TN-S networks, four TDS units are required. L1, L2, L3 should be protected to N, and N should be protected to PE.
- On TT networks, three TDS units and a SGD unit are required. L1, L2, L3 should be protected to N using the TDS units, and N should be protected to PE using the SGD unit.
- On IT networks, four TDS units are required. L1, L2, L3, N should be protected to PE using 440V TDS units on a normal 230V system.
- On the TDS1100 series, a “Kelvin” type connection can be made using separate input and output terminal pairs. This configuration helps reduce the effects of lead length. The maximum load current under such a configuration should be limited to 125A.

### 6. Wiring

The interconnecting wiring should:

- Be as short as possible - not exceeding 300mm (12”).
- Avoid sharp bends >100mm radius is recommended.
- Have the conductors twisted together where possible.
- Terminals will allow connection of 25mm<sup>2</sup> (#4AWG) multi-strand wiring or 35mm<sup>2</sup> (#2AWG) solid - ref. Table 1. The wire insulation should be stripped back 8mm (5/16”).

### 7. Residual Current Detectors (RCD)

When an RCD is used, it is preferable that the TDS modules be installed prior to (upstream of) this device to avoid nuisance tripping which may occur during transient activity.

### 8. Fusing and Isolation

Overcurrent protection must be installed in the upstream circuit of every TDS unit if the mains supply is > 100A. This is to provide protection to the TDS, the load and the wiring in the case of a fault - ref. Table 1 for suitable fuse ratings.

**Note:** Operation of this over-current protection under excessive surge conditions may occur removing protection from the circuit. The Remote Status contacts should be monitored for this possibility.

### 9. Status Indication

TDS modules incorporate an internal thermal disconnect element, which automatically disconnects the varistor from the network in the event of a thermal overload. Should the internal disconnect operate, a red flag appears in the transparent window of the status indicator(s) on the front of the TDS.

### 10. Maintenance and Testing

Before removing a TDS module from service, ensure that the power has been removed and if possible “locked out”. Qualified personnel should only undertake replacement of TDS modules. Replacement plug-in modules are available.

**Note:** It is very important to ensure that the new module is of the same type and voltage as that being replaced.

**Note:** TDS units should be inspected periodically, and also following any periods of lightning or transient voltage activity. Check the Status Indicator and replace the module if required.

### 11. Remote Status

The TDS provides remote status monitoring via voltage-free contacts. Failure of the TDS is signified by the N/C contacts (11,14) opening and the N/O contacts (11,12) closing. Ensure that the voltage and current ratings of the contacts are not exceeded.

**Note:** The TDS contacts are independent of whether power is supplied, or not, to the TDS module. The status of the contacts is given solely by the failure status of the TDS module.

**Table 1. TDS operating specifications**

Max. continuous operating voltage, U <sub>c</sub> (AC)	170, 275, 320, 610 Vac (Important: ensure correct TDS is selected, U <sub>c</sub> must be higher than power frequency voltage).
Max Torque	4.5N.m./40in-lbs
Main terminals – wire cross section / backup fuse	multi-strand 25 mm <sup>2</sup> (#4AWG) (single-strand 35 mm <sup>2</sup> (#2AWG)) / max. 125 AgL
Remote status contacts	0.5 A / 250 VAC; 3 A / 125 VAC 1.5 mm <sup>2</sup> wire cross section