

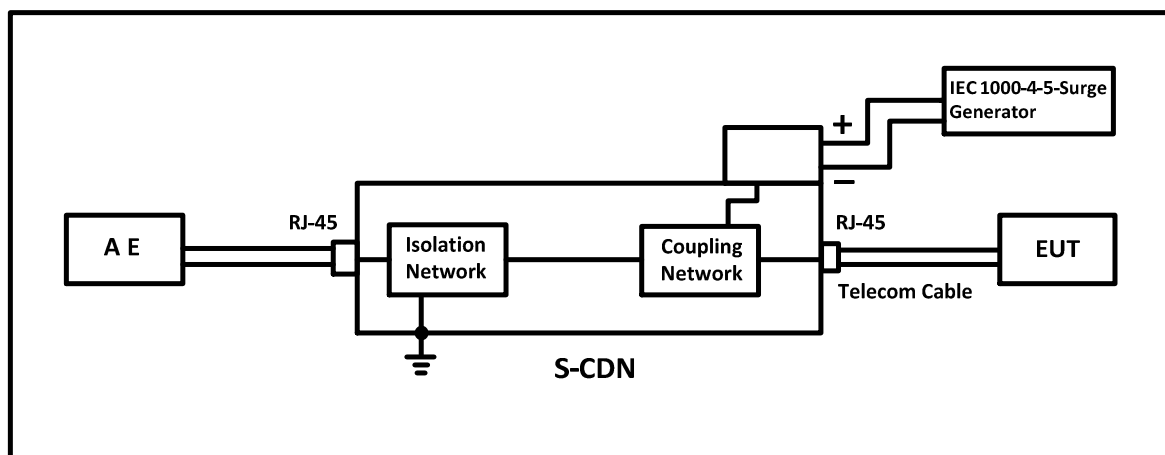
The F-130814-1004-4 Surge CDN couples the surge specified in EN 61000-4-5 onto high speed digital telecommunications lines of the Equipment Under Test (EUT) and decouples the surge from the Auxiliary Equipment (AE) port.

### Description

The F-130814-1004-4 is designed to couple the  $1.2 \times 50 \mu\text{s} / 8 \times 20 \mu\text{s}$  surge transient defined in EN 61000-4-5 onto balanced (symmetrical) high speed digital telecommunications cables as shown in the Figure below. The Surge CDN couples the Surge onto active telecommunications lines operating at speeds up to 1000 Base T for all categories of Power Over Ethernet (POE) (compliant with IEEE 802.3bt including all four types of POE++) and non-POE configurations while providing high isolation of the Surge to the AE port and minimal degradation of the intentional telecom signal. The Surge CDN maintains all of its Technical Specifications while delivering the full range of open circuit voltage to short circuit current demanded by the EUT load.

### Other Important Considerations

Since the Surge CDN is inserted in the middle of an active telecom line, it is important to take into consideration the impact the Surge CDN has on the telecom signal transmission quality, as well as its performance as a Surge CDN. A potential user of a Surge CDN needs to familiarize himself with these transmission quality issues, as well as ensuring the Surge CDN will work optimally under all load conditions while providing significant isolation for the AE port. Key Features of the Fischer Model F-130814-1004-4 are discussed on the next page of this data sheet.



Test Set Up



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## Key Features to Consider Before Purchasing a Surge CDN

- ***Fischer has designed this Surge CDN to:***
  - Optimize the surge stress delivered to the EUT and avoid under testing that could result in a false positive.
  - Minimize residual surge stress at the AE port to avoid unintended upset of the AE.
  - Optimize data transmission quality to minimize risk of poor data quality contributing to a failure when the Surge is applied.
- ***External Test data is provide with each Surge CDN demonstrating:***
  - The capability of the Surge CDN to deliver the full range of voltage/current demanded by the EUT under a wide range of EUT and AE load configurations.
  - The maximum voltage/current that will be seen at the AE port for **any** EUT common mode load configuration.
- ***External resistor boxes allow the Surge CDN to be used for 1 pair, 2 pair, and 4 pair telecom circuits.***
  - Resistors are normally matched to better than 0.1% to ensure a true common mode drive capability intended by EN61000-4-5.
  - Use of poorly matched resistors can result in an undesirable differential mode signal on the telecom wires that may create an upset condition (EN 61000-4-5 intends common mode drive only.)
- ***Fischer does not use spark gaps to either couple the surge or act as a voltage limiter of the AE port.***
  - Fischer lab testing has demonstrated that **all** spark gaps will **not** fire reliably on **every** surge application at the EUT.
  - Fischer isolation and decoupling circuitry permits a lower maximum AE voltage/current than can be achieved by spark gaps.
  - The Fischer design provides a minimum of 50dB of voltage and current isolation for all load conditions at the EUT port.
- ***Fischer uses properly sized isolation network inductance that will not saturate at the maximum rated surge level.***
  - Insufficient isolation inductance can result in saturation (or the beginnings of saturation) which increases the AE port voltage/current and risk to the AE, and may reduce the stress delivered to the EUT.
  - Fischer demonstrates this isolation in the time domain to show what the AE will actually see under worst case conditions.
  - Citing isolation and/or saturation at only one CW frequency does not provide isolation or saturation information for the lower frequency content of the surge.
  - Insufficient inductive isolation will result in a surge waveform at the EUT that decays too quickly may also result in excessive undershoot on the drive waveform.
- ***Fischer's proprietary circuit design allows all Surge CDN specifications to be met while simultaneously minimizing degradation of the telecom signal quality.***
  - Each Surge CDN is tested with a Fluke Model DTX-1800 Cable Analyzer to demonstrate that it meets CAT 6 Permanent Link.
  - Use of a Surge CDN that meets surge requirements but degrades the data transmission quality (example: degraded NEXT) may contribute to EUT upset when the surge is applied on top of marginal data transmission quality.
  - Highest quality CAT 6A RJ-45 connectors are provided on both the EUT and AE ports to further optimize data quality.
    - Use of inferior connectors will compromise data transmission quality.



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## Technical Specifications

- **Coupling mode:** Common mode injection with respect to Surge CDN chassis via external resistor boxes 1 pair, 2 pairs, and 4 pairs.
- **Maximum telecom operating speed:** 1000BaseT
- **Maximum telecom operating voltage:** 65 volts DC
- **IEEE 802.3bt compliant including all four types of POE++**
- **Telecom connectors:** RJ-45
- **Surge Generator connection:** Multi-Contact Safety Socket.
- **Maximum Surge Test Voltage:** 4.0kV (1.2x50 $\mu$ s as per EN 61000-4-5)
- **Maximum Surge Test Current:** 150A (8x20 $\mu$ s as per EN 61000-4-5)
- **Size:** 40cm x 23cm x 24cm (L x W x H)
- **Weight:** 8.0kg
- **Surge isolation EUT port to AE port:** 50dB minimum (voltage and current) for a wide range of EUT and AE voltage and current load configurations

## Data Transmission Quality

To provide a quantitative measure of the minimal impact this Surge CDN has on data transmission quality, a Fluke DTX-1800 Cable Analyzer is used. This Analyzer measures telecom cable parameters for the TIA-568-C and ISO 11801:2002 certification requirements. TIA 568 is administered by the International Telecommunications Union (ITU). This Surge CDN meets CAT6 Permanent Link performance (the highest performance level), as measured with the Fluke DTX-1800. Typical measured parameters:

**Device meets CAT6 Permanent Link Performance as measured on Fluke DTX-1800:**

NEXT:	45dB @ 250MHz
PS NEXT:	40dB @ 250MHz
ACR-F**:	30dB @ 250MHz
PS ACR-F:	30dB @ 250MHz
RL:	19dB @ 250MHz

\*\* Formally known Equal Level Far End Crosstalk (ELFEXT)



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