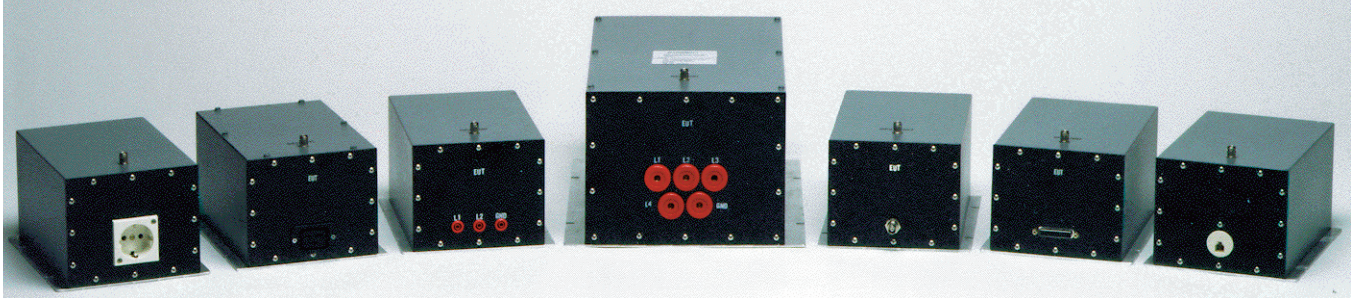




Fischer Custom Communications, Inc.

Coupling Decoupling Networks



Applications

IEC 1000-4-6 requires that the EUT be tested from 150 kHz to 80 MHz with the capability to test up to 230 MHz. No test levels have been imposed in the 9 kHz to 150 kHz region because of the low probability of causing electronic systems to fail from with either intentional or unintentional radiators.

The specification has three open circuit voltage levels — 1, 3, and 10. These levels have been selected because they represent the mid range of radiated fields.

Coupling and Decoupling Networks

The common mode current disturbance signal can be delivered to the EUT using a variety of coupling networks to inject the signal onto the unscreened cables, shielded cables, balanced cables, coaxial cables and power mains.

Decoupling networks are used to insure that the disturbance signal does not influence the auxiliary equipment and are placed between the EUT and the auxiliary equipment. One decoupling network is inductive and uses a high impedance choke. The second decoupling network combines resistive and inductive technique by using ferrite toroids that are placed around the cables connecting the EUT and the auxiliary equipment. These coupling and decoupling networks can be separate or combined in the same instrument.

Choosing a CDN

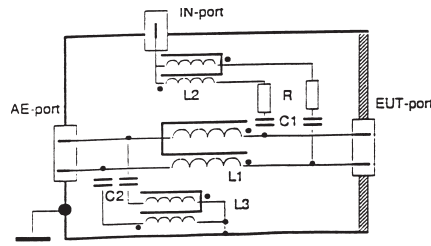
The Coupling/Decoupling Network or CDN incorporates both the decoupling and coupling circuitry in the same housing. The CDN contains integrated direct capacitive coupling along with a high impedance choke for inductive decoupling.

The CDN acts as a low pass filter preventing the susceptibility test signals from interfering with the auxiliary equipment. A family of CDN's are required to match the wide variety electronic instruments, systems, computer, printers and appliances. Fischer Custom Communications, Inc. offers over 35 different CDN's and custom configurations are available. All CDN's maintain the 150 Ω impedance from 150 kHz to 230 MHz.

Fischer Custom Communications, Inc. offers more than 15 powerline configurations with options for to 5 power mains with current rating of 16, 25, 32, 50, 100, 200 and 300 amperes.

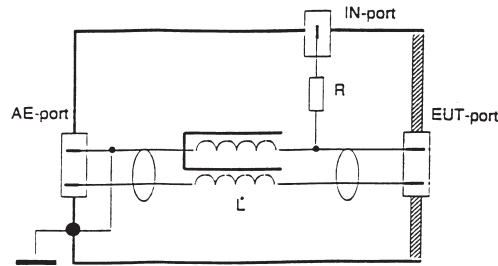
T Series

The T series CDN is used to couple RF CW and modulated signals into balanced or unshielded lines. It permits normal operation of balanced circuits with impedance to 600Ω up to 1 MHz and 1000 Ω impedance up to 100 kHz. It is available in 2, 4 or 8 line configurations.



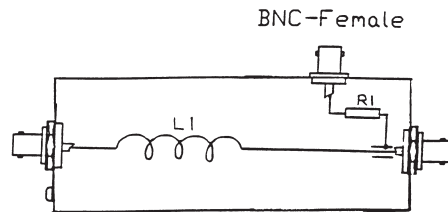
S Series

The S series CDN is used to test shielded cables and is available with 2 pins to 50 pins.



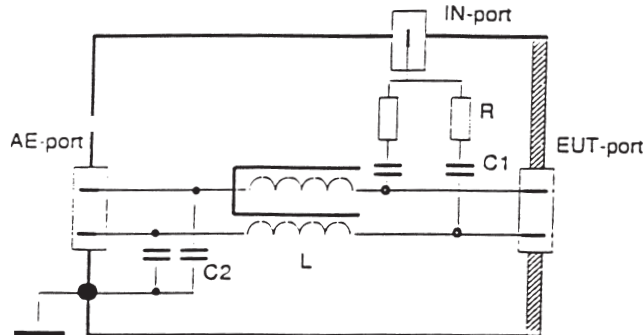
C Series

The C series CDN is used to couple RF interference signals onto shields of RF coaxial cables.



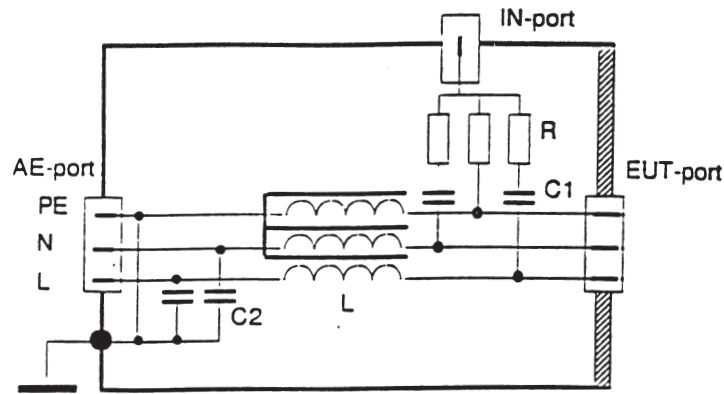
AF Series

The AF series is ideal for unshielded audio cables and is available with 2 pins to 50 pins. This CDN allows 600Ω systems to operate normally up to 10 kHz and 1000 Ω systems to operate up to 5 kHz. It is important to review the impedance and frequency of operation of audio systems to insure there is no influence on the CDN.



M Series

The M1 power line CDN is used to couple common mode CW and modulated signals onto single power line systems. The M1 is ideal for automotive systems using the chassis as the DC return. The M2 is commonly used for 2 wire power conductor cables and the M3 is used for two line single phase cables. The M4 is used on three phase power mains and the M5 is used on three phase systems with neutral and protected earth ground conductors.



Call, FAX or e-mail us to day to discuss your IEC 1000-4-6 testing requirements and let the applications engineers at FCC help you select the right CDN's.

FCC Fischer Custom Communications, Inc.

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CDN Selection Guide

Specifications	C Series	S Series	M Series	AF Series	T Series
EUT/AE Port					
AC Voltage	< 350 V	< 350 V	< 480 V line to line	< 350 V	< 350 V
DC Voltage	< 600 V	< 600 V	< 600 V	< 600 V	< 600 V
Current Rating	1.0 amp	3.0 amp	16 amp to 500 amp*	3.0 amp	3.0 amp
I/O Connectors	BNC	S2 to S50 Centronics, D Sub	Multi Contact Safety Socket	Multi Contact Safety Socket Audio Socket	Multi Contact Safety Socket
Common Mode Impedance at EUT Connector					
150 kHz to 26 MHz	150 ± 20 Ω	150 ± 20 Ω	150 ± 20 Ω	150 ± 20 Ω	150 ± 20 Ω
26 MHz to 80 MHz	150 +60/-45 Ω	150 +60/-45 Ω	150 +60/-45 Ω	150 +60/-45 Ω	150 +60/-45 Ω
80 MHz to 230 MHz	150 +60/-45 Ω	150 +60/-45 Ω	150 +60/-45 Ω	150 +60/-45 Ω	150 +60/-45 Ω
Disturbance Coupling Circuit					
Frequency Range	150 kHz to 230 MHz	150 kHz to 230 MHz	150 kHz to 230 MHz	150 kHz to 230 MHz	150 kHz to 230 MHz
Connector	50 Ω BNC	50 Ω BNC	50 Ω BNC	50 Ω BNC	50 Ω BNC
RF Voltage	< 40 V	< 40 V	< 40 V	< 40 V	< 40 V
Voltage Attenuation Generator / EUT					
	10 dB ± 1 dB	10 dB + 1 dB / -3 dB	10 dB + 1 dB / -3 dB	10 dB + 1 dB / -3 dB	10 dB + 1 dB / -3 dB
Insertion Loss EUT / AE					
	< 1 dB at 230 MHz	< 3 dB up to 20 kHz < 10 dB at 1 MHz < 20 dB up to 10 MHz	< 0.1 dB up to 400 Hz < 8 dB at 10 kHz > 45 dB at 150 kHz	< 0.5 dB DC to 20 kHz > 30 dB at 150 kHz > 20 dB at 230 MHz	< 8 dB at 150 kHz > 20 dB at 1 MHz > 30 dB at 2 MHz
Coupling Factor					
	0 dB ±1 dB	0 dB +dB/-3dB	0 dB +dB/-3dB	0 dB +dB/-3dB	0 dB +dB/-3dB
Decoupling Attenuation Generator / AE					Unbalanced Attenuation Generator / EUT
	> 50 dB up to 100 MHz > 20 dB up at 230 MHz	> 50 dB up to 20 MHz > 20 dB up at 230 MHz	> 50 dB up to 20 MHz > 20 dB up at 230 MHz	> 50 dB up to 30 MHz > 20 dB up at 230 MHz	> 70 dB at 150 kHz > 60 dB at 1 MHz > 40 at 10 MHz > 35 dB above 20 MHz

C Series: The C series CDN is used to couple RF interference signals onto shields of RF coaxial cables.

S Series: The S series CDN is used to test shield cables and is available with 2 to 50 pins.

M Series: The M1 power CDN is used to couple common mode CW and modulated signals onto single power line systems. The M1 is ideal for automotive systems using the chassis as the DC return. The M2 is commonly used for 2 wire power conductor cables and the M3 is used for two line single phase cables. The M4 is used on three phase power mains and the M5 is used on three phase systems with neutral and protected earth ground conductors. Fischer Custom Communications Inc. offers more than 15 powerline configurations with current rating of 16, 25, 32, 50, 100, 200 and 300 amperes. Custom configurations above 300 amperes are available.

AF Series: The AF series is ideal for unshielded audio cables and is available with 2 to 50 pins. This CDN allows 600 Ω systems to operate normally up to 10 kHz and 1000 Ω systems to operate up to 5 kHz. It is important to review the impedance and frequency of operation of audio systems to insure there is no influence on the CDN.

T Series: The T series CDN is used to couple RF CW and modulated signals into balanced or unshielded lines. It permits normal operation of balanced circuits with impedance to 600 Ω up to 1 MHz and 1000 Ω impedance up to 100 kHz. It is available in 2, 4 and 8 line configurations.