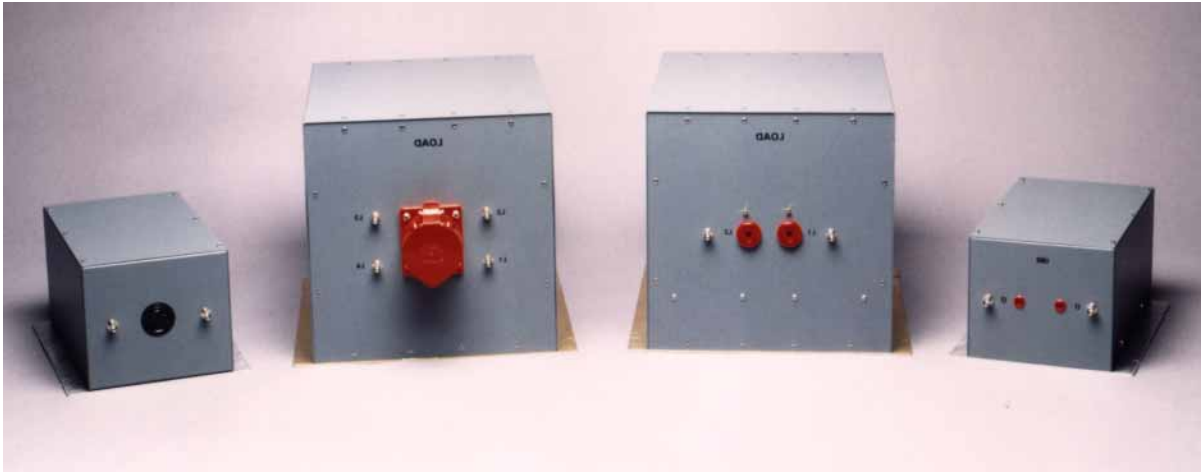


Line Impedance Stabilization Networks

Fischer Custom Communications, Inc. designs, develops and manufactures Line Impedance Stabilization Networks or Artificial Mains Networks covering the frequency range from 1 kHz to 1,000 MHz.



Line Impedance Stabilization Networks (LISN) are specialized low pass filter networks used to measure common mode conducted emissions from power lines. Fischer Custom Communications, Inc. has developed over 30 different Line Impedance Stabilization Networks to meet compliance testing requirements and custom requirements. Fischer Custom Communications, Inc. LISN's are available for pre-compliance and compliance testing in accord with CISPR, VDE, IEC, DO-160 and Mil Std. 461/462 Rev C, D and E.

The LISN must maintain a characteristic impedance to the EUT and isolate the EUT from unwanted RF signals on both DC and AC power source while allowing the necessary voltage and current to be delivered to the EUT. The LISN provides a 50 Ω output impedance for measurement of RF emissions produced by the EUT.

Impedance, insertion loss, voltage rating, current rating, number of power conductors and connector types are the key parameters in the selection of an LISN.

The impedance versus frequency of an LISN must match the requirements of the test specification being applied to the EUT. Many LISN attributes are defined by CISPR 16-1. The most widely used LISN's present a 50 Ω impedance to the EUT. The 50 Ω impedance was selected because theoretical and empirical data have shown that the power circuitry statistically looks like a 50 Ω impedance to standard electronic equipment and RF test instrumentation is typically designed for 50 Ω input. The bandwidth is typically determined by the operating frequency of the potential victims of the EUT's conducted emissions. The majority of conducted emission measurements are carried out from 150 kHz to 30 MHz. This insures that electronic equipment does not interfere with VLF, HF radio communications systems as well as other electronic devices operating in this frequency range.

The model FCC-LISN-50-25-2 is produced in accord with the required schematic of CISPR 16-1 and meets the frequency requirements. In addition there are 50 Ω versions used to test both lower and higher frequencies. VDE 0876 and CISPR 16-1 can require conducted emission measurements on electronic devices from 9 kHz to 30 MHz. In order to extend the frequency to

9 kHz a 250 μ H inductor and additional resistor and capacitance networks are added to the 50 Ω 50 μ H configuration. CISPR 16-1 defines this LISN as 50 Ω 50 μ H + 5 Ω . This type of LISN is often used when testing equipment with switch mode power supplies.

In contrast the aerospace, automotive and aircraft industries require conducted emission testing to frequencies higher than 30 MHz. To achieve the higher bandwidth a 5 μ H inductor is used.

Voltage and current rating of the LISN are the second characteristic. It is important to select LISN's with ratings that allow the EUT to operate as intended. Fischer Custom Communications, Inc. offers LISN's with voltage ratings from 240 to 500 volts RMS line to line and current ratings from 16 to 600 amperes.

The third parameter is the number of power conductors on lines. EMI specifications require all EUT power leads except ground leads to be tested for conducted emissions. Any neutral or ground wires not connected to the chassis inside the EUT must be tested. DC and AC single phase power circuits must be tested using LISN modules containing two lines. A delta, three phase power network requires tests to be conducted with a LISN containing three power conductors, and a Y or Star, three phase configuration must be tested with LISN modules have four lines. To maximize flexibility Fischer Custom Communications, Inc. offers LISN modules containing one, two, and four power conductors.

Fischer Custom Communications, Inc. offers over twenty connector types. The key characteristics are electrical and mechanical safety in compliance with IEC 1010, not cause the impedance of the LISN to vary and match the EUT power mains requirement. All Fischer Custom Communications, Inc. LISN's are calibrated and come with impedance and insertion loss data. We strongly recommend that IEC 320 or NEMA connectors be used to eliminate power cords.

All Fischer Custom Communications, Inc. LISN's are easily mounted to the ground plane using our standard baseplate. Additional grounding is available.

Filtered LISN's, remotely switched LISN's and low profile LISN's for under turn table mounting , special versions operating to 1 GHz and Military Standard configurations are available.

Remotely switched LISN's may be controlled by the remote control or via a personal computer (PC) with digital IO card that can output 0 – 5 volt DC logic. The remote control and 50 foot cable are supplied with mating 9-ping D-type connectors. The remote connector is filtered to prevent external noise from entering the LISN enclosure.

Contact the applications engineers at Fischer Custom Communications, Inc. to discuss your requirements for commercial and military EMC testing.

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LISN Selection Guide Codes

Chassis Dimensions (Length x Width x Height)

#1	23 cm x 15 cm x 13 cm
#2	31 cm x 18 cm x 16 cm
#3	38 cm x 23 cm x 18 cm
#4	38 cm x 31 cm x 31 cm
#5	61 cm x 36 cm x 36 cm
#6	76 cm x 46 cm x 46 cm
#7	76 cm x 61 cm x 51 cm

Test Type Code

01	CISPR / EN
02	FCC Part 15 / ANSI C 63.4
03	FCC Part 18
04	Mil Std 461/462 Rev C
05	Mil Std 461/462 Rev D
06	DO - 160 FAA
07	SAE J1113
08	TEMPEST
09	VDE 0876, Part 1

Connector Code

01	Multi-Contact Safety Socket
02	Superior Plug and Jack Safety Socket
03	IEC 320, 10 A / 16 A Power
04	IEC 320, 16 A / 20 A Power
05	French / Belgium 16 A Power
06	BS 1363 13 A British Power
07	CEE 7 / 7 16 A Schuko German Power
08	Nema 5-15, 15 A US Power
09	Nema 5-20, 20 A US Power
10	IEC 309, 16 A 3-Wire Power
11	IEC 309, 32 A 3-Wire Power
12	Hubbell 330P6W, 30 A 3-Wire US Power
13	Hubbell 430P12W, 30 A 4-Wire US Power
14	Hubbell 520P9W, 20 A 5-Wire US Power
15	Hubbell 530P7W, 30 A 5-Wire US Power
16	IEC 309, 32 A 5-Wire Power
17	IEC 309, 63 A 5-Wire Power
18	IEC 309, 125 A 5-Wire Power
19	LC Coaxial for Tempest

LISN Selection Guide

Model	Maximum Frequency (MHz)	Network Inductance	Maximum Current (A)	*Standard Maximum Voltage	Standard Power Source Frequency	# of Power Conductors	Chassis Type	Power Connector Options	Test Type
FCC-LISN-5-50-1	0.1 - 100	50 Ω /5 μ H	50	240	DC - 60 Hz	1	#1	02	01,02 & 04
FCC-LISN-5-50-1-DO-160	0.1 - 400	50 Ω /5 μ H	50	240	DC - 60 Hz	1	#1	02	06 & 07
FCC-LISN-5-50-1-T	0.1 - 1,000	50 Ω /5 μ H	50	240	DC - 60 Hz	1	#1	19	08
FCC-LISN-5-100-1	0.1 - 65	50 Ω /5 μ H	100	240	DC - 60 Hz	1	#2	02	01, 02,04,07
FCC-LISN-50-50-1	0.15 - 100	50 Ω /50 μ H	50	240	DC - 60 Hz	1	#2	02	01, 02, 05
FCC-LISN-50-100-1	0.15 - 30	50 Ω /50 μ H	100	240	DC - 60 Hz	1	#4	02	01, 02, 05
FCC-LISN-50-200-1	0.15 - 30	50 Ω /50 μ H	200	240	DC - 60 Hz	1	#5	02	01, 02, 05
FCC-LISN-57-50-1	0.01 - 10	50 Ω /57 μ H	50	240	DC - 60 Hz	1	#2	02	04
FCC-LISN-50-25-2	0.15 - 100	50 Ω /50 μ H	25	240	DC - 60 Hz	2	#3	01 - 10	01, 02, 05
FCC-LISN-50-32-2	0.15 - 100	50 Ω /50 μ H	32	240	DC - 60 Hz	2	#3	01 - 10, 12	01, 02, 05
FCC-LISN-50-50-2	0.15 - 100	50 Ω /50 μ H	50	240	DC - 60 Hz	2	#4	02	01 & 02
FCC-LISN-50-32-4	0.15 - 100	50 Ω /50 μ H	32	240	DC - 60 Hz	4	#4	01, 13, 15, 16	01, 02, 05
FCC-LISN-50-50-4	0.15 - 100	50 Ω /50 μ H	50	240	DC - 60 Hz	4	#4	02, 17	01, 02, 05
FCC-LISN-50-100-4	0.15 - 30	50 Ω /50 μ H	100	240	DC - 60 Hz	4	#6	02, 18	01, 02, 05
FCC-LISN-50/250-25-2	0.009 - 100	50 Ω /50 μ H + 5 Ω 50/250 μ H	25	240	DC - 60 Hz	2	#4	01 - 10	01 & 09
FCC-LISN-50/250-32-2	0.009 - 100	50 Ω /50 μ H + 5 Ω 50/250 μ H	32	240	DC - 60 Hz	2	#4	01 - 10, 12	01 & 09
FCC-LISN-50/250-32-4	0.009 - 100	50 Ω /50 μ H + 5 Ω 50/250 μ H	32	240	DC - 60 Hz	4	#5	01, 13, 15, 16	01 & 09
FCC-LISN-50/250-50-2	0.009 - 100	50 Ω /50 μ H + 5 Ω 50/250 μ H	50	240	DC - 60 Hz	2	#4	02	01 & 09
FCC-LISN-50/250-50-4	0.009 - 100	50 Ω /50 μ H + 5 Ω 50/250 μ H	50	240	DC - 60 Hz	4	#5	02, 17	01 & 09
FCC-LISN-50/250-100-2	0.009 - 30	50 Ω /50 μ H + 5 Ω 50/250 μ H	100	240	DC - 60 Hz	2	#7	02	01 & 09

* 240 volts line to ground. Higher line to line maximum voltages available upon request.

** LISN's can be rated to 400 Hz Power Source Frequency upon request.

Military standard configurations are available.

Custom LISN's up to 600 ampere rating available.