

SPACECRAFT LINE IMPEDANCE SIMULATION NETWORKS



The distinction between Line Impedance **Stabilization** Networks and Line Impedance **Simulation** Networks is twofold:

- a. Simulation networks do not contain an r.f. factor.
- b. Simulation networks are normally used on d.c. lines only (See the back side of this page for a.c.-d.c. units).

The acronym LISN is often used for either type of unit and it is important to provide modifiers to distinguish which unit is being described.

Line Impedance **Stabilization** Networks are used in many cases to measure the r.f. voltages (from line-to-ground) conducted on a.c. or d.c. power leads. They establish a known impedance-versus-frequency condition over the frequency range of interest. These units include an r.f. connector for cabling to an EMI meter or spectrum analyzer to perform the measurement. See catalog page LINE IMPEDANCE STABILIZATION NETWORKS for details on these units.

Line Impedance **Simulation** Networks are used for testing items which will be installed in spacecraft. They establish an impedance-versus-frequency condition which simulates the d.c. power sources used on satellites and other vehicles operating in a space environment. These are dual units with both positive and negative leads going through. Both lines are isolated from the case.

Spacecraft designers do not always agree on the characteristics of the d.c. power source aboard the vehicle. The inductance in series with the load, the resistance across the inductor, and the series resistance in each leg of the unit are variables specified by different spacecraft engineers.

In the styles we have provided to date, inductors are used in both sides of the line, except for the two styles marked with * in the following table.

Type Number**	Inductance, microhenries	Current Rating	Resistor across coil	Resistance in series
7505-4-TS-15-BP	4	15 A.	25 ohms	250.0 milliohms
8212-4-TS-100-BP	4	100 A.	25 ohms	0.36 milliohms
8312-4-TS-15-BP	4	15 A.	25 ohms	50.0 milliohms
† 8509-1-TS-15-BP	1	15 A.	50 ohms	82.0 milliohms
* 8708-26-PJ-50-X	26	50 A.	None	9.3 milliohms
* 8709-3.5-PJ-50-X	3.5	50 A.	None	2.8 milliohms
† 8712-2-TS-10-BP	2	10 A.	50 ohms	50.0 milliohms
† 8718-2-TS-50-BP	2	50 A.	50 ohms	50.0 milliohms
8809-1.3-TS-50-BP	1.35	50 A.	25 ohms	1.5 milliohms
† 8812-2-TS-120-BP	2	120 A.	50 ohms	2.2 milliohms
8901-4-TS-15-BP	4	15 A.	25 ohms	250.0 milliohms
8903-4-TS-100-BP	4	100 A.	25 ohms	0.36 milliohms
8904-4-TS-15-BP	4	15 A.	25 ohms	50.0 milliohms
8910-4-TS-15-BP	4	15 A.	25 ohms	0.25 milliohms
9002-1	0.9	6 A.	None	113.0 milliohms
9102-5-TS-10-X	5	10 A.	25 ohms	125.0 milliohms
9213-5-TS-50-BP	5	50 A.	25 ohms	50.0 milliohms
9238-10-TS-50	10	50 A.	25 ohms	0.50 milliohms
9336-100-TS-100-BP	100	100 A.		
9344-3/12-TS-50-BNC/PJ	0.25	50 A.		
9350-4-TS-50-N	4	50 A.		

* The return lead (negative) does not contain an inductor.

** The letters PJ indicate **Plug and Jack** power connections. The letters TS indicate **Terminal Screw** power connections. The letters BP at the end of the type number indicate **Binding Posts** connected across the coil. This enables the user to connect an oscilloscope across the coil for measuring line transients and ripple as required by NASA document SL-E-0002, paragraph 6.20.

† **In addition to the internal capacitance from line-to-line, these four units require another 45,000 μF, supplied by an external unit.**

SOLAR ELECTRONICS COMPANY *A division of A.T. Parker, Inc.*
 Innovative EMI Solutions Since 1960
 e-mail: sales@solar-emc.com www.solar-emc.com (800) 952-5302
 (818) 755-1700
 FAX (818) 755-0078

HIGH VOLTAGE, HIGH CURRENT, HIGH FREQUENCY LINE IMPEDANCE STABILIZATION NETWORKS

Five microhenry unit

To answer the need to cover the frequency range up to 1.0 GHz and to accommodate higher line voltages and currents, we offer the **Type 8902-5-TS-500-N** Line Impedance [Stabilization](#) Network. At the low frequency end of the spectrum, this network provides the impedance characteristic of all other 5 microhenry units and maintains the required 50 ohm ($\pm 20\%$) impedance up to 1.0 GHz. It is rated at 500 v.a.c. and 500 amperes., a.c. It is a single line unit in an aluminum case measuring 7.625" x 7.625" x 19". The line and load terminals are .5-20 threaded brass studs. The r.f. connector is a conventional Type N.

Fifty microhenry unit

For operation up to 100 MHz with a 50 microhenry coil, the **Type 8905-50-TS-50-N** is a Line Impedance Stabilization Network rated at 270 v.a.c., 50 amperes. The impedance characteristic meets the requirements at 10 KHz, sloping upward toward 50 ohms as frequency increases and maintains the required 50 ohm ($\pm 20\%$) impedance up to 200 MHz.

LINE IMPEDANCE SIMULATION NETWORKS FOR A.C. AND D.C. APPLICATIONS

In the application of Line Impedance [Simulation](#) Networks, some specifications require that NASA units (4 μ H) be used on both a.c. and d.c. power circuits. To do this, the large electrolytic capacitor stipulated for d.c. applications must be disconnected when the network is used on a.c. lines. Our engineers believed that the end-user might not be aware of this detail or would not know whether the capacitor was in place at the time the test was being set up. **A SPECIAL SERIES OF UNITS IS OFFERED WHICH AUTOMATICALLY CONNECT OR DISCONNECT THE CAPACITOR WHEN THE NETWORK IS CONNECTED TO A POWER LINE.**

When the power line is 24 to 30 volts d.c., the capacitor is automatically connected into the circuit. However, when the power line is 110 to 115 volts a.c., the capacitor is automatically switched out of the circuit. Since the switching function is automatic, there is no need to operate a switch or disconnect a wire to accomplish this. The end-user does not need to think about it.

These innovative combination networks are available in current ratings up to 100 amperes and with specified resistance values across the coil and differing series resistance in the circuit.

Type Number**	Inductance, microhenries	Current Rating	Resistor across coil	Resistance in series
8901-4-TS-15-BP	4	15 A.	25 ohms	250.00 milliohms
8903-4-TS-100-BP	4	100 A.	25 ohms	0.36 milliohms
8904-4-TS-15-BP	4	15 A.	25 ohms	50.00 milliohms

