

LINE IMPEDANCE STABILIZATION NETWORKS



APPLICATION

When measuring conducted radio interference voltages from active power lines to ground, it is essential to know the line impedance so that repeatable tests can be made by more than one laboratory. Artificial line impedances are specified in MIL-STD-462, V.D.E., C.I.S.P.R., C22.4, NACSEM 5100, ANSI C63.2 and other EMI specifications.

The characteristic impedance of the five microhenry and 50 microhenry LISNs brackets the mean value of power line impedance which has been measured by independent researchers. These two inductance values in parallel with the 50 ohms of the EMI meter fall between the minimum and maximum line impedance values which have been measured. The mean value would be represented by a twenty microhenry inductor in parallel with 100 ohms.

DESCRIPTION

The Solar Electronics LISNs use a series inductor between the test sample and the power source to provide the impedance-versus-frequency

characteristic. A coaxial connector with d.c. isolation is provided for connection to the associated frequency selective EMI meter. The power source end of the inductor is bypassed to ground.

Due to the large current-carrying capability of some LISNs, it is not always practical to use a switch for changing inductance values. Instead, some models are equipped with a high current pin plug-and-jack combination for quickly connecting and disconnecting a network and substituting another. This nylon insulated pin plug and jack arrangement is a safety feature, well isolated from inadvertent short circuits, providing protection to operating personnel.

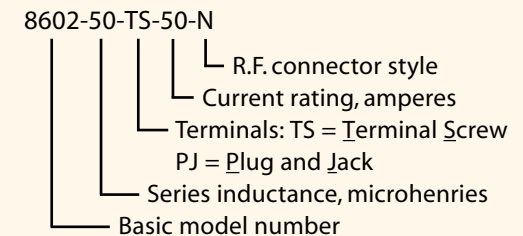
Current ratings up to 200 amperes are available in 50 μ H styles and 500 amperes in 5 μ H styles. See the chart on the following page.

When measurements are made in a shielded room, the LISNs intended for F.C.C. applications will also serve for V.D.E. tests. When operating on an unfiltered power line, the V.D.E. specifications require a filter consisting of 250 microhenry inductor and a capacitor. This filter is included in the 24 ampere LISN, **Type 9348-50-R-24-BNC**, and the 50 ampere LISN, **Type 8602-50-TS-50-N**.

EMI specifications require one LISN in each ungrounded power lead. Even though the neutral is considered "ground," if it is not connected to

chassis **inside** the unit under test, the lead must be tested with an LISN. Therefore, use two LISNs in d.c. or single phase a.c. applications, three LISNs for delta-connected three phase circuits, and four LISNs for 'Y' connected three phase circuits.

Explanation of Type Numbers



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LINE IMPEDANCE STABILIZATION NETWORKS

| Type Number | Current Amps | Inductance μ H | Line/Ground Voltage | | Case Size* | Circuit | Frequency Range |
|---|--------------|--------------------|---------------------|--------|------------|---------|---|
| | | | 50-60 Hz | 400 Hz | | | |
| 6330-100-PJ-50-N | 50 | 100 | 270 | 130 | #3 | Single | 10 KHz- 4 MHz |
| 6330-100-TS-50-N | 50 | 100 | 270 | 130 | #3 | Single | 10 KHz- 4 MHz |
| 6330-250-PJ-50-N | 50 | 250 | 270 | 130 | #3 | Single | 8 KHz- 4 MHz |
| 6330-250-TS-50-N | 50 | 250 | 270 | 130 | #3 | Single | 8 KHz- 4 MHz |
| 6330-600-PJ-50-N | 50 | 600 | 270 | 130 | #3 | Single | 7.5 KHz- 5 MHz |
| 6330-600-TS-50-N | 50 | 600 | 270 | 130 | #3 | Single | 7.5 KHz- 5 MHz |
| 6338-5-PJ-50-N | 50 | 5 | 270 | 130 | #1 | Single | 150 KHz- 65 MHz |
| 6338-5-TS-50-N | 50 | 5 | 270 | 130 | #1 | Single | 150 KHz- 65 MHz |
| 6338-57-PJ-50-N | 50 | 57 | 270 | 130 | #2 | Single | 14 KHz- 4 MHz |
| 6338-57-TS-50-N | 50 | 57 | 270 | 130 | #2 | Single | 14 KHz- 4 MHz |
| 6516-5-TS-10-BNC | 10 | 5 | 270 | 130 | #5 | Single | 150 KHz- 65 MHz |
| 6516-57-TS-10-BNC | 10 | 57 | 270 | 130 | #6 | Single | 14 KHz- 4 MHz |
| 7225-1 | 10 | 650 | 270 | 130 | #1 | Single | 10 KHz-400 MHz (useable up to 1 GHz) |
| 7333-5-PJ-50-N | 50 | 5 | 500 | 240 | #1 | Single | 150 KHz- 65 MHz |
| 7333-5-TS-50-N | 50 | 5 | 500 | 240 | #1 | Single | 150 KHz- 65 MHz |
| 7333-57-PJ-50-N | 50 | 57 | 500 | 240 | #2 | Single | 14 KHz- 4 MHz |
| 7333-57-TS-50-N | 50 | 57 | 500 | 240 | #2 | Single | 14 KHz- 4 MHz |
| 8012-50-R-24-BNC | 24 | 50 | 135 | N/A | #1 | Dual | 10 KHz- 50 MHz |
| 8028-50-TS-24-BNC | 24 | 50 | 270 | 130 | #1 | Single | 10 KHz- 50 MHz |
| 8116-50-PJ-100-N | 100 | 50 | 270 | 130 | #3‡ | Single | 10 KHz- 30 MHz |
| 8116-50-TS-100-N | 100 | 50 | 270 | 130 | #3‡ | Single | 10 KHz- 50 MHz |
| 8116-100-PJ-100-N | 100 | 100 | 270 | 130 | #3‡ | Single | 10 KHz- 4 MHz |
| 8116-100-TS-100-N | 100 | 100 | 270 | 130 | #3‡ | Single | 10 KHz- 4 MHz |
| 8116-250-PJ-100-N | 100 | 250 | 270 | 130 | #3‡ | Single | 8 KHz- 4 MHz |
| 8116-250-TS-100-N | 100 | 250 | 270 | 130 | #3‡ | Single | 8 KHz- 4 MHz |
| 8309-5-PJ-100-N | 100 | 5 | 500 | 240 | #3 | Single | 150 KHz- 65 MHz |
| 8309-5-TS-100-N | 100 | 5 | 500 | 240 | #3 | Single | 150 KHz- 65 MHz |
| 8328-50-PJ-50-N | 50 | 50 | 270 | 130 | #3 | Single | 10 KHz- 50 MHz, 0.1 μ f coupling capacitor |
| 8328-50-TS-50-N | 50 | 50 | 270 | 130 | #3 | Single | 10 KHz- 50 MHz, 0.1 μ f coupling capacitor |
| *Case Sizes (w x h x l) | | | | | | #3: | 10.06" x 9.0" x 13.12" (25.72 cm x 22.86 cm x 33.34 cm) |
| Add 3" (7.62 cm) for Base Plate | | | | | | #4: | 7.53" x 7.63" x 18.97" (19 cm x 19.43 cm x 48.26 cm) |
| ‡ With 50 or 60 Hz Ventilating Fan; add 7.09" (18.00 cm) | | | | | | #5: | 3.12" x 1.75" x 3.87" (7.94 cm x 4.44 cm x 9.84 cm) |
| #1: 4.5" x 4.5" x 9.25" (11.43 cm x 11.43 cm x 23.5 cm) | | | | | | #6: | 2.75" x 2.45" x 5.7" (6.98 cm x 6.22 cm x 14.48 cm) |
| #2: 7.0" x 7.0" x 8.25" (17.78 cm x 11.78 cm x 24.13 cm) | | | | | | #7: | 13.06" x 7.0" x 10.06" (33.20 cm x 17.78 cm x 25.55 cm) |



LINE IMPEDANCE STABILIZATION NETWORKS (cont.)

| Type Number | Current Amps | Inductance μ H | Line/Ground Voltage | | Case Size* | Circuit | Frequency Range |
|------------------|--------------|--------------------|---------------------|--------|------------|---------|--|
| | | | 50-60 Hz | 400 Hz | | | |
| 8410-250-R-24 | 24 | 250 | 270 | 130 | #1 | Dual | 250 μ H choke network with AC receptacle for use with 8012-() and 9252-() for VDE applications |
| 8602-50-PJ-50-N | 50 | 50 | 270 | 130 | #4 | Single | 10 KHz- 50 MHz w/ 250 μ H choke |
| 8602-50-TS-50-N | 50 | 50 | 270 | 130 | #4 | Single | 10 KHz- 50 MHz w/ 250 μ H choke |
| 8610-50-PJ-100-N | 100 | 50 | 500 | 240 | #3‡ | Single | 10 KHz- 30 MHz |
| 8610-50-TS-100-N | 100 | 50 | 500 | 240 | #3‡ | Single | 10 KHz- 30 MHz |
| 8611-50-TS-10-N | 10 | 50 | 270 | 130 | #2 | Single | 10 KHz- 30 MHz w/ 250 μ H choke |
| 8615-2-TS-100-N | 100 | 2 | 270 | 130 | #1 | Single | 1 MHz- 1 GHz |
| 8616-5-PJ-200-N | 200 | 5 | 270 | 130 | #3‡ | Single | 150 KHz- 65 MHz |
| 8616-5-TS-200-N | 200 | 5 | 270 | 130 | #3‡ | Single | 150 KHz- 65 MHz |
| 8616-50-PJ-200-N | 200 | 50 | 270 | 130 | #3‡ | Single | 10 KHz- 50 MHz |
| 8616-50-TS-200-N | 200 | 50 | 270 | 130 | #3‡ | Single | 10 KHz- 50 MHz |
| 8902-5-TS-500-N | 500 | 5 | 500 | 240 | #4 | Single | 150 KHz- 1 GHz |
| 8905-50-TS-50-N | 50 | 50 | 270 | 130 | #3 | Single | 10 KHz-200 MHz |
| 8907-250-TS-24 | 24 | 250 | 270 | 130 | #1 | Dual | 250 μ H choke network with binding posts. For use with two 8028-() for VDE applications |
| 9106-1300-N-10-N | 10 | 1300 | 270 | 130 | #1 | Single | 10 KHz- 1 GHz |
| 9117-5-PJ-50-N | 50 | 5 | 500 | 240 | #1 | Single | 150 KHz- 1 GHz |
| 9117-5-TS-50-N | 50 | 5 | 500 | 240 | #1 | Single | 150 KHz- 1 GHz |
| 9233-50-PJ-50-N | 50 | 50 | 270 | 130 | #3 | Single | 10 KHz- 50 MHz, 0.25 μ F coupling capacitor |
| 9233-50-TS-50-N | 50 | 50 | 270 | 130 | #3 | Single | 10 KHz- 50 MHz, 0.25 μ F coupling capacitor |
| 9247-50-TS-50-N | 50 | 50 | 500 | 240 | #3 | Single | 10 KHz- 50 MHz, 0.1 μ F coupling capacitor |
| 9252-50-R-24-BNC | 24 | 50 | 270 | 130 | #7 | Dual | 10 KHz- 50 MHz, 0.25 μ F coupling capacitor |
| 9322-50-R-10-BNC | 10 | 50 | 270 | 130 | #7 | Dual | 10 KHz- 50 MHz |
| 9331-50-PJ-200-N | 200 | 50 | 500 | 240 | #3‡ | Single | 10 KHz- 50 MHz |
| 9331-50-TS-200-N | 200 | 50 | 500 | 240 | #3‡ | Single | 10 KHz- 50 MHz |
| 9345-5-R-10-BNC | 10 | 5 | 135 | N/A | #1 | Dual | 150 KHz- 65 MHz |
| 9348-50-R-24-BNC | 24 | 50 | 270 | 130 | #7 | Dual | 10 KHz- 50 MHz with 250 μ H choke |

| | |
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| <p>*Case Sizes (w x h x l) Add 3" (7.62 cm) for Base Plate ‡ With 50 or 60 Hz Ventilating Fan; add 7.09" (18.00 cm) #1: 4.5" x 4.5" x 9.25" (11.43 cm x 11.43 cm x 23.5 cm) #2: 7.0" x 7.0" x 8.25" (17.78 cm x 11.78 cm x 24.13 cm)</p> | <p>#3: 10.06" x 9.0" x 13.12" (25.72 cm x 22.86 cm x 33.34 cm) #4: 7.53" x 7.63" x 18.97" (19 cm x 19.43 cm x 48.26 cm) #5: 3.12" x 1.75" x 3.87" (7.94 cm x 4.44 cm x 9.84 cm) #6: 2.75" x 2.45" x 5.7" (6.98 cm x 6.22 cm x 14.48 cm) #7: 13.06" x 7.0" x 10.06" (33.20 cm x 17.78 cm x 25.55 cm)</p> |
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LINE IMPEDANCE STABILIZATION NETWORKS (cont.)

| Type Number | Current Amps | Inductance μ H | Line/Ground Voltage | | Case Size* | Circuit | Frequency Range |
|-------------------|--------------|--------------------|---------------------|--------|------------|----------|--|
| | | | 50-60 Hz | 400 Hz | | | |
| 9351-5-TS-200-N | 200 | 5 | 500 | 240 | #3‡ | Single | 100 KHz- 1 GHz, 150 Ω impedance |
| 9403-5-TS-10-BNC | 10 | 5 | 270 | 130 | #5 | Single | 150 KHz- 65 MHz |
| 9408-50-R-24-BNC | 24 | 50 | 500 | 240 | #7 | Dual | 10 KHz- 50 MHz |
| 9409-50-R-24 | 24 | 50 | 135 | N/A | #2 | Dual | 6 Output Auxiliary, no RF connector |
| 9509-50-R-24-BNC | 24 | 50 | 500 | 240 | #7 | Dual | 10 KHz- 50 MHz w/ 250 μ H choke |
| 9517-50-R-10-BNC | 10 | 50 | 270 | 130 | #7 | Dual | 10 KHz- 50 MHz w/ 250 μ H choke |
| 9608-50-BP-10-BNC | 10 | 50 | 500 | 240 | #7 | Dual | 10 KHz- 50 MHz, binding posts, no switch |
| 9615-50-R-25-BNC | 25 | 50 | 270 | 130 | #7 | Dual | 10 KHz- 30 MHz, air coil |
| 9622-50-BP-10-BNC | 10 | 50 | 500 | 240 | #1 | Single | 10 KHz- 50 MHz |
| 9623-50-TS-25-BNC | 25 | 50 | 270 | 130 | #1 | Single | 10 KHz- 30 MHz, air coil |
| 9629-50-TS-25-BNC | 25 | 50 | 500 | 240 | #1 | Single | 10 KHz- 30 MHz |
| 9632-50-TS-50-N | 50 | 50 | 270 | 130 | #3 | Single | 10 KHz- 50 MHz, high wattage for GM spec |
| 9702-50-TS-100-N | 100 | 50 | 270 | 130 | call | Single | 10 KHz- 50 MHz w/ 250 μ H choke |
| 9706-5-TS-250-N | 250 | 5 | 270 | 130 | #3 | Single | 150 KHz- 65 MHz |
| 9845-50-BP-10-BNC | 10 | 50 | 135 | N/A | #1 | Dual | 10 KHz- 30 MHz, binding posts, no switch |
| 9847-50-TS-50-N | 50 | 50 | 270 | 130 | #3 | Single | with 20 μ F capacitor |
| 9857-50-BP-24-BNC | 24 | 50 | 135 | 120 | #1 | Dual | 10 KHz- 50 MHz, binding posts, no switch |
| 9861-50-BP-24-BNC | 24 | 50 | 270 | 130 | #7 | Dual | 10 KHz- 50 MHz, binding posts, no switch |
| 9867-5-TS-50-N | 50 | 5 | 270 | 130 | #2 | Single | 10 KHz- 400 MHz w/ 10 μ F capacitor |
| 9911-50-R-10-BNC | 10 | 50 | 135 | N/A | #1 | Dual | 10 KHz- 50 MHz |
| 9913-50-TS-10-BNC | 10 | 50 | 270 | 130 | #7 | Dual | 10 KHz- 50 MHz, 6-32 threaded terminals |
| 9924-5-TS-100 | 100 | 5 | 270 | 130 | #3 | Isolated | 100 KHz- 100 MHz (ISO 7637-2) |

***Case Sizes (w x h x l)**

Add 3" (7.62 cm) for Base Plate

‡ With 50 or 60 Hz Ventilating Fan; add 7.09" (18.00 cm)

#1: 4.5" x 4.5" x 9.25" (11.43 cm x 11.43 cm x 23.5 cm)

#2: 7.0" x 7.0" x 8.25" (17.78 cm x 17.78 cm x 21.13 cm)

#3: 10.06" x 9.0" x 13.12" (25.72 cm x 22.86 cm x 33.34 cm)

#4: 7.53" x 7.63" x 18.97" (19 cm x 19.43 cm x 48.26 cm)

#5: 3.12" x 1.75" x 3.87" (7.94 cm x 4.44 cm x 9.84 cm)

#6: 2.75" x 2.45" x 5.7" (6.98 cm x 6.22 cm x 14.48 cm)

#7: 13.06" x 7.0" x 10.06" (33.20 cm x 17.78 cm x 25.55 cm)

