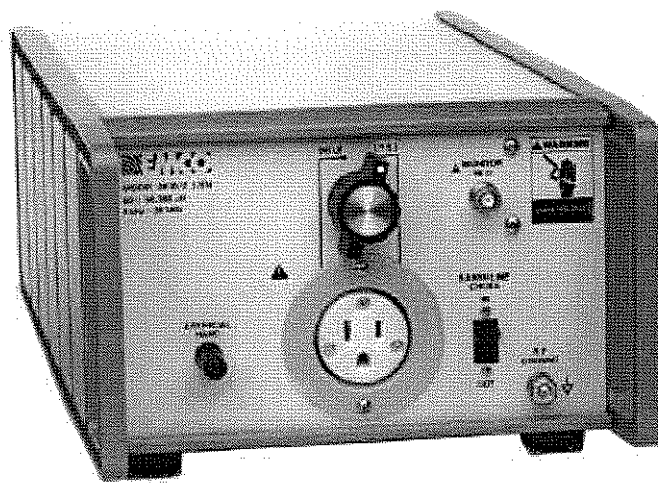


# MODEL 3810/2

## Line Impedance Stabilization Network

### OPERATION MANUAL



**NOTICE:** This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

## SAFETY SYMBOL DEFINITIONS



OR



### REFER TO MANUAL

When product is marked with this symbol refer to instruction manual for additional information.



OR



### HIGH VOLTAGE

Indicates presence of hazardous voltage. Unsafe practice could result in severe personal injury or death.



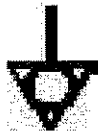
### PROTECTIVE EARTH GROUND (SAFETY GROUND)

Indicates protective earth terminal. You should provide an uninterruptible safety earth ground from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

CAUTION

### CAUTION

Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.



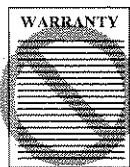
### EQUIPOTENTIALITY

Identifies the terminals, when connected together, to bring various parts of a system to the same potential, not necessarily being the earth (ground) potential, e.g. for local bonding.

## GENERAL SAFETY CONSIDERATIONS



**BEFORE POWER IS APPLIED TO THIS INSTRUMENT, GROUND IT PROPERLY** through the protective conductor of the AC power cable to a power source provided with protective earth contact. Any interruption of the protective (grounding) conductor, inside or outside the instrument, or disconnection of the protective earth terminal could result in personal injury.



**BEFORE SERVICING: CONTACT EMCO** - servicing (or modifying) the unit by yourself may void your warranty. If you attempt to service the unit by yourself, disconnect all electrical power before starting. There are voltages at many points in the instrument which could, if contacted, cause personal injury. Only trained service personnel should perform adjustments and/or service procedures upon this instrument. Capacitors inside this instrument may still be CHARGED even when instrument is disconnected from its power source.



**ONLY QUALIFIED PERSONNEL** should operate (or service) this equipment.

# Table of Contents

GENERAL DESCRIPTION .....	1
INSTALLATION AND APPLICATION .....	2-3
SERVICE AND CLEANING .....	4
SPECIFICATIONS .....	5-6
ELECTRICAL .....	5
MECHANICAL .....	6
ENVIRONMENTAL .....	6
SCHEMATIC .....	7
DATA .....	8
DECLARATION OF CONFORMITY .....	9

# General Description

The Model 3810/2 Line Impedance Stabilization Network is a two-channel low pass filter network designed to isolate the equipment under test from an external power source while steering any radio frequency signals from the power line to a 50 ohm port. The conducted emissions measurements may be made in accordance with regulatory compliance standards. A schematic of the Model 3810/2 is provided with the manual.

The product has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Electronic Measuring Apparatus, and has been supplied in a safe condition. The instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

# Installation and Application

The Line Impedance Stabilization Network (LISN) is nominally designed for a 10 ampere current capacity. Maximum line-to-line voltage must not exceed the voltage rating of the power outlet provided on the front panel of the LISN. Refer to the product specification sheet in this manual for the applicable maximum value.

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**WARNING** Overcurrent protection is not provided in the LISN. The LISN must be connected to a power mains which has the properly rated mains protection installed.

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The input power connection is made through an IEC-320 type power inlet. This three-wire input power connector is rated at 10 amperes maximum. In case of emergency, power can be removed from the LISN by removing the power connection at the LISN input. Alternately, a properly rated circuit breaker or switch which removes mains power from the unit can be installed in proximity to the LISN.



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**WARNING** This device is provided with a protective earthing ground integral to the power cord. The mains plug shall only be inserted in an outlet which incorporates a protective earth contact. Due to the high leakage current to ground inherent to this type of equipment, it is necessary to install a supplemental protective earthing wire from the protective earth terminal on the rear panel of the LISN to an appropriate earthing point of the power mains. This earthing point should be determined by an electrician authorized to do such work by appropriate code or law. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited. The supplemental ground wire is supplied with the LISN.

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The LISN is provided with an RF bonding stud on both the front and rear panels. The unit should be bonded to a ground plane in normal operation. The Equipment Under Test (EUT) is connected to the LISN through the panel mounted AC receptacle. The style of receptacle provided on the LISN is determined by the model specified. Standard output receptacle types are NEMA (type 5-15R), Schuko (type CEE 7/7) and British Standard (BS1363).

This product is designed for use in Installation Category II and Pollution Degree II per IEC-1010 and IEC-664. When installing the LISN in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the LISN by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.

Connection to the spectrum analyzer or EMI receiver is made using the type "bnc" connector on the front panel. The line to be monitored is selected using the two position selector switch located above the output AC receptacle. The line not selected is internally terminated into 50 ohms. Switching the monitor select switch between the two lines will not generate transients. When power is to be disconnected, remove the "bnc" connection to the measurement instrument first.

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**CAUTION** Although the LISN is provided with resistors to help bleed off high voltage transients, it is advisable to connect the input and output connectors to their proper power lines and loads before connecting the monitor port to the measurement instrument; otherwise, it is possible to damage the mixers or attenuators of the test instrument due to power surges or transients.

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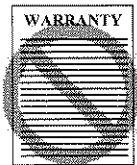
A safety ground isolation choke selector switch, located on the front panel, switches the 1.6 mHy earth line choke "IN" and "OUT" of the safety ground circuit. The ground choke is designed and manufactured with sufficient capacity to conduct the maximum current rating of the LISN and at no time is the safety ground of the unit compromised. The earth line choke avoids a double rf ground connection (safety ground and measurement ground) in the conducted emissions test set-up.

An artificial hand connection is provided on the front panel of the LISN. In conformance to EN55014 and BS800, the artificial hand is used to test those hand-held equipments which are provided without the earth connections.

# Service And Cleaning

The LISN has no user serviceable parts inside. To prevent electrical shock do not remove covers. Refer all servicing to qualified personnel. The unit is to be serviced at the factory. The factory address can be found on the serial number label on the product. To return the product for recalibration or service, use the original packaging or comparable materials.

To clean the exterior of the cabinet, wipe with a damp cloth only. Do not clean the interior of the LISN.



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**WARNING BEFORE SERVICING: CONTACT EMCO - Servicing (or modifying) the unit by yourself may void your warranty. If you attempt to service the unit by yourself, disconnect all electrical power before starting. There are voltages at many points in the instrument which could, if contacted, cause personal injury. Only trained service personnel should perform adjustments and/or service procedures upon this instrument. Capacitors inside this instrument may still be CHARGED even when instrument is disconnected from its power source.**

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# Specifications

## ELECTRICAL

<b>Frequency range</b>	9 kHz - 30 MHz (VDE 0876 specified curve +/-20%)
<b>Network inductance</b>	50 $\mu$ H / 250 $\mu$ H
<b>Network impedance</b>	50 ohm
<b>Current rating</b>	10 amps
<b>Maximum AC voltage</b>	3810/2NM 125 VAC 60 Hz 3810/2SH 250 VAC 50 Hz 3810/2BS 250 VAC 50 Hz
<b>Outlet receptacle</b>	3810/2NM NEMA 5-15R 3810/2SH Schuko CEE 7/7 3810/2BS British BS1363
<b>Input connector</b>	IEC-320 type 3-wire inlet.



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## MECHANICAL

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**Dimensions:****Height** 4.9 in (124 mm)**Width** 8.6 in (218 mm)**Depth** 15.0 in (381 mm)

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**Weight** 12.0 lb (5.4 kg)

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## ENVIRONMENTAL

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**Installation** Indoor use only

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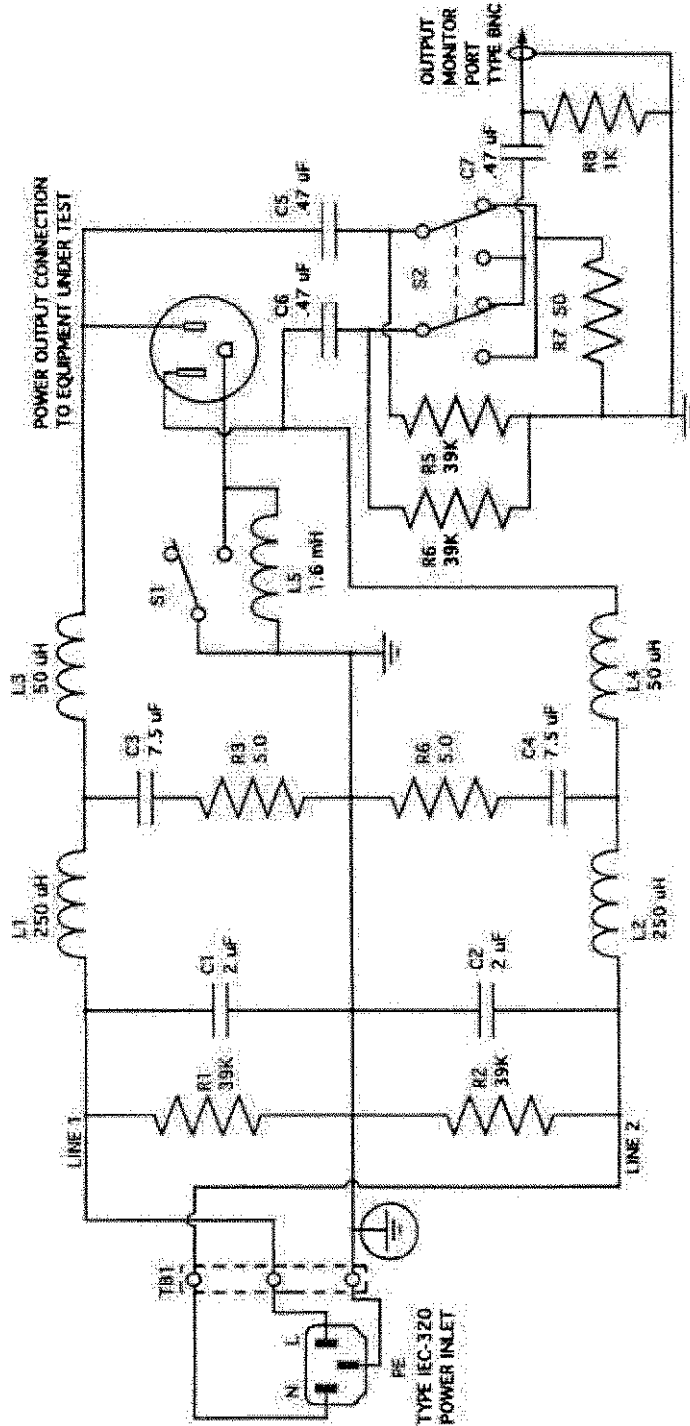
**Altitude** 15,000 ft (4,572 m) max

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**Temperature** 0° C to 40° C

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**Relative Humidity** 80% up to 31° C  
decreasing linearly to  
50% at 40° C



- NOTES**
1. Resistance values shown in ohms
  2. Ground choke select switch (S1) shown in "IN" position
  3. Line monitor select switch (S2) shown in "L2 (NTL)" position
  4. NEMA type output connector shown

**MODEL 3810/2 SCHEMATIC DIAGRAM  
LINE IMPEDANCE STABILIZATION NETWORK**

# Data

Graphs of the calibration data for each measurement port of the LISN are included in this manual. The graphs provide individual characterizations of both impedance and insertion loss data. Impedance is plotted in a semi-log graph where frequency is displayed on the horizontal from 9 kHz to 30 MHz. The vertical of the graph has a range of 0 to 100 ohms and represents the measured impedance of the unit. The insertion loss is also plotted with frequency of the horizontal from 9 kHz to 30 MHz. The vertical of the graph has a range of -9 dB to 1 dB and represents the measured insertion loss of the LISN. A Certificate of Calibration Conformance is provided with each Line Impedance Stabilization Network.

# Warranty

The Electro-Mechanics Company (EMCO) warrants that our products are free from defects in materials and workmanship for a period of two years from the date of shipment. If you notify us of a defect within the warranty period, we will at our option, either repair or replace those products which prove to be defective. If applicable, we will also recalibrate the product.

There also will be no charge for warranty services performed at the location we designate. You must however, prepay inbound shipping costs and any duties or taxes. We will pay outbound shipping costs from a carrier of our choice, exclusive of any duties or taxes. You may request warranty services to be performed at your location, but it is our option to do so. If we determine that warranty services can only be performed at your location, you will not be charged for our travel related costs.

*This Warranty does not apply to:*

- Normal wear of materials.
- Consumable items such as batteries, fuses, etc.
- Products which have been improperly installed, maintained, or used.
- Products which have been operated outside of specifications.
- Products which have been modified without authorization.
- Calibration of products, unless necessitated by defects.

This warranty is exclusive. No other warranty, written or oral, is expressed or implied, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

The remedies provided by this warranty are your sole and exclusive remedies. In no event are we liable for any damages whatsoever, including but not limited to, direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

*NOTE Please contact our sales department for a Return Material Authorization Number before shipping equipment to us.*