ILD252
INDUCTION LOOP DRIVER

1. INTRODUCTION

The ILD252 Induction Loop Driver has been designed as a high quality power driver for small and medium size audio frequency induction loops. Ease of installation and use have been major factors in the design, combined with optimised performance, and freedom from R.F.I. generation to meet all technical requirements.

To ensure compliance with all technical standards, it is essential that the equipment is installed by a person who is technically competent in professional audio, and who has the necessary installation skills.

Warranty Information
This product carries a 5 year warranty which could be invalidated if the following installation instructions are not followed correctly, or if the unit is tampered with in any way.
The 5 year warranty is dated from the time the equipment leaves Ampetronic and NOT when it is installed.

2. PRELIMINARY INSTALLATION DATA.

2.1 Inspect the equipment upon unpacking, and check for damage.

2.2 Install the unit in the place where it will be used. Care must be taken that this location provides satisfactory ventilation for the equipment. In order to ensure this, the unit should not be installed in a tightly enclosed space. Enough room must be available to permit free airflow across the equipment. The unit uses forced ventilation by using an internal fan, and the air intake grille at the left side of the unit, as well as the exhaust on the rear must be unobstructed. If the unit is installed in an enclosed environment, sufficient air flow must be provided through this enclosure. The amount of heat generated depends on the loop size, and wire gauge, but can be such that the reliability of the equipment will be reduced if the ventilation is poor..

The unit can be installed freestanding, rackmounted or wall hung with special adaptor brackets.

2.3 Prepare the input signal connection as described in section 3.

2.4 Connect the loop cable to the rear panel Loop Connector. Ensure that no stray wire ends protrude from the terminals. The polarity of the loop is not important, unless a specialised low–spill system is being installed. For sizing of the loop, see section 4.3 on Loop Design. It is important that the loop cable ends form a twisted pair between the amplifier and the loop, to reduce the magnetic field generated by the loop cable near the amplifier position

3. INPUT SIGNAL SOURCES

3.1 The equipment can be driven from various sources, such as a microphone, a P.A. system, any other audio system, or separate microphone preamplifier. A single microphone should be connected straight to the 'Mic' Input. All other sources should be connected to the 'Line Input' socket.

3.2 Microphone Input.

This input provides an electronically balanced input on an XLR connector for direct connection of a microphone. Phantom supply can be selected with the switch on the rear panel

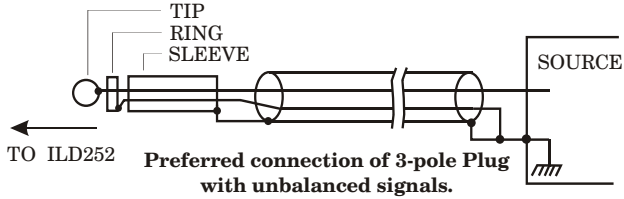
Modern electret microphones normally have a high output level. The rear panel gain boost setting should be off, unless a low output microphone is used.

High quality balanced screened microphone cable is necessary for this connection to ensure correct operation. Low quality, or poorly screened cable may result in serious instability of a full system, or non–compliance with the EMC requirements.

3.3 Line Input.

This input to the equipment is a balanced line high impedance input connection, which also permits single–ended operation. The connection is made via a 2-pole (unbalanced) or 3-pole (balanced) 6.3mm jack plug. Unbalanced inputs must use less than 3 metres of cable.

To prevent earth current loops causing hum effects, it is usually best to use the balanced input mode, coming from a single–ended signal using a good quality two–core plus screen cable as shown in the figure below. The connector sleeve is connected to the screening braid, the ring connected via one of the two cores to the source ground, and the tip to the source signal. If hum is encountered, then the earth lift switch can be used to disconnect the amplifier signal circuits from the AC power ground.



Preferred connection of 3-pole Plug with unbalanced signals.

3.4 100 Volt Line

The ILD252 can be connected to a 100V line system via the ATT100 adaptor. This allows any line configuration, from single–ended to balanced mode. The leads from the 100V speaker line are wired to the connector which plugs into the adaptor, which is plugged directly (no extension cable!) into the Line Input socket. Similarly, the ATT30 can be used to connect the ILD252 to a low-impedance speaker system.

3.5 Microphone Modules

The equipment can be used with separate microphone preamplifiers, which are available in different configurations (see data sheet for details). The power for these amplifiers can come from the Preamp Power socket, and the preamp output is connected into the Line Input socket. To ensure EMC immunity, cable length between preamp and Loop Driver should be less than 1 metre.

3.6 Slave (I/O)

The insertion of a 6.3mm 3–pole jack breaks the link between the input stage / compressor and the power driver. The tip of the plug will be the preamp output (after compression) and the ring connection is the input to the power amplifier (see below). This connector is mainly used for the connection of the special signal processor used in low–spillover loop installations where the master unit controls the signal gain, and the slave unit operates purely as a power driver. This is essential to ensure full tracking between amplifiers. ***Under no circumstances should this input be used as a normal input***, as this bypasses the automatic compression circuit. This compression is essential to the correct operation of other circuits which prevent RFI generation. Cable length must be less than 3 metres.

4. SIGNAL OUTPUT FACILITIES

4.1 Slave (I/O)

The output on this connector is the signal needed for driving equipment used with low–spill systems (see 3.6). It is also valuable for driving other audio equipment such as tape/cassette recording equipment, as the signal has been processed by the compressor, and therefore the dynamic range of the signal is reduced by the amount of compression. This can also be understood as an automatic gain control network. To obtain this recording facility the tip and ring of the 3–pole jack plug must be electrically joined. Do not use 2–pole plugs.

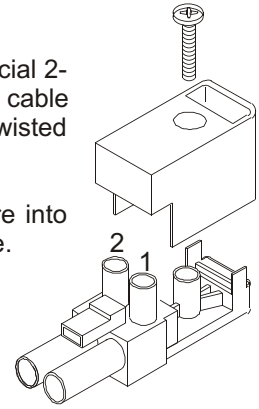
4.2 Loop Monitor

This jack socket on the front panel allows connection of standard, good quality stereo headphones for monitoring the current in the loop (do not use extension cables for this signal). The headphones are at this point connected in parallel with the loop current sensing resistor, which is of very low value (110 mW) and therefore the signal monitored at this point is exactly the current which is fed into the loop. A buffer resistance prevents the current sense resistor from being shorted.

4.3 Loop Design

The design of the actual loop, type of cable to use, etc. is covered by a separate publication.

4.4 Loop Output



The loop itself is connected to the ILD252 via a special 2-way connector, capable of handling the current. The cable from the loop to the amplifier should normally be a twisted pair.
- Remove screw from top of plug, remove cover.
- Insert one wire into terminal 1, and the other wire into terminal 2, and tighten screws to secure wires in place.
- Replace cover and refit screw.

5. METAL LOSS CORRECTION.

Modern building construction often includes a large amount of metal in the structure, including mesh in reinforced concrete floors and ceilings. Under some circumstances this can be a serious problem, as hysteresis losses in this metal cause a loss which is frequency-dependent. The actual value of the loss can only be found by measuring the site performance. Ampetronic have significant experience in this area and should be consulted prior to installation if significant amounts of metal are likely to be present. The loss varies from 0 to 3 dB per octave, with a lower corner frequency between 100 Hz and 0.01 Hz. As such, the loss in the middle frequency band can be very significant. A corrector is build into the ILD252 to correct the frequency response, but the power loss can only be overcome with additional power into the loop. This may require a more powerful driver.

6. LEVEL ADJUSTMENT

6.1 Initial setting up

During the initial commissioning of the equipment it is essential that the following procedure is used to ensure a satisfactory end result.

Ensure that all connections are made correctly, including power and loop.

Turn the “MIC”, “LINE” and “LOOP CURRENT” controls fully anti–clockwise, i.e. minimum signal. Set the “Metal Loss correction” on the rear panel to“0”. Provide a continuous input signal, preferably from a small tape or CD player with wideband music, connected directly (i.e. not via an external audio system) to the line input.

Switch unit on. After a short time the green Power LED should stop flashing. If the LOOP ERROR LED is illuminated, then check for loop continuity. The resistance of the loop must be within the specification for the unit to work. After correcting the loop error, the unit must be switched off and on again in order to reset the loop monitoring and system enabling circuits.

Increase the “LINE” gain until 2 of the compression LEDs are illuminated under peak signal conditions. This establishes a reference level for the output power driver. Increase the LOOP CURRENT setting until the desired output current is achieved (section 5.2). Where the current needed is a value

in between two LED readings, position the control by interpolating, bearing in mind that consecutive LEDs illuminate at 2 dB intervals. Having achieved this setting of the LOOP CURRENT, check with headphones plugged into the loop monitor output socket that a satisfactory sound quality is obtained from the loop current. If a standard field–strength measuring unit is available, then check that the field has the correct strength. From this point onwards, the LOOP CURRENT control will not need re–adjusting, as this only affects the peak field strength.

Before connecting to the sound system, check the entire sound system for crosstalk from the loop into the audio inputs. While still playing a music tape or CD, check every input circuit of the sound system, and if a significant amount of signal is picked up, identify the reason and correct. This ensures adequate stability for the complete system.

Connect the cable from the audio system to the line input, and readjust the input gain control for optimum compression. If only the microphone input is used directly, without another sound system, then set up the entire system from a normal sound source driving the microphone. The level is set with the “MIC” control. When using separate pre-amps, then adjust the gain controls on these pre-amps, and the “LINE” gain control to achieve a satisfactory balance.

6.2 Adjusting Metal Loss Correction.

Correct adjustment of the frequency response requires the use of specialised test equipment to measure the frequency response of the system, as specified by international standards (such as EN60118-4)

A simple method is to listen to the sound with a good quality receiver such as the ILR2. Using the same headphones, listen first to the loop current signal obtainable from the Loop Monitor outlet on the ILD252 with metal loss correction set to minimum.. Then listen to the loop signal using the ILR2 and adjust the “Loss Correction” to obtain a similar sound quality.

A full plot of the actual response can be made with suitable equipment, using the CMR2 calibrated receiver. This can be done with Pink Noise, or a frequency sweep (which must be done at 12 dB below normal maximum loop current). Please contact Ampetronic Ltd for further advice.

6.3 Optimising setting of MIC / LINE controls.

In order to obtain the greatest possible dynamic control range from the compressor, it is now necessary to establish the highest level of input signal which the equipment may receive in the operational installation. This will often be loud, close talking into a microphone. If the MIC / LINE gain is adjusted so that the amber 36dB LED does not illuminate (just), then the compressor will maintain the highest possible level into the loop for faint speech, etc. Monitoring with the output headphones will indicate the clarity of the signal under all levels of compression. It should be pointed out here that

back ground hum and noise from equipment earlier in the chain, such as a P.A. system may sound very troublesome when subjected to some 20–36db extra amplification. When this occurs, the gain must be kept at a lower level. This may also have to be done in the case of marginal magnetic feedback via dynamic microphones, etc. Where the dominant signal is music, it may be important to keep the compression level low to prevent serious degradation of the music dynamics. Experience will indicate which level to use. REMEMBER: once the LOOP CURRENT control has been set, only adjust the MIC/LINE controls, otherwise the correct operation of the system is impaired.

7. GENERAL INFORMATION

7.1 Loop Condition Testing.

The ILD252 incorporates two different modes of testing for correct loop condition. At startup, a full test is made to check that the loop impedance is between 0.3 W and 3 W. This test is done with an internal test signal . Any loop measuring outside these impedance values will cause the system to detect a loop error.

Additionally, during continuous operation, a monitor uses the actual audio signal to check for open circuit / high-resistance loop conditions, and when detected the unit will again indicate loop error condition. This will ensure early indication of system failure due to defective loops.

7.2 Difficulties

If you have any difficulties in calculating the loop design, or experience difficulties with the operation of the equipment, then contact your supplier or Ampetronic Ltd. It is useful to have all the relevant data available when contacting our technical staff who will be pleased to help you.

Please have the following information available:

Loop dimensions, loop position, conditions under which problem occurs, building usage, equipment type.

The following are known trouble areas:

– Strong hum field, mainly from fluorescent light fittings, or electrical wiring where current flow and return are not in the same cable or duct.

– Electric guitars used in single–coil mode. Twin coil/humbucker mode is generally necessary to prevent pickup of the loop signal into the guitar.

– Loop cable installed where it is in close proximity to microphone (or other audio) cables for an appreciable length. Telephone cabling can also be very sensitive to this coupling.

7.3 Fuses

A 20mm fuse is incorporated in the rear panel power input socket. It is necessary to remove the power cord before extracting the fuse holder. The fuse rating and type are printed on the rear panel.

7.4 Specialised Mounting

A rackmount kit is supplied for installing the ILD252 in a standard 19" rack, taking up 1 rack space (1U).

Wall mounting brackets (WM252) are also available for fixing the amplifier to a wall.

7.5 **WARNING - THIS APPARATUS MUST BE EARTHED.**

8. TECHNICAL SPECIFICATION

8.1 Microphone Input:

Suitable for driving from 200–600 microphones.
Electronically balanced, XLR connector.
Phantom voltage: +15V DC available
Input Sensitivity: -70dBu (gain boost position). Gain boost is 15dB
Overload level -20dBu.

8.2 Line Input:

Impedance 1M each side, 2M differential.
Sensitivity: -30dBu. Overload at +20dBu
Balanced signal input on 6.3mm 3–pole jack socket. Can be used unbalanced with mono plug.

8.3 Slave Input / Output

Input Impedance 100k Sensitivity 1V rms, +2.2dBu.
Source Impedance 100 Output level 1V rms +2.2dBu.
Signals are unbalanced, with a 3–pole jack socket used as an insert point. See chapter 3 for connections

8.4 Metal Loss Correction

Loss correction adjustable from 0 to 3dB per octave.
Gain remains constant at 1 kHz. Lower frequencies are attenuated.
Higher frequencies are boosted.

8.5 Output Current:

7A Peak signal current into SINGLE TURN loop
Absolute maximum peak current >8 Amp.
Metering via front panel LEDs. These LEDs indicate the peak current, with intervals of 2dB.

8.6 Output Voltage:

Greater than 19V peak to ensure good frequency response.

8.7 Loop Resistance:

Must be less than 2.75 , greater than 0.3 for normal operation.
Resistance range for Loop Condition Monitoring 0.3 to 3
Error will also be detected during normal operation, when loop goes high resistance, using normal audio signals for detection.

8.8 Compression:

Compression range 36dB before overload. Front panel indication of compression level. Efficiency: less than 0.25dB output change for 25dB input change. Attack and Decay

time constants optimised for speech.

8.9 Frequency response:
80Hz to 5.5kHz ±1.5dB at low level, measured as loop current.
High frequency high signal level response is a dynamic variable and is a function of loop size, loop current and signal content to ensure that no RFI generation takes place.
Internal time constants are very short.

8.10 Pre–amp power:
±15V DC regulated at up to 0.2A.

8.11 AC Power input:
230V nominal, 45-65Hz. 120VA Peak power.
Fuse fitted to input power connector type T 0.63A L
Factory setting for 115V operation available upon request.

8.12 Dimensions : Width: 430mm Height: 44mm Depth: 220mm
8.13 Weight: 2.9 kg.

The ILD252 is designed and manufactured in England by Ampetronic Ltd.

DECLARATION OF CONFORMITY

Manufacturer:	Ampetronic Ltd.
Address:	Northern Road, Newark, Nottinghamshire, NG24 2ET. United Kingdom.

Declares that the product:

Description:	Induction Loop Driver
Type Name:	ILD252

Conforms to the following Directive(s) and Norm(s):

Directive 89/336/EEC	
EMC:	EN55103 (1 & 2) 1997
Directive 73/23/EEC	
Safety:	EN60065 (1995)

September 2000

L.A. Pieters
Managing Director
Ampetronic Ltd.