ILD9
INDUCTION LOOP DRIVER

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This symbol is used to alert the user to important operating or maintenance instructions

The Lightning bolt triangle is used to alert the user to the risk of electric shock.

1. INTRODUCTION

The ILD9 Induction Loop Driver has been designed as a very high quality driver for 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 ensure compliance with all technical standards, it is essential that the equipment shall be installed by an individual who is technically competent in professional audio, and who has the necessary installation skills.

In order to achieve acceptable performance with respect to governing standards, the design, selection & installation of the loop layout is a critical part of the loop system. Before this induction loop driver is connected to any loop, the 'Designing induction loops' handbook that accompanies this amplifier must be read, and adhered to.

2. SAFETY INSTRUCTIONS

1- It is important to read these instructions, and to follow them.

2- Keep this instruction manual in an accessible place.

3- Clean only with a dry cloth. Cleaning fluids may affect the equipment.

4- Do not block any ventilation openings. Install in accordance with the manufacturers instructions. See sections 3.3, 3.4 and 6.3 for detailed instructions.

5- Do not install near any heat sources such as radiators, heating vents, or other apparatus that produce heat.

6- WARNING - THIS APPARATUS MUST BE EARTHED / GROUNDED.

7- Only power cords with the correct power connector may be used to maintain safety, Cables such as the UK 13A fused plug, Schuko with earthing contacts and UL approved "grounding type" are acceptable. These must be plugged into power outlets which provide a protective earth.

8- Refer all servicing to qualified personnel. Servicing is required when the apparatus has been damaged in any way, such as a power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to

any rain or moisture, does not operate normally or has been dropped.

9- WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

TO PREVENT ELECTRIC SHOCK DO NOT REMOVE THE COVER. THERE ARE NO USER SERVICABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.

3. UNIT OVERVIEW.

3.1 Terminology used in this handbook.

Slave connections:

This term is used in connection with connectors which permit unusual methods of equipment functioning. This may involve specialised external processors, linking of multiple amplifiers in an array structure, etc. As a general rule, slave connections are only used inside the installed system, and NEVER connect to the surrounding installation.

Compression:

The amplitude range of the input signal to the amplifier can be wide-ranging. Hearing aid users have a reduced range of loudness for an acceptable intelligibility. Thus, changes between loud and soft speech must be corrected for best understanding. While the term compression is used, it actually means a high-performance automatic gain system, which maintains the dynamic structure of a signal such as speech for short durations, but changes the gain to ensure that the ongoing level of the signal is comfortable for the listener. True signal compression must not be used in induction loop systems, as some very modern hearing aids use internal dynamic compression, which is not compatible with external processing.

3.2 Unpacking & Inspection

Inspect the equipment upon unpacking, to ensure that the contents of the shipping carton are not damaged.

3.3 Selection of Installation location

Care must be taken that the chosen location provides satisfactory ventilation for the equipment. The unit may be free standing in open space or 19" rack mounted. The unit is 2U high. For further details of mounting see sections 3.4 & 6.3.

3.4 Ventilation

Enough space must be available to permit free airflow across the equipment, especially the heatsink at the rear of the unit. If the

unit is installed in an enclosed environment, sufficient air flow must be provided through vents, fans or other means. 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 equipment is designed to shut down when it overheats.

When the unit is rack mounted, a minimum of 1U blank space is required both above and below the equipment, especially if this equipment is deeper than the ILD9. See section 6.3 for more details.

3.5 Magnetic Fields

⚠ Ensure that the location chosen is free from significant magnetic fields, as these may affect correct system functioning. The equipment itself generates some external magnetic field which may affect highly sensitive equipment such as microphone preamplifiers.

Note that Audio Induction Loops create a specified magnetic field in the area of the actual loop.

3.6 Layout of the Unit

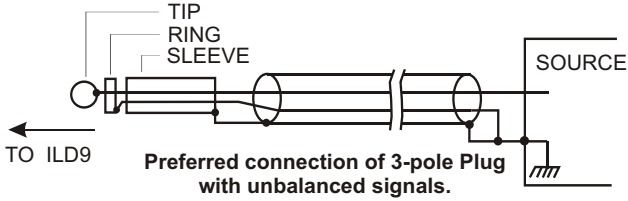
See page 12 of this handbook for the layout of the front and rear panels.

3.7 Back Panel Controls & Connections

AC Power: This is a standard IEC320/CEE22 3-pole connector. The connector housing also incorporates the primary fuse for the equipment. Use the supplied power cable, connected to a appropriate, correctly rated outlet.

Line Input: This input to the equipment is a balanced line high impedance input connection, which also permits unbalanced operation. The connection is made via a 2-pole (unbalanced) or 3-pole (balanced) 6.3mm (¼") jack plug. Unbalanced inputs must use less than 3 metres of cable. The audio signal here is at "line level", which is the normal signal coming from audio mixing desks, and standard microphone preamplifiers.

To prevent earth current loops causing hum effects, it is usually best to use the balanced input mode, even when the input signal comes from a single-ended source. Use 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



Preferred connection of 3-pole Plug with unbalanced signals.

source ground, and the tip to the source signal. If hum is encountered, then the earth link switch on the amplifier can be used to disconnect the amplifier signal circuits from the AC power ground.

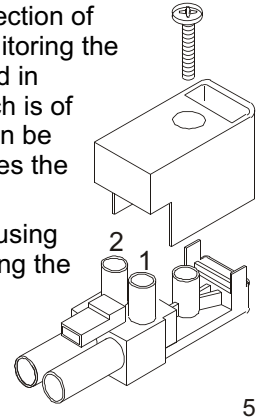
Microphone Input: There is no dedicated microphone input on the ILD9. If this type of connection is required, a Microphone Preamp will be needed to interface with the Line Input (see above). See 5.2 for details of pre-amplifiers.

Slave I/O: The insertion of a 6.3mm (¼") 3-pole jack breaks the link between the input stage / compressor and the loop 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. 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 compression circuit. This compression is essential to the correct operation of other circuits which prevent RFI generation. Cable length from amplifier to processor must be less than 3 metres / 10 feet. Where several amplifiers are used with a combiner for driving very large loops, then the slave output of one amplifier, the master, drives the slave input of all units, such that only one input configuration, and compressor, are used in the total system.

The connection 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. 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.

±15V DC Output : 3 pin power mini DIN socket for connection of Ampetronic accessories such as Phase Shifters and Microphone Pre-amplifiers.

Loop Monitor: This jack socket permits the connection of standard, good quality stereo headphones for monitoring the current in the loop. The headphones are connected in parallel with the loop current sensing resistor, which is of very low value (75 milliohm) and therefore what can be heard at this point is exactly the current which drives the loop.



Loop Output: The loop is connected to the ILD9 using a special 2-way connector, capable of handling the current. Ensure that no stray wires protrude from the individual terminals, which may create unwanted problems. Normally, the polarity of the loop does not matter, except when multiple

amplifiers driving a power combiner, or in a specialised loop layout, where the design information will highlight this requirement. Ensure that the connector is correctly wired, and has the cover securely fastened in normal operation. The cable from the loop to the amplifier must be a twisted pair, to ensure low magnetic fields near the equipment.

Earth Link: The earth link switch enables the equipment to operate in a mode where the actual amplifier is isolated from the earthed chassis, thereby minimizing the problem of circulating earth currents when required to prevent multiple earthing of equipment. The unit is normally operated in the grounded mode.

3.8 Front Panel Controls & Indicators

Power Switch: Located on the front right of the unit for easy access. Disables both poles of the AC supply from the rest of the unit.

Power LED: Located below the Power Switch, this LED illuminates when power is applied to the unit, and the Power Switch is toggled to the On (I) position. Flashes during self test on start-up.

Gain Control: Adjusts the level of signal that is fed into the compressor.

Compression LEDs: These indicate the amount of gain reduction in decibels.

Drive Control: Adjusts the level of peak current that is delivered into the Loop through the loop output.

Current LEDs: Indicates the quasi peak current (A) that is being delivered into the loop.

4. OPERATION & SYSTEM SET-UP

4.1 Start-up Procedure

An internal self test system has been incorporated in the equipment. When switching on, the power LED will flash for some 5 seconds, during which time the amplifier is tested for correct operation. If correct, the unit will then switch to an operational mode, and the LED will remain on without flashing. However, if an amplifier or loop fault exists, or develops during operation, the equipment will return to a safe mode, and the LED will flash continuously. Please contact your equipment supplier or Ampetronic Ltd.

4.2 Initial setting up

During the initial commissioning of the equipment it is essential that the following procedure be used to ensure a satisfactory end result. Turn the 'Gain' and 'Drive' controls fully anti-clockwise, i.e. minimum signal. Provide a continuous input signal, preferably from a small tape or CD player with good quality speech, connected directly to the line input.

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

Switch equipment on. After a short time the green Power LED will stop flashing, indicating that the amplifier is working correctly.

Increase the GAIN until 2 of the compression LEDs are just illuminated under peak signal conditions. This establishes a reference level for the output power driver. Increase the DRIVE setting until the desired output current is achieved. See the Loop Design handbook or Ampetronic recommendation for this current. If no reading is obtained, check for loop continuity. Where the current needed is a value between two LED readings, position the control by interpolating, bearing in mind that consecutive LEDs illuminate at 3dB intervals. Having achieved this setting of the DRIVE, check with headphones plugged into the loop monitor output socket to ensure that a satisfactory sound quality is obtained. If a standard field-strength measuring unit is available, then check that the loop magnetic field has the correct strength. From this point onwards, the DRIVE control will not need re-adjusting, as this only affects the peak field strength. For systems using multiple master/slave configurations, and phased array systems, adjust the output current as defined in the relevant instructions.

Before connecting to the audio system, check the entire sound system for crosstalk from the loop into the audio inputs. Playing a music tape directly into the loop driver, check every audio system channel. If a significant amount of signal is picked up on the relevant input, then check and correct the wiring for defective grounding. 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.

4.3 Optimising the Levels

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 GAIN is adjusted so that the amber OVERLOAD 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 background hum and noise from equipment earlier in the chain, such as a PA system may sound unacceptable when subjected to some 18 - 30dB extra amplification. When this occurs, the gain must be kept at a lower, acceptable 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, then it may be important to keep the compression level low, to

prevent serious degradation of the signal dynamics. Experience will indicate which level to use. REMEMBER: once the DRIVE control has been set, only adjust the GAIN control, as otherwise the correct operation of the system is impaired.

4.4 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 the international IEC standard EN60118-4 and all national derivatives of this standard.

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 ILD9 with metal loss correction set to minimum. Then listen to the loop signal using the ILR2 and adjust the "Metal Loss Correction" to obtain a similar sound quality.

A full plot of the actual response can be made with suitable equipment, using the CMR3 calibrated measuring receiver, in conjunction with suitable signal level measuring equipment. This test is normally done with Pink Noise at full current, or a sine-wave frequency sweep (which must be done at 12dB below normal maximum loop current). Please contact Ampetronic Ltd for further advice.

5 ACCESSORIES

5.1 Rack Mounting

A rackmount kit (RM9) is available for installing the unit in a 19" standard rack. This is fitted using the side screws which retain the covers.

5.2 Microphone Pre-amplifiers

The equipment can be used with separate microphone preamplifiers, which are available in different configurations from Ampetronic (see data sheets for details). The power for these amplifiers can come from the Preamp Power socket. The preamp output is connected into the Line Input socket. To ensure EMC immunity, the connecting cable should be less than 1 metre long, and should be a balanced line connection if possible.

5.3 100V Line

The ILD9 can be connected to a 70V / 100V line system via the ATT100 adaptor. This allows any speaker 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 ILD9 to a low-impedance speaker system.

TROUBLESHOOTING

6.1 General

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. This is often due to faulty wiring, or old wiring standards.

• Electric guitars used in singlecoil 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.

6.2 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.

6.3 Ventilation & Overheating

Section 3.4 indicates the necessity for good ventilation of the equipment. Under unusual load, the heatsink temperature can rise to nearly 90°C / 194°F, and therefore good ventilation is essential to remove up to 150 Watts of heat. Furthermore, provision should be made for restricting the access to the heatsink, to protect people. If the heatsink rises to the indicated temperature, an internal sensor will shut the equipment down until it has cooled to a safe value. In this condition, the equipment appears as if it is switched off, no power indication at all is available.

7. TECHNICAL SPECIFICATION

Line Input:

Impedance 1MΩ each side, 2MΩ differential.
Sensitivity: 7mV to 2.6V rms (-40dBu to +10dBu).
Balanced signal line. 6.3mm (¼") 3-pole jack socket. Can be used

unbalanced with mono plug.
Common mode rejection better than 50dB below 500Hz.

Slave Input / Output

Input Impedance 100kΩ Sensitivity 1V rms, +2.2dBu.
Source Impedance 220Ω Output level 1V rms +2.2dBu.
Signals are unbalanced, with a 6.3mm (¼") 3-pole jack socket used as an insert point. See chapter 3 for connections.

Metal Loss Correction

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

Loop Current & Voltage:

9.6A Peak signal current into a SINGLE TURN loop. Absolute peak current >13A. Metering via front panel LEDs. These LEDs indicate the peak current, with intervals of 3dB, using a PPM type 2 characteristic. Peak output voltage >36V.

Loop Resistance:

Must be less than 2Ω, and greater than 0.3Ω. Consult the "Designing Induction Loops" handbook for fuller details.

Loop Monitor:

6.3mm (¼") 3-pole Jack socket for connecting normal headphones. Output level 0.72 V peak at full rated current.

Compression / AGC:

Compression range 30dB 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.

Frequency response:

80Hz to 6.5kHz ±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.

±15V DC Output:

±15V DC regulated output, up to 0.3A.

AC Power input:

AC 45-65Hz. 160W
Fuse fitted in input connector:
230V AC version: T 1.6AL 120V AC version: T 3.15AL

Dimensions:

Length: 432mm Depth: 220mm Height: 88mm (2U)

Weight: 5.5kg.

Environmental:

Temperature: -10°C to +40°C
Relative Humidity: not exceeding 90%.
Ingress Protection: IP30

8. Warranty Information

This product carries a 5 year parts and labour warranty which could be invalidated if these 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.

9. Declaration of Conformity

Manufacturer:	Ampetronic Ltd.
Address:	Northern Road, Newark,
	Nottinghamshire, NG24 2ET.
	United Kingdom.
Country of Manufacture	England
Declares that the product:	
Description:	Induction Loop Driver
Type Name:	ILD9

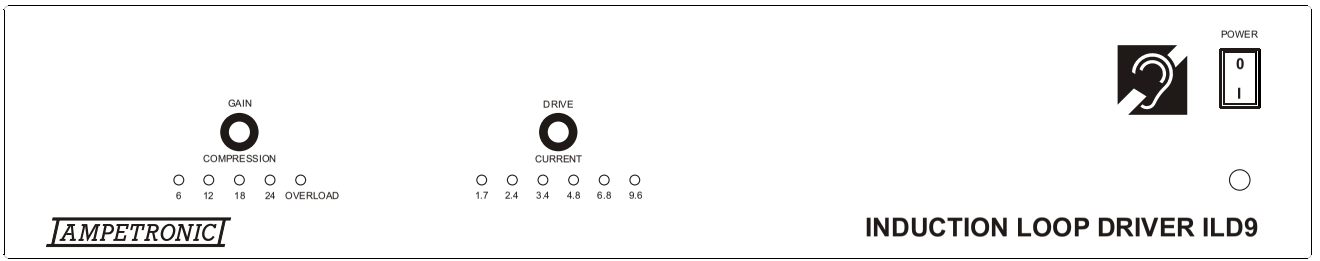
Conforms to the following Directive(s) and Norm(s):

Directive 89/336/EEC	
EMC:	EN 55103 (1 & 2) 1996
Directive 73/23/EEC	
Safety:	EN 60065 (2002)

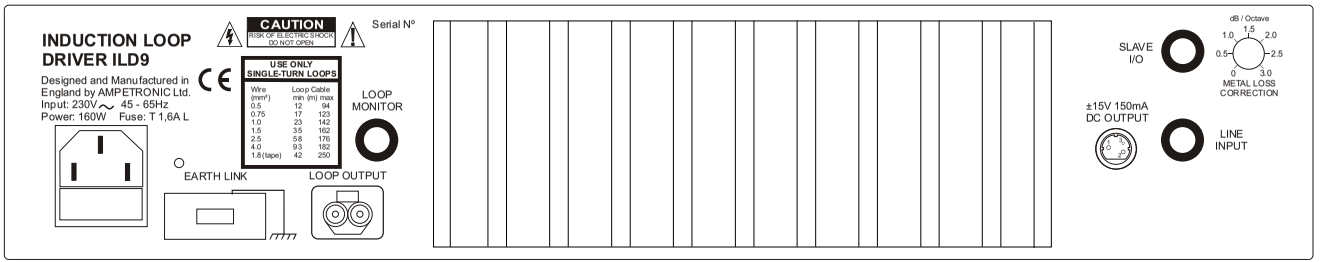
November 2004

L.A. Pieters
Technical Director
Ampetronic Ltd.

FRONT PANEL



REAR PANEL-230V



REAR PANEL-115V