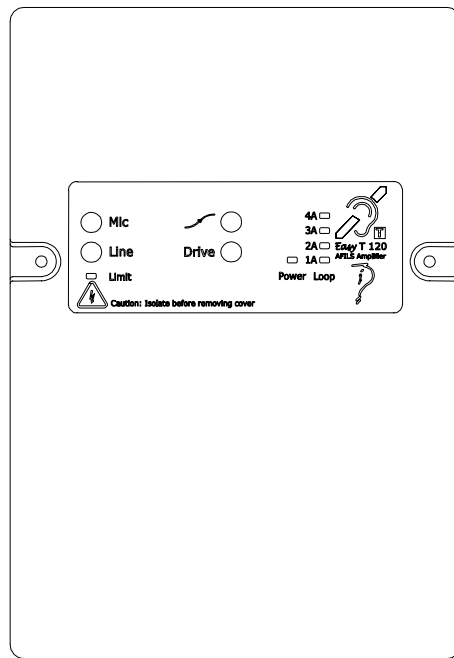


ET120 & ET60

Induction Loop Amplifiers



Installation and Maintenance Manual

Revision 1A - August 2005

**Please Read Carefully Before Commencing
Installation**



Introduction

Induction Loops (AFILS) use a feature provided by all hearing aids (both analogue and digital types) which carry NHS or similar approval or comply with IEC118-1, to deliver high quality sound directly to the hearing aid. The main advantages of AFILS (Loop systems) over other forms of assistive listening devices are the fact that the hearing aid user always carries and maintains their own receiver and the fact that the system is totally discreet.

Suitability

The ET 60 and ET120 are wall mount AFILS amplifiers and are suitable for use in rooms, which require induction loop coverage, such as meeting rooms and reception areas. The ET60 and ET120 are designed to be connected to the mains through a fused spur, and are designed for "24/7" operation.

The ET60 and ET120 are not designed for areas, which need secure or low spill type loop installations, for this we suggest the SecureT amplifier, which is housed in the same type enclosure and provides two drive outputs for low spill pattern loops.

System Design

A basic loop system is quite simple to put together. In fact it is rather like a standard sound system but with the loudspeaker replaced by the induction loop.

Sometimes a public address or sound system may already be installed, or perhaps a more sophisticated arrangement may be planned with inputs from various sources.

Where a satisfactory sound system is already installed the loop amplifier can be fed from the mixer or pre-amplifier stage of the system. This will save on duplication of microphones if these have been well chosen and sited in the first place but still give independent control of signal from the loop.

In the absence of an existing sound system it will be necessary to provide microphones and inputs to the loop amplifier for any other signals. When microphones are to be used it is vital that they are positioned to pick up sound, which is free from reverberation and other noises. If the microphones receive a poor signal then the signal transmitted to the listener will be poor no matter how good the design of the loop and other equipment. It is also necessary to ensure that the microphones are matched electrically to the amplifier so that it is 'driven' adequately when the loop is in operation.

When positioning microphones in rooms, the microphones should be as close to the person speaking as is practicable, for example in a classroom if the microphone is placed in the ceiling in the room centre, the loop microphone will be further away from the speaker than the microphone in the hearing aid of someone sitting on the front row of the class!

Product Overview

The wall mount amplifiers have been designed to be as flexible as possible, and carry a wide range of inputs, there are connections for two types of microphone and two types of line input. Please note only one microphone and one line input may be operated at a time.

The amplifier contains a high quality compressor limiter with a large dynamic range, and metal loss correction to restore the high frequencies in buildings with large metal contents.

Operation

The Easy T loop amplifiers are fully automatic in operation; once commissioned the unit should not be adjusted by the user.

Maintenance.

It is a recommendation of BS7594 that a maintenance procedure is in place for Induction Loop systems, our recommended maintenance schedule should be as follows.


- | | |
|------------|--|
| Monthly: | Using a loop receiver (such as the ETRX) listen to the area covered and check the audio is being heard and is not distorted. |
| Quarterly: | Check all inputs are working individually to the loop, and test quality using the loop receiver. |
| Yearly: | Engineer Call to check system inputs and loop field strength with a calibrated field strength meter, such as the ETFSM. |

Indications and Controls

Indicators

Limit	The AFILS amplifier is receiving a signal at a level where the limiter is starting to operate, this LED should blink on loud peaks in the audio, if it is lit continuously the audio input is too loud and may be distorting the input stage.
Power	Indicates healthy AC mains available.
Loop	A four LED bar graph showing the peak output current from the amplifier it is permissible for the top red LED to light on peaks (when the limit LED lights) but this should not be on permanently, as this may lead to the unit switching off due to thermal protection, and the audio distorting

Level Controls

Mic	Sets the Level of the Microphone inputs.
Line	Sets the level of the Line inputs.
	Metal loss correction to restore the high frequencies in areas containing large quantities of metal
Drive	Sets the output current from the loop amplifier.

Important Safety Information

This Equipment must only be installed and maintained by suitably skilled and competent person.
This Equipment is defined as Class 1 in EN60065 (Low Voltage Directive) and must be EARTHED.



CAUTION	INDOOR USE ONLY
WARNING	SHOCK HAZARD- ISOLATE BEFORE OPENING
WARNING	TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE
WARNING	THIS UNIT MUST BE EARTHED
WARNING	NO USER SERVICEABLE PARTS

Each amplifier unit requires a 3A spur or wiring into a 13A plug top fitted with a 3A fuse, this should be done by a qualified person



Anti-static handling guidelines

Make sure that electro-static handling precautions are taken immediately before handling PCBs and other static sensitive components

Before handling any static-sensitive items, operators should get rid of any electrostatic charge by touching a sound safety earth, such as a radiator. Always handle PCBs by their sides and avoid touching any components. PCBs should be stored in a clean, dry place that is free from vibration, dust and excessive heat.

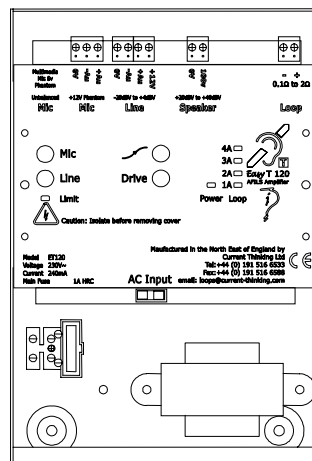
Storing the PCBs in a suitable cardboard box will also guard them against mechanical damage.

Unpacking the Unit

Remove the Unity DAU from its packing, and check the contents against the following list:

1. AFILS amplifier Unit.
2. Installation & maintenance manual (this document)
3. 2.5mm AF Alan Key.

Using the HEX key supplied remove the front cover.



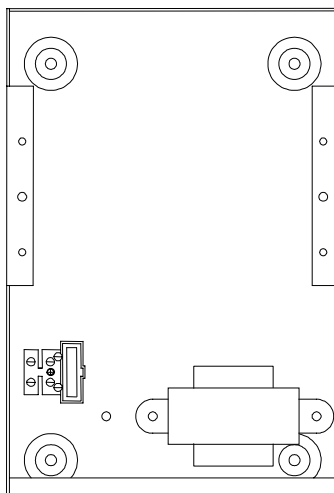
Verify the following items are present:

1. 1 off 3 way Microphone Screw terminal block
2. 1 off 4 way Line Level Screw terminal block
3. 1 off 2 way 100V line Screw terminal block
4. 1 off 2 way Loop Screw terminal block

If there are any Items missing please contact your supplier or Current Thinking Ltd, quoting the unit serial number, and the name on the packing list enclosed so we can rectify the situation.

Preparation

Remove the front panel plate containing the circuit board, first remove the white connecting lead to the mains transformer, then remove the 4 Philips head screws (two on the left, two on the right), Exercise static precautions to prevent damage to the electronics, store the front panel assembly safely until the amplifier is mounted and cables have been attached.



Before mounting the amplifier on the wall it is advisable to remove the cable knockouts. Decide how the wiring will be brought into the panel and remove the required knockouts for cable entry. If a knockout is removed fill the hole with a good quality cable gland. 4 knockouts are provided, 3 on the top face.

On the bottom face a single knockout is for the incoming mains, mains SHOULD NOT enter the box by any other hole. If additional holes are required, then they can be drilled, taking care not to obscure the transformer or PCB locations. Unused knockouts must be left unopened to comply with the LVD (Low Voltage Directive), accidentally knocked out holes should be blanked off. This work must be carried out prior to the re-installation of circuit boards.

Mounting The Amplifier

Before mounting the AFILS amplifier on the wall it is advisable to remove the cable knockouts as described above. The ET120 weighs 3KGs, so care should be taken to securely mount the unit on stud walling.

Connections

All wiring should come into the enclosure via the knockouts provided and be fixed tidily to the relevant terminals.

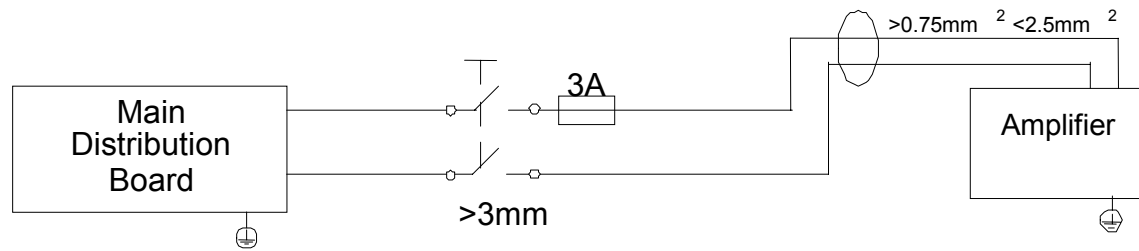
Note that correct cable glanding is essential and due regard should be paid to any system specifications which demand a certain cable type (providing it meets the appropriate national wiring regulations).

Planning The Wiring

All System wiring should be installed to meet the appropriate parts of BS 7671 (Wiring Regulations). Other national standards of installation should be adhered to where applicable.

You must observe local wiring regulations. Do not run SELV and LV cables in the same enclosure without adequate insulation between them.

Mains Connection



Each amplifier requires a 3A spur, or a three-pin mains plug fitted with a 3A fuse, and wired as below:

Brown	Live (L) pin on the Plug and amplifier terminal block
Blue	Neutral (N) pin on the Plug and amplifier terminal block
Green/Yellow	Earth (E) pin on the Plug and amplifier terminal block

Microphone connections

Microphone cables must be run separately from the loop cable, under no circumstances should the cables be tied together for any distance, this will cause magnetic feedback and the unit will not perform correctly.

NOTE ! Only one of the two microphone inputs should be connected to ensure correct operation.

Unbalanced Microphone

The Unbalanced microphone input is presented on a mono 3.5mm Jack connection, and is designed to accept most multimedia computer microphones directly, using the supplied connector. If this needs extending we recommend extending it to no more than three metres, and using a right-angled connecting plug.

Balanced Microphone

The balanced microphone input is presented on a three way two part screw terminal connection, and is designed to accept the microphone cables directly.

The input provides a balanced 12V phantom supply to power electret type microphones such as the ETCM/W and works with most professional microphones, unbalanced dynamic microphones should not be used with loop systems as they will cause magnetic feedback problems.

Connection details

ET120/ET60 Pin	XLR connection
0V	Pin 1 Ground
-AU	Pin 3 Cold
+AU	Pin 2 Hot

Balanced Line Input

The balanced Line input is presented on a four way two part screw terminal connection, and is designed to accept screened audio cables directly. The balanced line input can accept signals from -10dBV (tape level) to +4dBV (professional mixing desk level).

The balanced line input also has an auxiliary 12V output electronically fused at 100mA to power ETOK indicator plates or remote preamplifiers.

Connections

Do not use this input if the 100V line input is in use.

ET120/ET60 Pin	Unbalanced XLR	Balanced XLR	ETOK
0V	Pin 1 Ground	Pin 1 Ground	Power -
-AU	Pin 3 link to 0V	Pin 3 Cold	
+AU	Pin 2 Signal	Pin 2 Hot	
+12V			Power +

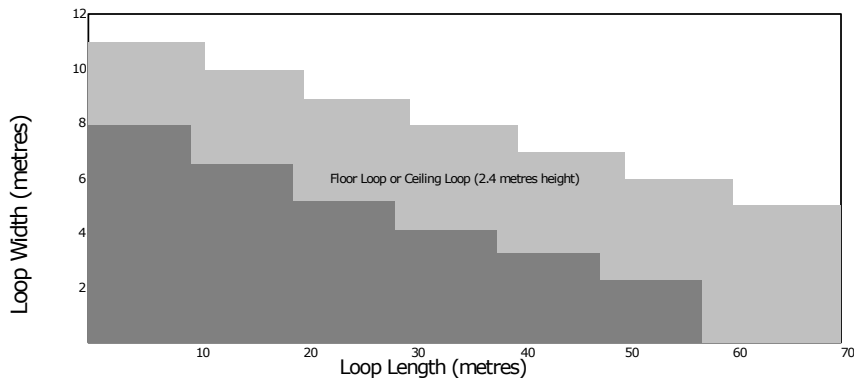
Speaker Line Input

The Speaker Line input is presented on a two-way two-part screw terminal connection, and is designed to accept speaker audio directly. The speaker line input can accept signals from 20dBV (30W 8Ω speaker connection) to 40dB (standard 100V line input).

For most purposes the amplifier can be considered as a speaker and wired as such.

Loop Connection

The area covered by the ET60 & ET120 can be determined from the chart below, if the area to be covered (ET120 light grey, ET60 dark grey) has a high quantity of metal or the loop is placed at a higher level than 2.4M then a larger current will be required (approximately 20% additional current per metre in height)



The amplifiers are designed to drive a single turn loop around the perimeter of the area to be covered, the loop cable should be chosen from the table below, the maximum impedance of the loop cable should be 3Ω when measured using an impedance or LCR meter at 1KHz.

Maximum length (m) Vs Cable Size (mm ²)					
Amplifier	1	1.5	2.5	4.0	ETCF*
ET60	70	80	90	100	90
ET120	90	105	120	140	140

*ETCF copper foil tape is equivalent to 1.8mm² cable but has a lower inductance per metre

Commissioning

Before powering up the amplifier, check all mains wiring and signal wiring, and turn all four controls fully anticlockwise.

Initial setting

An audio signal should be sent to the loop amplifier, either by placing a speaker and sound source of 65dBA near the microphones or by playing calibrated pink noise through the system.

Using a screwdriver adjust the input level for the audio source until the limit LED blinks, repeat the above for each input.

The peak current required for a room with the cable at floor can be obtained from the formula:

$$I=4*A/9$$

Where I= peak current required and A is the length of the shortest side of the loop.

Using a screwdriver adjust the drive control on the loop amplifier until the LED representing the value of I lights. (This gives a good first approximation for the required current).

Final Setting

Using the ETFSM held vertically and at the listening height (ear level) loop users will be at (standing or sitting), measure the field strength in the centre of the room. This should be 0dB peaking at +3dB when the limit LED blinks, if this is not the case adjust the drive control on the amplifier to achieve this level.

Finally walk through the area covered and note the average level of the loop field, adjusting the loop amplifier if necessary so that the average field strength is between -3dB and +3dB over as much of the area as possible. It is also wise to mark on a plan, areas of poor coverage or high background noise so hearing aid users can be directed away from these areas.

Metal Loss Adjustment

Once commissioned, we recommend listening to the loop signal with a receiver such as the ETRX to gain a qualitative measurement of loop audio performance, if the high frequencies are severely attenuated slowly turn the metal loss correction pot clockwise until the high frequencies are restored.

It may be wise to supply the responsible person a loop receiver so they can periodically measure loop operation and record this in a logbook.

Technical Specification (values for ET60 in brackets)

Inputs

Audio inputs 1 off balanced mic or unbalanced mic, 1 off 100V line or balanced line selectable.
 Type 2-part 5mm Screw terminals
 Line Power Aux 12V 100mA for loop OK signs and input pre amplifiers
 Phantom 12V 2mA
 Sensitivity -50dBV Microphone, +40dBV 100V line, -10dBV balanced line.

Mains Input

Voltage 230V ~ 50/60 Hz
 Current 250mA Nominal (180mA)
 Power 90VA Max (60VA Max)
 Internal fuses Mains 1A (F) HBC
 Fuse for Spur 3A

Indication & Controls

LED indicators 1 off input signal limit, 1 off AC present, 4 off loop current 1A, 2A, 3A, 4A (0.8A, 1.5A, 2.2A, 3A)
 User Controls 2x input mixer, Metal loss adjust and current Drive.
 Protection Recessed screwdriver adjust only.

Audio Processing

Metal Loss 0 to 3dB per Octave
 Compressor Variable ratio 1:1 to limit 20:1.
 Attack 10mS
 Release Automatic from 500mS to 1500mS
 Dynamic Range >60dB
 THD <0.25%

Output Stage

Type Current Mode
 Loop impedance 0.1Ω to 2Ω max 3Ω @1.6KHz
 Loop Type Single turn 1mm to 1.5mm CSA (0.75mm to 1mm CSA)
 Peak Current >8A peak (>6A peak)
 125mS burst >4A peak (>3A peak)
 RMS Current 2A @1KHz (1.8A @1KHz)
 Protection DC, Thermal, Short circuit, soft start.

Dimensions

Extents Height 225mm
 Width 160mm
 Depth 80mm
 Weight 1.2Kgs (1Kgs)

Mains Supply 110V operation

The ET60 & ET120 Units are designed and manufactured in the UK by:

**Current Thinking Ltd,
 Unit 91 Silver Briar
 Enterprise Park East,
 Sunderland,
 SR5 2TQ.**

www.current-thinking.com

info@current-thinking.com

