PHOENIX™
PROFESSIONAL-AUDIO

Made in EU

For Systems according to EN 60118-4 IEC 118-4

ENGLISH

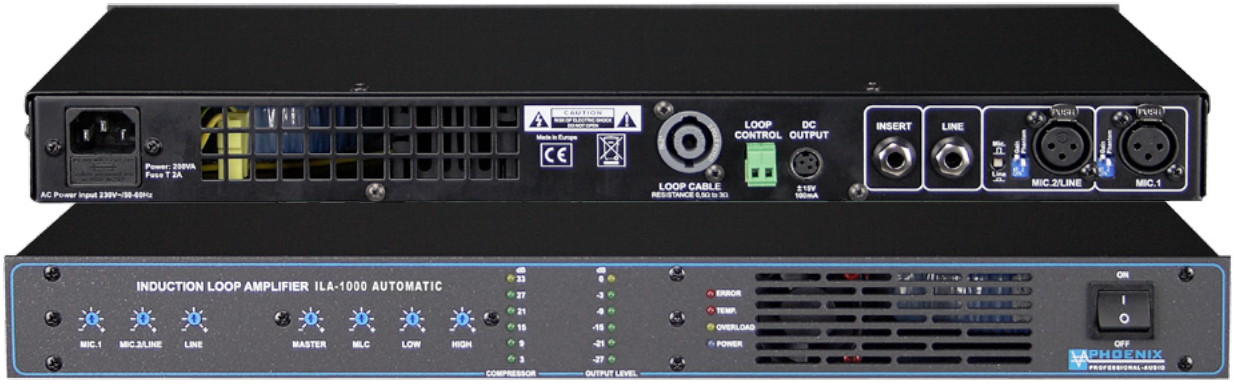
Instruction manual

ILA-1000
INDUCTION LOOP AMPLIFIER

Now with „MLC“ correction for frequency errors, COMPRESSOR, loop impedance monitoring and SPEAKON output jack.

Features:

- Digital automatic audio signal compressor
- Loop detector for automatic measurement and power matching to loop impedance
- Equalization by 2-point LF/HF EQ
- „MLC“ control for frequency error correction
- All controls are recessed and provide protection against incorrect operation



Phoenix Professional Audio GmbH
Gewerbepark Markfeld 5
D-83043 Bad Aibling / Germany
Tel.: +49(0)8061-495603-0
Fax: +49(0)8061-495603-1
www.phoenix-pa.com
www.phoenix-pa.com/shop

DOC-050720

IMPORTANT SAFETY INSTRUCTIONS & SYMBOL DECLARATION

1. Read this manual carefully.
2. Keep this manual in a safe place.
3. Observe all warnings.
4. Follow all instructions.
5. WARNING: To reduce the risk of fire or electric shock, do not expose this equipment to rain or moisture. Do not use this device near water.
6. Clean only with a dry cloth.
7. Do not cover any ventilation openings.
8. Do not install near heat sources such as radiators, air vents, stoves or other equipment (including amplifiers) that radiate heat.
9. Do not override the safety function of the polarity reversal protection or earthing contact plug. A connector with polarity reversal protection has two pins, one wider than the other (USA / Canada only). A safety plug has two pins and a ground terminal. If the supplied plug does not fit into your outlet, it will be outdated and must be replaced by an electrician.
10. Route the power cord so that nobody can step on it or get caught. This particularly applies to plugs, sockets and the point where the cable exits the device.
11. Use only Phoenix Professional Audio GmbH products and specified accessories.
12. Have maintenance performed by qualified service personnel only. The device must always be serviced if it has been damaged in any way, for example, if the power cord or plug is damaged, liquids have been spilled on the product, or objects have fallen into the product, the product has been exposed to rain or moisture, is not working normally, or has been dropped.

EXPLANATION OF GRAPHIC SYMBOLS

The exclamation mark in a triangle is intended to alert the user to the presence of important operating and maintenance instructions in this manual.

The symbol consisting of a lightning bolt with an arrowhead in a triangle is intended to alert the user to the presence of non-isolated, dangerous voltages within the housing that may be strong enough to give off an electric shock.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE THE COVER. USE QUALIFIED PERSONNEL FOR ALL MAINTENANCE WORK.

GENERAL INFORMATION

The ILA-1000 Induction Loop Amplifier for audio transmission is widely used to provide hearing aids with inductive audio signals.

The ILA-1000 Phoenix Induction Loop Amplifier was developed as a high-quality **LOOP amplifier** for medium induction loops.

The system is characterized by its easy installation and customer-oriented operation with optimal performance.

Induction loop amplifiers are very often used in **churches, theaters, outlets, libraries, press rooms, lecture halls, courtrooms, bank counters, interpreter systems or DRIVE IN / DRIVE-THROUGHs** so that hearing aid wearers can hear much better in severe acoustic conditions (background noise, reverberation etc) without disturbing noises.

System advantages: ⚠

Due to the inductive coupling of hearing aids, the useful signal (audio transmission) can be heard much better without disturbing noises. By transmitting an audio signal through the induction loop, an acceptable signal-to-noise ratio is achieved.

Useful Information: ⚠

A purely acoustic, direct sound transmission (between loudspeaker and hearing aid) due to reverberation and background noises considerably worsens the perception of the useful signal by the hearing aid wearer.

Receiver ILA-E: ⚠

The ILA-E Induction Loop Receiver makes it easy to quickly and easily check or maintain a loop system.

The ILA-E loop receiver is used wherever an induction transmission is installed or particularly suitable for people who need a high quality „wireless“ hearing aid without having to use a real hearing aid, such as in channel interpreter systems.

Planning the loop design: ⚠

Not everywhere where it would be desirable acceptable or good conditions for the installation of the induction loop can be found. Therefore, it is necessary in the planning phase to examine a proposed location in terms of the following conditions:

- Magnetic interference of electrical systems, for example, heating systems in the floor or in the roof area and electronic controls of lighting systems (especially in cinemas, theaters, etc.).

- Influence of magnetically or electrically conductive materials in the building structure, especially where the loop is to be laid.

- Presence of other induction loops in the neighborhood whose signals can interfere with those of the scheduled loops.

GENERAL INFORMATION

Unfortunately, it is still common practice to equip 100 V power amplifiers with the additional audio transformer. Such systems are fundamentally wrong, since they have an unfavorable frequency behavior. Such a system configuration increases the inductance with an increasing frequency, so that the high frequencies important for speech intelligibility can no longer be radiated.

Induction loop amplifiers do not have this disadvantage. Therefore, by using dynamic processors and special amplifier technology (constant current source), they are best suited for generating a constant field strength.

Monitoring

All important functions of the ILA induction loop amplifier are monitored.

This means that the ILA-1000 induction loop amplifier monitors its internal power output stage, the functionality of the connected induction loop with a pilot tone pulse. If a monitored function fails, the yellow LED on the front of the induction loop amplifier will not light up and the error contact **„INFO LOOP OK“** [15VDC] will be de-energized.

Compatibility according to EN 60118-4:

The ILA-1000 induction loop amplifier has been designed to be compliant with the EN 60118-4 standard, so that a loop construction according to a „LOOP SEGMENT“ system is made possible.

In a „LOOP SEGMENT“ system, two ILA-1000s always work together to form a magnetic field. As a result, a uniform field strength of the magnetic field is always achieved over the entire area.

The magnetic field outside the intended range loses strength rather quickly and drops to zero. This is done by coupling a **phase shifter FS-1**, which is connected between the two ILA-1000, which in turn generates a signal phase difference of **90 degrees** in the electrical flow through two adjacent induction loops.

Further notes on loop laying with the use of a **phase shifter FS-1** are described in detail in the following chapters.

SAFETY INSTRUCTIONS

Before putting the induction loop amplifier ILA-1000 into operation, we ask you to carefully read the safety instructions.

We ask you to perform the installation according to the following guidelines:

⚠

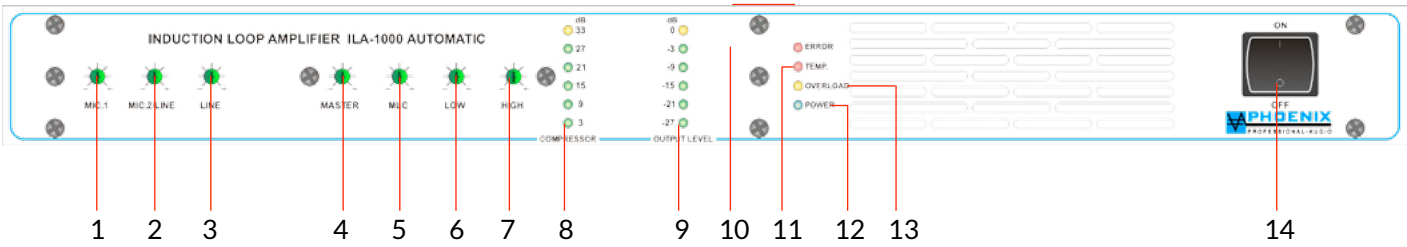
In a highly visible position, an **INDUCTIVE COUPLING** sign should be located near the entrance to the area where an induction loop is installed.

1 - Always place the amplifier on a flat and stable surface.
2 - Choose a dry environment and do not put liquids on the amplifier.
3 - Avoid the proximity of heat sources.
4 - Never open the case of the amplifier without disconnecting the power plug from the socket.
5 - Only connect the device to 230 VAC mains voltage.

KEY FEATURES

- Heat sink with a temperature-controlled fan control
- Short Circuit Protection - Overheat Protection - Open Circuit Protection - Overload Protection and Overload Protection
- LED level display „compressor“
- LED level display „output level“
- LED display loop detector „ERROR“
- LED - display temperature „TEMP“
- LED display overload „OVERLOAD“
- LED display „System POWER-ON“
- SOFT START and MEASURING with flashing „POWER LED“
- Balanced microphone / line inputs
- INSERT PORT Input/Output
- Phoenix connections for LOOP line
- Phoenix connection for LOOP CONTROL
- Separate volume control for all inputs
- Recessed volume controls, LF/HF EQ controls and MLC front panel controls
- Compression LED display 3 to 33 dB
- Output level LED display -27 to 0 dB
- Switchable phantom power (DIP switch on the back)
- Connectable GAIN system (signal increase by + 15dB)
- 19“ brackets can be removed for table version
- Space-saving 1 U housing version
- Monitoring of the loop impedance in the range from 0.5 ohms to 3.0 ohms

FRONT



1.- MIC.-1
This control determines the sensitivity of the **„MIC-1“** input.

2.- MIC.-2/LINE
This control determines the sensitivity (volume) of the **„MIC-2/LINE“** input.

3.- LINE
This control determines the sensitivity (volume) of the **„LINE“** input.

4.- MASTER
This control adjusts the electrical current flow of the loop.

5.- MLC „METAL LOSS CORRECTION“
Regulator for correcting frequency response errors caused by metals near the induction loop.

Useful information: ⚠

Rotate the MLC control to get the best playback / transmission of the audio signal on the induction loop while monitoring the audio signal via the headset with the **ILA-E receiver**. Repeat the measurement procedure for all ILA-1000 induction loop amplifiers or induction loops bound in the system

6.- LOW-EQ filter (+-12dB)
Separate LF control of the individual microphone or LINE inputs.

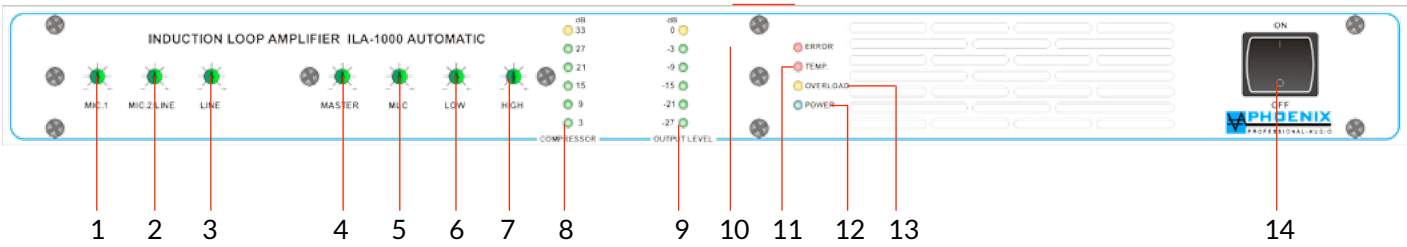
7.- HIGH-EQ filter (+-12dB)
HF-EQ control in the range (+/- 12 dB), HF control of the individual microphone or LINE inputs.

8.- COMPRESSOR
LED display (3 dB to 33 dB)

9.- OUTPUT LEVEL
Output level LED display (-27 dB to 0 dB).

IMPORTANT: ⚠
In the event of a system malfunction **(ERROR LED burning)**, no output level is displayed!

FRONT



10.- ERROR ⚠
Loop impedance fault indication (Impedance not in the range of 0.5 - 3.0 ohms).

IMPORTANT: ⚠
After eliminating the fault, always ***reset*** the loop amplifier ILA-1000 by switching off the amplifier with the POWER button, wait 3 seconds and turn it on again with the **POWER button.**

The measuring cycle (PILOT TONE) is reactivated and the POWER LED flashes..

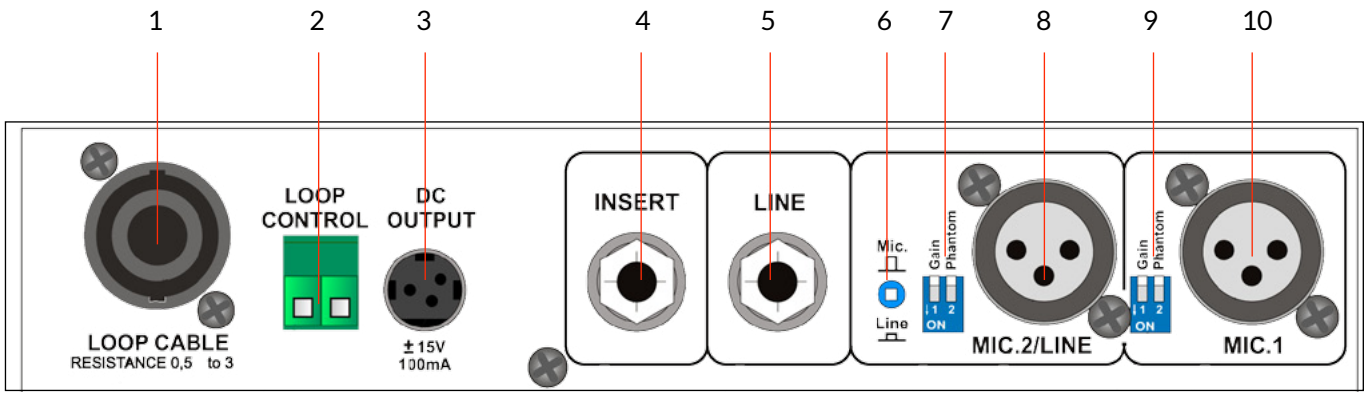
11.- TEMP
Error message display; the amplifier temperature is too high (in this state the amplifier is deactivated)

12.- POWER - Power indicator
State-1 LED flashes, system measurement is in progress and the turn-on delay is active.
State-2 LED is lit, the system is activated and loop impedance measurement is completed.

13.- OVERLOAD ⚠
Overload indicator, LED lights or flashes when overload is detected, the ***LIMITER*** is activated.

14.- ON/OFF - Power switch

REAR SIDE / CONNECTIONS



1.- LOOP CABLE
SPEAKON socket 2-pin, the loop cable should be connected to the terminals (+ pin) and (- pin).

2.- AMPLIFIER/LOOP CONTROL
Fault signaling output 15VDC. The contact remains potential-free, if the amplifier and the induction loop are working without interruption. The contact is supplied with 15VDC voltage as long as there is a system fault or loop fault.

3.- DC OUTPUT (+15VDC/-15VDC)
Balanced output voltage +/- 15VDC, used to connect or power a **phase shifter FS-1.**

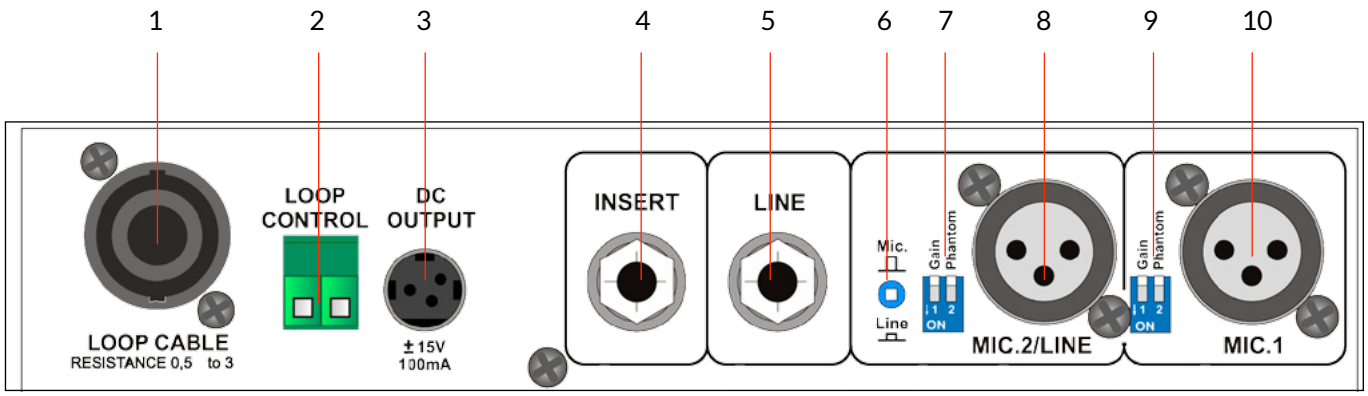
4.- INSERT
The INSERT socket is unbalanced. It is used to connect external signal processing equipment such as additional EQ's or **FS-1 phase shifter**. If the plug is not plugged in or if no additional device is connected to INSERT, the signal path is bridged.

5.- LINE OUTPUT [LINE-OUT]
Balanced audio signal output to JACK socket (0 dB maximum).

6.- MODE-SWITCH MIC.-LINE
This switch determines the sensitivity of the MIC.2/LINE input.
Switchable between microphone level and line level.

Attention:
Always se⚠e correct input sensitivity, otherwise an excessive signal level is reached at the input despite the automatic device (setting on MIC and input signal with LINE level) so that the amplifier can not process the signal properly and the signal is distorted at the loop output

REAR SIDE / CONNECTIONS



7.- SWITCH/DIP Switch GAIN/PHANTOM
DIP-1 (**ON**) — the sensitivity of the input is increased by +15 dB;
DIP-1 (**OFF**) — default sensitivity of input is set;
DIP-2 (**ON**) — the MIC.-2 / LINE input is supplied with 15VDC phantom power for condenser microphones;
DIP-2 (**OFF**) — phantom power is disabled.

8.- MIC.2/LINE INPUT
The input is balanced (+2), (-3), (1-shielding) - see diagram.
The input sensitivity is set on the front panel with separate MIC.2/LINE control and via DIP-1 or MODE-SWITCH.

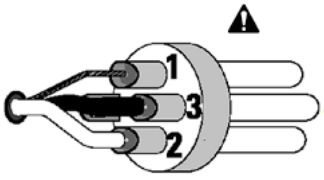
MODE-SWITCH MIC.-LINE
This switch sets the sensitivity of the MIC.2/LINE input between microphone and line level.

DIP-1 (ON) — the sensitivity of the input is increased by +15 dB.
DIP-1 (OFF) — Default sensitivity of input is set.

ATTENTION ⚠
All XLR inputs have a switchable phantom power 15VDC, **DIP-2** (*ON position*).
If unbalanced, dynamic microphones are connected to the audio inputs, a coupling capacitor must be inserted or the phantom power switched off, **DIP-2** *(OFF position)*.

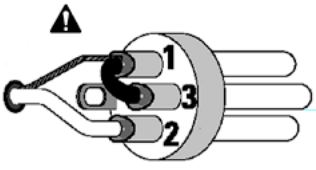
Balanced inputs: Strip the wire conductors by 6 mm and connect them to the terminals as shown. Tighten the screws.

1 GND
2 +IN
3 -IN

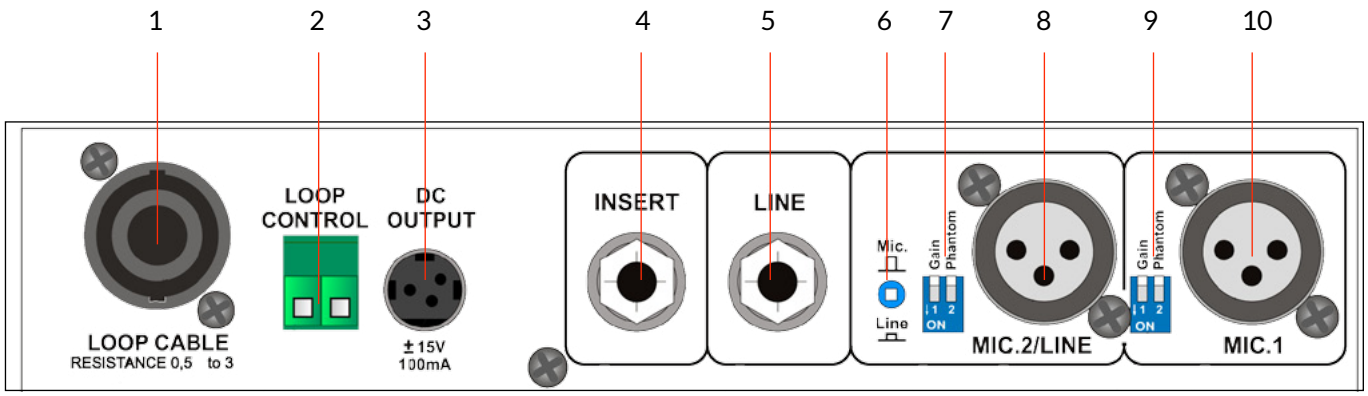


Unbalanced inputs: Strip the wire conductors by 6 mm and connect them to the terminals as shown. The center pin must be connected to the shielding pin as shown. Tighten the screws.

1 GND und wire bridge to 3
2 +IN



REAR SIDE / CONNECTIONS



9.- SWITCH/DIP Switch GAIN/PHANTOM
DIP-1 (**ON**) — the sensitivity of the input is increased by +15 dB;
DIP-1 (**OFF**) — default sensitivity of input is set;
DIP-2 (**ON**) — the MIC.-2 / LINE input is supplied with 15VDC phantom power for condenser microphones;
DIP-2 (**OFF**) — phantom power is disabled.

10.- MIC.1 INPUT
The input is balanced (+2), (-3), (1-shielding) - see diagram.
The input sensitivity is set on the front panel with separate MIC.2/LINE control and via **DIP-1** or MODE-SWITCH.

ATTENTION ⚠
All XLR inputs have a switchable phantom power 15VDC, **DIP-2** (*ON position*).
If unbalanced, dynamic microphones are connected to the audio inputs, a coupling capacitor must be inserted or the phantom power switched off, **DIP-2** *(OFF position)*.

TECHNICAL APPENDIX

In order to also provide users of hearing aids with a perfect sound signal, so-called induction loops are laid. In this case, the signal is transmitted by inductive means of a laid-in-space loop in a receiver coil located in the hearing aid.

The induction loop must be laid in such a way that it encloses the intended area of use. The impedance of the loop is approximately equal to the direct current resistance.

When laying the loop in concrete, PVC protective pipe should be used, UNDER NO CIRCUMSTANCES STEEL TUBE. In the case of difficult structural conditions, a test loop must first be designed and the supply checked.

NOTE: ⚠
Directly above the loop wires the reception is worst, because the field lines run horizontally there.

Wire cross-section	Min. cable length	Max. cable length
0.5 mm²	15 meters	90 meters
1.0 mm²	30 meters	130 meters
1.5 mm²	42 meters	160 meters
2.5 mm²	71 meters	180 meters
4.0 mm²	115 meters	190 meters

CONSTRUCTION SIMPLE LOOP SYSTEM „Single Array System“

A simple induction loop system consists of a LOOP amplifier ILA-1000 and one or more equal size induction loops, see drawing.

Figure 1.1 shows single loop

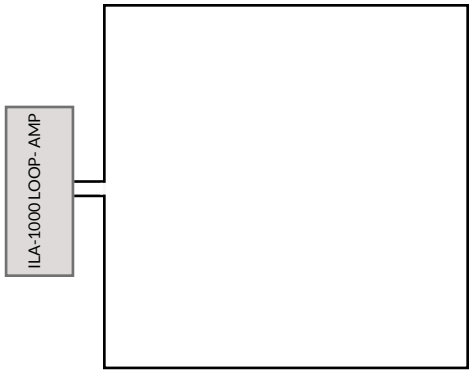
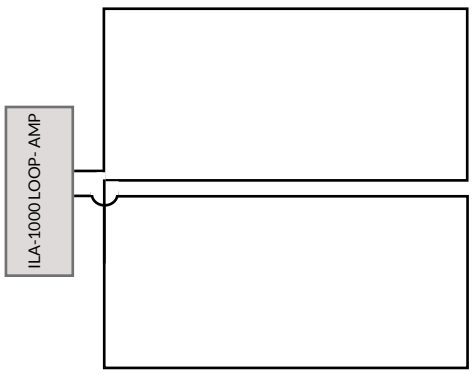


Figure 1.2 shows double loop

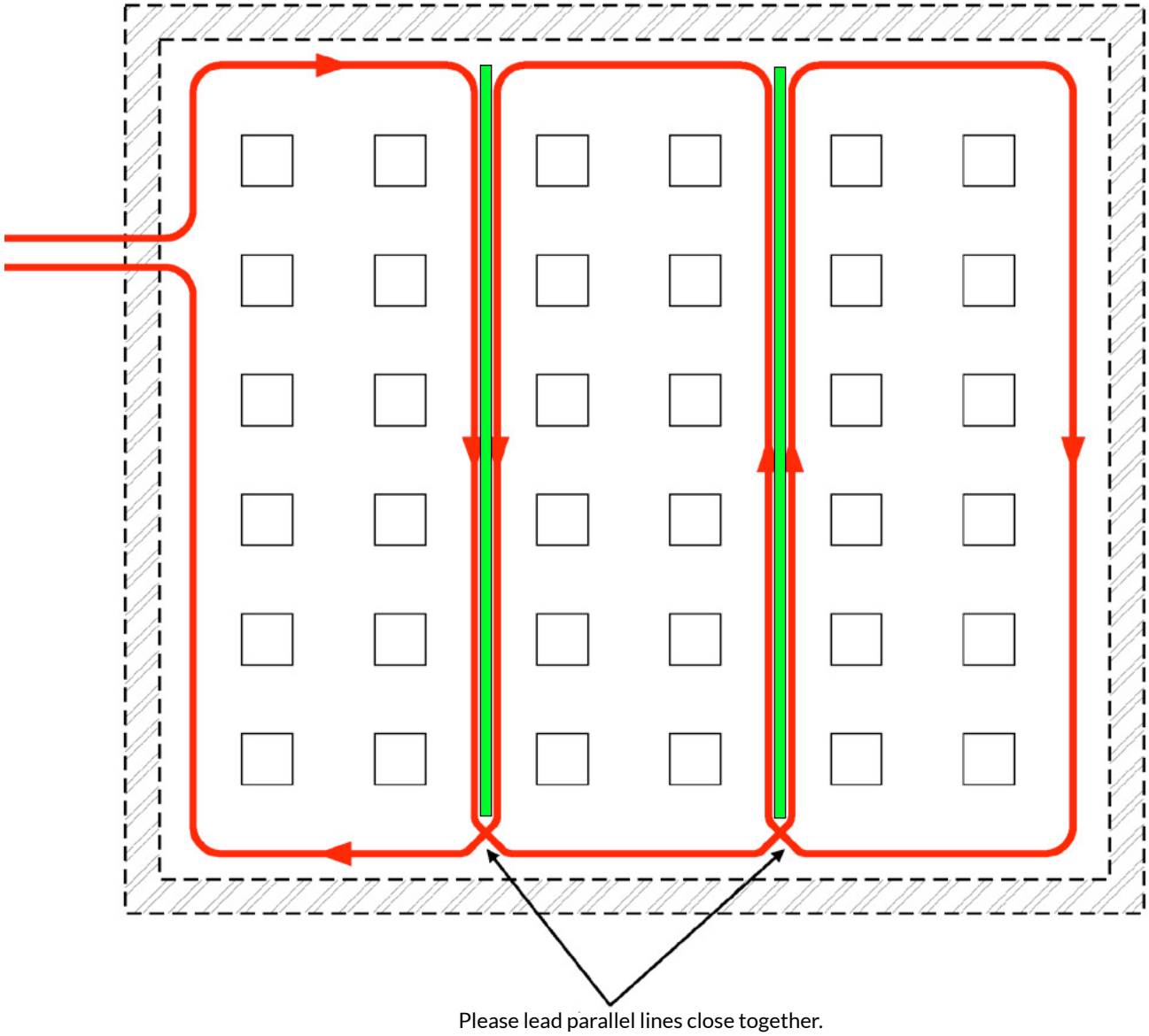


CONSTRUCTION SIMPLE LOOP SYSTEM „Single Array System“

A significantly better result (constant field strength) than with single loops is achieved by laying **LOOP SEGMENT loops**. The individual segments must be the same size, the distances should be between 2 meters and 5 meters. Application examples: rows of seats in the theater, church, schools, etc.

IMPORTANT: ⚠
Disadvantage of a LOOP SEGMENT loop *without* phase shifter:
Wherever two loop lines run parallel, the field strength is equal to „0“! The area of the „0“ field strength can be between a few centimeters to one meter.

IMPORTANT:
Rooms and areas where an induction loop has been installed should be marked accordingly.

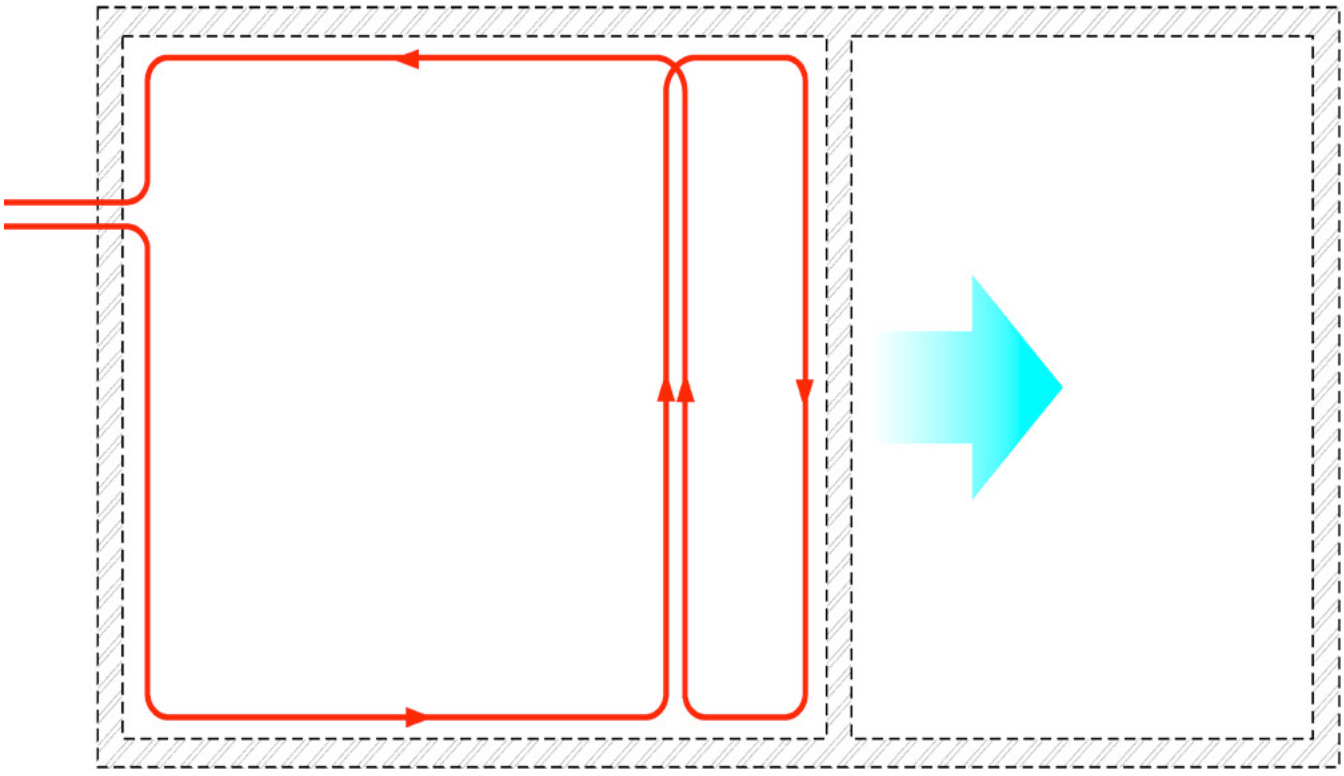


LOOP SYSTEM WITH DELETION OF THE MAGNETIC FIELD

The example shows an induction loop with limitation of the induction field to the adjoining room. The additional limiting loop is mainly used where a space division by e.g. plaster boards has been performed where two independent variable loops are to be processed with different audio signals.

The length of the additional turn of the limiting loop should be in the ratio of about 1:11.
Details are referring to a square space!

IMPORTANT: ⚠ T
Rooms and areas where an induction loop has been installed should be marked accordingly.



LOOP SYSTEM WITH 90 DEGREES PHASE SHIFT according to EN 60118-4

Phased Array System

The best result (constant field strength) is achieved by laying a **„DOUBLE LOOP SEGMENT“** with phase shift. **Compatibility according to EN 60118-4**.

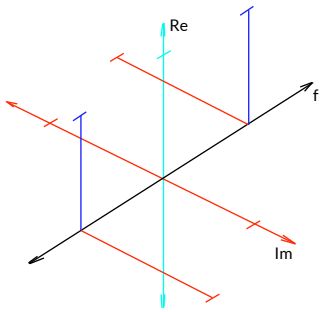
Such double ***LOOP SEGMENT*** induction loops are recommended for large areas and with large induction field influence by metallic objects (walls and floors) in the concrete.

Application examples: large churches, exhibition halls, railway stations, schools, gyms etc.

Since the laying of the double **LOOP SEGMENT** induction loop is associated with quite a lot of effort, this type of induction loops is usually only possible in new buildings or with general renovation of buildings.

The advantage of the **DOUBLE LOOP SEGMENT** induction loop is the up to 4 times lower loss of the induction field **(low power - large area)**.

For dual LOOP SEGMENT induction loops, the audio signal is connected to the first ILA-1000 LOOP amplifier. This in turn supplies the first loop in the system.



Due to the phase modulation, the audio signal is shifted by **90˚ phases** and forwarded to the second ILA-1000. The second ILA-1000 then has to supply the second parallel induction loop throughout the system.
All LOOP segments should be equal and should not exceed ranges of 2 to 5 meters.

Compatibility according to EN 60118-4

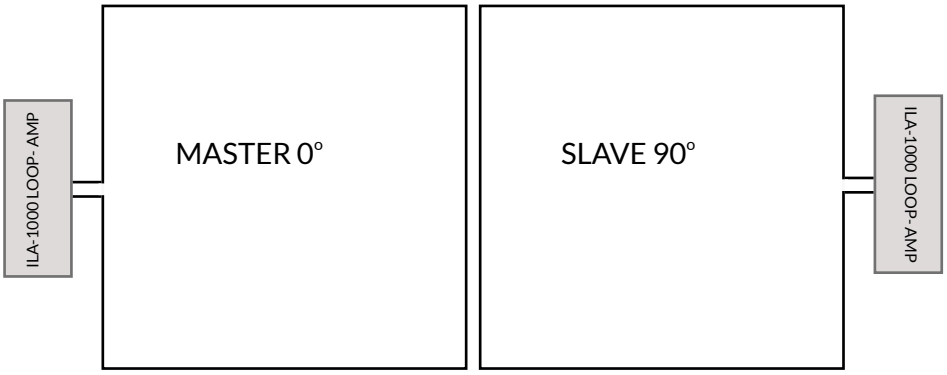
In a „LOOP SEGMENT“ system, two ILA-1000s are always working together to form a magnetic field.
As a result, a uniform field strength of the magnetic field is always achieved over the entire surface.
The magnetic field outside the intended range loses strength rather quickly and drops to zero. This is done by coupling a phase shifter FS-1, which is connected between the two ILA-1000, which in turn generates a signal phase difference of 90 degrees in the electrical flow through two adjacent induction loops.

LOOP SYSTEM WITH 90 DEGREES PHASE SHIFT according to EN 60118-4

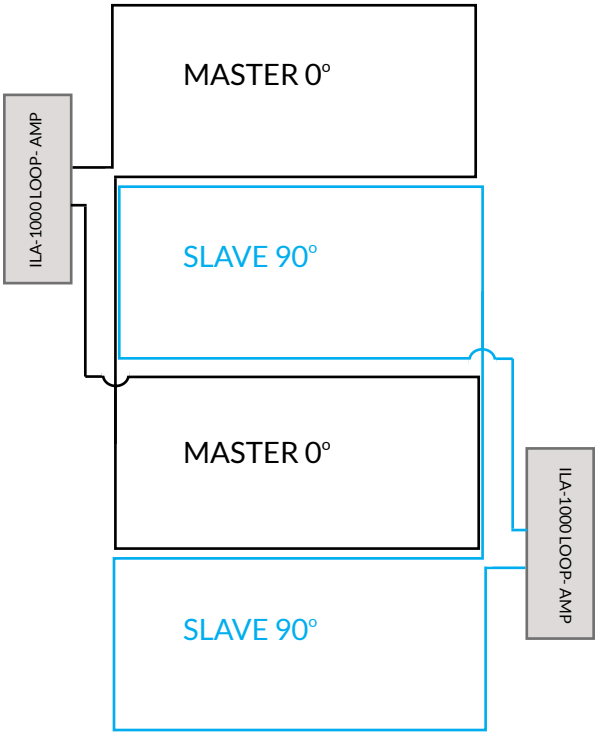
Phased Array System

Example of a simple LOOP SEGMENT induction loop system with two ILA-1000 (MASTER / SLAVE) and FS-1 90 degree phase shifter. It is important that the induction loops are approximately the same size.

System with single loops



System with several loops „COMB-SYSTEM“



LOOP SYSTEM WITH 90 DEGREES PHASE SHIFT according to EN 60118-4

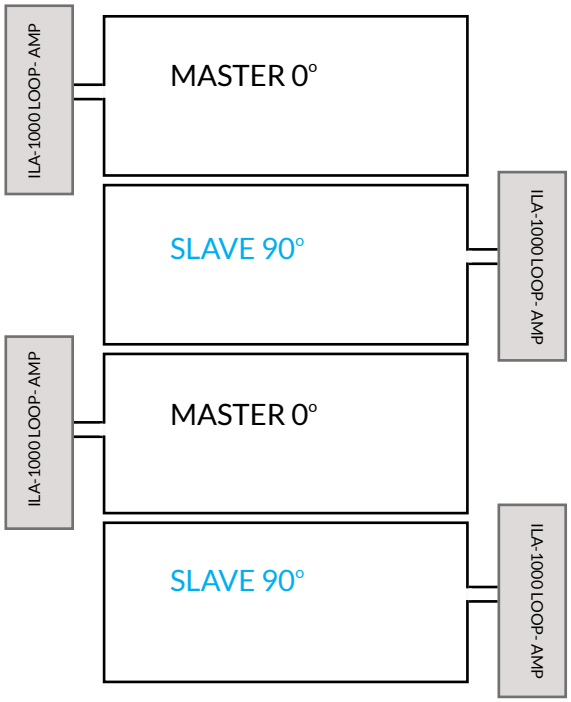
Phased Array System

Example of a multiple ***LOOP SEGMENT*** induction loop system with ***(MASTER / SLAVE)*** configuration to cover very large areas of constant magnetic field strength.

Important information:

It is important that the induction loops MASTER and SLAVE are approximately the same size and have a width of approx. 50 - 66% of the loop length.

System components:
4 x ILA-1000 Induction loop amplifier
2 x FS-1 90° Phase shifters



IMPORTANT:
Rooms and areas where an induction loop has been installed should be marked accordingly.

LOOP SYSTEM WITH 90 DEGREES PHASE SHIFT according to EN 60118-4

Phased Array System

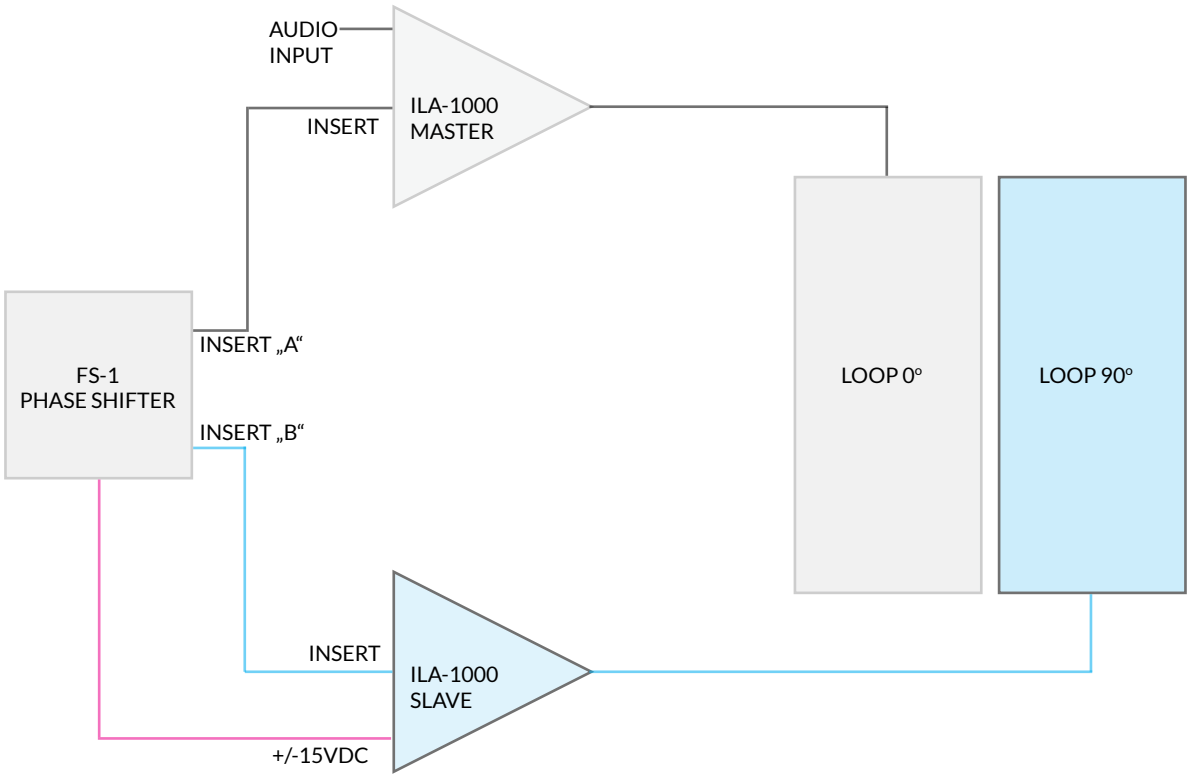
Due to the phase modulation, the audio signal is shifted by 90˚ phases and forwarded to the second ILA-1000 or to the second induction loop. The second ILA-1000 then has to supply the second parallel induction loop in the entire inductive hearing aid system.

The first LOOP amplifier of the entire induction loop system works without phase shift with 0˚.
The first ILA-1000 supplies the first parallel induction loop in the entire inductive hearing aid system.

In a „LOOP SEGMENT“ system, two ILA-1000s are always working together to form a magnetic field. As a result, a uniform field strength of the magnetic field is always achieved over the entire area.

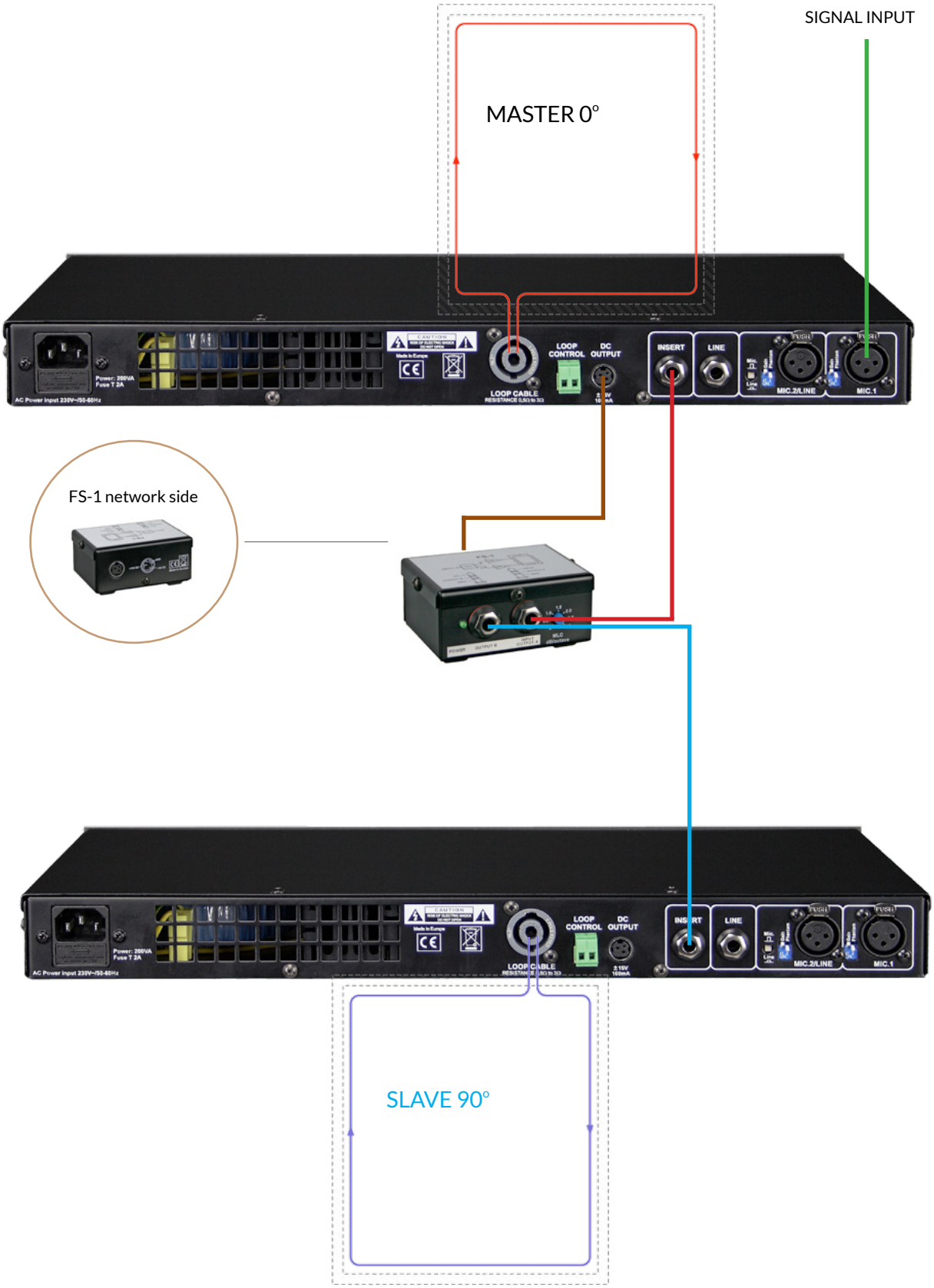
The magnetic field outside the intended range loses strength rather quickly and drops to zero.

This is done by coupling a phase shifter FS-1, which is connected between the two ILA-1000, which in turn causes a signal phase difference of 90 degrees in the electrical flow through two adjacent induction loops.



LOOP SYSTEM WITH 90 DEGREES PHASE SHIFT according to EN 60118-4

Phased Array System



MATHEMATICAL CALCULATION OF INDUCTION LOOPS

Induction loop type calculation: double LOOP SEGMENT

1.- First the room length is set (less 10-20 cm of the total length for other installations).
2.- Please set the preferred segment width (between 2 meters and 5 meters, depending on field loss).
3.- Now the coefficient „X“ can be calculated.

„L“= room length
„S“= preferred segment width

$$X = \frac{L}{S}$$

From the table in column „G“, please take the value closest to the calculated value „X“.
The coefficient values P 1 and P 2 indicate the number of segments for both loops.

Calculation of segment width „A“

$$A = \frac{L}{G}$$

„L“= room length
„G“= value closest to the calculated value „X“

Calculation of the distance between two segments „B“

$$B = 1.6 \times A$$

Calculation of the shift between the two loops „C“

$$C = \frac{B}{2}$$

G	P 1	P 2
2.6	2	1
3.4	2	2
4.2	3	2
5.0	3	3
5.8	4	3
6.6	4	4
7.4	5	4
8.2	5	5
9.0	6	5
9.8	6	6
10.6	7	6
11.4	7	7
12.2	8	7
13.0	8	8
13.8	9	8
14.6	9	9
15.4	10	9
16.2	10	10
17.0	11	10

MATHEMATICAL CALCULATION OF INDUCTION LOOPS

Calculation example:

Space measuring 25 meters x 8.0 meters; the preferred segment width is 3.0 meters.
„X“ should be calculated:

$$X=\frac{L}{S}=\frac{25}{3}=8.3$$

From the table in column „G“ we take a value of 8.2
The coefficient values P 1 and P 2 show:
P 1 =5
P 2 =5

„A“ should be calculated:

$$A=\frac{L}{G}=\frac{25}{8.2}=3.05\ \text{(meters)}$$

Now the exact distance at the beginning of the two loop segments „B“ / „A“ should be calculated:

$$B=1.6 \times A=1.6 \times 3.05=4.88\ \text{(meters)}$$

Calculation of the shift between the two loops „C“:

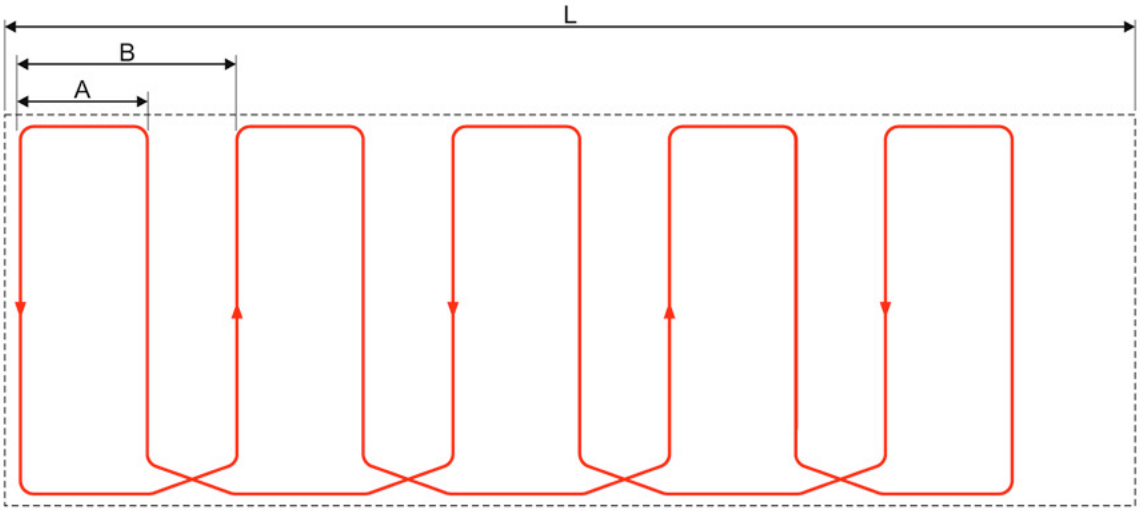
$$C=\frac{B}{2}=\frac{4.88}{2}=2.44\ \text{(meters)}$$

G	P 1	P 2
2.6	2	1
3.4	2	2
4.2	3	2
5.0	3	3
5.8	4	3
6.6	4	4
7.4	5	4
8.2	5	5
9.0	6	5
9.8	6	6
10.6	7	6
11.4	7	7
12.2	8	7
13.0	8	8
13.8	9	8
14.6	9	9
15.4	10	9
16.2	10	10
17.0	11	10

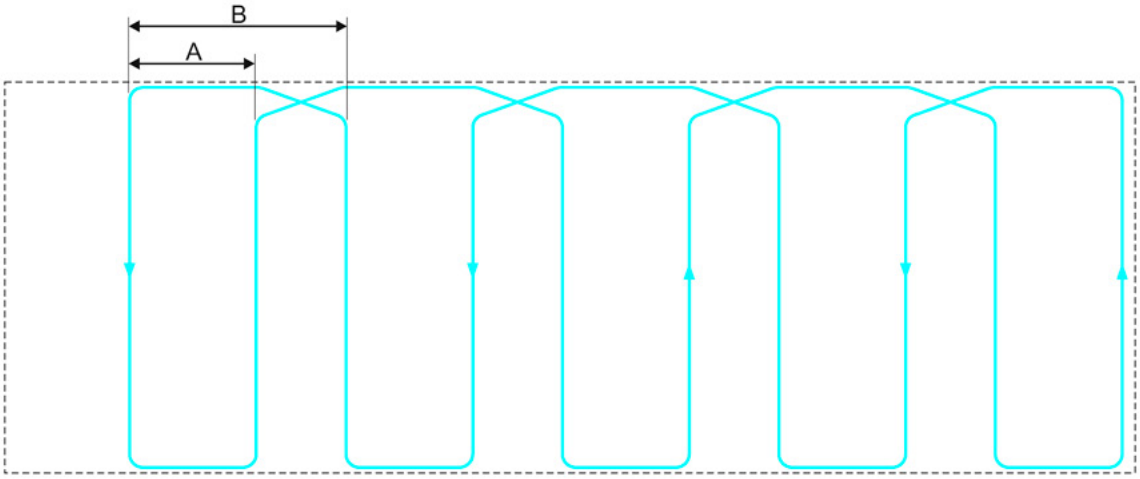
MATHEMATICAL CALCULATION OF INDUCTION LOOPS

Drawings show the laying of the two calculated induction loops from the example calculation.

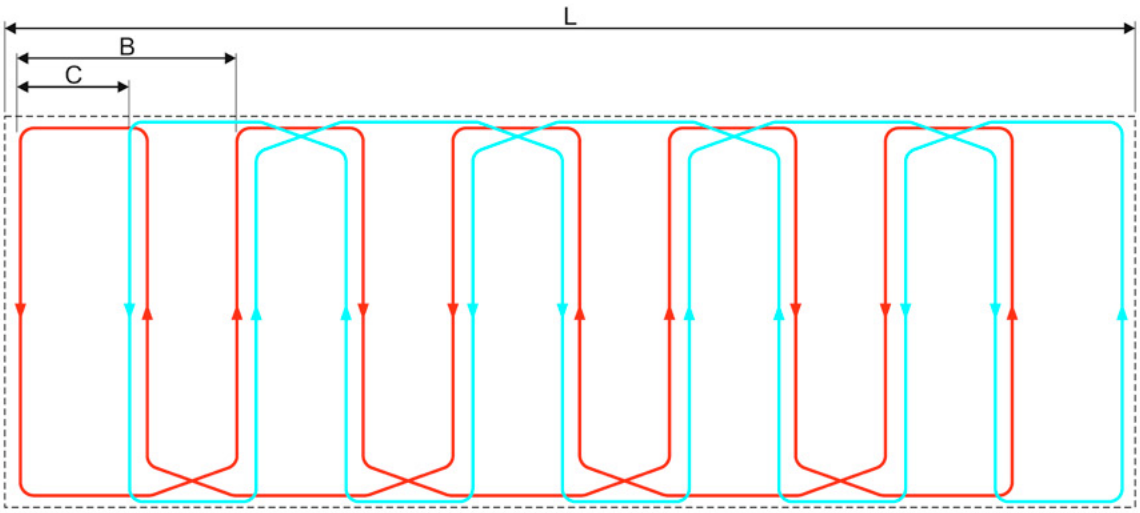
Induction loop no. 1 (the first ILA-1000)



Induction loop no. 2 (the second ILA-1000)

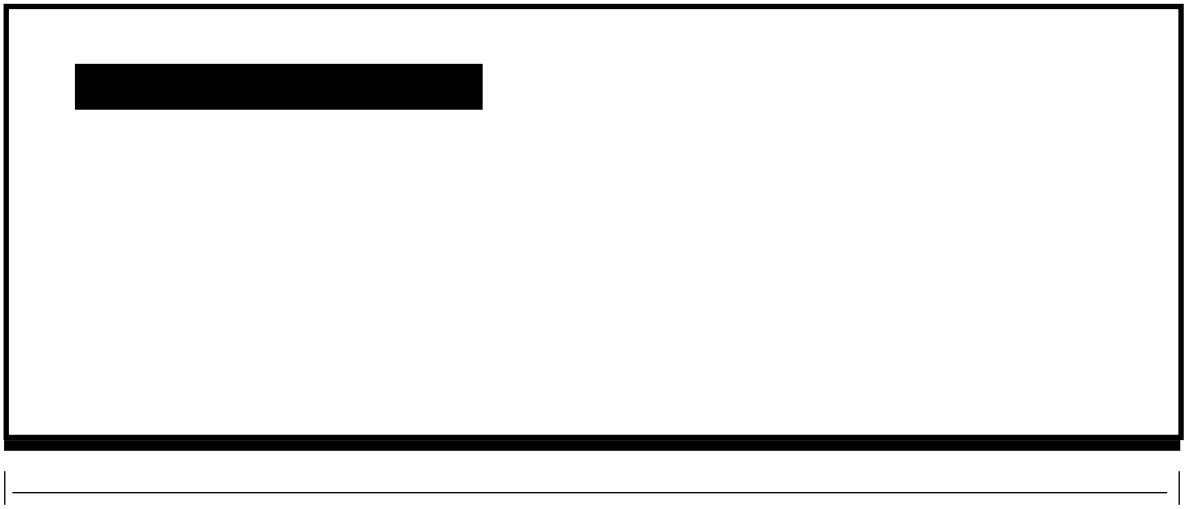


Induction loop „total“ (the first ILA-1000 and the second ILA-1000 induction loop amplifiers in the system)



MEASURE DRAWING

The devices have been developed both as table version and for 19“ mounting.
The matching 19“ mounting brackets are included.
For further details please refer to the technical data.



ACCESSORY: RECEIVER ILA-E

The ILA-E induction loop receiver makes it easy to quickly and easily check or maintain a loop system.

The ILA-E loop receiver is used wherever an induction transmission is installed or particularly suitable for people who need a high quality „wireless“ hearing aid without having to use a real hearing aid, such as in channel interpreter systems.

TECHNICAL DATA

TECHNICAL DATA	ILA-1000 *Induction loop amplifier*
Audio inputs / outputs	MIC.-1, MIC.-2 / LINE, balanced on XLR, INSERT, 0 dB LINE input on JACK
Audio input sensitivity	- 50 / -70 dB MIC. / 0dB LINE
Compressor / limiter	Automatic (3 dB to 33 dB)
Dimensions / color	(W) 443 mm x (H) 44 mm x (D) 205 mm, graphite, without 19" mounting bracket (1U)
Display LEDs	Overload, Output Level (-27 dB to 0 dB), Compressor (3 dB to 33 dB), Error, Temp, Power
Dynamics / frequency response	80 Hz - 7 kHz (-1.5 dB)
Equalization	LF-EQ / HF-EQ (+/- 12 dB)
Freq. Correction at LOOP-OUT	yes, MLC regulation
Induction loops measurement	in the range 0.5 - 3.0 Ohms
Info LOOP / AMP CONTROL	28VDC / 2A, 125VAC / 0.5A
Loop impedance	0.5 - 3.0 Ohms
LOOP Output Power	P max. 135 W
Loop Output Power	Automatic adaptation to the LOOP impedance (9.4 A max.)
Mass	About 4.2 kg
Option	90° frequency modulator, receiver ILA-E available
Phantom Power	switchable 15 VDC
Max. current consumption	300 VA
Power supply	230 VAC - 50/60 Hz
Protection circuits	Current limit (short circuit), over temperature protection, soft start
RMS current (at 1 kHz)	> 9.4 A
Temperature Monitoring	System shutdown at 92C° , system activation at 60C°
THD	< 0.25 %

TECHNICAL DATA	ILA-E *Induction loop receiver*
Battery	2 x 1.5 V type. AA
Colour	black
Connection	Headphone input on mini jack
Control LEDs	For reception strength up to 400mW / m
Controls	Volume & CUT filters
Dimensions	W-67 x H-90 x D-25 [mm]
Display / measurement	Green LED 50mW, Yellow LED 100mW, Red LED 400mW [m / rms]
EN 54-24 number	DIN EN 60118-4
Frequency response	Without CUT filter: 85Hz-6kHz [+ -1dB]
Frequency response	With CUT filter: 400Hz-6kHz [+ -3dB]
Headphone	3.5 mm jack plug
Headphone output	yes, one-ear headphones
Mass	100 gram
Material	plastic
Operating time	about 100 hours
Output	Headphone output with 100mW @ 200 ohms
Output impedance	200 ohms
THD	< 0.25%

Disclaimer
The author points out that the representations, explanations, calculations and the same contained in the directive are merely exemplary in nature. They reflect the current state of knowledge and the current legal situation, but make no claim to completeness. In view of the complexity of construction projects, the development of individual solutions relevant to the respective project is indispensable. Any liability for the descriptions, applications, indications and transmissions of the guideline or individual details or parts of it shall be hereby expressly excluded.

Important notes
The following applies to all pages of this description:
Technical changes and printing errors reserved.
The pictures are similar, color deviations reserved.