



Inductive loop systems: acoustic accessibility and inclusion in public areas

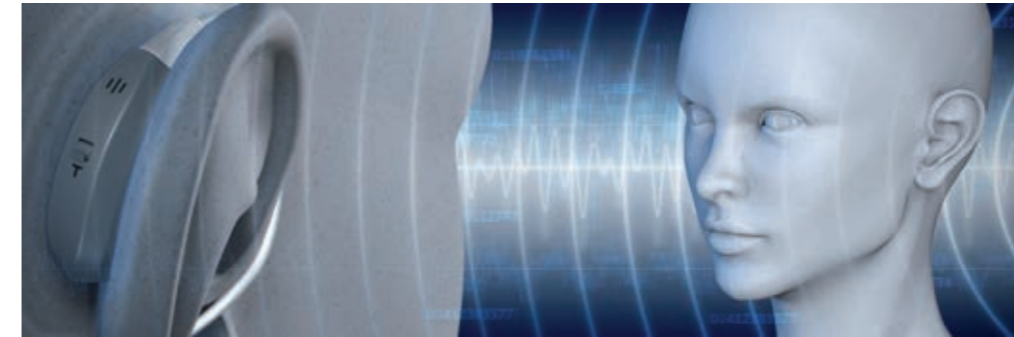
Inductive transmission of audio signals directly to personal hearing devices



AUDIOropa



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Inductive transmission of audio signals directly to personal hearing devices

Acoustic Accessibility: Switch to »T«

A loop system supplies complete rooms with inductive audio signals via a copper cable permanently installed along the outer contour of the according room. The signal processing and feeding is achieved by a loop amplifier connected to an audio source (hi-fi system, microphones, etc.). The power of the amplifier is adapted to the respective specific conditions of the application.

People with impaired hearing, who wear personal hearing equipment like hearing aids and cochlear implants (CI), can receive the audio transmission directly in their systems. The requirement for this is an integrated T-coil in the respective hearing systems, which the wearer can activate by switching the sound reception mode to »T«.

In this way, the sound reaches the wearers of such systems free of unwanted background noise or other »acoustic room effects« – and this with full liberty of movement in the entire supplied room.

A feature of convenience: no special receivers are required. The hearing aid or CI system alone is sufficient.

Areas of application

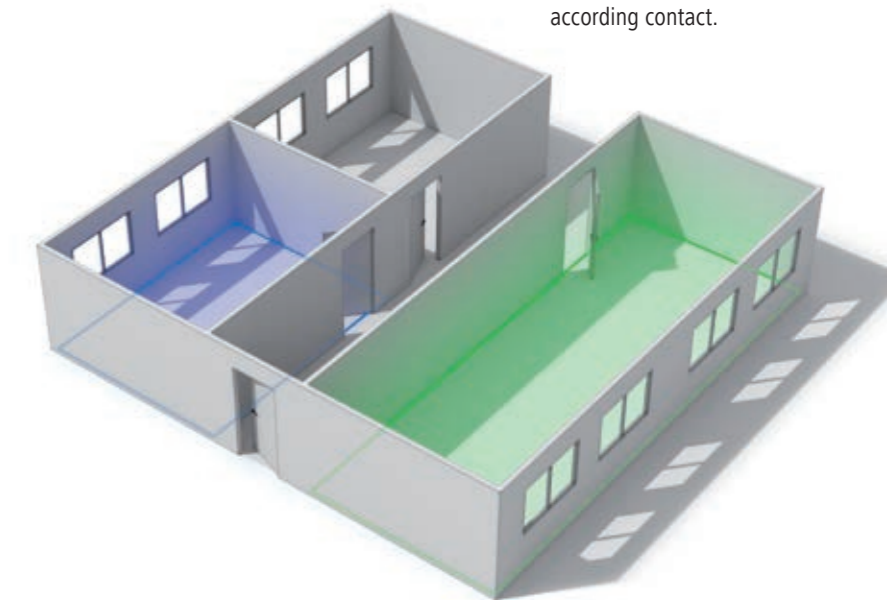
Typical application areas for inductive loop technology are churches, small to medium-sized conference rooms, town halls, auditoriums, theatres and cinemas as well as educational institutions.

Small and compact loop systems are also used in consulting areas, for example in banks or at receptions.

Overspill / Low Overspill

Standard loop systems generate a magnetic field, which usually exceeds the core supply area. This horizontally and vertically acting »overspill« can still be detected three to four loop sizes away. This limits the use of this setup.

Low-overspill systems (LOS) significantly reduce the »overspill« of the magnetic field. In addition, special loop layouts are used, which reduce the signal outside of the loop. In these configurations, for example, two phase-shifted Proloop DCCplus loop drivers are operated at the same time - or a single Proloop LOS driver can be used.



Low-overspill systems (LOS) significantly reduce the magnetic field's »overspill«. This makes it possible to operate loop systems in adjacent rooms without interference between each other.

The accompanying service of the **AUDIOropa partners** offers architects, construction companies and operators of audio systems a package of qualified technology, consulting and service for setting up inductive loop installations.

The consultation package covers all phases, from basic information and project planning up to the final commissioning.

The AUDIOropa headquarters in Weil am Rhein (see back page) will be happy to establish the according contact.



Class-D loop amplifier PROLOOP D5

Highly reliable, resistant against short circuits and with great audio quality: The »PROLOOP D5« provides middle-sized rooms with stable inductive signals. Comfortable controls enable the user to take full benefit of the versatility this system offers regarding its use various rooms and deployment conditions.

The combo-XLR-3 in-port as well as a further phoenix contact are individually configurable:

- a) as audio-in (balanced)
- b) as microphone-in (unbalanced)

A 12-V phantom power feed can be activated for the supply of condenser microphones.

The Automatic Gain Control (AGC) guarantees a constant field strength, a exemplary high stability in sound volume and good sound reproduction. A monitor port allows a direct connection with further loop amplifiers.

PROLOOP D5

Class-D loop amplifier for supplying rooms of up to 300 m²

- Easy to use
- High current output: 5,8 A RMS
- Resistant housing
- Compact build / requires lesser rack space
- Low heat generation
- Active protection against short circuits
- Combo-XLR-3 input and input via phoenix contact, configurable for:
 - ▶ microphone (phantom power)
 - ▶ audio source
- 100V-input for connecting to PA-systems
- Automatic Gain Control (AGC), loop current control
- 6,3mm headphone jack for monitoring audio signals
- Adjuster for metal loss compensation
- Suitable for setting up Low-Overspill-Systems
- 19 inch rack mounting material available as accessory

PROLOOP D5 · Specifications

Item no.: A-4280-0

Power supply:	90-265 V AC 50/60 Hz,
Passive protection:	Fuse 3,15A
Maximum area:	300 m ² according to IEC 60118-4
■ Loop output	
Max. current:	5,8 A RMS
Max. voltage:	48 V peak
Active protection against short circuits	
Automatic Gain Control (AGC):	Maintains a constant level of the audio signal
Frequency range:	100-5000 Hz (± 3 dB)
Distortion:	< 1% at rated power output, 1 kHz
Connector:	Speakon-plug connectors
■ Outputs	
Headphones:	Headphone output (on front face), jack plug socket 6,3 mm
2x Slave Out:	with 0° and 90° phase shift, 6,3mm jack plug socket
FAULT-output:	Device status via potential-free switch contact
■ Inputs	
INPUT 1 and 2:	0,5 mV to 100 mV / 10 kOhm (MIC) or 25 mV to 4 V / 10 kOhm (LINE) phantom power configurable, Combo-XLR-3 socket (INPUT 1), Phoenix contact (INPUT 2)
INPUT 3:	100V-Input for connecting PA-systems
Slave In, 6,3mm jack plug socket	
■ Automatic Gain Control (AGC)	
Dynamics:	up to 36dB
■ Controls and indicators	
Loop current adjustment via rotary control	
Amplification control for INPUT 1, 2 und 3 via rotary control	
Adjuster for the reduction of metal loss	
Indicators:	Loop Error (LED, yellow) Protect (LED, red) Clip (LED, red) ON / OFF (LED, green) AGC/Compression (3 green LEDs and 1 yellow LED) Loop current (3 green LEDs and 1 yellow LED)
■ Housing	
Size:	32 x 144 x 143 mm (H x W x D)
Mounting:	optionally available 19 inch rack fixtures
Colour:	black
Weight:	1,5 kg



Class-D loop amplifier PROLOOP D15

The loop amplifier PROLOOP D15 is specially conceived for deployment in public and commercial installations. The system is actively protected against short circuits and is notable for its high reliability and safety. The PROLOOP D15 supplies rooms up to 1300 m² with steady inductive audio signals of excellent quality.

The combo-XLR-3 in-port as well as a further phoenix contact are individually configurable:

- a) as audio-in (balanced)
- b) as microphone-in (unbalanced)

The microphone mode allows the activation of phantom power for the use of condenser microphones.

The Automatic Gain Control (AGC) guarantees a constant field strength, a exemplary high stability in sound volume and good sound reproduction. A monitor port allows a direct connection with further loop amplifiers.

PROLOOP D15

Class-D loop amplifier for large rooms up to 1.300 m²

- Easy to use
- High current output: 15 A RMS
- Resistant housing
- Compact build / requires less rack space
- High energy efficiency - low consumption
- Low heat generation
- Active protection against short circuits
- Combo-XLR-3 input and input via phoenix contact, configurable for:
 - ▶ microphone (phantom power)
 - ▶ audio source
- 100V-input for connecting to PA systems
- Automatic Gain Control (AGC), loop current control
- 6,3mm headphone jack for monitoring audio signals
- Adjuster for metal loss compensation
- Suitable for setting up Low-Overspill-Systems
- 19 inch rack mounting material available as accessory

PROLOOP D15 - Specifications

Item no.: A-4281-0

Power supply:	90-265 V AC 50/60 Hz,
Passive protection:	Fuse 3,15A
Maximum area:	1300 m ² according to IEC 60118-4
■ Loop output	
Max. current:	15 A RMS
Max. voltage:	48 V peak
Active protection against short circuits	
Automatic Gain Control (AGC):	Maintains a constant level of the audio signal in the connected loop
Frequency range:	100-5000 Hz (± 3 dB)
Distortion:	< 1% at rated power output, 1 kHz
Connector:	Speakon-plug connectors
■ Outputs	
Headphone:	headphone socket (front face), audio jack 6.3 mm
2x Slave Out:	with 0° and 90° phase shift, 6,3mm jack plug socket
FAULT-output:	Device status via potential-free switch contact
■ Inputs	
INPUT 1 and 2:	0,5 mV to 100 mV / 10 kOhm (MIC) or 25 mV to 4 V / 10 kOhm (LINE), 12V toggable phantom power, Combo-XLR-3 socket (INPUT 1), Phoenix contact (INPUT 2)
INPUT 3:	100V-Input for connecting PA-systems
Slave In, 6,3mm jack plug socket	
■ Automatic Gain Control (AGC)	
Dynamics:	up to 36dB
■ Controls and indicators	
Loop current adjustment via rotary control	
Amplification control for INPUT 1, 2 und 3 via rotary control	
Adjuster for the reduction of metal loss	
Indicators:	Loop Error (LED, yellow) Protect (LED, red) Clip (LED, red) ON / OFF (LED, green) AGC/Compression (3 green LEDs and 1 yellow LED) Loop current (3 green LEDs and 1 yellow LED)
■ Housing	
Size:	48 x 216 x 215 mm (H x W x D)
Mounting:	optionally available 19 inch rack fixtures
Colour:	black
Weight:	1,6 kg



Inductive loop amplifier PROLOOP C

The PROLOOP C loop amplifier is designed for the professional use in medium-sized rooms (up to 170 m²) in private buildings and public facilities, in which particularly high dependability and extremely reliable operation are required.

Thanks to being a 100-percent short-circuit-proof amplifier, with switchable, symmetrical XLR input jacks and an extremely stable output performance, the PROLOOP C is able to meet such demands.

Automatic Gain Control (AGC) guarantees consistent field strength and produces steady sound with a special emphasis on clear speech, even under acoustically challenging conditions.

Corresponding test equipment can be used to evaluate the sound quality via the integrated monitor out jack.

Induction loop system kit

The induction loop system kit contains a complete, portable induction loop system designed for rooms up to 140 m² in size. The set includes the PROLOOP C induction loop amplifier as well as two cable reels with 20 metres of loop wire each and the PROLOOP FSM measuring instrument incl. LPU-1 inductive loop receiver. The system is easy to use and ready to go »in a flash« – ideal for temporary installations.

The scope of delivery does not include a microphone; recommended microphones: e.g. table microphone or wireless microphones UHF101 and/or UHF401.

PROLOOP C

Inductive loop amplifier for medium sized rooms up to 170 m²

- High output current: 4.8 A RMS
- Short-circuit-proof
- Automatic fuse reset
- Two symmetrical XLR input jacks
- One RCA input jack
- One line-out jack
- Extra-sturdy jacks
- Dual action AGC for excellent speech recognition
- Very reliable, with assured quality
- Easy monitoring of the magnetic field by using headphones or speakers
- Treble control the compensation of treble loss due to metal reinforcement in walls

PROLOOP C · Specifications

Item no.: A-4246-0

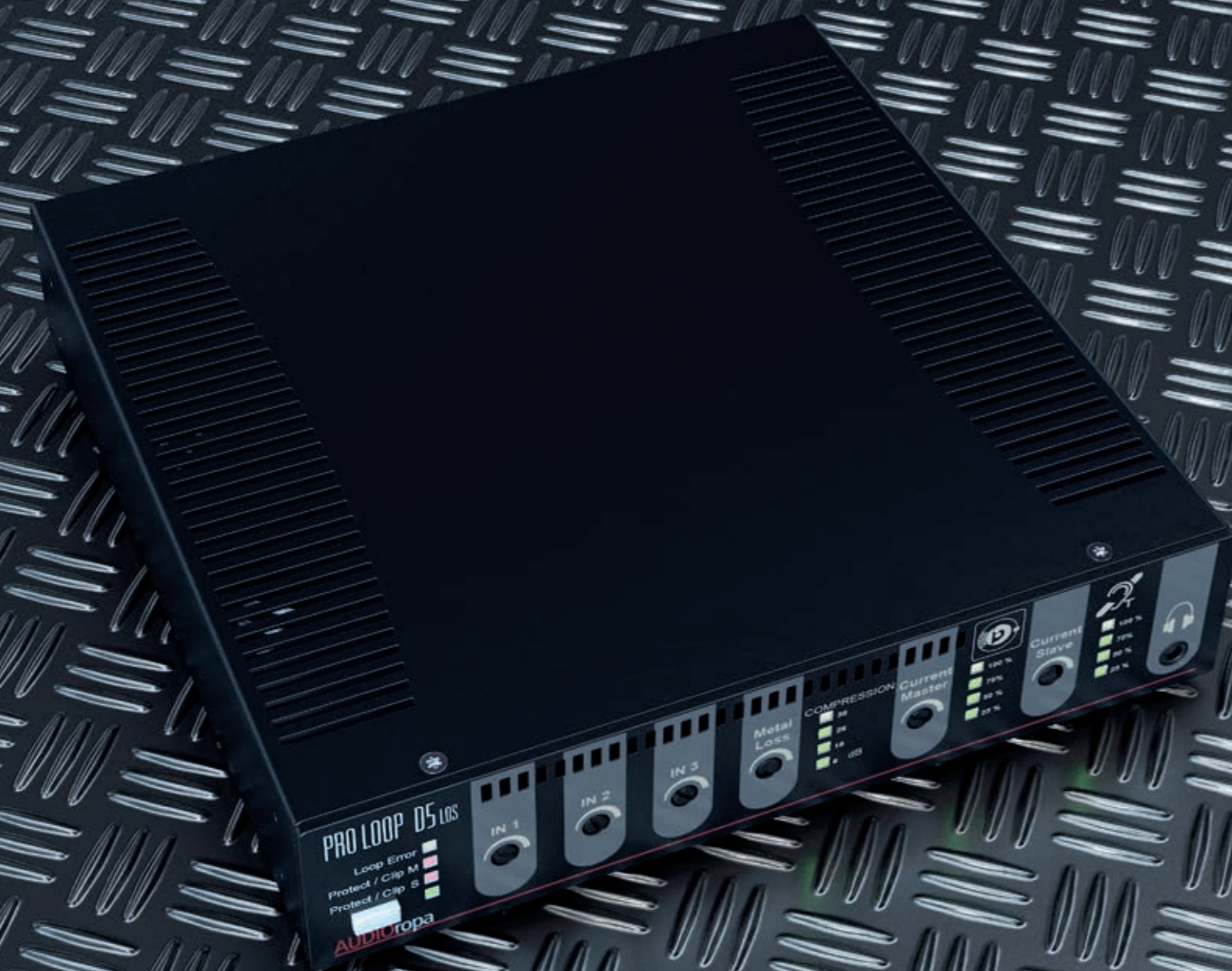
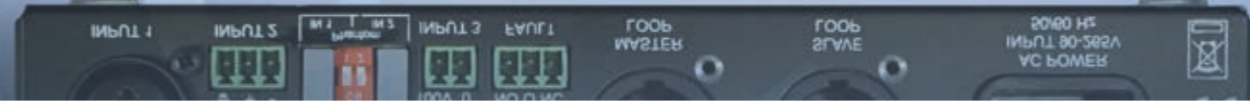
Mains connection:	115 / 230 V AC (main transfer switch) 50 / 60 Hz, 7-200 W, 10 A fuse
Coverage:	170 m ² acc. to IEC 60118-4, single-loop, free field
■ Induction loop output	
Max. current:	4.8 A RMS, 13 A from peak to peak, 1-5 ms, 1 kHz, short-circuit-proof
Max. voltage:	31 V peak
Output AGC:	Sets voltage and power for steady signals like oscillation and sine curves after 0.6-1 seconds to -10 dB. Short pulses and normal program signals are not limited.
Frequency response:	100 - 5.000 Hz (± 3 dB)
Distortion:	< 1%
Cable connection:	Screw connection on rear panel of the amplifier
■ Outputs	
1. LINE OUT:	0 dBm-RCA out (with AGC function)
■ Inputs	
IN 1 and 2:	0.5 mV-100 mV / 10 kΩ (mic.) alt. 25 mV - 4 V / 10 kΩ (line) AGC, switchable phantom voltage, XLR connections
IN 3:	50 mV-10 V / 10 kΩ, RCA connection
■ AGC	
Dynamics:	> 70 dB
Rise time:	2 - 500 ms
Fall time:	0,5 - 20 dB/s
■ Controls and displays	
Treble control:	0 - +9 dB, potentiometer
Induction loop adjustment:	0 - 170 m ² , potentiometer
Displays:	Mains connection: 1 green LED Input level: 1 green LED Induction loop power: 1 green LED
■ Ringschleifenüberwachung	
6,3 mm-Buchse für Headphonesanschluss	
■ Enclosure	
Dimensions:	64 x 295 x 205 mm (H x W x D)
Weight:	3,6 kg
Colour:	black

Induction loop system kit

Item no.: A-4246-0



Induction loop system kit



Class-D Low-Overspill loop amplifier

PROLOOP D5-LOS (Low-Overspill)

PROLOOP D5-LOS, the ready-to-use digital system for setting up digital Low-Overspill-Systems in rooms up to 360 m², incorporates all necessary electronics in a single compact housing. This loop driver is the ideal solution for use in event rooms and larger meeting rooms. Ease of use and according performance reserves enable matching the system to various conditions of spaces and room shapes.

The combo-XLR-3-port and the Phoenix contact at INPUT 1 and 2 can be configured as LINE-IN or microphone-In (balanced). 12 V phantom power can be activated on both both ports for the use of condenser microphones.

In addition, the amplifier has a 100 V input for the connection to according PA- and audio systems. The input amplification can be adjusted on all 3 inputs.

The powerful amplifier is equipped with Automatic Gain Control (AGC), which will provide constant sound and clear voice intelligibility even under difficult surroundings. The sound quality of the Master and Slave loop can be checked via a monitoring port for headphones.

PROLOOP D5-LOS

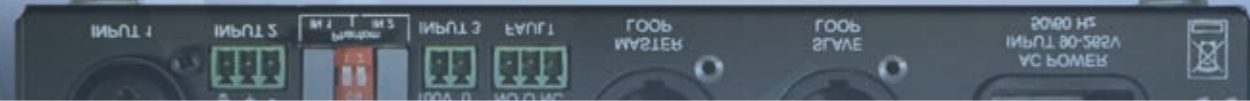
Class-D Low-Overspill loop amplifier for rooms up to 360 m²

- Homogenous magnetic field provision for rooms up to 360 m²
- Significantly lower overspill
- No signal variations when the hearing system user moves his head
- Reduced sensibility concerning steelwork
- Compact build / requires lesser rack space
- High energy efficiency – low consumption
- Low heat generation
- High current output: 2x 5,8 A RMS
- Active protection against short circuits
- 100V-input for connecting to ELA systems
- Automatic Gain Control (AGC), loop current control
- 6,3mm headphone jack for monitoring audio signals
- Adjuster for metal loss compensation
- 19 inch rack mounting material available as accessory

PROLOOP D5-LOS · Specifications

Item no.: A-4285-0

Power supply:	90-265 V AC 50/60 Hz,
Passive protection:	Fuse 3,15A
Maximum area:	360 m ² according to IEC 60118-4
■ Loop output	
Max. current:	2x 5,8 A RMS
Max. voltage:	2x 48 V peak
Active protection against short circuits	
Automatic Gain Control (AGC):	Maintains a constant level of the audio signal in the connected loop
Frequency range:	100-5000 Hz (± 3 dB)
Distortion:	< 1% at rated power output, 1 kHz
Connector:	2x Speakon-plug connectors
■ Outputs	
Headphones:	Headphone output (on front face), jack plug socket 6,3 mm
Monitor output:	jack plug socket 6,3 mm
FAULT-output:	Device status via potential-free switch contact
■ Inputs	
INPUT 1 and 2:	0,5 mV to 100 mV / 10 kOhm (MIC) or 25 mV to 4 V / 10 kOhm (LINE) phantom power configurable, Combo-XLR-3 socket (INPUT 1), Phoenix contact (INPUT 2)
INPUT 3:	100V-Input for connecting PA-systems
Monitor output, jack plug socket 6,3 mm	
■ Automatic Gain Control (AGC)	
Dynamics:	up to 36dB
■ Controls and indicators	
Master-loop current adjustment via rotary control	
Slave-loop current adjustment via rotary control	
Amplification control for INPUT 1, 2 und 3 via rotary control	
Adjuster for the compensation of metal loss	
Indicators:	Loop Error (LED, yellow) Protect / Clip M (LED, red) Protect / Clip S (LED, red) ON / OFF (LED, green) AGC/Compression (3 green LEDs and 1 yellow LED) Loop current (3 green LEDs und 1 yellow LED, each separate for Master and Slave)
■ Housing	
Dimensions:	48x 216 x 215 mm (H x W x D)
Mounting:	optionally available 19 inch rack fixtures
Colour:	black
Weight:	1,6 kg



Class-D Low-Overspill-loop amplifier

PROLOOP D15-LOS (Low-Overspill)

The ready-to-use digital system for setting up digital Low-Overspill-Systems in rooms up to 3.300 m², incorporates all necessary electronics in a single compact housing. Its power, its strong and steady inductive signal and the audio quality make the PROLOOP D15-LOS the ideal solution for event rooms and assembly halls.

The combo-XLR-3-port and the Phoenix contact at INPUT 1 and 2 can be configured as LINE-IN or microphone-In (balanced) ports. 12 V phantom power can be activated on both ports for the use of condenser microphones.

In addition, the amplifier has a 100 V input for the connection to according PA- and audio systems. The input amplification can be adjusted on all 3 inputs.

The powerful amplifier is equipped with Automatic Gain Control (AGC), which will provide constant sound and clear voice intelligibility even in difficult surroundings. The sound quality of the Master and Slave loop can be checked via a monitoring port for headphones.

PROLOOP D15-LOS

Class-D Low-Overspill-loop amplifier for large rooms up to 3.300 m²

- Homogenous magnetic field for rooms up to 3.300 m²
- No signal variations when the hearing system user moves his head
- Reduced sensibility concerning steelwork
- Compact build / requires less rack space
- High energy efficiency - low consumption
- Low heat generation when in use
- High current output: 2x 15 A RMS
- Active protection against short circuits
- 100V-input for connecting to PA systems
- Automatic Gain Control (AGC), loop current control
- 6,3mm headphone jack for monitoring audio signals
- Adjuster for metal loss compensation
- 19 inch rack mounting material available as accessory

PROLOOP D15-LOS · Specifications

Item no.: A-4286-0

Power supply:	90-265 V AC 50/60 Hz,
Passive protection:	Fuse 3,15A
Maximum area:	3300 m ² according to Norm IEC 60118-4
■ Loop output	
Max. current:	2x 15 A RMS
Max. voltage:	2x 48 V peak
Active protection against short circuits	
Automatic Gain Control (AGC):	Maintains a constant level of the audio signal in the connected loop
Frequency range:	100-5000 Hz (± 3 dB)
Distortion:	< 1% at rated power output, 1 kHz
Connector:	Speakon-plug connectors
■ Outputs	
Headphones:	Headphone output (on front face), 6.3mm jack plug socket
Monitor output:	6.3mm jack plug socket
FAULT-output:	Device status via potential-free switch contact
■ Inputs	
INPUT 1 and 2:	0,5 mV to 100 mV / 10 kOhm (MIC) or 25 mV to 4 V / 10 kOhm (LINE) phantom power configurable, Combo-XLR-3 socket (INPUT 1), Phoenix contact (INPUT 2)
INPUT 3:	100V-Input for connecting PA-systems
Monitor output:	6.3mm jack plug socket
■ Automatic Gain Control (AGC)	
Dynamics:	up to 36dB
■ Controls and indicators	
Master-loop current adjustment via rotary control	
Slave-loop current adjustment via rotary control	
Amplification control for INPUT 1, 2 und 3 via rotary control	
Adjuster for the reduction of metal loss	
Indicators:	Loop Error (LED, yellow) Protect (LED, red) Clip (LED, red) ON / OFF (LED, green) AGC/Compression (3 green LEDs and 1 yellow LED) Loop current (3 green LEDs und 1 yellow LED, each for Master and Slave separately)
■ Housing	
Dimensions:	48x 216 x 215 mm (H x W x D)
Mounting:	optionally available 19 inch rack fixtures
Colour:	black
Weight:	1,7 kg



Low-Overspill-loop amplifier PROLOOP LOS

The PROLOOP LOS is a complete system for the operation of low-overspill systems. It includes the complete range of electronics required in a single enclosure. Thus, there is a flexibly sized, reliable low-overspill solution available to serve neighbouring event rooms and assembly halls up to 300 square metres in size.

The system is equipped with Automatic Gain Control (AGC) to produce steady sound with outstanding speech reproduction, even under difficult acoustic conditions. The inbuilt monitor output for the corresponding measurement technology makes it possible to easily and conveniently test the sound quality of the induction loop system.

PROLOOP LOS

for low-overspill applications: trouble-free operation of several loop systems in neighbouring rooms

- Even coverage throughout the room (no dead spots in the middle of the room)
- High output current: 2 x 4 A RMS
- No signal fluctuations when a hearing-aid user moves his/her head
- Reduced sensitivity in respect to architecture-related steel reinforcements
- High efficiency, low power consumption
- 19" design
- Well suited for retrofitted installation in theatres, cinemas, concert halls, schools, conference rooms, housing, etc. (floor reconstruction necessary)

PROLOOP LOS · Specifications

Item no.: A-4252-0

Mains connection:	230-240 V AC 50 Hz, 25-700 W
Coverage:	300 m ² according to IEC 60118-4
■ Induction loop output	
Max. current:	2 x 4 A RMS, short-circuit-proof
Max. voltage:	2 x 31 V peak
Output AGC:	Sets voltage and power for steady signals like oscillation and sine curves after 0.6-1 seconds to -10 dB. Short pulses and normal program signals are not limited.
Frequency range:	100 - 5000 Hz (± 3 dB)
Distortion:	< 1%
Cable connection:	2 screw connections on rear panel of the amplifier
■ Outputs	
Master OUT:	0 dBm, RCA (with AGC function)
Slave OUT:	0 dBm, RCA (with AGC function)
Induction loop monitoring:	Two 6.3 mm jacks for headphone connection
■ Inputs	
IN 1:	Combined XLR / 6.35 mm connector, MIC sensitivity 2.5 mV – 10V RMS / 10 kOhm, LINE sensitivity 37 mV – 10V RMS / 10 kOhm or phantom voltage 9 – 20 V
IN 2:	Dual RCA connections, 45 mV – 10V RMS / 10kOhm
SCART (IN/OUT):	Dual RCA connections, 45 mV – 10V RMS / 10kOhm
■ AGC	
Dynamics:	> 70 dB
Rise time:	2 - 500 ms
Fall time:	0,5 - 20 dB/s Rise and fall times depend on the currently active channel
■ Control and display	
Loop setting:	0 – 300 m ² (with one potentiometer each for master and slave outputs)
Input level:	IN 1 and IN 2 can be adjusted separately
Displays:	Mains connection: 1 green LED Input level: 1 green LED Induction loop power: 2 green LED
■ Housing	
Dimensions (H x W x D):	88 x 438 x 280 mm
Colour:	black
Weight:	9,3 kg



Low-Overspill-loop amplifier PROLOOP LOSplus

As a ready-for use system for operating low-overspill systems in large rooms of up to 1,000 m², the induction loop amplifier PROLOOP LOSplus has all the required electronic equipment in one single casing.

The high-performance amplifier has an Automatic Gain Control (AGC) that also guarantees steady sound with excellent speech reproduction even in challenging acoustic conditions. For sound quality control on the induction loop outputs A and B, the PROLOOP LOSplus has a monitoring output for headphones.

PROLOOP LOSplus

for low-overspill applications in large rooms and halls

- Homogeneous signal supply to rooms up to 1,000 m²
- High output current: 2 x 12 A RMS
- No signal fluctuation when the hearing aid wearer moves the head
- Reduced sensitivity towards architecture-related steel reinforcements
- High efficiency, low power consumption
- 19" model

PROLOOP LOSplus · Specifications

Item no.: A-4254-0

Main connection:	230 V AC, 45-60 Hz, 150 Watt
Passive protection:	Fuse 1,5 A
Coverage:	1.000 m ² according to IEC 60118-4
■ Induction loops output	
Max. current:	2x 12 A RMS, 25.4 A from peak to peak, 1-5 ms, 1 kHz
Max. voltage:	2 x 44 V peak
Output AGC:	Sets the voltage and current for continuous signals such as oscillation and sinus curves to -10 dB after 0.6-1 seconds. Short pulses and normal program signals are not limited.
Frequency range:	100 – 5.000 Hz (±3 dB)
Distortion:	< 1 %
Cable connection:	2 screw terminals on the reverse of the device
■ Outputs	
Slave LINE OUT:	6.3 mm jack plug
Induction loop monitoring:	1 headphone output (left audio channel for induction loop output A and right audio channel for induction loop output B)
■ Inputs	
IN 1:	XLR(F) socket, Microphone input MIC sensitivity 2.5 mV – 10 V RMS
IN 2:	XLR(F) socket, can be switched as a microphone or line input
IN 3:	6.3 mm jack plug
100-V priority input for connection to PA systems	
■ AGC	
Dynamics:	> 36dB
■ Control and display	
Loop setting:	Rotary knob for channel A and B
Input level:	IN 1, IN 2 und IN3 can be set separately
Display:	Main connection: 1 green LED Input level: 6 different coloured LEDs Current: 6 red LEDs per loop channel
■ Housing	
Dimensions:	90 x 430 x 270 mm (H x W x D), 19-inch rack (2 height units)
Attachment:	4 attachment points on the front plate for installation in 19-inch rack
Colour:	black
Weight:	9,3 kg



The **PROLOOP DCCplus** is designed for rooms of up to 1000 m² and is the ideal solution for events and meeting venues.

Each of the two XLR(F) inputs can be configured as LINE (symmetrical) or as microphone input (asymmetrical).

The equipment provides an output of up to 12 A RMS and guarantees secure transmission of audio. The Automatic Gain Control hereby ensures good sound

reproduction at a constant field strength and high stability.

For standard and low overspill supply

Beyond the standard application, the **PROLOOP DCCplus** is also suitable for setting up low overspill loop systems. This requires two **PROLOOP DCCplus** devices. The devices are connected via the integrated jack sockets "Slave In" and "Slave Out".

PROLOOP DCCplus

feeds inductive audio signals into large loops and provides for rooms up to 1000 m² – for low overspill and standard installations

- Simple and safe handling
- High output current: 12 A RMS
- Main transfer switch 115 / 230 V AC
- Active protection against short circuits
- Two XLR(F)-sockets configurable as Microphone input (amplifier setting, phantom feed) or LINE-input (amplifier setting)
- 100-V-priority input for the connection of ELA systems
- Separate treble/bass regulation
- Display of loop current
- 6.3-mm-headphone socket for monitoring the audio output
- Control to reduce metal losses
- Suitable for the set-up of low overspill systems
- 19" rack casing

PROLOOP DCC plus · Specifications		Item no.: A-4264-0
Main connection:	230 V AC, 45-60 Hz, 150 Watt	
Passive protection:	Fuse 1,5 A	
Coverage:	1.000 m ² according to IEC 60118-4	
■ Induction loop output		
Max. current:	12 A RMS, 34 A peak, 1-5 ms, 1 kHz	
Max. voltage :	44 V peak	
Outputs-AGC :	Sets the voltage and current for continuous signals such as oscillation and sinus curves to -10 dB after 0.6-1 seconds. Short pulses and normal program signals are not limited.	
Frequency range:	100 – 5.000 Hz (±3 dB)	
Distortion:	< 1 %	
Cable connection:	2 screw terminals on the reverse of the device	
■ Outputs		
Slave:	SLAVE OUT, 0° - 90° phase shift adjustable, 6.3 mm jack plug	
■ Inputs		
IN 1:	XLR(F) socket, microphone input symmetric, sensitivity 1 mV	
IN 2:	XLR(F) socket, can be switched as a microphone or line input	
IN 3:	SLAVE IN, 6.3 mm jack plug	
100-V priority input for connection to PA systems		
■ AGC		
Dynamics:	> 36 dB	
■ Control and display		
Induction loop setting:	Rotary knob	
Input level:	IN 1 and IN 2 can be set separately	
Display:	Main connection: 1 green LED Input level 6 different coloured LEDs Current: 6 different coloured LEDs	
■ Housing		
Dimensions:	90 x 430 x 270 mm (H x W x D), 19-inch rack (2 height units)	
Attachment:	4 attachment points on the front plate for installation in 19-inch rack	
Colour:	black	
Weight:	9,3 kg	



Class-D loop amplifier LA-70

Small but powerful, the digital loop amplifier LA-70 is made for setting up a loop system for smaller areas like information booths, bank counters and cash areas. The slim size of the device allows for hidden installation and placement within confined spaces. However, the maximum area which can be covered is an impressive 40m².

LA-70 · Specifications

Item no.: A-4216-0

Power supply:	100 - 220 V AC
50/60 Hz 10 VA	
Dimensions (LxHxD):	100 x 50 x 21 mm
Weight:	78 g
Output power of the inductive loop system:	max. 20 W, RMS 2,1 A at 1 kHz, peak output current 3,5 A

LA-70 Set

Artikel-Nr.: A-4217-0

Contents: LA-70, table microphone, small induction loop »Cross-the-counter«

Induction loop amplifier LA-240

The LA-240 can supply rooms up to approx. 70 m² with inductive audio signals via the connected loop. A 40 metre long induction loop cable is included in the package. In addition to the setting options for basic volume and sound, the digitally controlled induction loop amplifier also supports volume stabilisation through the automatic gain control. The device has two audio-input sockets and a digital TOSLINK input.

It is connected to the 220 / 110 V mains grid via an external adapter.

All settings can be also be adjusted by the included remote control.

LA-240 · Specifications

Item no.: A-4221-0

Dimensions (HxWxD)	42 x 180 x 140 mm
Max. Strom:	3 A RMS
Weight	905 g
Colour	silber-metallic
Power supply	12 – 30 V DC via adapter (extern)
Audio input	2x Micro input, 2x Line In, 1x TOSLINK, 1x S/PDIF

■ Accessories

Scope of delivery:	pedestal remote control Power supply unit with supply line and main connection Optical TOSlink cable Cable set for analog audio: 1.2m RCA cable, SCART/Cinch adapter and 3.5mm stereo jack to RCA adapter 40 m loop cable and 1 package with 50 pcs. Cable fixings
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LA-70

Class-D loop amplifier for information counters, cash desks or rooms up to 40 m²

LA-240

Induction loop amplifier for inductive signal supply in small rooms or coaches





Mobile loop system LA-90

»LA-90« is a compact loop system for transmission over short distances, for example at receptions, counters or in sales areas.

Positioned between the speaking person and the listener, the »LA-90« receives the spoken word via a built-in or an optional added connected microphone (e.g. table microphone or EH1205). The inbuilt loop transmits the signals via induction to hearing devices, CI-systems or other induction receivers (e.g. LPU-1). There is also the option of connecting a headset.

The »LA-90-Set« ...

... includes the compact ring loop system LA-90 and additionally contains a table microphone as well as a connected telephone receiver.

The power is supplied by the included rechargeable battery power pack or an external power supply unit.

LA-90

Portable compact loop system, integrating amplifier and loop in a single device – ideal for places of consultation

LA-90 - Specifications

Item no.: A-4209-0

Dimensions (H x W x D)	200 x 185 x 70 mm
Weight	650 g
Microphone sensitivity	bis 60 dB ±3 dB
Power supply	Primary 100-240V 50-60 Hz Secondary 16 V DC or via integrated 12 V 1300 mAh rechargeable battery
Output power	max. 10 W
Cable length	1,8 m

Counter induction loop system LA-90 Set

Item no.: A-4211-0

LA-90 accessories set

Item no.: A-4230-0

Contents: Handset; black insert with holder for handset; connecting lead for handset

LA-90 Set

Counter induction loop system, extended configuration



LPU-1 under-the-chin receiver for inductive audio signals

The LPU-1 takes the signals transmitted by an induction loop system directly to the ears of people who do not wear hearing aids.

The ear buds of the featherweight, ergonomically designed under-the-chin receiver can swivel to stay comfortably fixed in the user's ears even when he/she moves his or her head. The soft flexible material of the ear buds also nestles gently into the auditory canal to effectively subdue ambient noise.

LPU-1 - Specifications

Item no.: A-4276-0

Sound frequency transmission range	70-5400 Hz
Distortion factor	< 1%
Signal-to-noise ratio	60 dB
Maximum volume	120 dB
Weight	55 g

Accessories

Item no.

Silicone earpieces	Please ask for versions and article numbers
Additional battery	A-4970-0
Single-bay recharger	A-4977-0
5-bay recharger	A-4976-0
12-bay recharger	A-4974-0

Aluminium case as transport, charging and storage unit for 10 LPU-1, integrated power supply unit, electrical connection lead-out

A-4183-0



Hearing system CRESCENDO 60

The »Crescendo 60« is a versatile hearing amplifier for TV, radio and conversation. The user receives the sound over the comfortable light-weight underchin headphones and can adjust volume and tone according to his personal needs. The »Crescendo 60« is also suited as a pocket receiver for the inductive audio signals of loop systems.

The CRESCENDO-60-Set contains:

- CRESCENDO 60
- light-weight underchin headphones
- belt clip and carry cord
- external microphone with extension lead
- 2 x 1.5 V batteries for up to 75 hours of use

CRESCENDO 60 - Specifications

Item no.: A-4203-0

Dimensions (H x W x D)	26 x 62 x 95 mm
Colour	white, grey
Weight	110 g
Power supply	2 x Mignon LR6 1,5 V batteries
Underchin headphones	with 1 m lead
Selectable input modes:	Microphone, Line-In, Loop reception

LPU-1 DIR

Inductive loop receivers / under-the-chin receiver

CRESCENDO 60

universal hearing system – also for receiving inductive audio signals



Effective protection against mechanical influences

The wall mounting case for Class D Loop Drivers is specifically designed for use in areas where loop amplifiers require special mechanical protection. This is ensured by the robust steel housing, which does not allow access to the amplifier without special tools.

The protection is particularly effective in schools and public vocational training facilities (classrooms and workshops). The use of inductive loop systems fulfils the legal requirement for the inclusion of the hearing

impaired at these educational institutions. Here the housing withstands vandalism attacks and damage attempts on the part of pupils and trainees extremely effectively.

In addition, the use of the wall mount housing for Class D loop drivers is suitable for all indoor areas where the direct exposure of these devices is not recommended – in this respect it is also ideal for the implementation of acoustic barrier-free zones in corresponding industrial production facilities.

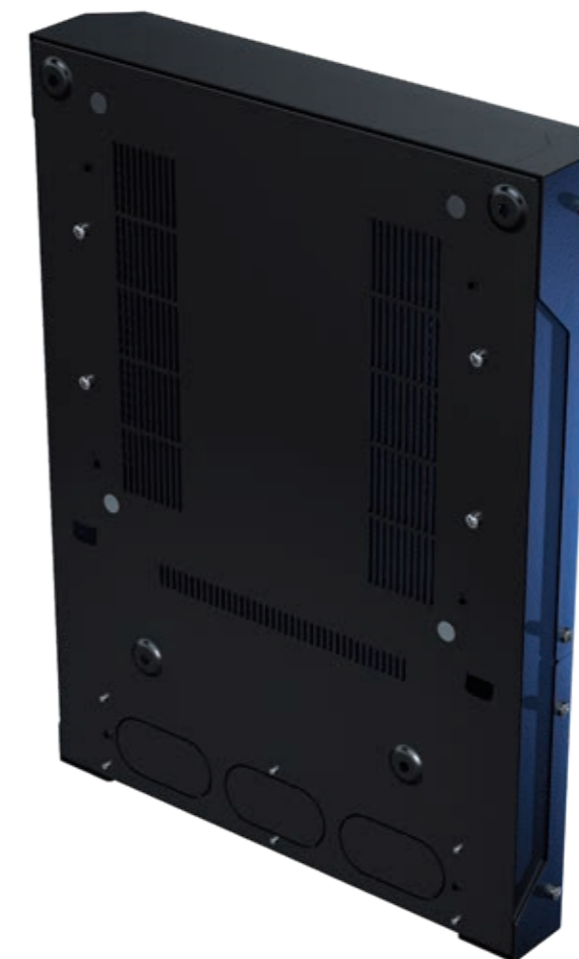
Accessories

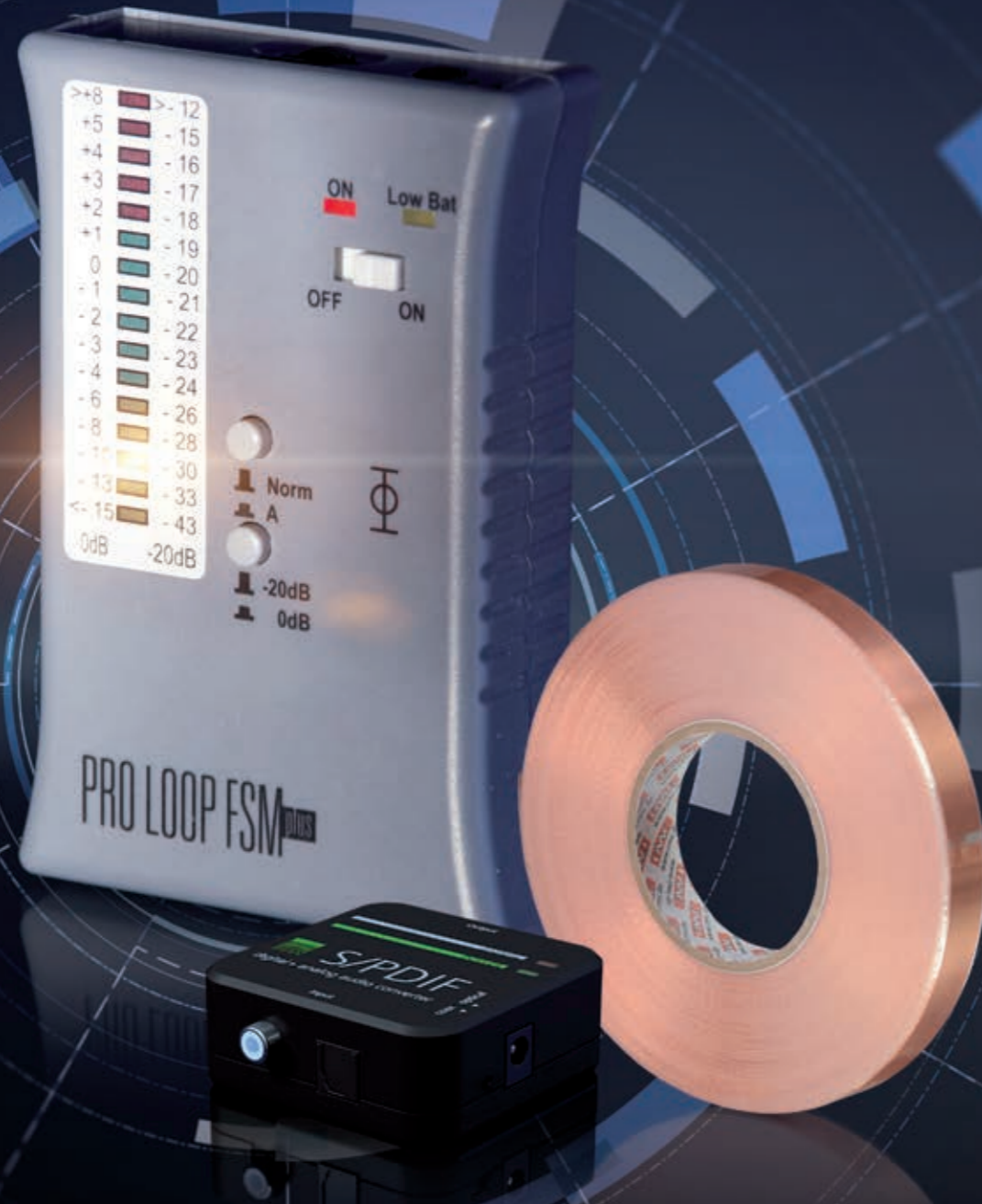
Wall-mounted casing for Class-D loop drivers

Wall-mounted casing for Class-D loop drivers

Item no.: A-4294-0

Suited for Class-D loop drivers	PROLOOP D5 PROLOOP D15 PROLOOP D5-LOS
Dimensions (closed) W x H x D (cm):	261 x 353 x 55
Material:	1 mm steel sheet, coated
Colour:	black
Cable ducts:	through the back plate or underside.





Accessories

The AUDIORopa portfolio includes all hardware needed for the setup of inductive loop systems.

This page presents an excerpt of essentials from the offered accessory components for loop systems.

You can find the complete range of loop conductors, small loops, connection cables, microphones, converters and much more at www.AUDIORopa.com

PROLOOP FSMplus

Measuring device for induction loop systems

Item no.: A-4291-0

The PROLOOP FSMplus is a measuring device, which can register the magnetic field strength of induction loop systems according to IEC 60118-4:2006 and BS 6083, Para. 4. The device delivers reliable RMS values on the output level, response frequency, AGC function (Automatic Gain Control), distortion and background noise in the induction looped tested. In addition, it enables the user to make an acoustic evaluation of the sound using signal reproduction via earphones.

- Compliant with IEC 60118-4:2006 and BS for testing equipment used to evaluate induction loop systems.
- True RMS: 125 ms average time
- Crest factor: 3
- A filter
- Measuring range: +6 dB ...-40 dB (0 dB = 400mA/m)
- Power supply: 2 x 1.5V AA batteries, long battery life
- Display: Battery status control via LED
- Field strength: via LED-scale (approx. 1 dB resolution)
- Headphone jack with volume control

S/PDIF-Box

S/PDIF Audio converter

Item no.: A-4963-0

The S/PDIF converter (operation with power supply unit) converts digital signals of respective audio sources into analogue signals, allowing their further processing by systems with analogue input.

loop cables – insulated

Roll 50 m, 21 x 0,4 mm (cross section 5,4mm²)

Item no.: A-4937-0

Roll 100 m, 21 x 0,4 mm (cross section 5,4mm²)

Item no.: A-4948-0

Roll 100 m, 21 x 0,1 mm (cross section 1,8mm²)

Item no.: A-4949-0

loop cable 10 m, insulated, single-core (cross section 1,5 mm²)

Item no.: A-4296-0

loop cable 10 m, insulated, single-core (cross section 2,5 mm²)

Item no.: A-4297-0

loop cable 10 m, insulated, single-core (cross section 4,0 mm²)

Item no.: A-4298-0

Adhesive loop marking tape

Item no.: A-4949-0

The tape is intended to indicate the location of loop cables and conductors hidden underneath floor materials.



Small »Cross-the-counter« induction loop

Small »Cross-the-counter« induction loop

Item no.: A-4917-0

The small »Cross-the-counter« induction loop for supplying induction loop signals to small areas, such as individual service points or reception desks. The system is installed underneath the table top

Induction loop pad

Induction loop pad for use with LA-70 or LA-240

Item no.: A-4910-0

The »pad« contains a small loop. It is connected directly to the LA-240 or LA-70 induction loop amplifier and placed under the seat cushion or behind the back of a chair.

Marking of inductive signal supply areas

T-Sign, luminescent

Item no.: A-4278-0

Dimensions H x W x D:

18 cm x 15 cm x 4,5 cm

Weight:

360 g

Indication:

LED green or red, depending on the signal strength of the loop.

Signal strength detection:

integrated loop signal strength sensor + external loop sensor

Scope of delivery:

T-sign; power supply -Power supply; wall mounting set with plasterboard anchor, screws and cable ties; external loop sensor (plugged into the loop label); small screwdriver; instruction manual



The percentage of people with impaired hearing is on the increase.

The demographic shift in age has had a decided impact on this development. Hearing loss – even if only slight – can now be detected in every fourth 50- to 59-year-old. Among people over 70, the number who are hard of hearing is already considerably higher at more than fifty percent – with significantly greater hearing loss. The percentage of people in these age groups is also expected to increase in the future.

Right to participation in cultural life

This so-called »50plus Generation« is very active in shaping public life. They represent a group with considerable purchasing power, take advantage of a comprehensive range of cultural offers and use all contemporary media. And they also demand – quite justifiably – unlimited access to information and communication – which constitutes acoustically accessible infrastructures in the broadest sense.

National laws on equality and their implementation

The application of equality guidelines (anti-discrimination laws) is as diverse as the cultural attributes of the individual European states. While far-reaching measures enabling equal treatment are already common in France, the Netherlands, Great Britain and Scandinavian countries, for example, the provision of accessible infrastructures is lagging behind in other countries – as in Germany.

The equal treatment of the disadvantaged and minorities has, however, now become a central concern of the European Union (EU Basic Treaty). In this respect, the consistent implementation of accessible infrastructures – particularly in government offices, but also in restaurants, at event venues and in public transportation systems – will only be a question of time for all EU nations.

Europe's self-image

The EU appeals to all its member states to not discriminate against anyone because of his/her personal situation. Article 26 of the Charter of Fundamental Rights of the European Union, for example, reads: »The Union recognises and respects the right of persons with disabilities to benefit from measures designed to ensure their independence, social and occupational integration and participation in the life of the community.«



The UN Convention on the Rights of Persons with Disabilities

The »United Nations Convention on the Rights of Persons with Disabilities« has been in force since 2008. Article 9 states on accessibility: » To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems...«.

The »United Nations Convention on the Rights of Persons with Disabilities« has been signed by 158 States and ratified by 150 countries. Approximately half of the States Parties - including Germany - have also signed the Optional Protocol. This makes it possible for individuals or groups to open international complaint procedures against non-compliance with the convention.

Technical solutions for accessible sound

In addition to building acoustics and electro-acoustic public address systems (DIN 18041), the following systems can be used for a significantly higher proportion of direct sound:

- Induction loop systems
- Infrared transmission systems
- Radio-frequency transmission systems

In order to ensure that the listening systems provided are effective, it is important to compare the requirements of the venue and its architectural features with the properties of the transmission systems early in the decision-making process. Further information is found in DIN 18040-1 (Restriction-free Building and Construction Part 1: Publicly accessible buildings).

The main advantage of all these systems is that the sound is delivered to the listeners in a pure, undistorted form that is not influenced by the distance of the listeners to the sound source or by any annoying background noise in the room.

The HUMANTECHNIK portfolio

The HUMANTECHNIK program is structured in a cross-system manner and includes components and the complete range of accessories for transmission systems using all three of the physical principles mentioned here.

Special skills or knowledge are often required in the planning, project development and installation of sound transmission systems. That's why we offer system operators and architects a comprehensive consulting and services package in this field. From qualified information to competent support in the planning process and right on up to the installation and first-time operation of the system, we will accompany you every step of the way with our consulting services to ensure the effective implementation of your professional audio transmission system.

The accessible design of public and private infrastructures

The German law for the equality of disabled persons (BGG) defines accessibility as follows: »Buildings and other facilities, means of transport, technical apparatus, systems for information processing, acoustic and visual sources of information and communication facilities as well as all other areas of life are accessible when they are useable by handicapped people in a general way, without any particular difficulty and without necessitating the help of third parties.«

Needless to say, the term accessibility also includes the access of the hearing impaired to acoustic information – starting with such elementary sounds as alarms and emergency signals to educational information and communications and right on up to acoustic participation in cultural and sporting events.

Even contemporary hearing aids are not able to guarantee good hearing and clear understanding in every situation. In noisy environments or in rooms with extreme resonance or echoes, for example, these systems often quickly reach their limits. That's why audio transmission systems that effectively include or supplement hearing aids are now often used, particularly in places where interruption-free communication is important.

These systems feed the sound either directly into a hearing aid or a CI system or make it available to the user via special receivers.





Inductive loop technology: European standard

The technical requirements for inductive loop systems are defined in the European standard DIN EN 60118-4: 2014 (also known as IEC 60118-4) or the German version EN 60118-4: 2015.

This standard, which HUMANTECHNIK inductive loop components fulfil when properly installed, regulates the magnetic field strength and the frequency range of the systems. All induction systems also comply with CE standards. These require strict functional checks of the equipment in regards to the susceptibility to interference, secondary oscillations and electrical safety.

The above-mentioned European standard also points out that areas equipped with inductive hearing systems must be accordingly marked with signs. These signs should be placed in the entrance areas or, in the case of small application zones, directly where wearers of hearing systems can use the offered service.

Planning of ring loop systems: The AUDIOropa system partner network

The planning and implementation of professionally used inductive loop systems requires special qualifications.

Even during the planning of inductive loop systems, quite complex interrelations and influencing factors have to be considered (see also page 31). The aim is to ensure an interference-free, high-quality audio transmission within the areas supplied with inductive signals.

Against this background, Humantechnik, the umbrella company of the AUDIOropa service area, has appointed chosen partners to its service portfolio. These partners are involved in ever growing knowledge and experience, which keeps the know-how about the AUDIOropa system spectrum up to date. In addition, Humantechnik provides these particularly qualified partners with exclusive tools that comprehensively support inductive loop projects in every phase - from basic planning to technical perfection.

Quality assurance

The use of apps, such as the AUDIOropa Loop Designer, helps the system partner not only in planning and component configuration, but also in securing quality and keeping installation standards up to date.

As a web-based application, it allows planners and contractors to jointly coordinate the status of each project at any location - stationary or mobile.

On-site installation is finalized either by the system partners' own installers or by proven integrated companies with specially trained personnel. On-site commissioning the inductive loop systems is carried out by experienced specialists of the system partners or by employees of the AUDIOropa competence centre in Weil am Rhein.

After the handover to the operator, the team prepares a final report on the setup. This records and confirms the set values and parameters and also gives hints at remaining improvement potential, if applicable.

Qualified system partners for the complete service concerning the implementation of professional inductive loop installations.



The Hans-Sachs-Haus in Gelsenkirchen, one of the most attractive town halls in the Ruhr area, is a prime example of restriction-free public spaces.

Here, acoustic accessibility has been comprehensively implemented at a high level – through inductive hearing with AUDIORopa loop systems.

For example, the council hall: Two partial loops, each consisting of a master loop and a slave loop, both operated with a single PROLOOP LOS loop driver, supply the total area of the hall of approx. 400 m².

Inductive hearing

Inductive loop amplifiers convert the output of the audio system into inductive signals and feed it as alternating current into the inductive loops, i.e. into copper cables that are laid in a loop in the floor.

If a wire coil is brought into this magnetic field - for example the T-coil of a hearing aid - a corresponding alternating current is generated within it: without any galvanic connection, the electrical signals are "induced" into the wire coil. Classical hearing aids with integrated T-coils, cochlear implant systems or special induction headphones convert the electric signals and reproduce them as audio signals. One advantage is that the microphone of the hearing systems can also be switched off completely, so that the listeners only hear the output of the audio system - free of environmental noise and free of interference by reverberation or other acoustic influences in the room.

An outstanding example of acoustic accessibility in public spaces: Low-overspill loop systems from the AUDIORopa portfolio in the new Hans-Sachs-Haus, Gelsenkirchen.

The exemplary implementation of restriction-free accessibility in Gelsenkirchen City Hall is not least the result of particularly close cooperation between the municipal building administration, architects, technicians and the coordination office for senior citizens and disabled persons.

In addition to structural measures, an essential aspect here is restriction-free acoustic accessibility. The corresponding media technology, including the integration of inductive loop systems, was realised by the local AUDIORopa system partner.

A special quality feature is the complete and perfect configuration of the rooms. Three LOS systems alone supply the atrium on the ground floor with over 500 square metres. Cable lengths totalling around 670 metres for master and slave loops open up the entire room with highly constant inductive signals. Hearing aid wearers or users of other inductive signal receivers can pass through the atrium, enjoying inductive hearing without even the slightest fluctuations in quality.

In the civic forum, also located on the ground floor, two systems for more than 200 square meters each are installed. On the second floor, inductive loop systems supply the entire council hall, including its gallery, and on the fourth floor several meeting rooms, which are mainly used by committees and parliamentary groups, allow inductive listening.

The systems are active around the clock. This means that whatever is spoken into a microphone in the town hall to be played back via loudspeakers is simultaneously available in the corresponding areas in the form of inductive signals.

The enormous room sizes required the laying of about two and a half kilometers of loop cables, fed by eleven high-tech loop drivers from the AUDIORopa portfolio.

The smallest unit in this context is the compact "LA-90" small loop system. This provides inductive signals over the short distance between the visitor and the consultant in the reception area of the foyer when advising and informing hearing system wearers.

Inductive loop systems for restriction-free acoustic accessibility in public areas: An example

Consultation desk with inductive loop discreetly integrated into the desk body: The range is adapted to the immediate dialogue zone. Customers entering the loop area switch their hearing systems to inductive reception and hear the words of the bank employee, spoken into the microphone, at an individually adjusted volume and without being affected by background noise.



The LA-240 amplifier, visibly positioned on the work surface, converts the words spoken into the microphone into inductive signals and feeds them into a connected ring loop. Users of hearing aids with an integrated T-coil receive the audio signals clearly and free of annoying background noise.



The Uni Credit Bank Austria overcomes acoustic barriers in customer service with loop systems.

Security, trust and discretion have the highest priority in the banking business. The Austrian financial institution, Uni Credit Bank Austria, is the countries' first bank group to render their branches free of acoustic barriers.

At the customer service desks, users of hearing aids and CI-systems can now directly receive the voice of their dialogue partner in their own preferred volume – given that the hearing apparatus is equipped with a T-coil.

Discreet consulting service. No misunderstandings.

At the Uni Credit Bank Austria, the financial counselling of hearing impaired customers can now be as discreet as with people with normal hearing abilities – and misunderstandings on behalf of acoustic inconveniences are almost non-existent: The advisor speaks in normal volume into a microphone, which is connected to the loop amplifier LA-215. This converts the spoken word and directs it into the small »Cross-the-counter« loop, which is mounted beneath the desk top or in the base. This loop configuration, which was used in the first branch office to be equipped in this way, is strictly dimensioned so that its range is limited to one service point only. Users of the according hearing aids activate the T-coils (T-button) and so "hear by induction" – free of other noise and therefore acoustically safe.

Other branch offices use the compact mobile loop system „LA-90“ from the AUDIORopa product range. This system features an inbuilt induction loop and microphone. According to its operational area, the LA-90 can also be used with- or without Plug & Play accessories, like an additional microphone.

For hearing impaired people, who do not own a hearing aid capable of inductive hearing, special sound amplifying underchin induction-receivers are kept ready for use.

The project had been launched by the Bank in early summer 2012 at the Kaisermühlen pilot site in Vienna. After successful operation, the bank gradually equipped the counter areas of all branches in Austria with barrier-free hearing systems by the end of 2015.

Acceptance of the innovation was already very high to begin with – not only on behalf of the customers but also from the bank's employees. These emphasize on the easy operation of the systems. The routine maintenance does not involve more than switching the loop amplifier on and using the underchin receiver for a sound check.

By implementing »barrier-free acoustics for inclusion«, the bank has set an effective signal for consequent customer orientation. This results also in a gain of image.

Component versatility

Depending on the infrastructure and interior design, the bank was able to fall back on a wide variety of configurations and systems within the AUDIORopa portfolio: Mobile inductive compact system LA-90 or LA-90-Set, loop amplifier LA-240, for example for operation with the small loop »Cross-the-counter«, table microphone – and receiver with chin strap receiver for hearing impaired people whose hearing aids do not have a T-coil.

Since 2017, the LA-70, a new Class D loop driver, has also been expanding the range of AUDIORopa systems for supplying information counters, receptions or checkout areas.

A bank sets a benchmark: Hearing without restrictions at the Uni Credit Bank Austria.

AUDIOropa

AUDIOropa is a division of the Humantechnik Group

The AUDIOropa portfolio focuses on audio technology for professional use - stationary and mobile. The portfolio includes

- Inductive loop systems
- Radio transmission systems
- Infrared transmission systems

The focal point of the application of these systems are solutions for acoustic accessibility within the scope of inclusion projects.

AUDIOropa systems prove their worth even under difficult acoustic conditions with an increase in audio quality and speech understanding for hearing impaired people, resulting from the integration of audiological technology.

Welcome to the dialog:



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